Appendix A

Initial Study/NOP and NOP Comment Letters

City of Calabasas

Canyon Oaks Project

Initial Study

January 2015

Environmental Scientists Planners Engineers

Canyon Oaks Project
Calabasas, California

Initial Study

Prepared by:

City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

Prepared with the assistance of:

Rincon Consultants, Inc.
180 N. Ashwood Avenue
Ventura, California 93003

January 2015

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INITIAL STUDY

1. Project title: Canyon Oaks Project

2. Lead agency name and address: City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

3. Contact Person and Phone Number: Talyn Mirzakhanian, Senior Planner
Krystin Rice, Associate Planner
(818) 224-1600

4. Project location: The project site is located at 4790 Las Virgenes Road (Assessor's Parcel Numbers 2069-078-009 and 2069-078-011) in the City of Calabasas, County of Los Angeles. Figure 1 shows the location of the project site within the greater Los Angeles region and within the City of Calabasas. Figure 2 shows an aerial view of the project site and surroundings.

5. Project sponsor's name and address: TNHC Canyon Oaks, LLC
85 Enterprise, Suite 450
Aliso Viejo, CA 92656

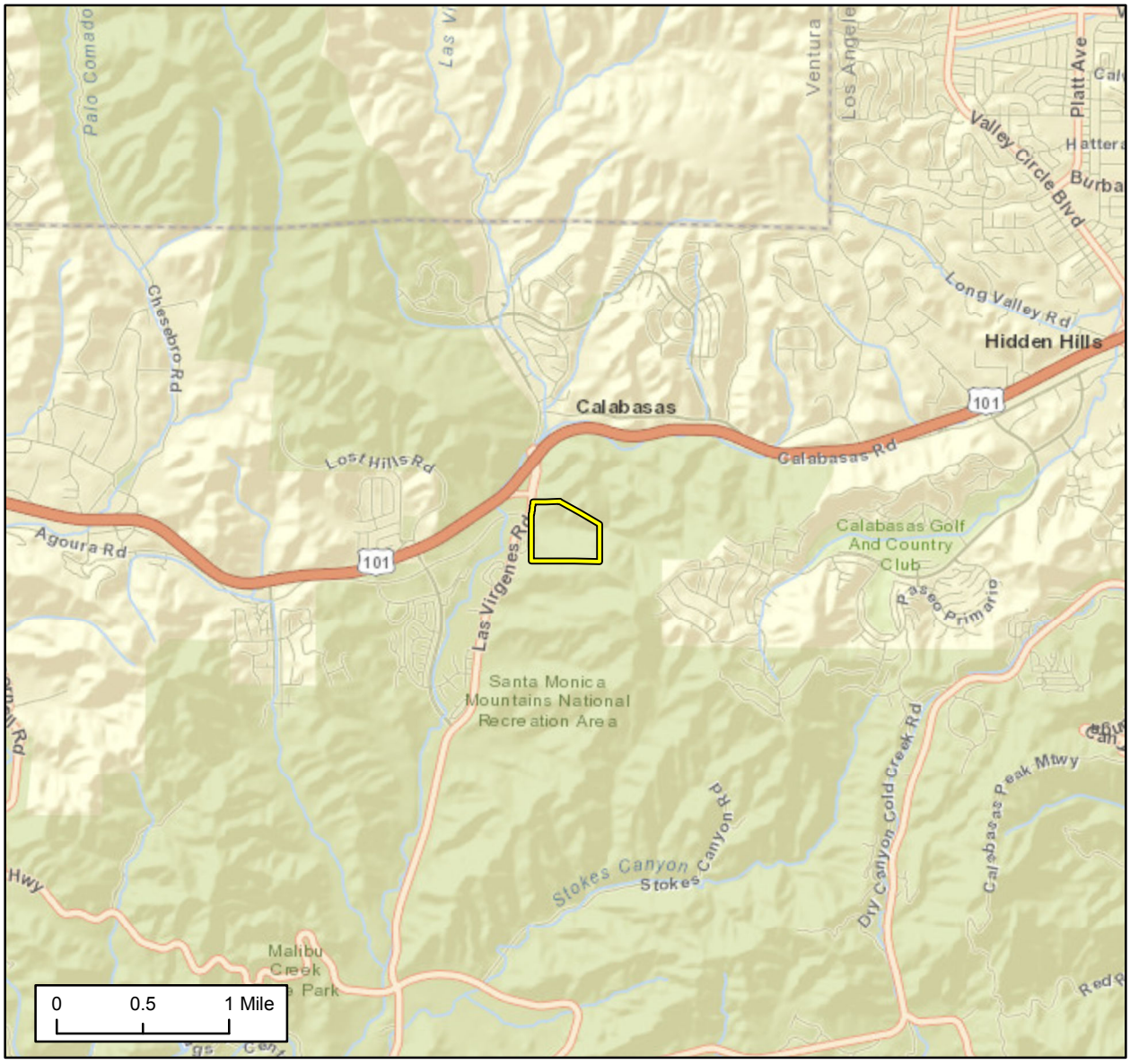
6. Description of project:

The proposed project involves the development of residential, commercial, and public open space/trail uses on an undeveloped site of approximately 77 acres. Table 1 summarizes the proposed features on-site.

The residential component would include a gated community with 67 single-family detached homes and four affordable units within two duplexes, each linked via pathways to a resident-exclusive clubhouse with resort-style amenities.

The commercial component would consist of a 67,580 square-foot, 120-room, four-story hotel. This hotel would be designed to achieve a LEED silver rating through a compact footprint, landscaping with native and drought-tolerant plants, and a pedestrian- and bicycle-friendly environment.

Approximately 80 percent of the site (61.5 acres) would be preserved as open space. The project also provides an internal walkway system and public sidewalk linkages to afford access to existing, local trail systems surrounding the site.



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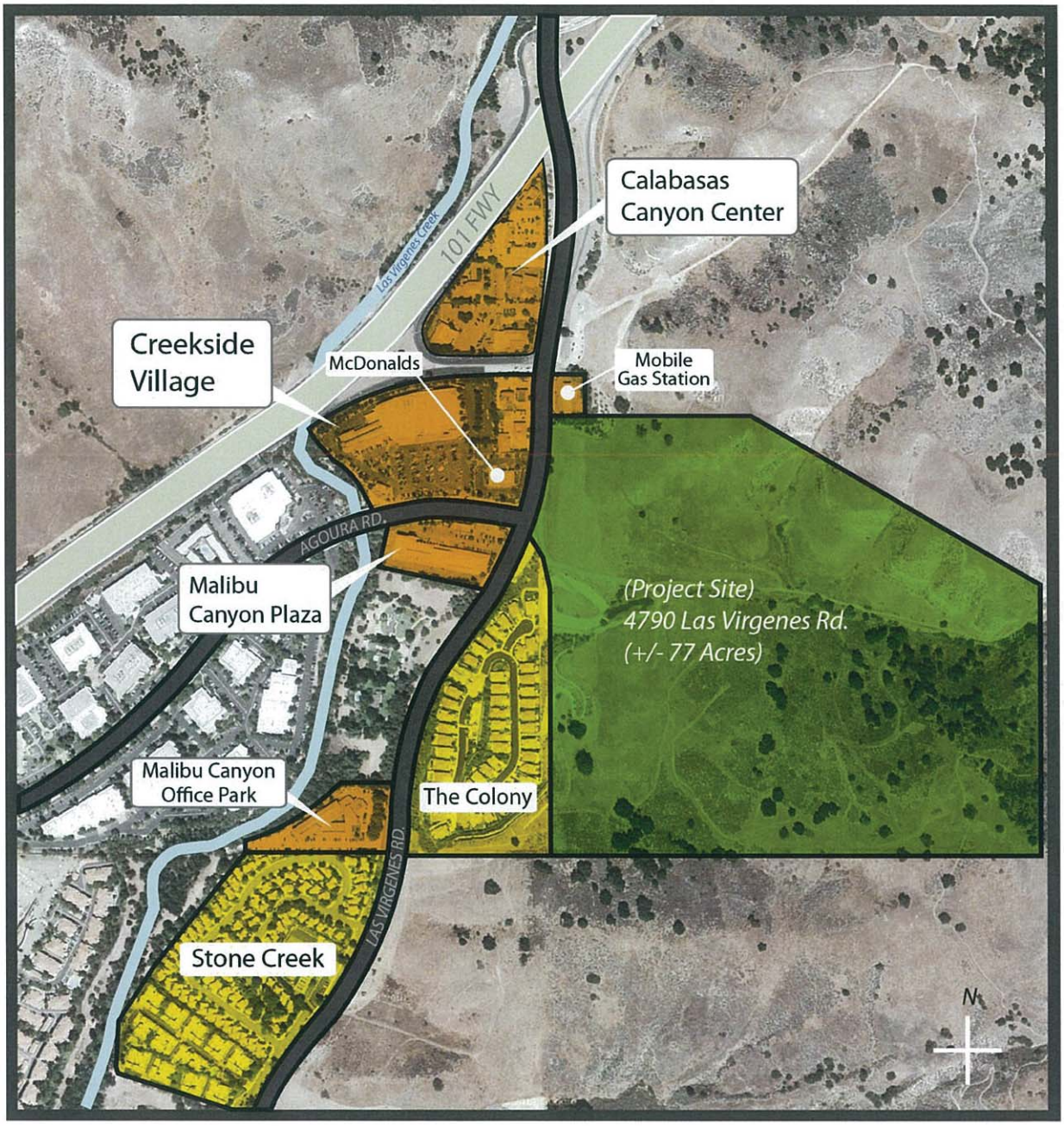
Project Site

Regional Location

Figure 1



Land Use Vicinity Map

Figure 2

Source: TNHC Canyon Oaks, LLC, 2014

Table 1
Proposed Land Uses

Land Use	Acreage	Details
Residential		
Single-family Detached	13.03	71 units, including 2 duplexes
Commercial		
Hotel	2.91	120 rooms
Trails/Open Space	59.74	
Public Street Dedication	0.08	
Easement for Flood Control	1.46	
Total	***77.22***	

Non-remedial site grading would involve 613,183 cubic yards of cut and 569,544 cubic yards of fill, with a net of 43,639 cubic yards. Based on anticipated soil shrinkage, no export is required. In addition, the project would involve remedial grading to reshape and slope the land to stabilize an ancient landslide hazard area on the southern portion of the site. This remedial grading would involve an estimated 1,577,899 cubic yards of cut and 1,240,185 cubic yards of fill. The balance of the remedial grading dirt would be balanced onsite.

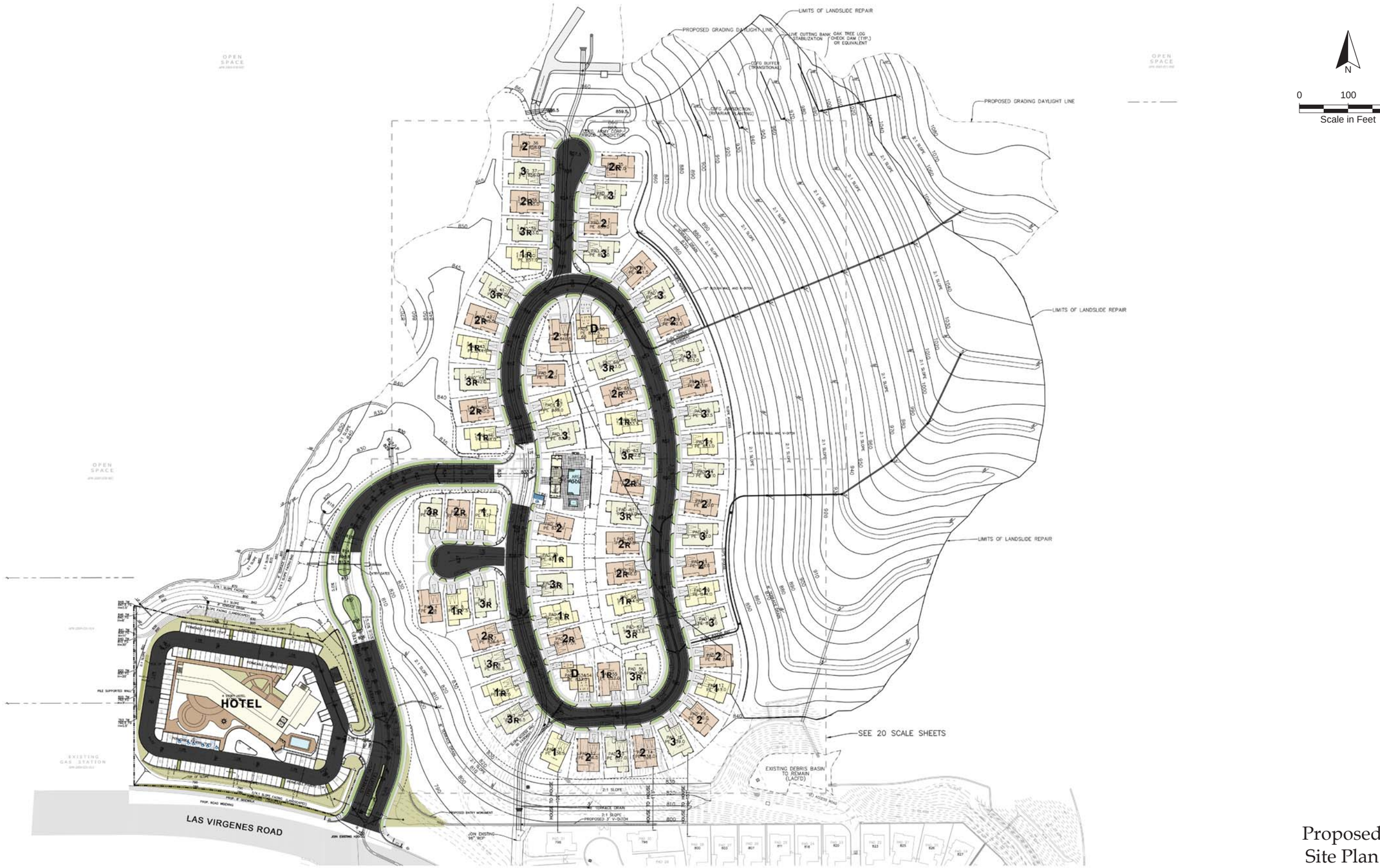
The project would provide a total of 419 parking spaces on-site, including 213 residential spaces within private garages and driveways, 72 on-street parking spaces, and 134 spaces for the hotel. To enable access to and from the project site, a new Street "A" extension to Agoura Road would be constructed.

Figure 3 shows the layout of proposed structures on the project site.

The project applicant is requesting approval of a Development Plan, a Conditional Use Permit, a Scenic Corridor Permit, a Vesting Tentative Tract Map, a Site Plan Review, a General Plan Amendment, a Zone Change, and an Oak Tree Permit for the removal of 39 oak trees and encroachment into the protected zone of 14 oak trees.

7. Surrounding land uses and setting:

The project site is located immediately east of the intersection of Las Virgenes Road and Agoura Road. Land uses surrounding the project site consist mainly of open space to the south and east; open space, a gas station and the 101 South Freeway on-ramp to the north; and mixed commercial and residential development to the west.



Proposed
Site Plan

Source: TNHC Canyon Oaks, LLC, 2015

8. **Necessary public agency approvals**: The City of Calabasas is the lead agency with responsibility for approving the proposed project.

Other public agencies whose approval is required include:

- *U.S. Army Corps of Engineers (USACE) – Section 404 discharge permit*
- *Regional Water Quality Control Board (RWQCB) – Section 401 water quality certification*
- *California Department of Fish and Wildlife (CDFW) – Streambed Alteration Agreement*
- *Los Angeles County Fire Department*
- *County of Los Angeles Department of Public Works*

ENVIRONMENTAL FACTORS AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Agriculture and Forest Resources	☒ Air Quality
☒ Biological Resources	☐ Cultural Resources	☒ Geology/Soils
☒ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☒ Hydrology/Water Quality
☒ Land Use/Planning	☐ Mineral Resources	☒ Noise
☐ Population/Housing	☒ Public Services	☐ Recreation
☒ Transportation/Traffic	☐ Utilities/Service Systems	☒ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potential significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Talyn Mirzakhanian	
Printed Name	Title

Environmental Checklist

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☒	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

a, c-d. As shown on the City's Land Use Map and Zoning Map, the project site is located within a locally designated Ventura Freeway Scenic Corridor and the Las Virgenes Gateway. The proposed project would alter the visual character of portions of the site by replacing open hillside terrain with residential and commercial development. This would have the potential to result in adverse impacts to scenic vistas, scenic resources, visual character, and light/glare conditions. Impacts to aesthetic resources would be **potentially significant** and will be addressed in an EIR.

b. The project site is located approximately 700 feet southeast of U.S. Highway 101, which is not officially designated as a state scenic highway; however, it is identified as eligible for designation as a state scenic highway (Caltrans, 2014). U.S. Highway 101 is also a locally designated scenic highway in the 2030 General Plan. The site is also highly visible from Las Virgenes Road, which the 2030 General Plan identifies as a Scenic Corridor. Due to the visibility of the project site from these view corridors, impacts to views would be **potentially significant** and will be addressed in an EIR.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. AGRICULTURE AND FOREST RESOURCES -- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. AGRICULTURE AND FOREST RESOURCES -- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

a-e. Neither the project site nor surrounding areas contain any agricultural resources, farmland, forest land, or timberland. Consequently, the proposed project would have no effect on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (California Division of Land Resource Protection, 2014). In addition, Calabasas does not include land zoned for agricultural or forest land, nor are any lands within the City under a Williamson Act contract. The proposed project includes about 61.2 acres of dedicated open space on the approximately 77-acre project site, consistent with the 2030 General Plan. **No impact** would occur with respect to this issue and further analysis in an EIR is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. AIR QUALITY – Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

a-d. The project site is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The South Coast Air Basin is in nonattainment for the federal standards for ozone, lead, and particulate matter ($PM_{2.5}$), as well as state standards for ozone and particulate matter ($PM_{2.5}$, PM_{10}) (California Air Resources Board, 2014). During project construction, dust could be generated and contribute to particulate matter that may degrade local air quality. Traffic and energy consumption associated with project operation would also generate air pollutant emissions. Such emissions could potentially exceed SCAQMD's significance thresholds. In addition, sensitive residential receptors located adjacent to the project site have the potential to be adversely impacted by air pollutant emissions associated with project construction and operation. These air quality impacts would be **potentially significant** and will be assessed in an EIR.

e. The proposed project involves residential and commercial development, which would not be expected to create odor issues. Zoning districts contained in Article II of the Development Code and site planning and design standards contained in Article III would reduce the potential for odor impacts by ensuring that incompatible uses are not located in proximity to each other or that compatibility issues are addressed through site design. **No impact** would occur with respect to odors and further analysis of this issue is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a, b, d, e. Rincon Consultants, Inc. prepared botanical surveys for the project site in 2010 and updated these surveys in 2013. Carlberg Associates prepared an Oak Tree Report for the project site in accordance with the City of Calabasas' Oak Tree Preservation and Protection Guidelines in February 2014. During the 2010 and 2013 surveys, one special status plant was found (Catalina mariposa lily). The Catalina mariposa lily is included on the California Native Plant Society's List 4 - plants of limited distribution – a watch list. List 4 includes plants of limited

distribution or that are infrequent throughout a broader area in California. In addition, one sensitive habitat (Southern Coast Live Oak Riparian Forest) was observed. Southern Coast Live Oak Riparian Forest is listed on California Department of Fish and Wildlife's (CDFW) *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986) and the CDFW (2003) considers this community rare and worthy of consideration as it is listed by the California Natural Diversity Database. According to the Oak Tree Report (2014), 184 Coast Live Oaks and 14 Valley Oaks are located on-site, 72 of which are heritage oak trees. The project applicant is requesting an Oak Tree Permit to remove 39 oak trees and encroach into the protected zone of 14 oak trees.

These biological resources located within and adjacent to the project site boundaries could be adversely affected by the project construction and operation. Impacts to these biological resources would be **potentially significant** and will be studied in an EIR.

c. Rincon Consultants, Inc. prepared a wetland delineation for the project site in 2010 and confirmed the delineation findings with a supplemental site visit in 2012. According to the delineation report, the project site contains an unnamed ephemeral drainage channel near the center of the project site within APN 2069-078-011 that is within U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB) jurisdiction. In addition, there are two small wetlands within a tributary to this drainage that are within USACE and RWQCB jurisdiction, as well as two additional isolated wetlands that are considered RWQCB jurisdictional Waters of the State (Rincon Consultants, 2012). Impacts associated with the proposed project would be **potentially significant** and will be assessed in an EIR.

f. No adopted habitat conservation plans or natural community conservation plans apply in Calabasas (2030 General Plan FEIR, 2008). **No impact** would occur and further analysis of this issue is not warranted.

	Potentially Significant Impact	**Potentially Significant Unless Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
V. <u>CULTURAL RESOURCES</u> -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES -- Would the project:				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

a-d. **In accordance with the City of Calabasas Historic Preservation ordinance, ~~A~~a** Phase I Cultural Resources Investigation**, which included assessment of archaeological resources,** was prepared for the project site by McKenna et al. in November 2013 and a Cultural Resources Review was prepared for the project site by Historical Environmental Archaeological Research Team (HEART) in April 2011. Both studies report no evidence of prehistoric or historic cultural resources, including archaeological, paleontological or other cultural resources. Further, the report prepared by HEART (2011) concludes that development of the proposed project would have no effect on significant cultural resources. Although the McKenna et al. report identifies the project site sensitive for the presence of prehistoric and paleontological resources, standard monitoring during construction in conformance with current discipline standards would render impacts **less than significant**. Monitoring for paleontological resources would be consistent with current protocol of the Natural History Museum of Los Angeles County. In addition, the consulting archaeological monitor(s) would be accompanied by a local Native American representative. Further analysis of cultural resources in an EIR is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure,	☐	☒	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY AND SOILS – Would the project:				
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

a-d. No faults traverse the project site and no active faults have been mapped within the City of Calabasas; however, the City lies within a seismically active region that is prone to occasional earthquakes. According to the Southern California Earthquake Data Center Map (SCEDC), there are nine active faults and four potentially active faults within 25 miles of the City. Like much of California, the project site is subject to groundshaking from seismic activity emanating from a number of faults in the region. In addition, portions of the project site are potentially susceptible to liquefaction and earthquake-induced landslides (2030 General Plan Seismic Hazard Zones Map, 2014). Geotechnical analysis of the project site (RJR Engineering, 2011 and 2014) indicates that on-site slopes could be subject to seismically induced landslides; therefore, the proposed project includes remedial grading to address existing landslide hazards.

The California Building Code (CBC) and the City of Calabasas Development Code control building design and construction. The City of Calabasas, along with all of Southern California and the Central Coast, is within Seismic Zone 4, the area of greatest risk and subject to the strictest building standards. New development would conform to the CBC (as amended at the time of permit approval) as required by law, and preparation of a final City-approved geotechnical study and remediation plan would be required prior to project approval.

Geologic issues would be **potentially significant unless mitigation incorporated** and will be addressed in an EIR.

e. The project would connect to the City's sewer system and would not require the use of septic tanks. Therefore, **no impact** would result and further analysis of this issue is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GREENHOUSE GAS EMISSIONS - Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

a-b. Project construction and operation would generate emissions of greenhouse gases (GHGs) and, therefore, would incrementally contribute to global climate change. As such, project implementation could conflict with the requirements of Assembly Bill 32, Senate Bill 375, and related plans, policies, and regulations pertaining to reducing GHG emissions. The project's potential contribution to cumulative impacts related to GHG emissions and climate change would be **potentially significant** and will be studied in an EIR.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
d) Be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

a, b. The proposed residential, commercial, and open space uses would not involve the routine transport, use or disposal of hazardous substances, other than minor amounts used for maintenance and landscaping. The project would not have the potential to release hazardous materials into the environment. Impacts would be **less than significant** and further analysis of these issues in an EIR is not warranted.

c. **MUSE School is located approximately 1,000 feet from the project site.** The proposed residential/commercial project would not generate hazardous emissions and the project site is not located within ¼ mile of an existing or proposed school. **No impact** would occur and further analysis of this issue is not warranted.

d. The project site does not appear on any hazardous material site list compiled pursuant to Government Code Section 65962.5. The following databases were checked (June 2014) for known hazardous materials contamination at the project site:

- *Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database*
- *Geotracker search for leaking underground fuel tanks*
- *Cortese list of Hazardous Waste and Substances Sites*
- *Department of Toxic Substances Control's Site Mitigation and Brownfields Database*

The project site does not appear on any of the above lists. Furthermore, a Phase I Environmental Site Assessment prepared in November 2013 by Leighton and Associates, Inc., found no recognized environmental conditions associated with the project site. Although the Phase I report identified a moderate potential for elevated levels of naturally occurring radon on-site, compliance with California Health & Safety Code § 105430 would require radon testing and mitigation plans for new construction prior to the issuance of building permits (U.S. EPA, 2013). The applicant would incorporate construction measures into building design to reduce radon levels. Thus, **no impact** related to hazardous material sites would occur and further analysis of this issue is not warranted.

e, f. There are no public or private airports on or adjacent to the project site. The nearest airport is Van Nuys Airport, located approximately 12 miles northeast of the project site. **No impact** would occur and further analysis of these issues is not warranted.

g. The project would conform to the site planning and project design standards contained in Article III of the Development Code, which would ensure that emergency response access is maintained. **No impact** would occur and further analysis of this issue is not warranted.

h. The entire City of Calabasas, including the project site, is located within the Los Angeles County Consolidated Fire District's Very High Fire Hazard Severity Zone. This zone includes wildland fire hazard areas defined as watershed lands that contain native growth and vegetation (City Municipal Code, Section 17.20.130). The proposed project would adhere to standard requirements set forth by the City Municipal Code and the California Building Code (CBC) with City of Calabasas amendments, including driveway width requirements, the creation and maintenance of wildfire buffers, and sprinkler and alarm requirements. Impacts related to wildland fire would be **less than significant** with mandatory compliance with applicable building standards and regulations.

	Potentially Significant Impact	**Potentially Significant Unless Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
IX. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY – Would the project:				
would be a net deficit in aquifer volume or a lowering or the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☒	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☒	☐	☐
f) Otherwise substantially degrade water quality?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a, c-f. The proposed project would alter the existing topography of the site and add impervious surfaces. This would alter drainage patterns and the rate and amount of surface runoff. The introduction of urban/suburban uses also has the potential to cause downstream surface water quality impacts due to the introduction of impervious surfaces and pollutant-generation activities. Impacts related to these issues would be **potentially significant unless mitigation incorporated**; therefore, these issues will be studied further in an EIR. The findings of a hydrology study being prepared for the project will be incorporated into the EIR, as will a discussion of applicable water quality requirements of the National Pollutant Discharge Elimination System (NPDES) and related regulations.

b. The Las Virgenes Municipal Water District would provide water to the project site and relies on imported water for its supplies. Therefore, the proposed project would not affect groundwater supplies or recharge. **No impact** would occur with respect to groundwater and further analysis of this issue is not warranted.

g-i. The project site is located outside the 100-year flood hazard zone and the proposed project would not expose people or structures to a significant risk of loss, injury, or death involving flooding (FEMA Map No. 06037C1264F). In addition, according to the 2030 General Plan FEIR (2008), the City of Calabasas is not in the dam inundation area for any major stream or river in the region. Therefore, **no impact** with respect to flooding would occur and further analysis of this issue is not warranted.

j. The project site is not subject to risks relating to seiche, tsunami or mudflows (2030 General Plan FEIR, 2008). **No impact** would occur with respect to this issue and further analysis is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. LAND USE AND PLANNING -- Would the proposal:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐
c) Conflict with an applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a. Development of the proposed project would not involve a road or other facility that would physically divide an established community. The project involves residential and commercial development that is generally consistent with the 2030 General Plan land use designations for the site. **No impact** would occur and further analysis of this issue is not warranted.

b. The proposed project would involve development of the site in general accordance with the uses prescribed in the 2030 General Plan. The project includes development on about 16 acres, as specified for the project site in the General Plan. The project may disturb sensitive biological resources and could potentially create adverse impacts with respect to such issues as aesthetics, air quality, biological resources, geology, and greenhouse gases. Therefore, consistency of the project with environmental policies contained in applicable local and regional plans, including the 2030 General Plan, the Calabasas Municipal Code, and the Southern California Association of Government's (SCAG's) Regional Comprehensive Plan and Regional Transportation Plan-Sustainable Communities Strategy will be discussed in an EIR. Impacts would be **potentially significant unless mitigation is incorporated**.

c. The proposed project would not conflict with any habitat conservation plan or natural community conservation plan as the project site is not subject to such plans. **No impact** would occur and further analysis of this issue is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a-b. The proposed project would not entail construction of structures or facilities for the purposes of extraction or exploration of mineral resources and the project would not result in the loss of availability of a mineral resource of local, regional, or statewide importance (2030 General Plan FEIR, 2008). **No impact** would occur with respect to mineral resources and further analysis of this issue is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) A substantial permanent increase in ambient noise levels above levels existing without the project?	☐	☒	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise?	☐	☐	☐	☒

a-d. The project site is adjacent to Las Virgenes Road and approximately 700 feet southeast of U.S. Highway 101; therefore, it would be subject to noise from traffic on these roadways. Further, project construction would temporarily increase noise levels at adjacent residences, while project operation would increase traffic along Las Virgenes Road and Agoura Road, which may adversely affect existing uses along these corridors. Development of the proposed project would also add commercial activity onsite, which could generate noise at adjacent residences. Impacts related to these issues would be **potentially significant unless mitigation is incorporated** and will be addressed in an EIR.

e, f. The airport nearest to the project site is Van Nuys Airport, located approximately 12 miles northeast of the site. The project would not be subject to excessive noise levels associated with airport operations. **No impact** would occur with respect to these issues and further analysis is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a. The Southern California Association of Governments (SCAG) produces projections of regional population, which form the basis for growth projection in SCAG's 2012 Regional Transportation Plan-Sustainable Communities Strategy (RTP-SCS). SCAG's growth forecast projects a population of 24,400 for Calabasas in 2035, an increase of 457 from the estimated 2013 population of 23,943 (California Department of Finance, 2014). As discussed in Section 4.10 of the 2030 General Plan FEIR (2008), given that Calabasas is almost entirely built out and the General Plan includes numerous policies and objectives aimed at limiting further growth, no exceedance of SCAG population forecasts for the City is anticipated.

The proposed project would involve development of the project site in general accordance with the uses prescribed in the 2030 General Plan. Specifically, development of the proposed project would add 71 new dwelling units. According to the California Department of Finance (2014), the average household density in Calabasas is 2.74 residents per unit. Based on this average, the project would add an estimated 195 residents for a total City population of 24,138 residents (262 residents fewer than SCAG's growth forecast for Calabasas). Therefore, development of the proposed project would not add population beyond that anticipated in the 2030 General Plan projection, which is consistent with SCAG's 2030 growth forecast (2030 General Plan FEIR, 2008). Impacts would be **less than significant** and further analysis of this issue is not warranted.

b-c. The project site is currently vacant. Thus, project implementation would not displace people or housing. **No impact** would occur and further analysis of these issues is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☒	☐	☐
iv) Parks?	☐	☐	☒	☐
v) Other public facilities?	☐	☐	☒	☐

a(i). The Los Angeles County Fire Department (LACFD) provides fire protection services to the project site. The nearest fire station is Station #125, located at 5215 Las Virgenes Road, in Calabasas. The site is approximately one half mile (driving distance) from the fire station, with access via Las Virgenes Road.

The proposed project would incrementally increase demand for fire protection service. However, the proposed project would be required to pay standard development impact mitigation fees. In addition, the applicant would be required to comply with the Fire Code and LACFD standards, including specific construction specifications, access design, location of fire hydrants, and other design requirements. Since the project site is within the current service area for Station #125, it would not require the construction of new fire protection facilities. Impacts related to fire services would be **less than significant** and further analysis of this issue is not warranted.

a(ii). The Los Angeles County Sheriff's Department (LASD) provides police protection service in Calabasas and to the project site. The LASD is located at 27050 Agoura Road in the City of Agoura, approximately one mile (driving distance) from the project site. The proposed project would incrementally increase demand for police protection service. However, project implementation would not create the need for new or expanded police protection facilities. Therefore, impacts related to police protection services would be **less than significant** and further analysis of this issue is not warranted.

a(iii). The Las Virgenes Unified School District (LVUSD) provides primary and secondary public education services to the project site. LVUSD manages three schools located within the attendance area of the project site: Calabasas High School, A. E. Wright Middle School, and Lupin Hill Elementary School. The proposed project would increase school enrollment and could result in exceedances of capacity at LVUSD schools. Section 65995(h) of the California Government Code (Senate Bill 50, chaptered August 27, 1998) states that payment of statutory fees is deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization. However, because the 2030 General Plan FEIR from 2008 found that Lupin Hill Elementary School was 7% overcapacity and Calabasas High School was 4% over capacity (2030 General Plan FEIR, 2008), impacts would be **potentially significant unless mitigation is incorporated**; therefore, this issue will be studied further in an EIR.

a(iv). Development of the proposed project would add 71 new dwelling units. According to the California Department of Finance (2014), the average household density in Calabasas is 2.74 residents per unit. Based on this average, the project would add an estimated 195 residents. The City of Calabasas maintains a parkland target ratio of 3 acres per 1,000 residents. Thus, 195 residents would result in a demand of 0.6 acres of parkland. To offset this incremental increase in park demand, the project allocates about 61.2 acres for open space on-site and also includes a private community recreation area. The community recreation area consists of a pool, spa, multi-purpose room, meeting room, and grassy areas. Impacts related to parks would be **less than significant** and further analysis of this issue is not warranted.

a(v). The project site would be served by the Calabasas Library, which opened in July 2008. The library is expected to meet the City's library needs through 2030 (2030 General Plan FEIR, 2008). Therefore, because the proposed project would not add population beyond that anticipated in the 2030 General Plan projections, significant impacts related to libraries are not anticipated. Impacts relating to other services would be **less than significant** and further analysis of these issues is not warranted.

	Potentially Significant Impact	**Potentially Significant Unless Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
XV. RECREATION --				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a-b. Please see the discussion above under Item XIII.a.iv. Impacts related to recreation would be **less than significant** and further analysis of these issues is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. TRANSPORTATION / TRAFFIC -- Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?	☐	☒	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☒	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities?	☐	☐	☒	☐

a-b. The proposed project would generate increased traffic on surrounding roadways, particularly Las Virgenes Road and Agoura Road, and may alter existing traffic patterns. Project-generated traffic could potentially cause exceedances of City level of service standard and, therefore, may also conflict with local and regional congestion management standards. Impacts related to these issues would be **potentially significant unless mitigation is**

incorporated and will be studied further in an EIR. A traffic study will be prepared in conjunction with the Draft EIR.

c. Van Nuys Airport is the airport nearest to the project site, approximately 12 miles northeast. Implementation of the proposed project would have no effect on air traffic patterns, including either an increase in traffic levels or a change in location that results in safety risks. **No impact** would occur and further analysis of these issues is not warranted.

d-f. The project does not include any design features or incompatible uses that would increase traffic hazards. As a condition of project approval, the project would be required to provide adequate emergency access, based on Article III of the City Development Code, which includes specific site planning and project design standards intended to address such issues as traffic hazards and emergency access. In addition, the project would be subject to the LACFD and LASD review, prior to approval, to ensure that access needs are met. The project would not affect existing pedestrian facilities or conflict with adopted policies plans or programs regarding public transit. As such, impacts relating to traffic hazards and emergency access would be **less than significant** and further analysis of these issues is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. UTILITIES AND SERVICE SYSTEMS -- Would the project:				
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a, b, e. Wastewater generated in Calabasas is treated at the Tapia Water Reclamation Facility (TWRF), operated by Las Virgenes Municipal Water District (LVMWD). The TWRF has a capacity of 16 million gallons per day (mgd) and currently treats an average of 9.5 mgd (LVMWD, 2011). Therefore, there is a surplus capacity of 6.5 mgd. Wastewater generation factors from the City of Los Angeles CEQA Thresholds Guide were used to estimate the proposed project's wastewater generation. As shown in Table 2, the proposed project would generate about 31,930 gallons of wastewater per day (0.032 mgd).

Table 2
Projected Wastewater Generation

Land Use	Units	Wastewater Generation Factor	Wastewater Flow (Gallons Per Day)
Single Family Residential	71 units	230 gpd/unit	16,330
Hotel	120 rooms	130 gpd/room	15,600
Total Wastewater Generation			**31,930**

gpd = gallons per day sf = square feet
Source: City of Los Angeles, CEQA Thresholds Guide Document, 2006.

Wastewater generated by the proposed project would account for approximately 0.5% of the Tapia Water Reclamation Facility's available treatment capacity. Therefore, impacts related to wastewater treatment would be **less than significant** and further analysis of these issues is not warranted.

c. Please see Item VIII, *Hydrology and Water Quality*, for a discussion of storm drain infrastructure. Impacts related to this issue would be **potentially significant unless mitigation is incorporated**; therefore, this issue will be studied further in an EIR.

d. The Las Virgenes Municipal Water District (LVMWD) provides water service in Calabasas.

The reliability of the LVMWD's water supply is currently dependent on the reliability of its imported water supplies, which are managed and delivered by the Metropolitan Water District of Southern California (MWD). As shown in Table 3, the proposed project would generate demand for about 38,316 gallons of water per day or 43 acre-feet per year.

Table 3
Project Water Demand

Land Use	Units	Demand Factor	Demand (Gallons Per Day)	Demand (Acre-Feet Per Year)
Single Family Residential	71 units	276 gpd/unit	19,596	22
Hotel	120 rooms	156 gpd/room	18,720	21
Total Water Demand			**38,316**	**43**

gpd = gallons per day
Source: City of Los Angeles, CEQA Thresholds Guide Document, 2006.
Water demand is assumed to be 120% of wastewater generation, as shown in Table 2, in order to account for landscape irrigation.

Table 4 compares LVMWD water supplies to forecast demand under normal year conditions and multiple dry years based on the LVMWD's 2010 Urban Water Management Plan. The LVMWD has sufficient water supplies to meet forecast demand for the normal year as well as dry years 1, 2, and 3 of a multiple dry year scenario.

The proposed project would generate demand for about 43 acre-feet of water per year. The proposed project is consistent with the level of development that was anticipated for the project site under the 2030 General Plan and the LVMWD 2010 UWMP water demand forecasts account for growth anticipated under the 2030 General Plan. Consequently, the increase in water demand associated with the proposed project can be accommodated with existing and planned supplies. Impacts to water supply would therefore be **less than significant** and further analysis of this issue is not warranted.

Due to the driest year in recorded history, the governor proclaimed a State of Emergency for California in 2014 and directed officials to take all necessary actions to prepare for drought conditions. LVMWD and MWD support the Governor's action, which calls for a voluntary 20% water use reduction.

Despite the record dry conditions, MWD does not plan to impose water supply restrictions. LVMWD continues to enforce the following mandatory water restrictions for its customers:

1. Irrigation is prohibited between the hours of 10 a.m. and 5 p.m.
2. Irrigation water may not run off your property into streets, gutters or onto adjacent properties.

Table 4
LVMWD Water Supply and Demand in Normal Year and Single and Multiple Dry Years (Acre Feet)

Normal Year	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	46,553	49,591	54,434	54,163	52,845
Demand Totals	28,829	28,219	30,280	32,304	33,252
Reserves (Supply – Demand)	17,724	21,372	24,154	21,859	19,953
Multiple Dry Year No. 1	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	34,132	35,979	38,479	39,498	39,384
Demand Totals	33,981	33,261	35,690	38,077	39,193
Reserves (Supply – Demand)	152	2,718	2,788	1,421	190
Multiple Dry Year No. 2	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	33,986	36,484	38,973	39,730	39,615
Demand Totals	33,837	33,747	36,168	38,300	39,423
Reserves (Supply – Demand)	149	2,737	2,806	1,430	191
Multiple Dry Year No. 3	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	33,839	36,988	39,468	39,961	39,846
Demand Totals	33,693	34,233	36,645	38,523	39,653
Reserves (Supply – Demand)	147	2,755	2,823	1,438	192

Source: Las Virgenes Municipal Water District, 2010 Urban Water Management Plan, June 2011.

3. Irrigation may not occur during periods of rain or in the 24 hours following rainfall of an inch or more.
4. The washing down of sidewalks, parking areas and driveways is not permitted, unless an approved water broom is used.
5. A trigger nozzle is required on hoses used for home car washing.

f, g. The Calabasas Sanitary Landfill, located adjacent to the U.S. Highway 101 on Lost Hills Road, would receive solid waste generated by the proposed project. The total capacity of the Calabasas Landfill is 69.3 million cubic yards and its remaining capacity is approximately 18.1 million cubic yards (CalRecycle, SWIS, 2014). An average of 581 tons of waste is deposited in the landfill daily, with a permitted maximum daily capacity of 3,500 tons per day (CalRecycle, 2013 Landfill Summary Tonnage Report, 2014). Thus, the average daily surplus is 2,919 tons per day. As shown in Table 5, the proposed project would generate about 1,190 pounds, or 0.6 tons, of solid waste per day before mandated diversion.

Table 5
Project Solid Waste Generation

Land Use	Area	Generation Factor	Solid Waste Generated (lbs/day)	Solid Waste Generated (tons/year)
Single Family Residential	71 units	10 lbs/unit/day	710	130
Hotel	120 rooms	4 lbs/room/day	480	87
Total Solid Waste Generation			**1,190**	**217**

** Note solid waste generated as shown herein does not include mandated diversion requirements.*
sf = square feet
Source: CalRecycle, 2013. http://www.calrecycle.ca.gov/wastechar/wastegenrates/Residential.htm, http://www.calrecycle.ca.gov/WasteChar/WasteGenRates/Commercial.htm, http://www.calrecycle.ca.gov/WasteChar/WasteGenRates/Service.htm.

The proposed project would be subject to federal, state, and local regulations related to solid waste, recycling, and water conservation, including the City's 75% waste diversion rate goal, which would reduce the total amount generated to about 298 pounds per day (55 tons per year). The Calabasas Landfill has a surplus of 2,919 tons per day, or 1.07 million tons per year. Therefore, the landfill has adequate capacity to serve the proposed project and impacts would be **less than significant**. Further analysis of this issue is not warranted.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE —				
a) Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self- sustaining levels, eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

a-c. As described in the sections above, the proposed project may generate impacts in the following areas: Aesthetics, Air Quality, Biological Resources, Geology and Soils, Greenhouse Gas Emissions, Hydrology and Water Quality, Land Use and Planning (Policy Consistency), Noise, Public Services (Schools), and Transportation/Traffic. These issue areas as well as potential cumulative impacts will be evaluated in the EIR, and any feasible mitigation measures will be identified to avoid and/or reduce any significant impacts.

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DEPARTMENT OF TRANSPORTATION
DISTRICT 7-OFFICE OF TRANSPORTATION PLANNING
100 S. MAIN STREET, MS 16
LOS ANGELES, CA 90012
PHONE (213) 897-9140
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March 4, 2015

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COMMUNITY DEVELOPMENT
PLANNING DEPT

Ms. Talyn Mirzakhanian
City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

RE: Canyon Oaks Project
Vic. LA-101/PM 31.3
SCH # 2015021008
IGR/CEQA No. 150216AL-NOP

Dear Ms. Mirzakhanian:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The proposed project involves the development of residential, commercial, and open space uses on an undeveloped site of about 77 acres. The residential component would include a gated community with 67 single-family detached homes, four affordable units located within two duplexes for very-low income residents, and a clubhouse. The commercial component would consist of a 67,580 sf. 120-room, four-story hotel. Approximately 61.5 acres would be preserved as open space.

On March 2, 2015, in a phone conversation between you and Caltrans Project Coordinator, Mr. Alan Lin, the City agreed to extend the CEQA compliance date to March 6, 2015. We have the following comments after reviewing the Notice of Preparation.

To assist in evaluating the impacts of this project on State transportation facilities, a traffic study should be prepared prior to preparing the Draft Environmental Impact Report (DEIR). Please refer the project's traffic consultant to Caltrans' traffic study guide Website:

http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

Listed below are some elements of what is generally expected in the traffic study:

1. Presentations of assumptions and methods used to develop trip generation, trip distribution, choice of travel mode, and assignments of trips to US-101 and all off ramps at the project vicinity including but not limited to Northbound (NB) and Southbound

(SB) US-101 at Las Virgenes Road (Exit 32) and NB/SB US-101 at Lost Hills Road (Exit 33). The traffic consultant should work with Caltrans to identify and confirm off-ramp study locations prior to the preparation of the traffic study. The traffic study should also analyze the storage for left-turn pockets at on/off-ramps.

Caltrans has serious safety concerns when an excessive amount of vehicles are expected to use an off-ramp, thus causing congestion to back up onto the mainline, which in turn may lead to rear-end accidents. For this project, the City should conduct an off-ramp queuing analysis utilizing the Highway Capacity Manual (HCM) queuing analysis methodology with the actual signal timings. Capacity of the off-ramp should be calculated by the actual length of the off-ramp between the terminuses to the gore point. The existing queue length should be calculated from the traffic counts, including the percentage of truck assignments to the ramp with a passenger car equivalent factor of 3.0 (worst case scenario) with 30 feet per car. The analyzed result may need to be calibrated with actual signal timing when necessary. Please include mitigation measures if forecasted vehicle queues are expected to exceed 85% of the total available storage capacity such that the storage will allow a 15% safety factor.

2. Project travel modeling should be consistent with other regional and local modeling forecasts and travel data. Caltrans uses the indices to verify the results and any differences or inconsistencies must be thoroughly explained. Please submit modeling assumptions for Caltrans review and comment.

3. Trip generation rates for the project should be based on the nationally recognized recommendations contained in "Trip Generation" manual, 9th edition, published by the Institute of Transportation Engineers (ITE).

4. Analysis of ADT, AM and PM peak-hour volumes for both the existing and future conditions in the affected area with and without project. Utilization of transit lines and vehicles, and of all facilities, should be realistically estimated. Future conditions should include build-out of all projects and any plan-horizon years.

5. Include all appropriate traffic volumes. The analysis should include existing traffic, traffic generated by the project, cumulative traffic generated from all specific approved developments in the area, and traffic growth other than from the project and developments.

6. A discussion of mitigation measures appropriate to alleviate anticipated traffic impacts should also be included. Any mitigation involving transit or Transportation Demand Management (TDM) should be justified and the results conservatively estimated.

7. A fair share contribution toward pre-established or future improvements on the State Highway System is considered acceptable mitigation. (Please see Appendix "B" of the Guide for more information).

We look forward to reviewing the traffic study and expect to receive a copy from the State Clearinghouse when the DEIR is completed. Should you wish to expedite the review process or receive early feedback from the Department, please feel free to send a copy of the DEIR directly to our office.

If you have any questions, please feel free to contact Mr. Alan Lin the project coordinator at (213) 897-8391 and refer to IGR/CEQA No. 150216AL.

Sincerely,

Rick Holland

RICK HOLLAND
Acting IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

California Native Plant Society

California Native Plant Society
Los Angeles/Santa Monica Mountains Chapter
15811 Leadwell St.
Van Nuys, CA 91406
Feb. 25, 2015

RECEIVED
MAR 0 4 2015
COMMUNITY DEVELOPMENT
PLANNING DEPT.

Talyn Mirzakhanian, Senior Planner
City of Calabasas, Planning Division
100 Civic Center Way
Calabasas, CA 91302

Re: Scoping, DEIR Canyon Oaks Projects

Dear Ms Mirzakhanian :

On behalf of the California Native Plant Society, Los Angeles/Santa Monica Mountains Chapter, I am writing to provide input pertaining to the preparation of a draft EIR for the Canyon Oaks Project at 4790 Las Virgenes Rd. in Calabasas. The California Native Plant Society (CNPS) is a non-profit organization of over 9,000 laypersons and professional botanists with 34 statewide chapters. Our mission is to increase the understanding and appreciation of California's native plants and to conserve them and their natural habitats through education, science, advocacy, horticulture and stewardship. Having viewed the Initial Study for the project we have the following concerns:

- Native tree removal – oaks are targeted for removal; what other significant trees such as walnut, sycamore are targeted; how would this removal effect the overall ecology, habitat; air quality and CO2 sequestration and effects on nesting sites are other concerns.
- Vernal pools & riparian areas are on the property; has there been enough precipitation to fairly study the ecological importance of these areas.
- Invasive weeds should be considered. What are the possible effects from introduction of invasives and how will that be mitigated. A weed abatement plan should be called out.
- What consideration is being made for the fact that the project is at the wildland urban interface and is in a known wildlife corridor.
- Will new plantings for mitigation as well as landscaping be with native plants appropriate to the water-shed. If not, why not?
- Other habitat types such as coastal sage scrub and chaparral are threatened by this project; what will be the effects of their removal.
- What will be the effects on the overall soil ecology if the proposed grading takes place; in particular such underground organisms such as mycorrhizae that are vital to the ecological health of native plants.
- Who will have access to the open-space proposed on the property, and who will monitor its use and maintenance?

Thank for the opportunity to give input to the planning for this DEIR. I look forward to hearing from you as planning progresses. Please contact our CNPS Chapter concerning this matter at the address above rather than at the CNPS state office.

Sincerely,

Snowdy Dodson, Chapter President
818-782-9346 email: snowdy.dodson@csun.edu

July 17, 2014

Comments regarding the:

Initial Study for the Canyon Oaks Project
Calabasas, California
February 18, 2015

Submitted by: Carl Ehrlich (ehrliccf@ix.netcom.com)

I've been a resident of the Malibu Canyon area for over 50 years ever since Brent's Junction was just that: a junction with no grade separation. I feel that I've been looking at these beautiful hills and mountains all along, but since this project has come to the forefront, I've literally been seeing them for the first time. Hence, my continued interest in the progress of the site's development and potential impact on the local area.

I have reviewed the subject document as well as the original document submitted last July and have the following general and specific comments. Some are new and some are compiled for easy reference from my earlier submissions.

Description of the project – Page 1and Table 1.

The report misleads the readers regarding the actual amount of what is called: "open space." The original project documentation states that only ~48% of the project area was classified as actual "undisturbed open space," while the description referred to ~73% "open space" (since revised to ~80%). This "open space" definition, as applied, includes the actual "undisturbed open space," walkways and sidewalks within the project area, and landscaped green space (e.g., artificial built-up slopes for the building pads, greenways through the project, and retaining wall escarpments for seismic mitigation). These latter areas should not be included as "open space" because they are only visual space, not necessarily usable space. This discrepancy apparently comes about from the Calabasas City definitions; these need to be revisited for the sake of reality and common sense.

The hotel component is now described as consisting of some 67,580 sq. ft. while the original consisted of some 64,162 sq. ft., resulting in a net increase of 3,418 sq. ft. Since the hotel is still planning to have 120 rooms, where does this change come from?

Description of the project – Page 2.

The description further reports that no material will be exported but there will apparently be a total of 381,357 cu. yd. of excess material (i.e., cut minus fill totals). This is to be "balanced onsite" according to the Initial Study document. This difference needs to be clarified since, to my mind, cut and fill volumes should be equal if no excess is to be exported.

I – AESTHETICS – Page 8.

General comments. The 4-story hotel will create an urban canyon very much like the one existing along Park Sorrento between Parkway Calabasas and the City Hall – these are 4-story buildings, too, so you can all see what will happen to Las Virgenes Road if the hotel is built.

That will be compounded to the south by a new escarpment and "Mesa" created by the cut-and-fill operation that will create the housing terrace. That escarpment will start at what will be the southeast corner of Las Virgenes and Agoura Roads and extend behind the existing Colony homes. It will range around 60 feet above the grade of Las Virgenes Road – these are numbers taken directly from the New Homes building plans. And it will be about 30-40 feet above their average street level – plus the five foot berm that they will be adding at the western edges of that escarpment.

[*Overheard at the scoping meeting and endorsed: The impact of the overall aesthetic impacts of the proposed project could be brought to light by the use of "story polls." If adopted, they should be installed for both the hotel and the residential frontages on Las Virgenes Road.]*

Hotel sight-lines. As seen from Las Virgenes Road (elev. ~775 ft), the hotel pad rises about 20-25 ft (elev. ~805-815 ft) and the hotel proper approximately another 53 ft, varying with various cupolas, towers, and similar decorative pieces. That makes the top of the hotel about 70 feet above the street level. That will be the visual effect as seen by people on Las Virgenes and Agoura Roads as they pass by the intersection or visit the local shops.

Further, the hotel will obliterate the view of the hills behind it, being so high and so close to the heavily travelled road. Figure 1 clearly illustrates this effect. The drawing was copied from the Canyon Oaks Design Submittal packet dated 04/07/2014. It shows the contours of the land in front of and behind the hotel stating with the Las Virgenes Road surface at the extreme left. As noted, there is no clear sight line from the road to even the hill top.

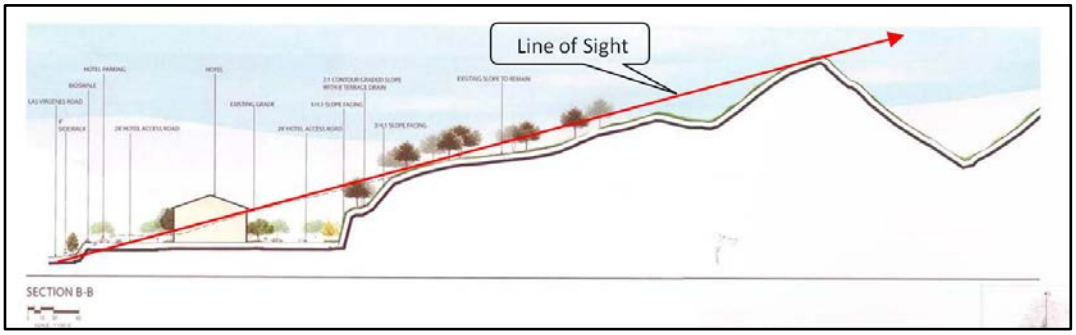

Figure 1. Source: New Homes plans.

The end result of all this could well be an urban canyon like there is on the north side of Park Sorrento between Parkway Calabasas and the City Hall. That will certainly adversely impact the rural nature of the West Calabasas area.

The residential building pad. My concerns here are nearly the same as for the hotel site. Here, the building pad will be constructed from ancient landslide detritus to be removed from other parts of the property. It will constitute another man-made mountain, or "Mesa", some 840 feet in elevation and about 65 feet above the Las Virgenes Road level, as seen to the right. This makes it almost as high as the hotel structure and equally obscuring views of the existing hills, as indicated in Figure 2..

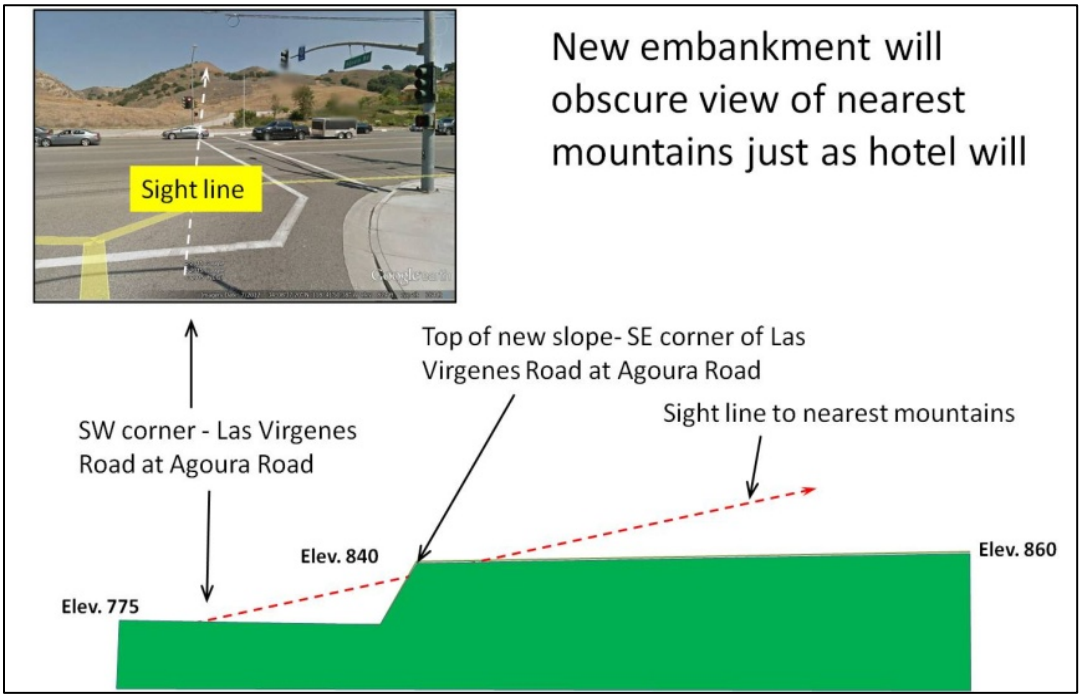

Figure 2. Source: Self-generated based on New Homes plans and Google Earth data.

In addition, this embankment will not be a "nice" neighbor to the existing Shea homes just to the southwest of the property. In that case, the new "Mesa" will be higher than the rooflines of those homes, as shown in the graphic below. Now, to be sure, those homes are not protected from future construction of such an earthen structure in their purchase documents, but that doesn't make it any more acceptable.

Figure 3. Source: New Homes plans.

Each of these concerns infringe on the spirit and intent of the "Las Virgenes Gateway Master Plan," adopted December 2, 1998.

VI – GEOLOGY AND SOILS – Page 15.

Geberal comments.A portion of the existing landslides dating from the late Quarternary Age (that's about 10,000 years ago) were graded during the construction of the Colony homes. That, incidentally was spread out over the original canyon floor and pasture land east of Agoura Road. The new plans call for substantial cuts into that and other equally ancient landslides along the southern edge of the project property. The substantially increased slopes of the new cuts will certainly destabilize the now-compacted debris fields by removing the overburden from their natural angle of repose. By that removal, these cuts will create unbalanced forces within the remaining debris – look at what happened a few years ago along Agoura Road just this side of Liberty Canyon. Not as drastic a cut as that proposed but which took a couple of years to restabilize – that stretch of road still isn't open to the intended four traffic lanes.

The subject report should address these longer term issues.

VIII - HAZARDS AND HAZARDOUS MATERIALS – Page 17.

Item VIIIh should be remarked as "Potentially Significant Impact Unless Mitigation Incorporated" as there is a history of wildfires in that very location. In about 1965-67, there was an arson fire that started just north of the Mobil station and travelled parallel to Las Virgenes and Malibu Canyon Roads all the way to the coast. There have been other fire events in that same time frame that jumped the freeway close to the project site. Therefore, this item should be examined more closely.

XIV PUBLIC SERVICES – Page 24.

Here, again in item XIV-a-iv Parks? the definition of "open space" comes into play, as cited above. In addition, the definitions of "open space" and "parkland" need to be clarified. Parkland implies that such areas are "usable" by the general public but there are two issues that come to light: 1) there seems to be some assurances made that the general public and local residents will not be able to use the escarpments for recreation, these are merely visual (while practical) elements; 2) the term "parkland" implies that the general public will have access to those areas but it appears on the project drawings that these areas will mostly within the gated (residents only) areas and therefore not accessible by the general public. Therefore, this item should be marked as "Potentially Significant Impact Unless Mitigation Incorporated."

9XVI – TRANSPORTATION/ TRAFFIC – Page 26.

The alignment of the eastward extension of Agoura Road. I recall that, at an earlier ARB meeting (January 2014?), one of the City planners noted that the new easterly extension of Agoura Road should have its centerline aligned with a tangential extension of the existing centerline on the westerly right of way. While I'm not a civil engineer, that's how I remember the comment. At any rate, this doesn't seem to have happened as shown in the site drawing (Figure 4), extracted from the subject document. Is this requirement still on the table?

Figure 4. Source: New Homes plans.

[*Overheard at the scoping meeting and endorsed: The concept of an additional or secondary access road for the residential area, at least. This could be a benefit because we, in the area north of the freeway, we have been "trapped" on several occasions due to flooding*]

XVII – UTILITIES AND SERVICE SYSTEMS – Page 28.

Table 3 presents the expected demand for water supplies after project completion. This raises the issue of water usage during the project development and the current statewide drought conditions. As I understand it, water is used for both dust mitigation and for compacting the fill dirt. This water usage addressed nowhere in this document. This should be noted as a "Potentially Significant Impact" issue.

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

RECEIVED

MAR 05 2015

COMMUNITY DEVELOPMENT
PLANNING DEPT

February 24, 2015

Talyn Mirzakhanian, Senior Planner
City of Calabasas
Planning Division
100 Civic Center Way
Calabasas, CA 91302

Dear Ms. Mirzakhanian:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT, PROJECT NO. 140000011, "CANYON OAKS PROJECT," THE PROJECT REPLACES A PREVIOUS VERSION OF THE PROJECT, FOR WHICH A NOTICE OF PREPARATION WAS ISSUED ON JUNE 19, 2014, THE DEVELOPMENT OF RESIDENTIAL, COMMERCIAL, AND OPEN SPACES USES, 4790 LAS VIRGENES ROAD, CALABASAS (FFER 201500027)

The Notice of Preparation of a Draft Environmental Impact Report has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

PLANNING DIVISION:

1. We have no comments at this time.

LAND DEVELOPMENT UNIT:

1. The statutory responsibilities of the County of Los Angeles Fire Department's Land Development Unit are to review and comment on all projects within the unincorporated areas of the County of Los Angeles. Our emphasis is on the availability of sufficient water supplies for firefighting operations and

local/regional access issues. However, we review all projects for issues that may have a significant impact on the County of Los Angeles Fire Department. We are responsible for the review of all projects within contract cities (cities that contract with the County of Los Angeles Fire Department for fire protection services). We are responsible for all County facilities located within non-contract cities. The County of Los Angeles Fire Department's Land Development Unit may also comment on conditions that may be imposed on a project by the Fire Prevention Division, which may create a potentially significant impact to the environment.

2. This property is located within the area described by the Forester and Fire Warden as a Fire Zone 4, Very High Fire Hazard Severity Zone (VHFHSZ). All applicable fire code and ordinance requirements for construction, access, water mains, fire hydrants, fire flows, brush clearance, and fuel modification plans must be met.

3. The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows, and fire hydrants.

4. When involved with subdivision in a city contracting fire protection with the County of Los Angeles Fire Department, the Fire Department's requirements for access, fire flows, and hydrants are addressed during the subdivision tentative map stage.

5. The proposed development may necessitate multiple ingress/egress access for the circulation of traffic and emergency response issues.

6. Every building constructed shall be accessible to Fire Department's apparatus by way of access roadways with an all-weather surface of not less than the prescribed width. The roadway shall be extended to within 150 feet of all portions of the exterior walls when measured by an unobstructed route around the exterior of the building.

7. The maximum allowable grade shall not exceed 15% except where topography makes it impractical to keep within such grade. In such cases, an absolute maximum of 20% will be allowed for up to 150 feet in distance. The average maximum allowed grade including topographical difficulties shall be no more than 17%. Grade breaks shall not exceed 10% in ten feet.

8. Fire sprinkler systems are required in some residential and most commercial occupancies. For those occupancies not requiring fire sprinkler systems, it is

strongly suggested that fire sprinkler systems be installed. This will reduce potential fire and life losses. Systems are now technically and economically feasible for residential use.

9. COMMERCIAL HYDRANT REQUIREMENTS: Fire hydrant spacing shall be 300 feet and shall meet the following requirements:

   a) No portion of lot frontage shall be more than 200 feet via vehicular access from a public fire hydrant.

   b) No portion of a building shall exceed 400 feet via vehicular access from a properly spaced public fire hydrant.

   c) Additional hydrants will be required if hydrant spacing exceeds specified distances.

   d) When cul-de-sac depth exceeds 200 feet on a commercial street, hydrants shall be required at the corner and midblock.

   e) A cul-de-sac shall not be more than 500 feet in length when serving land zoned for commercial use.

10. COMMERCIAL FIRE FLOW: The development may require fire flows up to 8,000 gallons per minute at 20 pounds per square inch residual pressure for up to a five-hour duration. Final fire flows will be based on the size of buildings, its relationship to other structures, property lines, and types of construction used.

11. NON-RESIDENTIAL ACCESS TURNING RADIUS: Turning radii shall not be less than 32 feet. This measurement shall be determined at the centerline of the road. A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in-length and at the end of all cul-de-sacs.

12. NON-RESIDENTIAL ACCESS: All on-site driveways/roadways shall provide a minimum unobstructed width of 28 feet, clear-to-sky. The on-site driveway is to be within 150 feet of all portions of the exterior walls of the first story of any building. The centerline of the access driveway shall be located parallel to and within 30 feet of an exterior wall on one side of the proposed structure.

13. NON-RESIDENTIAL ACCESS WIDTHS: Driveway width for non-residential developments shall be increased when any of the following conditions will exist:

a) Provide 34 feet in-width when parallel parking is allowed on one side of the access roadway/driveway. Preference is that such parking is not adjacent to the structure.

b) Provide 42 feet in-width when parallel parking is allowed on each side of the access roadway/driveway.

c) Any access way less than 34 feet in-width shall be labeled "Fire Lane" on the final recording map and final building plans.

d) For streets or driveways with parking restrictions: The entrance to the street/driveway and intermittent spacing distances of 150 feet shall be posted with Fire Department approved signs stating "NO PARKING - FIRE LANE" in three-inch high letters. Driveway labeling is necessary to ensure access for Fire Department use.

14. HIGH DENSITY RESIDENTIAL FIRE FLOW: The development may require fire flows up to 8,000 gallons per minute at 20 pounds per square inch residual pressure for up to a five-hour duration. Final fire flows will be based on the size of the buildings, their relationship to other structures, property lines, and types of construction used.

15. HIGH DENSITY RESIDENTIAL HYDRANT REQUIREMENTS: Fire hydrant spacing shall be 300 feet and shall meet the following requirements:

a) No portion of lot frontage shall be more than 200 feet via vehicular access from a public fire hydrant.

b) No portion of a building shall exceed 400 feet via vehicular access from a properly spaced fire hydrant.

c) When cul-de-sac depth exceeds 200 feet, hydrants will be required at the corner and midblock.

d) Additional hydrants will be required if the hydrant spacing exceeds specified distances.

16. HIGH DENSITY RESIDENTIAL TURNING RADIUS: Turning radii shall not be less than 32 feet. This measurement shall be determined at the centerline of the road. A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in-length and at the end of all cul-de-sacs.

17. HIGH DENSITY RESIDENTIAL ACCESS: All on-site driveways shall provide a minimum unobstructed width of 28 feet, clear-to-sky. The 28 foot width does not allow for parking and shall be designated as a "Fire Lane," and have appropriate signage. The centerline of the on-site driveway shall be located parallel to and within 30 feet of an exterior wall on one side of the proposed structure. The on-site driveway is to be within 150 feet of all portions of the exterior walls of the first story of any building.

18. HIGH DENSITY RESIDENTIAL ACCESS WIDTHS: The 28 feet in width shall be increased to:

    a) 34 feet in width when parallel parking is allowed on one side of the access way.

    b) 36 feet in width when parallel parking is allowed on both sides of the access way.

    c) Any access way less than 34 feet in width shall be labeled "Fire Lane" on the final recording map and final building plans.

    d) For streets or driveways with parking restrictions: The entrance to the street/driveway and intermittent spacing distances of 150 feet shall be posted with Fire Department approved signs stating "NO PARKING - FIRE LANE" in three-inch high letters. Driveway labeling is necessary to ensure access for Fire Department use.

19. HIGH DENSITY RESIDENTIAL NET ACRE: When serving land zoned for residential uses having a density of more than four units per net acre:

    a) A cul-de-sac shall be a minimum of 34 feet in width and shall not be more than 700 feet in length.

    b) The length of the cul-de-sac may be increased to 1000 feet if a minimum of 36 feet in width is provided.

    c) A Fire Department approved turning area shall be provided at the end of a cul-de-sac.

20. SINGLE FAMILY DWELLING FIRE FLOW: Single family detached homes shall require a minimum fire flow of 1,250 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration. Two family dwelling units

(duplexes) shall require a fire flow of 1,500 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration. When there are five or more units taking access on a single driveway, the minimum fire flow shall be increased to 1,500 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration.

21. SINGLE FAMILY DWELLING HYDRANT REQUIREMENT: Fire hydrant spacing shall be 600 feet and shall meet the following requirements:

    a) No portion of lot frontage shall be more than 450 feet via vehicular access from a public fire hydrant.

    b) No portion of a structure should be placed on a lot where it exceeds 750 feet via vehicular access from a properly spaced public fire hydrant.

    c) When cul-de-sac depth exceeds 450 feet on a residential street, hydrants shall be required at the corner and midblock.

    d) Additional hydrants will be required if hydrant spacing exceeds specified distances.

22. SINGLE FAMILY DWELLING TURNING RADIUS: A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in-length and at the end of all cul-de-sacs.

23. SINGLE FAMILY DWELLING ACCESS: Fire Department access shall provide a minimum unobstructed width of 28 feet, clear-to-sky and be within 150 feet of all portions of the exterior walls of the first story of any single unit. If exceeding 150 feet, provide 20 feet minimum paved width "Private Driveway/Fire Lane" clear-to-sky to within 150 feet of all portions of the exterior walls of the unit. Fire Lanes serving three or more units shall be increased to 26 feet.

24. All access devices and gates shall meet the following requirements:

    a) Any single gated opening used for ingress and egress shall be a minimum of 26 feet in-width, clear-to-sky.

    b) Any divided gate opening (when each gate is used for a single direction of travel i.e., ingress or egress) shall be a minimum width of 20 feet clear-to-sky.

c) Gates and/or control devices shall be positioned a minimum of 50 feet from a public right-of-way and shall be provided with a turnaround having a minimum of 32 feet of turning radius. If an intercom system is used, the 50 feet shall be measured from the right-of-way to the intercom control device.

d) All limited access devices shall be of a type approved by the Fire Department.

e) Gate plans shall be submitted to the Fire Department prior to installation. These plans shall show all locations, widths, and details of the proposed gates.

25. All proposals for traffic calming measures (speed humps/bumps/cushions, traffic circles, roundabouts, etc.) shall be submitted to the Fire Department for review prior to implementation.

26. Disruptions to water service shall be coordinated with the County of Los Angeles Fire Department and alternate water sources shall be provided for fire protection during such disruptions.

27. Submit three sets of water plans to the County of Los Angeles Fire Department's Land Development Unit. The plans must show all proposed changes to the fire protection water system such as fire hydrant locations and main sizes. The plans shall be submitted through the local water company.

28. The County of Los Angeles Fire Department's Land Development Unit's comments are general requirements. Specific fire and life safety requirements and conditions set during the environmental review process will be addressed and conditions set at the building and fire plan check phase. Once the official plans are submitted for review there may be additional requirements.

29. The County of Los Angeles Fire Department's Land Development Unit appreciates the opportunity to comment on this project.

30. Should any questions arise regarding subdivision, water systems, or access, please contact the County of Los Angeles Fire Department's Land Development Unit's Inspector Nancy Rodeheffer at (323) 890-4243.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department's Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed in the Draft Environmental Impact Report.

HEALTH HAZARDOUS MATERIALS DIVISION:

1. The Health Hazardous Materials Division has no additional comment than those already provided.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

KEVIN T. JOHNSON, ACTING CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

JTK:ad

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

February 26, 2015

Ms. Talyn Mirzakhanian
City of Calabasas
100 Civic Center Way
Calabasas, CA 91302-3172
tmirzakhanian@cityofcalabasas.com

Subject: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Canyon Oaks Project - 140000011, City of Calabasas, Los Angeles County; SCH #2015021008

Dear Ms. Mirzakhanian:

The California Department of Fish and Wildlife (Department) has reviewed the above-referenced Notice of Preparation (NOP) for the Canyon Oaks Project - 140000011 (Project) Draft Environmental Impact Report (DEIR) prepared by the City of Calabasas (City) acting as the Lead Agency under the California Environmental Quality Act (CEQA). The Project site is located at 4790 Las Virgenes Road, immediately east of the intersection of Las Virgenes Road and Agoura Road in the City of Calabasas, County of Los Angeles. The proposed Project involves the development of residential, commercial, and public open space/trail uses on an undeveloped site of approximately 77 acres. A Notice of Preparation for a previous project on the subject property was issued on June 19, 2014 and the Department commented with a letter dated July 23, 2014.

The following comments and recommendations have been prepared pursuant to the Department's authority as a Responsible Agency under CEQA Guidelines section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (Fish and Game Code §2050 *et seq.*) and Fish and Game Code section 1600 *et seq*., and pursuant to our authority as Trustee Agency with jurisdiction over natural resources affected by the project (California Environmental Quality Act, [CEQA] Guidelines §15386) to assist the Lead Agency in avoiding or minimizing potential project impacts on biological resources.

Specific Comments

1. Jurisdictional Delineation. The *Jurisdictional Waters and Wetlands Delineation* (JD), which was provided to the Department upon request, indicated an upland swale/erosional feature, ephemeral drainage, and two small wetlands resulting from seeps occur on the Project site. The JD states that "the isolated wetland areas are not considered within Department jurisdiction as they are not within a definable 'bed, bank, or channel' and do not contain the features of a lake or stream."

   All streams and lakes are subject to Department jurisdiction for the purposes of implementing Fish and Game Code section 1600 (CCR Title 14 §720). Departmental jurisdiction is not dependent on a well-defined bed, bank, or channel. Features of a lake or stream may be difficult to discern, especially within ephemeral drainages. The Department

requests the JD be revised to accurately reflect all swales, ephemeral drainages, and wetlands be within the Department's jurisdiction pursuant to Fish and Game Code section 1600 *et seq.* The Department is willing to work with the City to review, verify, and provide comments to any delineation within the Department's jurisdiction.

2. Rare Plant Survey. The *Focused Rare Plant Survey Report, 2013 Update* was provided to the Department for review. A California Natural Diversity Database search was conducted within a 5-mile radius of the Project site. Two focused rare plant surveys were conducted on May 3, 2013 and June 5, 2013.

   a) The Department recommends a nine-quad literature search of CNDDB be conducted in order to accommodate for a wider range of populations. The CNDDB should be used to generate an initial list of potential species occurrence and not used as evidence of non-occurrence. A lack of records in CNDDB does not mean that rare plants or animals do not occur in a Project area. Field verification for the presence or absence of sensitive species, by a qualified botanist, is necessary to provide a complete biological assessment for adequate CEQA review.

   b) The Santa Susana tarplant (*Deinandra minthornii*) has the potential to occur on the Project site. Focused rare plant surveys were conducted outside of the blooming period for the Santa Susana tarplant, which occurs between July and November, depending on climatic conditions. Identification of rare plants can be easily missed outside of blooming periods. The Department recommends the City conduct appropriately timed focused surveys, with blooming periods verified by a known reference site, to maximize detection of the rare plant.

   c) Santa Susana tarplant is designated as a state-listed rare[1] plant pursuant to the Native Plant Protection Act (NPPA; Fish and Game Code §1900 *et seq.*). The NPPA prohibits the take[2] of state-listed rare plants unless authorized by the Department or in certain limited circumstances. Take of Santa Susana tarplant or other state-listed rare plants that may occur as a result of the Project may only be permitted through an incidental take permit or other authorization issued by the Department pursuant to California Code of Regulations, Title 14, section 786.0 subdivision (b). Please contact the Department early if any NPPA or CESA listed species are identified within the vicinity of the Project.

3. Southern Coast Live Oak and Valley Oak. The NOP states that 184 coast live oaks (*Quercus agrifolia*) and 14 valley oaks (*Quercus lobate*) are located on the Project site. The proposed Project would remove 39 oak trees of unknown species and encroach into the protected zone of 14 oak trees of unknown species.

   a) The Department considers southern coast live oak woodland and valley oak woodland to be sensitive plant communities. The proposed Project would remove an unknown acreage of coast live oak woodland and valley oak woodland habitat with understory

[1] See Cal. Code Regs. tit. 14, §670.2, subd.(c)(4)(D)
[2] Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

components associated with the 53 individual oak trees. The Department recommends the DEIR evaluate the temporal loss (i.e., the impacts associated with the loss of functions and values) associated with impacting the oak tree woodland and its associated understory, which takes decades to mature. The DEIR should consider the existing functional conditions of the oak woodland and understory resources to be impacted, and develop a mitigation proposal to meet or exceed the functional conditions. Evaluating the direct and temporal loss to the habitat will enable the City to consider the whole of the impacts to wildlife resources and compensate for those impacts appropriately.

b) The Department recommends avoidance of coast live oak woodland and valley oak woodland and request the City look at alternative locations to avoid this sensitive resource. If avoidance is not feasible, the Department recommends that on-site acquisition of woodland habitat in the local area be considered. All acquired habitat should be protected under a conservation easement and deeded to a local land conservancy for management and protection in perpetuity.

4. References. The NOP references several documents including the *Focused Rare Plant Survey Report* (July 2010 and Updated July 2013), an *Oak Tree Report* (November 2014), and a *Jurisdictional Waters and Wetlands Delineation* (May 2012). The Department recommends the City make all references available to the public for review pursuant to CEQA Guidelines section 15150.

General Comments

1. Project Description and Alternatives. To enable the Department to adequately review and comment on the proposed Project from the standpoint of the protection of plants, fish, and wildlife, we recommend the following information be included in the DEIR:

   a) A complete discussion of the purpose and need for, and description of, the proposed Project, including all staging areas and access routes to the construction and staging areas; and,

   b) a range of feasible alternatives to Project component location and design features to ensure that alternatives to the proposed Project are fully considered and evaluated. The alternatives should avoid or otherwise minimize direct and indirect impacts to sensitive biological resources and wildlife movement areas.

2. Lake and Streambed Alteration Agreements (LSA). As a Responsible Agency under CEQA Guidelines section 15381, the Department has authority over activities in streams and/or lakes that will divert or obstruct the natural flow, or change the bed, channel, or bank (including vegetation associated with the stream or lake) of a river or stream, or use material from a streambed. For any such activities, the Project applicant (or "entity") must provide written notification to the Department pursuant to section 1600 *et seq.* of the Fish and Game Code. Based on this notification and other information, the Department determines whether a Lake and Streambed Alteration Agreement (LSA) with the applicant is required prior to conducting the proposed activities. The Department's issuance of a LSA for a Project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. As a Responsible Agency, the Department may consider the Negative Declaration

or Environmental Impact Report of the local jurisdiction (Lead Agency) for the Project. To minimize additional requirements by the Department pursuant to section 1600 *et seq.* and/or under CEQA, the document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the LSA.[3]

a) The Project area supports aquatic, riparian, and wetland habitats; therefore, a preliminary jurisdictional delineation of the streams and their associated riparian habitats should be included in the DEIR. The delineation should be conducted pursuant to the U. S. Fish and Wildlife Service wetland definition adopted by the Department.[4] Some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers' Section 404 permit and Regional Water Quality Control Board Section 401 Certification.

b) In Project areas which may support ephemeral streams, herbaceous vegetation, woody vegetation, and woodlands also serve to protect the integrity of ephemeral channels and help maintain natural sedimentation processes; therefore, the Department recommends effective setbacks be established to maintain appropriately-sized vegetated buffer areas adjoining ephemeral drainages.

c) Project-related changes in drainage patterns, runoff, and sedimentation should be included and evaluated in the environmental document.

3. Wetlands Resources Fish and Game Code states that "wetlands" means lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools. (Fish & Game Code §2785).

   The Wetlands Resources policy (http://www.fgc.ca.gov/policy/) of the Fish and Game Commission "…seek[s] to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California. Further, it is the policy of the Fish and Game Commission to strongly discourage development in or conversion of wetlands. It opposes, consistent with its legal authority, any development or conversion which would result in a reduction of wetland acreage or wetland habitat values. To that end, the Commission opposes wetland development proposals unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. The Commission strongly prefers mitigation which would achieve expansion of wetland acreage and enhancement of wetland habitat values."

   The Department encourages avoidance of wetland resources as a primary mitigation measure and discourages the development or type conversion of wetlands to uplands. The Department encourages activities that would avoid or minimize the reduction of wetland

[3] A notification package for a LSA may be obtained by accessing the Department's web site at www.wildlife.ca.gov/habcon/1600.

[4] Cowardin, Lewis M., et al. 1970. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

acreage, function, or habitat values. Once avoidance and minimization measures have been exhausted, the project should include mitigation measures to assure a "no net loss" of either wetland habitat values, or acreage, for unavoidable impacts to wetland resources. All wetlands and watercourses, whether ephemeral, intermittent, or perennial, should be retained and provided with substantial setbacks, which preserve the riparian and aquatic values and functions for the benefit to on-site and off-site wildlife populations.

4. California Endangered Species Act (CESA). The Department considers adverse impacts to a species protected by CESA, for the purposes of CEQA, to be significant without mitigation. As to CESA, take of any endangered, threatened, candidate species, or state-listed rare plant species that results from the Project is prohibited, except as authorized by state law (Fish and Game Code, §§ 2080, 2085; Cal. Code Regs., tit. 14, §786.9). Consequently, if the Project, Project construction, or any Project-related activity during the life of the Project will result in take of a species designated as endangered or threatened, or a candidate for listing under CESA, the Department recommends that the Project proponent seek appropriate take authorization under CESA prior to implementing the Project. Appropriate authorization from the Department may include an Incidental Take Permit (ITP) or a consistency determination in certain circumstances, among other options (Fish and Game Code §§ 2080.1, 2081, subds. (b),(c)). Early consultation is encouraged, as significant modification to a Project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, may require that the Department issue a separate CEQA document for the issuance of an ITP unless the Project CEQA document addresses all Project impacts to CESA-listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of an ITP. For these reasons, biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA ITP.

5. Biological Baseline Assessment. To provide a complete assessment of the flora and fauna within and adjacent to the Project area, with particular emphasis upon identifying endangered, threatened, sensitive, regionally and locally unique species, and sensitive habitats, the DEIR should include the following information:

   a) Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]);

   b) a thorough, recent, floristic-based assessment of special status plants and natural communities, following the Department's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see http://www.dfg.ca.gov/habcon/plant/);

   c) floristic, alliance- and/or association-based mapping and vegetation impact assessments conducted at the Project site and within the neighboring vicinity. *The Manual of California Vegetation*, second edition, should also be used to inform this mapping and

assessment (Sawyer et al. 2008[5]). Adjoining habitat areas should be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions. The surveys periods should be verified with a known reference site because blooming periods are easily missed with a single survey, and blooming periods can shift with changes in climatic conditions such as during drought years. During drought years, some plants germinate and die without growing to full size. Evidence of these species would likely be absent later in the season (June/July surveys);

d) a complete, recent, assessment of the biological resources associated with each habitat type on site and within adjacent areas that could also be affected by the Project. The Department's CNDDB in Sacramento should be contacted to obtain current information on any previously reported sensitive species and habitat. The Department recommends that CNDDB Field Survey Forms be completed and submitted to CNDDB to document survey results. Online forms can be obtained and submitted at http://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp.

e) a complete, recent assessment of rare, threatened, and endangered, and other sensitive species on site and within the area of potential effect, including SOC and California Fully Protected Species (Fish and Game Code § 3511). Species to be addressed should include all those which meet the CEQA definition (see CEQA Guidelines § 15380). Seasonal variations in use of the Project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service; and,

f) a recent, wildlife and rare plant survey. The Department generally considers biological field assessments for wildlife to be valid for a one-year period, and assessments for rare plants may be considered valid for a period of up to three years. Some aspects of the proposed Project may warrant periodic updated surveys for certain sensitive taxa, particularly if build out could occur over a protracted time frame, or in phases.

5. Biological Direct, Indirect, and Cumulative Impacts. To provide a thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts, the following should be addressed in the DEIR:

a) A discussion of potential adverse impacts from lighting, noise, human activity, exotic species, and drainage. The latter subject should address Project-related changes on

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[5] Sawyer, J. O., Keeler-Wolf, T., and Evens J.M. 2008. A manual of California Vegetation, 2nd ed.

ISBN 978-0-943460-49-9.

drainage patterns and downstream of the Project site; the volume, velocity, and frequency of existing and post-Project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-Project fate of runoff from the Project site. The discussion should also address the proximity of the extraction activities to the water table, whether dewatering would be necessary and the potential resulting impacts on the habitat, if any, supported by the groundwater. Mitigation measures proposed to alleviate such impacts should be included;

b) a discussion regarding indirect Project impacts on biological resources, including resources in nearby public lands, open space, adjacent natural habitats, riparian ecosystems, and any designated and/or proposed or existing reserve lands (e.g., preserve lands associated with a NCCP). Impacts on, and maintenance of, wildlife corridor/movement areas, including access to undisturbed habitats in adjacent areas, should be fully evaluated in the DEIR;

c) the impacts of zoning of areas for development Projects or other uses nearby or adjacent to natural areas, which may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the environmental document; and,

d) a cumulative effects analysis, as described under CEQA Guidelines section 15130. General and specific plans, as well as past, present, and anticipated future Projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

6. Avoidance, Minimization, and Mitigation for Sensitive Plants. The DEIR should include measures to fully avoid and otherwise protect sensitive plant communities from Project-related direct and indirect impacts. The Department considers these communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3 and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer et al. 2008).

7. Compensatory Mitigation. The DEIR should include mitigation measures for adverse Project-related impacts to sensitive plants, animals, and habitats. Mitigation measures should emphasize avoidance and reduction of Project impacts. For unavoidable impacts, on-site habitat restoration or enhancement should be discussed in detail. If on-site mitigation is not feasible or would not be biologically viable and therefore not adequately mitigate the loss of biological functions and values, off-site mitigation through habitat creation and/or acquisition and preservation in perpetuity should be addressed.

8. Long-Term Management of Mitigation Lands. For proposed preservation and/or restoration, the DEIR should include measures to protect the targeted habitat values from direct and indirect negative impacts in perpetuity. The objective should be to offset the Project-induced qualitative and quantitative losses of wildlife habitat values. Issues that should be addressed include, but are not limited to, restrictions on access, proposed land dedications, monitoring and management programs, control of illegal dumping, water pollution, and increased human intrusion.

9. Nesting Birds. In order to avoid impacts to nesting birds, the DEIR should require that clearing of vegetation and construction occur outside of the peak avian breeding season, which generally runs from February 1st through September 1st (as early as January 1 for some raptors). If Project construction is necessary during the bird breeding season, a qualified biologist with experience in conducting bird breeding surveys should conduct weekly bird surveys for nesting birds within three days prior to the work in the area, and ensure that no nesting birds in the Project area would be impacted by the Project. If an active nest is identified, a buffer shall be established between the construction activities and the nest so that nesting activities are not interrupted. The buffer should be a minimum width of 300 feet (500 feet for raptors), be delineated by temporary fencing, and remain in effect as long as construction is occurring or until the nest is no longer active. No Project construction shall occur within the fenced nest zone until the young have fledged, are no longer being fed by the parents, have left the nest, and will no longer be impacted by the Project. Reductions in the nest buffer distance may be appropriate depending on the avian species involved, ambient levels of human activity, screening vegetation, or possibly other factors.

10. Translocation/Salvage of Plants and Animal Species. Translocation and transplantation is the process of moving an individual from the Project site and permanently moving it to a new location. The Department generally does not support the use of, translocation or transplantation as the primary mitigation strategy for unavoidable impacts to rare, threatened, or endangered plant or animal species. Studies have shown that these efforts are experimental and the outcome unreliable. The Department has found that permanent preservation and management of habitat supporting these species is often a more effective long-term strategy for conserving sensitive plants and animals, and their habitats.

11. Moving out of Harm's Way. The proposed Project is anticipated to result in clearing of natural habitats that support many species of indigenous wildlife. To avoid direct mortality, the Department recommends a qualified biological monitor approved by the Department be on site prior to and during ground and habitat disturbing activities to move out of harm's way special status species or other wildlife of low mobility that would be injured or killed by grubbing or Project-related construction activities. It should be noted that the temporary relocation of on-site wildlife does not constitute effective mitigation for the purposes of offsetting Project impacts associated with habitat loss.

12. Wildlife Movement and Connectivity. The Project area supports significant biological resources and is located adjacent to a regional wildlife movement corridor. The Project area contains habitat connections and supports movement across the broader landscape, sustaining both transitory and permanent wildlife populations. Onsite features, which contribute to habitat connectivity, should be evaluated and maintained. Aspects of the Project could create physical barriers to wildlife movement from direct or indirect Project-related activities. Indirect impacts from lighting, noise, dust, and increased human activity may displace wildlife in the general area.

13. Revegetation/Restoration Plan. Plans for restoration and re-vegetation should be prepared by persons with expertise in southern California ecosystems and native plant restoration techniques. Plans should identify the assumptions used to develop the proposed restoration strategy. Each plan should include, at a minimum: (a) the location of restoration sites and

assessment of appropriate reference sites; (b) the plant species to be used, sources of local propagules, container sizes, and seeding rates; (c) a schematic depicting the mitigation area; (d) a local seed and cuttings and planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity. Monitoring of restoration areas should extend across a sufficient time frame to ensure that the new habitat is established, self-sustaining, and capable of surviving drought.

i) The Department recommends that local onsite propagules from the Project area and nearby vicinity be collected and used for restoration purposes. Onsite seed collection should be initiated in the near future in order to accumulate sufficient propagule material for subsequent use in future years. Onsite vegetation mapping at the alliance and/or association level should be used to develop appropriate restoration goals and local plant palettes. Reference areas should be identified to help guide restoration efforts. Specific restoration plans should be developed for various Project components as appropriate.

ii) Restoration objectives should include protecting special habitat elements or re-creating them in areas affected by the Project; examples could include retention of woody material, logs, snags, rocks, and brush piles for a more detailed discussion of special habitat elements).

We appreciate the opportunity to comment on the referenced NOP. Questions regarding this letter and further coordination on these issues should be directed to Victoria Chau, Environmental Scientist at (562) 430-5082 or Victoria.Chau@wildlife.ca.gov.

Sincerely,

Betty J. Courtney
Environmental Program Manager I
South Coast Region

ec: Ms. Erinn Wilson, CDFW, Los Alamitos
Ms. Victoria Chau, CDFW, Los Alamitos
Ms. Kelly Schmoker, CDFW, Mission Viejo
Mr. Scott Harris, CDFW, Pasadena
Mr. Brock Warmuth, CDFW, Newbury Park
Ms. Christine Medak, U.S. Fish and Wildlife Service, Carlsbad
Mr. Scott Morgan, State Clearinghouse

Las Virgenes Homeowners Federation, Inc.

Post Office Box 353, Agoura Hills, California 91301

*The **voice** and conscience of the Santa Monica Mountains since 1968*

February 24, 2015

Ms. Talyn Mirzakhanian
Planning Department City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

Re: Canyon Oaks Project Comments on the Scope and Content of the Draft Environmental Impact Report (DEIR)

Dear Ms. Mirzakhanian:

Before addressing comments on the scope of the DEIR, we want to state that any concessions made for including low-income housing should be applied to the residential element of the project and **not** be transferred to the commercial development. The commercial and residential areas are separated by gates and are not being built at the same time or by the same developer. They are entirely separate entities in this respect.

Secondly, we concur with and strongly support the Santa Monica Mountains Conservancy's comment letter in respect to the DEIR for the Canyon Oaks Project.

ENVIRONMENTAL FACTORS AFFECTED

AESTHETICS – (Page 8) Las Virgenes Road is the gateway to the Santa Monica Mountains National Recreation Area (SMMNRA). The view of the project from residential neighborhoods, the scenic corridors - 101 freeway and Las Virgenes Road – is important to all Calabasas residents as outlined in the City's General Plan, "Maintenance of a high quality of life is dependent on a high quality environment. The area's natural environment is cited as the key to Calabasas' desirability and preservation of open space is generally cited as the community's number one priority. **Protecting the area's remaining natural hillsides, ridgelines and significant habitat areas, as well as preserving remaining open lands in their natural state are important concerns of area residents."** *(GP page I-11,12)*

Currently the elevation of the housing pads above Las Virgenes Road is approximately 57 feet for the lowest pad closest to the road. Add a 26 foot high two-story house and the roof of the house is approximately 83 feet above Las Virgenes Road. This will negatively impact the viewshed for miles.

If the remedial grading of the landslide becomes significantly greater than indicated in the DEIR, by a factor of 1.5 or more, the following conditions should apply. (1) The project plans should come back to the Planning Commission for review of potential increases of the final elevation of the housing pads. There should be no automatic approvals by the Building Department or other city entities. (2) If more oak trees are impacted mitigation plantings should increase accordingly. (3) The California Oak Forest should not be impacted in any way.

The 4-story hotel, on a pad 10 feet or more above Las Virgenes Road, will eliminate any view of the hills from Las Virgenes Road.

Because there are significant view preservation concerns, prior to Public Hearings on the DEIR, story poles should be placed on the hotel and residence sites to create an accurate silhouette of the proposed project. This will provide the public with a good indication of the size and scope of the project and any negative impact on the view-shed.

BIOLOGICAL RESOURCES - (Page 12 a,b,c,d) The Southern Coast Live Oak Riparian Forest should be protected during construction. The extent of this Forest should be indicated on the plans to see if it is impacted in any way by the project.

The project will have potentially significant impact on water quality in the Malibu Creek Watershed including Las Virgenes Creek, Malibu Creek and downstream to the Bay. This needs to be considered in the DEIR.

In addition, if grading changes during construction impact oak trees which are not included in the DEIR, the applicant must obtain additional Oak Tree Permits.

HAZARDS AND HAZARDOUS MATERIALS - (Page 16c) This should be marked potentially significant unless mitigated. Google shows a school on Las Virgenes Road within ¼ mile of the property and there is a danger of dust containing Valley Fever spores becoming airborne during construction.

Significant measures should be taken in dust control during grading to avoid air quality issues and the possibility of releasing any hazardous materials that may exist on the property.

LAND USE - (Page 20b and Page 21b) Should be labeled as "potentially significant", removing "unless mitigation incorporated". According to California State Guidelines the role of the General Plan is to establish a document that will "…act as a 'constitution' for development, the foundation upon which all land use decisions are to be based." This is mandated by the state and therefore cannot be mitigated.

A four-story hotel is in direct conflict with the Las Virgenes Gateway Master Plan. The architecture of the hotel and residential project must complement this plan.

The project is inconsistent with the policies and guidelines of the Calabasas General Plan and is in conflict with the Las Virgenes Gateway Master Plan. The design standards and the height of the hotel need to be redone to adhere to the Las Virgenes Gateway Master Plan.

In addition, the City of Calabasas Trails Master Plan calls for natural drainage channels to be incorporated into the design of trails. This needs to be included in the DEIR.

POPULATION AND HOUSING - (Page 23 a) This should be labeled potentially significant considering the cumulative impact of all projects in the city on the population. There are several other hotels being proposed by the City of Calabasas, one directly adjacent to this hotel. This raises the question of the financial viability of so many 4-story hotels in a city of this size. Projects should be evaluated on the appropriateness of the size and scope for the site, not for the revenue it will produce. Economic projections are not a guarantee and the community does not want to be left with abandoned buildings that become a blight and a drain on the citizenry.

PUBLIC SERVICES - (Page 24 a (iv) This should be labeled potentially significant. The dog park on Las Virgenes Road is already inadequate for existing city residents. The estimate of 195 additional residents will result in additional dogs competing for space in an already overcrowded park.

Also, the additional 195 residents demand 0.6 acres of active parkland. The 61.2 acres of open space is for passive use. It includes steep hillsides and graded hillsides with concrete culverts. It should not be counted toward this requirement. Even with a minimal private community recreation area resident will place demands on existing open space. This must be addressed.

RECREATION – (Page 25 b) This should be labeled potentially significant. Easements for parking and access to the existing Anza Calabash Canyon Loop Trail (per Google Maps) located on the project site should be specified for hikers, bikers, and equestrians.

TRAFFIC - (Page 26 a,b) There are already traffic jams daily at the southbound 101/Las Virgenes interchange because the 101 Freeway is jammed. Any study and mitigation must address not only vehicle traffic but pedestrian and bicycle use as well. There is a treacherous left turn for bicyclists from Agoura Road on to Las Virgenes Road. This should be labeled significant impact and any remediation needs to be very specific in nature.

(Page 23c) This needs to be marked as potentially significant unless mitigated. There is a change in traffic patterns since Agoura Road, instead of terminating at Las Virgenes Road, will be extended to the East side of Las Virgenes Road to provide access to the hotel and residences planned for the project. This adds complications and traffic to an

already complicated and congested intersection.

It is also noted that the hotel entrance uses the residential driveway entrance for a short distance. This can cause traffic congestion on the residential driveway and contribute to the congestion at the Agoura Road/Las Virgenes Road intersection.

(Page 26 d) This needs to be marked as potentially significant unless mitigated. The Las Virgenes Road/Agoura Road Intersection is already a dangerous intersection. This project will add complications to the intersection and increase danger. Cross traffic from the McDonalds, Jack in the Box, Sharkeys, Starbucks, Albertsons, and gas stations have traffic entering and leaving these establishments crossing traffic lanes. How this is mitigated needs to be addressed.

(Page 26 e) This should be marked as potentially significant. Las Virgenes Road is a major North-South Road for emergency vehicles going to and from the mountains and Pacific Coast. Having major traffic jams on Las Virgenes Road will impact emergency services and needs to be addressed.

(Page 26 f) This should be marked potentially significant. A Class 2 bike lane on Las Virgenes Road is a minimum of 3 feet wide as written in the Bicycle Master Plan. Also noted is the fact that the 120-room hotel has 134 parking spaces, which is inadequate for guests, people attending meetings/weddings, special events, etc. and for employees.

Overflow of these people onto streets or in other parking lots is unacceptable.

Additionally, the impact on traffic from grading and construction during the construction process is a major concern. Las Virgenes Road is already a heavily traveled road prone to congestion in the northbound lanes because of the Agoura Road interchange and congestion on the southbound entrance to the 101 freeway.

UTILITIES AND SERVICES SYSTEMS - (Page 27c) This should be marked potentially significant impact considering the newly placed impervious surfaces combined with wetlands that drain. (Page 27 d) In light of the current drought this should be labeled potentially significant due to the impact of 195 new residents and a hotel on the water supply. The table on the Project Water Demand needs to be updated as it may not be accurate beyond year 3.

Respectfully submitted,

For the LVHF Canyon Oaks Committee,
Kim Lamorie, President
Las Virgenes Homeowners Federation, Inc., of the Santa Monica Mountains

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207
WWW.SMMC.CA.GOV

February 23, 2015

Ms. Talyn Mirzakhanian
Planning Division
Community Development Department
City of Calabasas
100 Civic Center Way
Calabasas, California 91302

Notice of Preparation Comments - Canyon Oaks Project
4790 Las Virgenes Road (APNs 2069-078-009 and 011)
SCH No. 2015021008

Dear Ms. Mirzakhanian:

The Santa Monica Mountains Conservancy (Conservancy) has had a long history with the subject 77-acre property that is integral both to the central core habitat of the Santa Monica Mountains and a regional habitat linkage to the Simi Hills. Parkland owned and managed by the Mountains Recreation and Conservation Authority (MRCA) abuts the subject land on three sides. The ultimate land use on the subject property will have great bearing on a major viewshed located along the 101 Freeway, within the City, and within a major northern extension of the Santa Monica Mountains National Recreation Area. All of the property is located within the boundary of the Los Angeles County General Plan-designated Santa Monica Mountains Significant Ecological Area.

The proposed project has the exact disturbance and development footprints as the project the Conservancy commented on in July of 2014. The number of units has been reduced but the impacts of the massive manufactured remedial slopes and the loss of habitat have not been reduced. The project still proposes a four-story hotel right above Las Virgenes Road, 419 parking spaces in a watershed with Federally-endangered steel head trout, a 20-acre v-ditch covered slope, and a minimum of 2,191,092 cubic yards of grading. That is almost 30,000 cubic yards of grading per proposed residence. The proposed project is an attempt to force a flat land suitable project into mountainous terrain that is in a gateway to the Santa Monica Mountains National Recreation Area.

The now mostly undeveloped east side of Las Virgenes Road adjacent to core Santa Monica Mountains habitat would be transformed into a major development area with

scores of acres of impermeable surface and thousands of lighting elements. Scores of acres would require permanent irrigation.

Grading for the large, ancient landslide on the property's north-facing slope is a major development constraint. As it is proposed, the project's remedial earthwork necessary to stabilize the slide would require mass grading and one hundred percent visible, manufactured slope faces over 300 feet high. The Initial Study discloses the amount of required minimum grading volume as 2,191,092 cubic yards. The proposed project categorically fails to work with the site's topographical and geological constraints. The amount of emissions from moving and compacting this much earth must be addressed.

It is safe to say that any project requiring full remediation of the subject large landslide would result in unavoidable, significant adverse impacts to biological and visual resources at a minimum. The proposed project fails to attempt to avoid obvious significant impacts as dictated by the California Environmental Quality Act.

The Draft Environmental Impact Report (DEIR) must include at least two physically and economically feasible development alternatives that do not require full remediation of the landslide. Only with such alternative projects can decision makers be presented with alternatives which avoid unmitigable significant adverse biological and visual impacts. The applicant knowingly took many financial risks acquiring the site. Such non-full-landslide remediation DEIR alternatives cannot be excluded from impact analysis because the applicant paid more for the property than such projects can support. Clearly the proposed four-story hotel can be built without full landslide remediation. The City is under no obligation to approve a General Plan Amendment, a Zone Change, or a project with unavoidable significant adverse impacts.

Many historic landslides dot the Santa Monica Mountains and the City of Calabasas. To our knowledge, amidst widespread local geological instability, the generalized threat of land movement does not prohibit the use of existing roads, trails, and recreation areas in other parts of the City. To our knowledge, the subject landslide under current land use conditions does not pose any substantial public safety threat even to users of the historic dirt road (Anza Calabash Canyon Loop Trail) that courses through the property at the foot of the landslide to the MRCA parkland. For the DEIR to include an adequate range of alternatives, it must include two physically and economically feasible alternative projects that leave the landslide basically in place and work around its hazards to result in projects that allow for full economic use of the remainder of the property.

The DEIR should include a simplified geological constraints analysis that specifically shows at approximately 200-scale where development is physically feasible without the need to do large-scale remediation of the subject major landslide. If there are cost effective ways to adequately attenuate the slide without the substantial loss of oak trees and coastal sage scrub and gain additional development footprint, the constraints analysis should also show how much of such additional development area could be gained through such methods.

Within the subject property, there are many acres of substantially disturbed land with full access to Las Virgenes Road that can be intensively developed for a considerable economic return given the site's zoning and proximity to utilities.

The highest quality ecological areas on the property are the north-facing landslide slope and the back canyon narrows that abut MRCA property. The narrows of that back canyon support a locally rare alkali seep including yerba mansa (*Anemopsis californica*). We encourage the City to shape the majority of project alternatives to include both no adverse impacts and permanent protection in these two important resource areas. Because approximately 20 acres of the existing proposal would consist of v-ditch covered slopes, the DEIR must analyze how much groundwater recharge potential would be permanently lost compared to the natural slope or a slope with no v-ditches.

In conclusion, the Conservancy sees no overriding benefits associated with the proposed project, or any combination of residential and commercial development in a similar footprint, that the City could identify to adopt a statement of overriding considerations. Let the land dictate the use.

Please address any questions and send all correspondence to Paul Edelman of our staff at the (310) 589-3200 ext. 128 and at the above letterhead address.

Sincerely,

LINDA PARKS
Chairperson

CANYON OAKS PROJECT

COMMENTS BY CASH AT THE NOP/EIR MEETING ON FEBRUARY 18, 2015

NORMAN BUEHRING, VICE PRESIDENT OF THE COMMUNITY ASSOCIATION OF SARATOGA HILLS (CASH)

LAST MAJOR DEVELOPMENT ON OUR END OF TOWN

MAKE SURE DEVELOPMENT IS NOT GIVEN CONCESSIONS THAT OTHERS DID NOT RECEIVE

FIRST, IT IS IMPORTANT TO RECOGNIZE THE SIGNIFICANT MOVEMENT ON HOUSING DENSITY FROM 150 TO 67. THE REDUCED IMPACTS IN TRAFFIC, SCHOOLS, AND OTHER AREAS ARE IMPORTANT AND SIGNIFICANT.

A REMAINING ISSUE IS THE VIEW OF THE PROPOSED UNIFORM 2:1 CONSTRUCTED SLOPE FROM THE SURROUNDING AREA. THE ENTRANCE SLOPE SHOULD HAVE VARIEGATION IN BOTH SLOPE SURFACE AND LANDSCAPE COLOR.

THE FOUR STORIES ASKED FOR THE HOTEL HAVE NOT BEEN ALLOWED IN THIS CORRIDOR AND SHOULD NOT START NOW. THE 35 FOOT HEIGHT IS THE STANDARD FOR THIS CORRIDOR. THE EIR MUST INCLUDE THIS ALTERNATIVE. A TWO STOREY ALTERNATIVE, WHICH WAS PROPOSED BY THE PREVIOUS PROPERTY OWNER, SHOULD ALSO BE CONSIDERED IN THE EIR.

THE SITE IMPACTS IN REDUCING THE FOUR STORIES ARE MODEST. A REDUCTION OF ONE STORY WOULD REDUCE OPEN SPACE LESS THAN 1%, A VERY MODEST CHANGE. TALK ABOUT THIS IN THE EIR

THE VIEW IMPACTS FOR THIS SITE ARE SIGNIFICANT GIVEN THE HIGH PAD ELEVATIONS ABOVE LAS VIRGENES ROAD. AND, GIVEN THE UNPRESIDENTED PROPOSED 4 STORY STRUCTUCTURES. THE EIR MUST INCLUDE THIS DISCUSSION.

SCALE CROSS SECTIONS ON VIEWS FROM AGOURA ROAD, THE FREEWAY, LOST HILLS BRIDGE, AND SARATOGA HILLS SHOULD BE INCLUDED.

AT THE CONCLUSION OF THE EIR SITE POLES SHOULD BE INSTALLED TO SHOW HEIGHT IM PACTS.

TRAFFIC CONJESTION IS A CURRENT ISSUE AT LAS VIRGENES ROAD AND AGOURA ROAD, PARTICULARLY DURING THE PM PEAK PERIOD. THE SELECTION AND INTENSITY OF THE COMMERCIAL PORTION OF THE PROJECT SHOULD BE CAREFULLY DETERMINED TO ENSURE TRAFFIC IMPACTS THAT CONSIDER THE PM PEAKS.

PRESENT TWO CATEGORIES OF OPEN SPACE IN THE EIR. GRADED FILLS AND OPEN AREAS WITHIN THE DEVELOPMENT HAVE LESSER VALUES FOR WILDLIFE AND RECREATION USE THAN TRUE OPEN SPACE.

THESE COMMENTS HIGHLIGHT THE MAJOR CONCERNS OF SARATOGA HILLS.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

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COMMUNITY DEVELOPMEN
PLANNING DEPT

February 3, 2015

Talyn Mirzakhanian
City of Calabasas
100 Civic Center Way
Calabasas, CA 91302

Notice of Preparation of a CEQA Document for the Canyon Oaks Project

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft CEQA document. Please send the SCAQMD a copy of the CEQA document upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to the SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address in our letterhead. **In addition, please send with the draft EIR all appendices or technical documents related to the air quality and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files. These include original emission calculation spreadsheets and modeling files (not Adobe PDF files). Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. More recent guidance developed since this Handbook was published is also available on SCAQMD's website here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). SCAQMD staff also recommends that the lead agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD staff requests that the lead agency quantify criteria pollutant emissions and compare the results to the recommended regional significance thresholds found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. In addition to analyzing regional air quality impacts, the SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is

recommended that the lead agency perform a localized analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

In the event that the proposed project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the lead agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

In addition, guidance on siting incompatible land uses (such as placing homes near freeways) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Perspective*, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate these impacts. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying possible mitigation measures for the project, including:

- Chapter 11 of the SCAQMD *CEQA Air Quality Handbook*
- SCAQMD's CEQA web pages at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies.
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions
- Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf?sfvrsn=4.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's webpage (http://www.aqmd.gov).

The SCAQMD staff is available to work with the Lead Agency to ensure that project emissions are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at jbaker@aqmd.gov or call me at (909) 396-3176.

Sincerely,

Jillian Baker

Jillian Baker, Ph.D.
Program Supervisor
Planning, Rule Development & Area Sources

LAC150130-02
Control Number

Appendix B

Air Quality, Noise, and Greenhouse Gases Impact Report
Technical Data

AIR QUALITY, NOISE, AND GREENHOUSE GASES IMPACT REPORT

Canyon Oaks Project

4790 Las Virgenes Road
Calabasas, California

Lead Agency:
City of Calabasas
100 Civic Center Way
Calabasas, California 91302

Applicant:
The New Home Company
85 Enterprise, Suite 450
Aliso Viejo, California 92656

Prepared By:
CAJA Environmental Services, LLC
11990 West San Vicente Blvd, Suite 250
Los Angeles, California 90049

June 2015

III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the Project:

a) Conflict with or obstruct implementation of the applicable air quality plan? *Less Than Significant Impact.*

Pollutants and Effects

Criteria air pollutants are defined as pollutants for which the federal and State governments have established ambient air quality standards for outdoor concentrations. The federal and State standards have been set at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), particulate matter ten microns or less in diameter (PM_{10}), and lead (Pb). These pollutants are discussed below.

- Carbon Monoxide (CO) is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. It is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, automobile exhaust accounts for the majority of emissions. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient concentrations generally follow the spatial and temporal distributions of vehicular traffic. Concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. Inversions are an atmospheric condition in which a layer of warm air traps cooler air near the surface of the earth, preventing the normal rising of surface air. The highest concentrations occur during the colder months of the year when inversion conditions are more frequent. CO is a health concern because it competes with oxygen, often replacing it in the blood and reducing the blood's ability to transport oxygen to vital organs. Excess CO exposure can lead to dizziness, fatigue, and impair central nervous system functions.

- Ozone (O_3) is a colorless gas that is formed in the atmosphere when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; rather, it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of ROG and NO_X, the components of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation. Ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. The greatest source of smog-producing gases is the automobile. Short-term exposure (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

- Nitrogen Dioxide (NO_2) like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM_{10}. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere with reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase of bronchitis in children (2-3 years old) has been observed at concentrations below 0.3 ppm.

- Sulfur Dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries. Generally, the highest levels of SO_2 are found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

- Particulate Matter (PM) consists of small liquid and solid particles floating in the air, including smoke, soot, dust, salts, acids, and metals and can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair and results from fuel combustion (e.g. motor vehicles, power generation, industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as SO_2, NO_X, and VOC. Inhalable particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

  $PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, they can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body. These substances can transport absorbed gases, such as chlorides or ammonium, into the lungs and cause injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

- Lead (Pb) in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturers of batteries, paint, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source

of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95 percent. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities have become lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

- Toxic Air Contaminants (TAC) are airborne pollutants that may increase a person's risk of developing cancer or other serious health effects. TACs include over 700 chemical compounds that are identified by State and federal agencies based on a review of available scientific evidence. In California, TACs are identified through a two-step process established in 1983 that includes risk identification and risk management.

Regulatory Setting

Federal

United States Environmental Protection Agency (USEPA). The USEPA is responsible for enforcing the Federal Clean Air Act (CAA), the legislation that governs air quality in the United States. USEPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). NAAQS are required under the 1977 CAA and subsequent amendments. USEPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. USEPA has jurisdiction over emission sources outside State waters (e.g., beyond the outer continental shelf) and establishes emission standards, including those for vehicles sold in States other than California, where automobiles must meet stricter emission standards set by CARB.

As required by the CAA, NAAQS have been established for seven major air pollutants: CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, SO_2, and Pb. The CAA requires USEPA to designate areas as attainment, nonattainment, or maintenance for each criteria pollutant based on whether the NAAQS have been achieved. The federal standards are summarized in Table 3-1. The USEPA has classified the Los Angeles County portion of the South Coast Air Basin as nonattainment for O_3, $PM_{2.5}$, and PM_{10} and maintenance for CO and NO_2.

State

California Air Resources Board (CARB). In addition to being subject to the requirements of the CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for administering the CCAA and establishing the California Ambient Air Quality Standards (CAAQS). The CCAA, as amended in 1992, requires all air districts in the State to achieve and maintain the CAAQS, which are generally more stringent than the

federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

CARB has broad authority to regulate mobile air pollution sources, such as motor vehicles. It is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB established passenger vehicle fuel specifications, which became effective in March 1996. CARB oversees the functions of local air pollution control districts and air quality management districts, which, in turn, administer air quality activities at the regional and county levels. The State standards are summarized in Table 3-1.

The CCAA requires CARB to designate areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a State standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a State standard and are not used as a basis for designating areas as nonattainment.

TABLE 3-1: STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS FOR THE SOUTH COAST AIR BASIN					
Pollutant	Averaging Period	California		Federal	
		Standards	Attainment Status	Standards	Attainment Status
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m^3)	Nonattainment	--	--
	8-hour	0.070 ppm (137 µg/m^3)	/a/	0.075 ppm (147 µg/m^3)	Nonattainment
Respirable Particulate Matter (PM_{10})	24-hour	50 µg/m^3	Nonattainment	150 µg/m^3	Nonattainment
	Annual Arithmetic Mean	20 µg/m^3	Nonattainment	--	--
Fine Particulate Matter ($PM_{2.5}$)	24-hour	--	--	35 µg/m^3	Nonattainment
	Annual Arithmetic Mean	12 µg/m^3	Nonattainment	12 µg/m^3	Nonattainment
Carbon Monoxide (CO)	8-hour	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Maintenance
	1-hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Maintenance
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Nonattainment	53 ppb (100 µg/m^3)	Maintenance
	1-hour	0.18 ppm (338 µg/m^3)	Nonattainment	100 ppb (188 µg/m^3)	Maintenance
Sulfur Dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	Attainment	--	Attainment
	1-hour	0.25 ppm (655 µg/m^3)	Attainment	75 ppb (196 µg/m^3)	Attainment
Lead (Pb)	30-day average	1.5 µg/m^3	Nonattainment	--	--
	Calendar Quarter	--	--	0.15 µg/m^3	Attainment

/a/ CARB has not determined 8-hour O_3 attainment status.
Source: CARB, Ambient Air Quality Standards, and attainment status, accessed October 20, 2014 (www.arb.ca.gov/desig/adm/adm.htm)

Local

South Coast Air Quality Management District (SCAQMD). The 1977 Lewis Air Quality Management Act merged four air pollution control districts to create the SCAQMD to coordinate air quality planning efforts throughout Southern California. It is responsible for monitoring air quality, as well as planning, implementing, and enforcing programs designed to attain and maintain State and federal ambient air quality standards. Programs include air quality rules and regulations that regulate stationary sources, area sources, point sources, and certain mobile source emissions. The SCAQMD is also responsible for establishing stationary source permitting requirements and for ensuring that new, modified, or relocated stationary sources do not create net emission increases.

The SCAQMD monitors air quality over its jurisdiction of 10,743 square miles, including the South Coast Air Basin, which covers an area of 6,745 square miles and is bounded by the Pacific Ocean to the west; the San Gabriel, San Bernardino and San Jacinto mountains to the north and east; and the San Diego County line to the south. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The SCAQMD also regulates the Riverside County portion of the Salton Sea Air Basin and Mojave Desert Air Basin.

All areas designated as nonattainment under the CCAA are required to prepare plans showing how they will meet the air quality standards. The SCAQMD prepares the Air Quality Management Plan (AQMP) to address CAA and CCAA requirements by identifying policies and control measures. On December 7, 2012, the SCAQMD adopted its 2012 AQMP, which is now the legally enforceable plan for meeting the 24-hour $PM_{2.5}$ strategy standard.

The Southern California Association of Governments (SCAG) assists by preparing the transportation portion of the AQMP through the adoption of its Regional Transportation Plan (RTP). This includes the preparation of a Sustainable Communities Strategy (SCS) that responds to planning requirements of SB 375 and demonstrates the region's ability to attain greenhouse gas reduction targets set forth in State law.

In its role as the local air quality regulatory agency, the SCAQMD also provides guidance on how environmental analyses should be prepared. This includes recommended thresholds of significance for evaluating air quality impacts.

City of Calabasas General Plan. The City's 2030 General Plan addresses air quality directly through its Conservation Element. That Element includes an objective to "[a]chieve and maintain air quality levels that meet or exceed Federal and State standards by achieving consistency of General Plan policies and subsequent new development projects with the South Coast Air Quality Management Plan (AQMP) and the air quality provisions of the Regional Transportation Plan (RTP)…" It identifies five associated policies that focus on criteria pollutants:

IV-14 Minimize reliance on single occupant vehicle travel and reduce the number of vehicles on City streets during peak travel hours by maintaining transportation demand management programs in commercial and business park developments consistent with the South Coast Air Quality Management Plan.

IV-15 Minimize the need for vehicular travel through incorporation of transit and other transportation alternatives such as walking and bicycling into the design of new commercial, office, and business park developments.

IV-16 Consistent with the City's Bicycle Master Plan, promote a system of bicycle routes within Calabasas that provide recreational opportunities and represent viable routes for travel between home and school or work.

IV-17 Ensure that construction activity within Calabasas complies with applicable South Coast Air Quality Management District rules and policies.

IV-18 Minimize emissions of air pollutants, including greenhouse gases, generated by electricity and natural gas consumption through implementation of the energy conservation policies listed in subchapter IV.F and the solid waste recycling policies listed in subchapter IV.G.

IV-20 Require applicants for projects containing sensitive receptors (such as residences, schools, day care centers, and medical facilities) on sites within 500 feet of the Ventura Freeway to demonstrate that health risks relating to diesel particulates would not exceed SCAQMD health risk standards prior to project approval.

City of Calabasas Municipal Code. The City's municipal code has provisions that regulate air quality in the City from both temporary construction activities and long-term operations of facilities, including Section 15.11.090, which governs the control of dust and debris from construction sites.

Air Pollution Climatology

The Project site is located within the Los Angeles County non-desert portion of the South Coast Air Basin. The Basin is in an area of high air pollution potential due to its climate and topography. The region lies in the semi-permanent high pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The Basin experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west and high mountains around the rest of its perimeter. The mountains and hills within the area contribute to the variation of rainfall, temperature, and winds throughout the region.

The Basin experiences frequent temperature inversions that help to form smog. While temperature typically decreases with height, it actually increases under inversion conditions as altitude increases, thereby preventing air close to the ground from mixing with the air above. As a result, air pollutants are trapped near the ground. During the summer, air quality problems are created due to the interaction between the ocean surface and the lower layer of the atmosphere. This interaction creates a moist marine layer. An upper layer of warm air mass forms over the cool marine layer, preventing air pollutants from dispersing upward. Additionally, hydrocarbons and NO_2 react under strong sunlight, creating smog. Light daytime winds, predominantly from the west, further aggravate the condition by driving air pollutants inland toward the mountains.

Air quality problems also occur during the fall and winter, when CO and NO_2 emissions tend to be higher. CO concentrations are generally worse in the morning and late evening (around 10:00 p.m.) when temperatures are cooler. High CO levels during the late evenings result from stagnant atmospheric conditions trapping CO. Since CO emissions are produced almost entirely from automobiles; the highest CO concentrations in the Basin are associated with heavy traffic. NO_2 concentrations are also generally higher during fall and winter days.

Local Climate

The mountains and hills within the Basin contribute to the variation of rainfall, temperature, and winds throughout the region. Within the Project Site and its vicinity, the average wind speed, as recorded at the Camarillo Airport Monitoring Station, is approximately 6.0 miles per hour. The annual average maximum temperature in the Project area is 80°F, as measured at the Woodland Hills Pierce College Monitoring Station, with an average minimum temperature of 53°F.[1] Precipitation in the Project area averages 14.73 inches annually at the Thousand Oaks monitoring station.[2]

Air Monitoring Data

The SCAQMD monitors air quality conditions at 40 locations throughout the Basin. The Project Site is located in Area 6 (West San Fernando Valley). Historical data from the subregion were used to characterize existing conditions in the vicinity of the Project area. Table 3-2 shows pollutant levels, State and federal standards, and the number of exceedances recorded in the West San Fernando Valley from 2011 to 2013. The one-hour State standard for O_3 was exceeded 42 times from 2011 to 2013. CO and NO_2 levels did not exceed the CAAQS during this period. While localized PM_{10} concentrations are not monitored at this station, $PM_{2.5}$ concentrations exceeded federal 24-hours standards four times during this three-year period.

TABLE 3-2: ESTIMATED DAILY OPERATIONS EMISSIONS - UNMITIGATED

Pollutant	Pollutant Concentration & Standards	Northwest Coastal LA County		
		2011	2012	2013
Ozone	Maximum 1-hour Concentration (ppm)	0.13	0.129	0.124
	Days > 0.09 ppm (State 1-hour standard)	17	18	7
	Days > 0.075 ppm (Federal 8-hour standard)	26	23	11
Carbon Monoxide	Maximum 1-hour Concentration (ppm)	N/A	N/A	N/A
	Days > 20 ppm (State 1-hour standard)	N/A	N/A	N/A
	Maximum 8-hour Concentration (ppm)	2.8	2.8	2.3
	Days > 9.0 ppm (State 8-hour standard)	0	0	0
Nitrogen Dioxide	Maximum 1-hour Concentration (ppm)	0.0561	0.079	0.0582
	Days > 0.18 ppm (State 1-hour standard)	0	0	0
PM_{10}	Maximum 24-hour Concentration (µg/m^3)	N/A	N/A	N/A
	Days > 50 µg/m^3 (State 24-hour standard)	N/A	N/A	N/A
$PM_{2.5}$	Maximum 24-hour Concentration (µg/m^3)	39.8	41.6	41.8
	Days > 35 µg/m^3 (Federal 24-hour standard)	1	2	1
Sulfur Dioxide	Maximum 24-hour Concentration (ppm)	N/A	N/A	N/A
	Days > 0.04 ppm (State 24-hour standard)	N/A	N/A	N/A

Source: DKA Planning 2015, based on SCAQMD annual monitoring data (www.aqmd.gov/home/library/air-quality-data-studies/historical-data-by-year).
N/A: Not available at this monitoring station.

[1] Western Regional Climate Center, Historical Climate Information, http://www.wrcc.dri.edu, accessed March 8, 2015.

[2] Ibid.

Existing Site Emissions

There are no anthropogenic emissions on the Proposed Project site, as there are no documented structures on-site.

Project Consistency with Air Quality Plans

SCAQMD Air Quality Management Plan. The proposed residential land use will neither conflict with the SCAQMD's 2012 Air Quality Management Plan (AQMP) nor jeopardize the region's attainment of air quality standards. The regional ozone attainment plan centers on accommodating population growth forecasts by the Southern California Association of Governments (SCAG). Specifically, SCAG's growth forecasts from the 2012 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) are largely built off local growth forecasts from local governments like the City of Calabasas. The RTP/SCS accommodates up to 24,400 persons; 9,200 households; and 16,200 jobs in the City of Calabasas by 2035.

The Project would develop 71 single- and multi-family residential units in the City of Calabasas. As shown in Table 3-3, the Proposed Project could add 188 residents to the Plan area, based on the City's projected household density in the RTP/SCS. This increase is approximately 23.5 percent of growth projected by the RTP/SCS in the City over a twelve-year period from 2008-2020. The Project site is zoned "Planned Development (PD), Residential Multi-Family 20 (R-MF-20) and Open Space Resource Protection (OS-RP) with a Scenic Corridor overlay, zoning classifications that allows residential and commercial uses like the Proposed Project. As such, the RTP/SCS' assumptions about growth in the City likely accommodate housing and population growth on this site. As such, the Project does not conflict with the growth assumptions in the regional air plan and this impact is considered **less than significant**.

TABLE 3-3: ESTIMATED DAILY OPERATIONS EMISSIONS - UNMITIGATED

	Population	Project	Households	Project	Employment	Project
2008	23,000		8,500		14,800	
2020	23,800		9,000		15,400	
2035	24,400	188	9,200	71	16,200	TBD

Source: DKA Planning 2015 based on SCAG 2012 Regional Transportation Plan Growth Forecast.

City of Calabasas General Plan. As illustrated in Table 3-4, the Proposed Project is consistent with the applicable air quality policies in the General Plan. As such, the Proposed Project's impact on the City's General Plan would be considered **less than significant**.

TABLE 3-4: PROJECT CONSISTENCY WITH CITY OF CALABASAS GENERAL PLAN

Strategy	Project Consistency
Policy IV-14. Minimize reliance on single occupant vehicle travel and reduce the number of vehicles on City streets during peak travel hours by maintaining transportation demand	**Not Applicable.** The policy calls for implementation of employer-based TDM programs in commercial and business park

TABLE 3-4: PROJECT CONSISTENCY WITH CITY OF CALABASAS GENERAL PLAN	
Strategy	Project Consistency
management programs in commercial and business park developments consistent with the South Coast Air Quality Management Plan.	developments. The Proposed Project does not include these types of uses.
Policy IV-15. Minimize the need for vehicular travel through incorporation of transit and other transportation alternatives such as walking and bicycling into the design of new commercial, office, and business park developments.	**Consistent.** The Proposed Project promotes active transportation through the inclusion of seven bicycle parking spaces for the hotel.
Policy IV-16. Consistent with the City's Bicycle Master Plan, promote a system of bicycle routes within Calabasas that provide recreational opportunities and represent viable routes for travel between home and school or work.	**Neutral.** The Proposed Project does not include internal trails that connect to the regional bicycle trails.
Policy IV-17. Ensure that construction activity within Calabasas complies with applicable South Coast Air Quality Management District rules and policies.	**Consistent.** Applicable construction activities would be regulated by the SCAQMD. This includes Rule 403, which controls fugitive dust from construction activities.
Policy IV-18. Minimize emissions of air pollutants, including greenhouse gases, generated by electricity and natural gas consumption through implementation of the energy conservation policies listed in subchapter IV.F and the solid waste recycling policies listed in subchapter IV.G.	**Consistent.** The Proposed Project would include a hotel component that is subject to the City's green building ordinance and must achieve a rating of silver from the Leadership in Energy and Environmental Design (LEED). The hotel will employ a compact development design by minimizing its footprint, emphasizing native and drought-tolerant plants and landscape buffers.
Policy IV-20. Require applicants for projects containing sensitive receptors (such as residences, schools, day care centers, and medical facilities) on sites within 500 feet of the Ventura Freeway to demonstrate that health risks relating to diesel particulates would not exceed SCAQMD health risk standards prior to project approval.	**Not Applicable.** The Proposed Project boundaries are no closer than 840 feet from the Ventura Freeway. As such, a health risk assessment is not required.
Source: DKA Planning, 2015.	

Air Quality Plan Mitigation Measure

None required

Air Quality Plan Impacts After Mitigation

The air quality impacts of residential development on the Project site are accommodated in the region's emissions inventory for the 2012 RTP/SCS and 2012 AQMP. The project is therefore not expected to conflict with or obstruct implementation of the AQMP, and any impact on the Plan would be considered less than significant. Similarly, the Proposed Project is consistent with the City's General Plan and would not conflict with its goal and six policies.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? *Less Than Significant Impact with Mitigation Incorporated.*

Construction Phase Air Quality Impacts on Regional Air Quality

Construction-related emissions were estimated using the South Coast Air Quality Management District's (SCAQMD's) CalEEMod 2013.2.2 model using assumptions from the Project's

developer, including the Project's construction schedule of 34 months. Key assumptions include no net import or export of soils and the following phasing plan:

- Clearing: 3/1/16-3/31/16
- Grading: 4/1/16-11/30/16. Assumes 39 acres of total grading area, including 23.4 acres of development phase grading and 18.6 acres of remediation phase grading. Some grading of development and remediation phases is anticipated, as the development grading area will overlap with remediation grading limits.
- Underground improvements: 10/1/16-11/30/16
- House construction: 11/1/16-12/31/18
- Street improvements: 12/1/16-12/31/16
- Landscape: 1/1/17-1/31/17
- Architectural coatings: 3/1/17-12/31/18

As shown in Table 3-5, the construction of the Proposed Project will produce VOC, CO, SO_X, PM_{10} and $PM_{2.5}$ emissions that do not exceed the SCAQMD's regional thresholds. However, NO_X emissions would exceed recommended thresholds, particularly during grading, underground improvements, and street improvements in 2016. As a result, construction of the Proposed Project would contribute substantially to existing violations of air quality standards for regional pollutants (e.g., ozone). This impact is considered **significant but mitigable**.

TABLE 3-5: ESTIMATED DAILY CONSTRUCTION EMISSIONS - UNMITIGATED

	Pounds Per Day					
Construction Phase	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2016						
On-Site Emissions	25	257	145	<1	43	29
Off-Site Emissions	1	5	11	<1	1	<1
Total Emissions	26	262	156	<1	44	29
2017						
On-Site Emissions	14	79	51	<1	22	4
Off-Site Emissions	<1	2	6	<1	<1	<1
Total Emissions	14	81	57	<1	22	4
2018						
On-Site Emissions	10	30	19	<1	2	2
Off-Site Emissions	<1	<1	2	<1	<1	<1
Total Emissions	10	30	21	<1	2	2
Maximum Regional Total	26	262	156	<1	44	29
Regional Significance Threshold	75	100	550	150	150	55
Exceed Threshold?	No	Yes	No	No	No	No

TABLE 3-5: ESTIMATED DAILY CONSTRUCTION EMISSIONS - UNMITIGATED						
Maximum Localized Total	25	257	145	<1	43	29
Localized Significance Threshold	--	221	1,158	--	11	6
Exceed Threshold?	--	Yes	No	--	Yes	Yes

Source: DKA Planning, 2015 based on CalEEMod 2013.2.2 model runs. LST analyses based on 5 acre site with 25 meter distances to receptors in West San Fernando Valley source receptor area.

Construction Phase Air Quality Impacts on Local Air Quality

In terms of local air quality, the Proposed Project would produce significant emissions that exceed the SCAQMD's recommended localized standards of significance for NO_2, PM_{10} and $PM_{2.5}$ during the construction phase. These emissions could produce concentrations of these localized pollutants that could violate ambient air quality standards. As a result, construction impacts on localized air quality are considered **significant but mitigable**.

Mitigation Measures AQ1 through AQ4 call for the use of readily-available construction equipment that uses EPA-certified Tier 4 engines to reduce combustion-related PM_{10} and $PM_{2.5}$ emissions. Mitigation Measure AQ5 addresses fugitive dust emissions of PM_{10} and $PM_{2.5}$ that would be regulated by SCAQMD Rule 403, which calls for Best Available Control Measures (BACM) that include watering portions of the site that are disturbed during grading activities and minimizing tracking of dirt onto local streets. It should be noted that Table 3-5 conservatively does not assume the application of BACMs to control fugitive dust. Mitigation Measure AQ6 staggers fugitive PM_{10} emissions during earthmoving activities in the grading and underground improvement phases in 2016, as both phases have potential to produce cumulative emissions that exceed the SCAQMD's LST threshold for the residences in The Colony directly adjacent to the Proposed Project site. Staggering earthmoving for these two phases will ensure that fugitive emissions remain below significance thresholds.

Construction Phase Air Quality Mitigation Measures

AQ1 All off-road construction equipment greater than 50 hp shall meet U.S. EPA Tier 4 emission standards, where available, to reduce NO_x, PM_{10}, and $PM_{2.5}$ emissions at the Project site. In addition, all construction equipment shall be outfitted with Best Available Control Technology devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

AQ2 Require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export) and if the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall require trucks that meet U.S. EPA 2007 model year NO_x emissions requirements.

AQ3 At the time of mobilization of each applicable unit of equipment, a copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided.

AQ4 Encourage construction contractors to apply for SCAQMD Surplus Off-Road Opt-In ("SOON") funds. Incentives could be provided for those construction contractors who apply for SCAQMD "SOON" funds. The "SOON" program provides funds to accelerate clean up of off-road diesel vehicles, such as heavy-duty construction equipment. More information on this program can be found at: http://www.aqmd.gov/home/programs/business/business-detail?title=off-road-diesel-engines&parent=vehicle-engine-upgrades.

AQ5 Construction activities shall comply with SCAQMD Rule 403, including the following measures:

- Apply water to disturbed areas of the site three times a day
- Require the use of a gravel apron or other equivalent methods to reduce mud and dirt trackout onto truck exit routes
- Appoint a construction relations officer to act as a community liaison concerning on-site construction activity including resolution of issues related to p.m. generation.
- Limit soil disturbance to the amounts analyzed in the Final MND.
- All materials transported off-site shall be securely covered.
- Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more).
- Traffic speeds on all unpaved roads to be reduced to 15 mph or less.
- Require minimum soil moisture of 12 percent for earthmoving by use of a moveable sprinkler system or a water truck.

AQ6 Ensure that earthmoving associated with underground improvements does not coincide with any earthwork associated with grading to minimize fugitive PM_{10} emissions.

Construction Phase Air Quality Impacts After Mitigation

As shown in Table 3-6, implementation of Mitigation Measures AQ1 through AQ6 would substantially reduce regional VOC, NO_x, CO, PM_{10} and $PM_{2.5}$ emissions during the construction process, particularly during the site preparation and grading phases. The resulting impact on regional air quality is considered **less than significant**.

TABLE 3-6 ESTIMATED DAILY CONSTRUCTION EMISSIONS - MITIGATED

Construction Phase	Pounds Per Day					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2016						
On-Site Emissions	3	12	129	<1	7	<1
Off-Site Emissions	1	5	11	<1	1	<1
Total Emissions	3	17	140	<1	8	<1
2017						

TABLE 3-6 ESTIMATED DAILY CONSTRUCTION EMISSIONS - MITIGATED						
On-Site Emissions	7	4	35	<1	<1	<1
Off-Site Emissions	<1	<1	2	<1	<1	<1
Total Emissions	7	4	37	<1	<1	<1
2018						
On-Site Emissions	7	3	21	<1	<1	<1
Off-Site Emissions	<1	<1	2	<1	<1	<1
Total Emissions	7	3	23	<1	<1	<1
Maximum Regional Total	7	17	140	<1	8	<1
Regional Significance Threshold	75	100	550	150	150	55
Exceed Threshold?	No	No	No	No	No	No
Maximum Localized Total	7	12	129	<1	7	3
Localized Significance Threshold	--	221	1,158	--	11	6
Exceed Threshold?	--	No	No	--	No	No

Source: DKA Planning, 2015 based on CalEEMod 2013.2.2 model runs. LST analyses based on 5 acre site with 25 meter distances to receptors in West San Fernando Valley source receptor area.

With implementation of Mitigation Measures AQ1 through AQ6, construction emissions of NO_2, CO, PM_{10} and $PM_{2.5}$ would be substantially reduced and would not exceed the SCAQMD's LST thresholds. As such, the Proposed Project would not produce a local violation of air quality standards or contribute substantially to an existing or projected air quality violation. The resulting impact on localized air quality is considered **less than significant**.

Operation Phase Air Quality Impacts

The Project will also produce long-term air quality impacts to the region primarily from motor vehicles that access the Project site. The Project could add up to 1,650 net vehicle trips to and from the Project site on a peak weekday at the start of operations in 2019.[3] Operational emissions would not exceed SCAQMD's regional significance thresholds for VOC, NO_X, CO, PM_{10} and $PM_{2.5}$ emissions (Table 3-7). As a result, the Project's operational impacts on regional air quality are considered **less than significant**.

With regard to localized air quality impacts, the Proposed Project would emit minimal emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ from area and energy sources on-site. As shown in Table 3-7, these localized emissions would not approach the SCAQMD's localized significance thresholds that signal when there could be human health impacts at nearby sensitive receptors during long-term operations. The Project's operational impacts on localized air quality are considered **less than significant**.

[3] Associated Traffic Engineers, *Updated Traffic and Circulation Study Canyon Oaks Project*; February 2015.

TABLE 3-7: ESTIMATED DAILY OPERATIONS EMISSIONS - UNMITIGATED						
	Pounds per Day					
Emission Source	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	6	<1	6	<1	<1	<1
Energy Sources	<1	1	1	<1	<1	<1
Mobile Sources	5	13	59	<1	10	3
Net Regional Total	**11**	**14**	**59**	**<1**	**10**	**3**
Regional Significance Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Exceed Threshold?	No	No	No	No	No	No
Net Localized Total	**6**	**1**	**7**	**<1**	**<1**	**<1**
Localized Significance Threshold	**-**	**221**	**1,158**	**-**	**3**	**2**
Exceed Threshold?	N/A	No	No	N/A	No	No

Source: DKA Planning 2015 based on CalEEMod 2013.2.2 model runs. LST analysis based on 5 acre site with 25 meter distances to receptors in West San Fernando Valley source receptor area.

Operation Phase Air Quality Mitigation Measures

None required.

Operation Phase Air Quality Impacts After Mitigation

The long-term operation of the Proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation for regional and localized air quality.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? *Less Than Significant Impact with Mitigation Incorporated.*

Construction Phase Air Quality Impacts

For regional ozone precursors, the Project would not exceed SCAQMD mass emission thresholds for ozone precursors during construction or operations. As such, the Project's impact on cumulative ozone precursor emissions would be considered **less than significant.**

When considering local impacts, cumulative construction emissions are considered when projects are within close proximity of each other that could result in larger impacts on local sensitive receptors. While there are ten proposed developments in the vicinity of the Project site that were identified by the project's traffic study, only one cumulative project is proposed anywhere within one-half mile of the Project Site: [4]

- Calabasas Blue residences, a proposed 78-unit multi-family residential project at 4240 Las Virgenes, approximately 1060 feet southwest of the Proposed Project site.

[4] Associated Traffic Engineers, *Updated Traffic and Circulation Study Canyon Oaks Project*; February 2015.

If this potential project was to undertake construction concurrently with the Proposed Project, localized CO, $PM_{2.5}$, PM_{10}, and NO_2 concentrations at residences in The Colony, which is situated between both potential construction sites, could increase based on both project's relative contributions.

However, any cumulative impacts on residences in The Colony are expected to be less than significant for two key reasons. First, the two potential construction sites are over 1,100 feet apart; as a result, any receptors potentially impacted by both construction jobs would be in the center of the development, approximately 550 feet or more from both sites. At this distance, the SCAQMD's recommended LST thresholds are substantially higher than for those receptors in close proximity to a construction site. For example, the LST threshold for PM_{10} emissions from a construction site is approximately 67 lb/day of PM_{10} during construction, a threshold that is orders of magnitude higher than any potential daily construction emissions for the Proposed Project and likely for the Calabasas Blue proposal. Second, the proposed mitigation measures for the Proposed Project will substantially reduce daily emissions to 12, 129, 7, and 3 lb/day of emissions for NO_2, CO, $PM_{2.5}$, and PM_{10} respectively. Any potential emissions of localized pollutants during construction of the Calabasas Blue proposal would not trigger the SCAQMD's LST thresholds. As a result, cumulative impacts from construction activities would be considered **significant but mitigable**.

Construction Phase Air Quality Mitigation Measures

Mitigation Measures AQ1 through AQ6 would require the use of off-road construction equipment, construction phasing, and good housekeeping measures that substantially reduce PM_{10} and $PM_{2.5}$ emissions during on-site construction activities.

Construction Phase Air Quality Impacts After Mitigation

Construction of the Proposed Project would result in a less than considerable contribution to cumulative impacts on NO_2, CO, PM_{10} and $PM_{2.5}$ concentrations at nearby receptors. This is considered a **less than significant** impact.

Operation Phase Air Quality Impacts

As for cumulative operational impacts, the proposed land use will not produce cumulatively considerable emissions of nonattainment pollutants at the regional or local level. Because the Project's air quality impacts would not exceed the SCAQMD's operational thresholds of significance as noted in Table 3-7, the Project's impacts on cumulative emissions of non-attainment pollutants is considered **less than significant**. The Project is a residential and hotel project that does not include major sources of combustion or fugitive dust. As a result, its localized emissions of PM_{10} and $PM_{2.5}$ would be minimal. Similarly, existing land uses in the area include residential and commercial land uses that do not produce substantial emissions of localized nonattainment pollutants.

Operation Phase Air Quality Mitigation Measures

None required.

Operation Phase Air Quality Impacts After Mitigation

Long-term operation of the Project would not result in a cumulatively considerable net increase of any non-attainment criteria pollutant.

d) Expose sensitive receptors to substantial pollutant concentrations? *Less Than Significant Impact with Mitigation Incorporated.*

Construction Phase Air Quality Impacts on Sensitive Receptors

Construction of the Proposed Project could produce air emissions that impact one existing sensitive receptor near the Project Site:[5]

- The Colony at Calabasas, a neighborhood of single family homes as close as 10 feet west of the Project site

As illustrated in Table 3-5, this nearby receptor could be exposed to substantial concentrations of localized pollutants NO_2, PM_{10} and $PM_{2.5}$ from construction of the Proposed Project. Specifically, construction activities would exceed SCAQMD LST thresholds for NO_2, PM_{10} and $PM_{2.5}$ and represent a **significant but mitigable** impact. LST thresholds represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable ambient air quality standard.

Construction Phase Air Quality Mitigation Measures for Sensitive Receptors

Mitigation Measures AQ1 through AQ6 would require the use of off-road construction equipment and good housekeeping measures that substantially reduce NO_2, PM_{10} and $PM_{2.5}$ emissions during on-site construction activities.

Construction Phase Air Quality Impacts on Sensitive Receptors After Mitigation

Construction of the Proposed Project would not have any significant impacts on pollutant concentrations at nearby receptors with implementation of Mitigation Measures AQ1 through AQ6.

Operation Phase Air Quality Impacts on Sensitive Receptors

The Proposed Project would generate long-term emissions that would generate negligible pollutant concentrations of CO, NO_2, $PM_{2.5}$, or PM_{10} at sensitive receptors and would be considered **less than significant**. Long-term operations of the Project would not result in exceedances of CO air quality standards at roadways in the area. This is due to three key factors. First, CO hotspots are extremely rare and only occur in the presence of unusual atmospheric conditions and extremely cold conditions, neither of which applies to this Project

5 Stone Creek residences, a neighborhood of residences is located about 1,250 feet south of the Project site and would not be affected by construction activities on the Proposed Project site.

area. Second, auto-related emissions of CO continue to decline because of advances in fuel combustion technology in the vehicle fleet. Finally, the Project would not contribute to the levels of congestion that would be needed to produce the amount of emissions needed to trigger a potential CO hotspot. Screening analysis guidelines for localized CO hotspot analyses from Caltrans recommend that projects in CO attainment areas focus on emissions from traffic intersections where air quality may get worse.[6] Specifically, projects that significantly increase the percentage of vehicles operating in cold start mode, significantly increase traffic volumes, or worsen traffic flow should be considered for more rigorous CO modeling. Traffic levels of service at the six intersections studied in the vicinity of the Project would not be significantly impacted by traffic volumes from the development under existing or 2019 horizon scenarios with mitigation.[7] In addition, the Project would not significantly increase the percentage of vehicles operating in cold start mode or substantially worsen traffic flow.

Finally, TAC emissions are not expected to be significant, as the Proposed Project does not include typical sources of acutely and chronically hazardous TACs such as industrial manufacturing processes and automotive repair facilities. In addition, the SCAQMD recommends that health risk assessments be conducted for substantial sources of diesel particulate emissions (e.g., truck stops and warehouse distribution facilities) and has provided guidance for analyzing mobile source diesel emissions.[8] The Proposed Project is not anticipated to generate a substantial number of truck trips. Based on the limited activity of TAC sources, the Project would not warrant the need for a health risk assessment associated with on-site activities, and any minimal TAC impacts are expected to be less than significant.

Operation Phase Air Quality Mitigation Measures for Sensitive Receptors

None required.

Operation Phase Air Quality Impacts on Sensitive Receptors After Mitigation

Long-term operation of the Proposed Project would not have any significant impacts on pollutant concentrations at nearby receptors.

e) Create objectionable odors affecting a substantial number of people? *Less Than Significant Impact.*

The Proposed Project would introduce residential and hotel land uses to the area but would not result in activities that create objectionable odors. It would not include any land uses typically associated with unpleasant odors and local nuisances (e.g., rendering facilities, dry cleaners). SCAQMD regulations that govern nuisances would regulate any occasional odors associated with on-site uses such as the hotel and any restaurant uses. As a result, any odor impacts from the Project would be considered **less than significant**.

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6 Caltrans, *Transportation Project-Level Carbon Monoxide Protocol*, updated October 13, 2010.

7 Associated Traffic Engineers, *Updated Traffic and Circulation Study Canyon Oaks Project*; February 2015.

8 SCAQMD, *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions*, December 2002.

VII. GREENHOUSE GAS EMISSIONS – Would the Project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? *Less Than Significant Impact.*

The global nature of climate change creates unique challenges for assessing the Project's climate change impact under CEQA, which focuses on cause and effect. When compared to the cumulative inventory of GHG across the globe, a single Project's impact will be negligible. To further complicate this, there is debate about whether a Project's emissions are adding to the net emissions worldwide, or simply redistributing emissions that would have occurred anyway somewhere in the world.

Climate change analyses are also unique because emitting CO_2 into the atmosphere is not itself an adverse environmental effect. It is the increased concentration of CO_2 in the atmosphere resulting in global climate change and the associated consequences of climate change that results in adverse environmental affects (e.g., sea level rise, loss of snowpack, severe weather events). Although it is possible to estimate a Project's incremental contribution of CO_2 into the atmosphere, it is typically not possible to determine whether or how an individual Project's relatively small incremental contribution might translate into physical effects on the environment. Nevertheless, both short-term impacts occurring during construction and long-term effects related to the ongoing operation of the Project are discussed in this section.

Pollutants and Effects

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation entering Earth's atmosphere is absorbed by the Earth's surface. When the Earth emits this radiation back toward space, the radiation changes from high-frequency solar radiation to lower-frequency infrared radiation. GHGs are transparent to solar radiation and absorb infrared radiation. As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

GHGs that contribute to the greenhouse effect include:

- Carbon Dioxide (CO_2) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO_2 emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems. CO_2 comprises over 80 percent of GHG emissions in California.[9]
- Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment. Mobile sources represent 0.5 percent of overall methane emissions.[10]

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[9] California Environmental Protection Agency, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006, p. 11.

[10] United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2003,* April 2005 (EPA 430-R-05-003).

- Nitrous Oxide (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 14 percent of N_2O emissions.[11] N_2O emissions from motor vehicles generally occur directly from operation of vehicles.
- Hydrofluorocarbons (HFCs) are one of several high global warning potential (GWP) gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.
- Perfluorocarbons (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs are generally negligible from motor vehicles.
- Sulfur Hexafluoride (SF_6) is another high GWP gas that is not naturally occurring and are generated in a variety of industrial processes. Emissions of SF_6 are generally negligible from motor vehicles.

For most non-industrial development projects, motor vehicles make up the bulk of GHG emissions, particularly carbon dioxide, methane, nitrous oxide, and HFCs.[12] As illustrated in Table 7-1, the other GHGs are less abundant but have higher GWP than CO_2. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. High GWP gases such as HFCs, PFCs, and SF_6 are the most heat-absorbent.

TABLE 7-1: GLOBAL WARMING POTENTIAL FOR GREENHOUSE GASES

Greenhouse Gas	Global Warming Potential (100-Year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265
Perfluorocarbons (PFCs)	7,000-11,000
Hydrofluorocarbons (HFCs)	100-12,000
Sulfur Hexafluoride (SF_6)	23,500

Source: California Air Resources Board, *First Update to the Climate Change Scoping Plan*. May 2014.

The effects of increasing global temperature are far-reaching and difficult to quantify. If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. According to a California Energy Commission report, the snowpack portion of the supply could potentially

11 United States Environmental Protection Agency, *U.S. Adipic Acid and Nitric Acid N2O Emissions 1990-2020: Inventories, Projections and Opportunities for Reductions*, December 2001

12 California Air Resources Board, Climate Change Emission Control Regulations, 2004

decline by 70 to 90 percent by the end of the 21st century. This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population. Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system. Sea level has risen approximately seven inches during the last century and, according to the CEC report, it is predicted to rise an additional 22 to 35 inches by 2100, depending on the future GHG emissions levels. If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion and disruption of wetlands. As the existing climate throughout California changes over time, mass migration of species, or worse, failure of species to migrate in time to adapt to the perturbations in climate, could also result.

While efforts to reduce the rate of GHG emissions continue, the State has developed a strategy to adapt the State's infrastructure to the impacts of climate change. The 2009 California Climate Adaptation Strategy (Strategy) analyzes risks and vulnerabilities and proposes strategies to reduce risks. The Strategy begins what will be an ongoing process of adaptation, as directed by Governor Schwarzenegger's Executive Order S-13-08. The Strategy analyzes two components of climate change: (1) projecting the amount of climate change that may occur using computer-based global climate models and (2) assessing the natural or human systems' abilities to cope with and adapt to change by examining past experience with climate variability and extrapolating from this to understand how the systems may respond to the additional impact of climate change. The Strategy's key preliminary adaptation recommendations include:

- Appointment of a Climate Adaption Advisory Panel;
- Improved water management in anticipation of reduced water supplies, including a 20 percent reduction in per capita water use by 2020 from 2011 levels;
- Consideration of project alternatives that avoid significant new development in areas that cannot be adequately protected from flooding due to climate change;
- Preparation of agency-specific adaptation plans, guidance or criteria by September 2010;
- Consideration of climate change impacts for all significant State projects;
- Assessment of climate change impacts on emergency preparedness;
- Identification of key habitats and development of plans to minimize adverse effects from climate change;
- Development of guidance by the California Department of Public Health by September 2010 for use by local health departments to assess adaptation strategies;
- Amendment of General Plans and Local Coastal Plans to address climate change impacts and to develop local risk reduction strategies; and
- Inclusion of climate change impact information into fire program planning by State fire fighting agencies.

Regulatory Setting

International

Kyoto Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States (the "U.S.") joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG emissions in the U.S. The plan currently consists of more than 50 voluntary programs for member nations to adopt.

The Kyoto Protocol (the "Protocol") is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Some have estimated that if the commitments outlined in the Protocol are met, global GHG emissions could be reduced an estimated five percent from 1990 levels during the first commitment period of 2008-2012. Notably, while the U.S. is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol's commitments. In December 2009, international leaders from 192 nations met in Copenhagen to address the future of international climate change commitments post-Protocol.

The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The targets amount to an average of five percent reduction levels against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the UNFCCC is that while the UNFCCC encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

Negotiations after the Protocol have continued in an attempt to address the period after the first "commitment period" of the Protocol, which is set to conclude at the end of 2012. In Durban, South Africa, parties to the protocol agreed in principle to negotiate a new comprehensive and legally binding climate agreement by 2015 to enter into force for all parties from 2020. However, significant divisions remain in determining the parameters of any such new protocol, including its enforcement mechanisms and the degree to which developing economies will begin to be subject to binding emissions targets.

The Western Regional Climate Action Initiative (WCI)

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states, including California, and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region's electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated that this would require 2007 levels to be reduced worldwide between 50 percent and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board's (CARB) planned cap and-trade

program, discussed below, is also intended to link California and the other member states and provinces.

Federal

The U.S. Environmental Protection Agency (the "USEPA") has historically not regulated GHG emissions because it determined the Clean Air Act did not authorize it to regulate emissions that addressed climate change. In 2007, the U.S Supreme Court found that GHG emissions could be considered within the Clean Air Act's definition of a pollutant.[13] In December 2009, USEPA issued an endangerment finding for GHG emissions under the Clean Air Act, setting the stage for future regulation. In September 2009, the National Highway Traffic Safety Administration and USEPA announced a joint rule that would tie fuel economy to GHG emission reduction requirements. By 2016, this could equate to an overall light-duty vehicle fleet average fuel economy of 35.5 miles per gallon.

In June 2013, President Obama announced a Climate Action Plan that calls for a number of initiatives, including funding $8 billion in advanced fossil energy efficiency projects, calls for federal agencies to develop new emission standards for power plants, invests in renewable energy sources, calling for adaptation programs, and leading international efforts to address climate change. In September 2013, USEPA announced its first steps to implement a portion of the Obama Climate Action Plan by proposing carbon pollution standards for new power plants. These proposals are undergoing the rulemaking process as of Fall 2013.

Vehicle Standards

Other regulations have been adopted to address vehicle standards including the USEPA and National Highway Traffic Safety Administration (the "NHTSA") joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011.[14]
- On May 7, 2010, the USEPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016.[15]
- On August 9, 2011, USEPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles.[16]
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking.[17]
- In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the USEPA and the NHTSA announced fuel economy and GHG emissions standards for medium- and heavy-duty trucks that applies to vehicles from model year 2014–2018.[18]

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13 Massachusetts v. Environmental Protection Agency et al (127 S. Ct. 1438 [2007])

14 NHSTA. 2009. Average Fuel Economy Standards Passenger Cars and Light Trucks Model Year 2011, Final Rule. 75 Fed. Reg. 25324.

15 USEPA. 2010. Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, Final Rule. 75 Fed. Reg. 25324.

16 Available http://www.gpo.gov/fdsys/pkg/FR-2011-08-09/pdf/2011-19905.pdf. Accessed November 2011.

17 NHSTA. 2012. 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. 77 Fed. Reg. 62624.

Energy Independence and Security Act (the "EISA")

Among other key measures, the EISA would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:

1) Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2) Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.
3) While superseded by NHTSA and USEPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

State

Assembly Bill 1493

California has adopted a series of laws and programs to reduce emissions of GHGs into the atmosphere. Assembly Bill (AB) 1493 was enacted in September 2003 and requires regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by vehicles used for personal transportation.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05, which set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The California Environmental Protection Agency (Cal EPA) formed a Climate Action Team ("CAT") that recommended strategies that can be implemented by state agencies to meet GHG emissions targets.

Assembly Bill 32

In September 2006, AB 32 was signed into law by Governor Arnold Schwarzenegger, focusing on achieving GHG emissions equivalent to statewide levels in 1990 by 2020. It mandates that CARB

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[18] USEPA Office of Transportation and Air Quality. 2011. EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium-and Heavy-Duty Vehicles. Available: http://www.epa.gov/otaq/climate/documents/420f11031.pdf. Accessed November 2011.

establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

AB 32 charges CARB with the responsibility to monitor and regulate sources of GHG emissions. On June 1, 2007, CARB adopted three early action measures: setting a low carbon fuel standard, reducing refrigerant loss from motor vehicle air conditioning maintenance, and increasing methane capture from landfills.[19] On October 25, 2007, CARB approved measures improving truck efficiency (i.e., reducing aerodynamic drag), electrifying port equipment, reducing PFCs from the semiconductor industry, reducing propellants in consumer products, promoting proper tire inflation in vehicles, and reducing sulfur hexaflouride emissions from the non-electricity sector. CARB also developed a mandatory reporting program on January 1, 2008 for large stationary combustion sources that emit more than 25,000 metric tons of CO_2 per year and make up 94 percent of the point source CO_2 emissions in California.

CARB developed an AB 32 Scoping Plan that contains strategies to achieve the 2020 emissions cap. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in October 2008 (the "2008 Scoping Plan"). The 2008 Scoping Plan proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce the state's dependence on oil, diversify the state's energy sources, save energy, create new jobs, and enhance public health. An important component of the plan is a cap-and-trade program covering 85 percent of the state's emissions. Additional key recommendations of the 2008 Scoping Plan include strategies to enhance and expand proven cost-saving energy efficiency programs; implementation of California's clean cars standards and increasing the amount of clean and renewable energy used to power the state. Furthermore, the 2008 Scoping Plan proposes full deployment of the California Solar Initiative, high-speed rail, water-related energy efficiency measures, and a range of regulations to reduce emissions from trucks and from ships docked in California ports. As required by AB 32, CARB must update its Scoping Plan every five years to ensure that California remains on the path toward a low carbon future.

In order to assess the scope of reductions needed to return to 1990 emissions levels, CARB first estimated the 2020 "business-as-usual" (BAU) GHG emissions in the 2008 Scoping Plan. These are the GHG emissions that would be expected to result if there were no GHG emissions reduction measures, and as if the state were to proceed on its pre-AB 32 GHG emissions track. After estimating that statewide 2020 BAU GHG emissions would be 596 metric tons, the 2008 Scoping Plan then identified recommended GHG emissions reduction measures that would reduce BAU GHG emissions by approximately 174 metric tons (an approximately 28.4 percent reduction) by 2020.

On August 19, 2011, following legal action in opposition to the Scoping Plan, CARB updated the Scoping Plan through a Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED or 2011 Scoping Plan).[20] CARB updated their 2020 BAU emissions estimate to

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[19] California Air Resources Board, Proposed Early Action Measures to Mitigate Climate Change in California, April 20, 2007.

[20] California Air Resources Board, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, August 19, 2011.

account for the effect of the 2007–2009 economic recession, new estimates for future fuel and energy demand, and the reductions achieved through implementation of regulations recently adopted for motor vehicles, building energy efficiency standards, and renewable energy.[21] Under that scenario, the State would have had to reduce its BAU GHG emissions by approximately 21.7 percent by 2020 (down from 28.4 percent).

On May 22, 2014, CARB approved its first update to the AB 32 Scoping Plan, recalculating 1990 GHG emissions using IPCC Fourth Assessment Report (AR4) released in 2007. It states that based on the AR4 global warming potentials, the 427 $MMTCO_2e$ 1990 emissions level and 2020 GHG emissions limit would be slightly higher than identified in the Scoping Plan, at 431 $MMTCO_2e$. Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the FED and updated 1990 emissions levels identified in the draft first update to the Scoping Plan, achieving the 1990 emission level would require a reduction of 76 $MMTCO_2e$ (down from 507 $MMTCO_2e$) or a reduction by approximately 15 percent (down from 28.4 percent) to achieve in 2020 emissions levels in the BAU condition.

State Bill 1368

Senate Bill (SB) 1368, requires the California Public Utilities Commission and the California Energy Commission to establish GHG emissions performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the state.

SB 97 & CEQA Guidelines

In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97), requiring the Governor's Office of Planning and Research (OPR) to prepare and transmit new CEQA guidelines for the mitigation of GHG emissions or the effects of GHG emissions to the Resources Agency by July 1, 2009. In response to SB 97, the OPR adopted CEQA guidelines that became effective on March 18, 2010. The amendments provide guidance to public agencies on analysis and mitigation of the effects of GHG emissions in CEQA documents, including the following:

- Lead agencies should quantify all relevant GHG emissions and consider the full range of project features that may increase or decrease GHG emissions as compared to the existing setting;
- Consistency with the CARB Scoping Plan is not a sufficient basis to determine that a project's GHG emissions would not be cumulatively considerable;
- A lead agency may appropriately look to thresholds developed by other public agencies, including the CARB's recommended CEQA thresholds;
- To qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project. General compliance with a plan, by itself, is not mitigation;
- The effects of GHG emissions are cumulative and should be analyzed in the context of CEQA's requirements for cumulative impact analysis; and

[21] California Air Resources Board, *Greenhouse Gas Inventory – 2020 Emissions Forecast,* http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Accessed June 2014.

- Given that impacts resulting from GHG emissions are cumulative, significant advantages may result from analyzing such impacts on a programmatic level. If analyzed properly, later projects may tier, incorporate by reference, or otherwise rely on the programmatic analysis.

State Bill 375

On September 30, 2008, SB 375 was instituted to help achieve AB 32 goals through regulation of cars and light trucks. SB 375 aligns three policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve GHG emissions reductions targets for the transportation sector. It establishes a process for CARB to develop GHG emissions reductions targets for each region (as opposed to individual local governments or households). SB 375 also requires Metropolitan Planning Organizations ("MPOs") to prepare a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP) that guides growth while taking into account the transportation, housing, environmental, and economic needs of the region. SB 375 uses CEQA streamlining as an incentive to encourage residential projects, which help achieve AB 32 goals to reduce GHG emissions. While SB 375 does not prevent CARB from adopting additional regulations, such actions are not anticipated in the foreseeable future.[22]

On October 24, 2008, CARB published draft guidance for setting interim GHG emissions significance thresholds. This was the first step toward developing the recommended statewide interim thresholds of significance for GHG emissions that may be adopted by local agencies for their own use. The guidance does not attempt to address every type of project that may be subject to CEQA, but instead focuses on common project types that are responsible for substantial GHG emissions (i.e., industrial, residential, and commercial projects). CARB's preliminary proposal consisted of a quantitative threshold of 7,000 metric tons (MT) of CO_2e per year for operational emissions (excluding transportation), and performance standards for construction and transportation emissions. Further, CARB's proposal sets forth draft thresholds for industrial projects that have high operational stationary GHG emissions, such as manufacturing plants, or uses that utilize combustion engines.[23] There is currently no timetable for finalized thresholds.

On September 23, 2010, CARB adopted regional targets for the reduction of GHG emissions applying to the years 2020 and 2035.[24] For the area under the Southern California Association of Governments' (SCAG) jurisdiction—including the Project area—CARB adopted Regional Targets for reduction of GHG emissions by 8 percent for 2020 and by 13 percent for 2035. On February 15, 2011, the CARB's Executive Officer approved the final targets.[25]

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22 American Planning Association, California Chapter, *Analysis of SB 375*, http://www.calapa.org/-en/cms/?2841, accessed March 30, 2009.

23 California Air Resources Board. *http://www.arb.ca.gov/cc/localgov/ceqa/meetings/102708/prelimdraftproposal102408.pdf*

24 California Air Resources Board. Notice of Decision: Regional Greenhouse Gas Emissions Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375. http://www.arb.ca.gov/cc/sb375/notice%20of%20decision.pdf

25 CARB. 2011. Executive Order No. G-11-024: Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375.

The SCS for the southern California region, including Riverside, Los Angeles, Orange, and San Bernardino counties was prepared by SCAG and approved on April 4, 2012. SCAG's SCS is included in the SCAG 2012-2035 Regional Transportation Plan Sustainable Communities Strategy (the "RTP/SCS").

The RTP/SCS plans to concentrate future development and provide higher intensity development, including residential development, in proximity to transit hubs in order to reduce vehicle miles traveled (VMT) and thereby reduce GHG emissions from personal vehicles. To conduct required modeling analysis for the 2012-2035 RTP/SCS, SCAG distributes the growth forecast to transportation analysis zones (TAZs) to capture localized effects of the interaction of land use and transportation. The TAZ level maps have been development for the purpose of modeling performance only.[26] The growth and land use assumptions are to be adopted at the jurisdictional level.[27] Further, it is important to note that there is nothing in SB 375 that requires a city's "land use policies and regulations…to be consistent with the regional transportation plan or an alternative planning strategy."[28]

The RTP/SCS also includes an appendix listing examples of measures that could reduce impacts from planning, development and transportation.[29] It notes, however, that the example measures are "not intended to serve as any kind of checklist to be used on a project-specific basis." Since every project and project setting is different, project-specific analysis is needed to identify applicable and feasible mitigation. These mitigation measures are particularly important where streamlining mechanisms under SB 375 are utilized. Example GHG emissions reduction measures include the following:

- **GHG1**: SCAG member cities and the county governments may adopt and implement Climate Actions Plans (CAPS, also known as Plans for the Reduction of Greenhouse Gas Emissions as described in CEQA Guidelines Section 15183.5 Tiering and Streamlining the Analysis of Greenhouse Gas Emissions).

- **GHG2**: Project sponsors may require Best Available Control Technology (BACT) during construction and operation of projects, including:
    a) Solicit bids that include use of energy and fuel-efficient fleets;
    b) Solicit preference construction bids that use BACT, particularly those seeking to deploy zero- and/or near zero emission technologies;
    c) Employ use of alternative fueled vehicles;
    d) Use lighting systems that are energy efficient, such as LED technology;
    e) Use CEQA Guidelines Appendix F, Energy Conservation, to create an energy conservation plan;
    f) Streamline permitting process to infill, redevelopment, and energy-efficient projects;
    g) Use an adopted emissions calculator to estimate construction-related emissions;

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[26] Southern California Association of Governments, 2012-2035 Regional Transportation Plan Sustainable Communities Strategy, p. 124.

[27] Ibid.

[28] California Gov't. Code §65080(b)(2)(E).

[29] Southern California Association of Governments, *Final PEIR, 2012-2035 RTP/SCS, Appendix* G: *http://rtpscs.scag.ca.gov/Documents/peir/2012/final/2012fPEIR_AppendixG_ExampleMeasures.pdf*.

h) Use the minimum feasible amount of GHG-emitting construction materials that is feasible;
i) Use of cement blended with the maximum feasible amount of flash or other materials that reduce GHG emissions from cement production;
j) Use of lighter-colored pavement where feasible;
k) Recycle construction debris to maximum extent feasible; and
l) Plant shade trees in or near construction projects where feasible.

- **GHG3**: Local jurisdictions can and may establish a coordinated, creative public outreach activities, including publicizing the importance of reducing GHG emissions and steps community members may take to reduce their individual impacts.

- **GHG4**: Pedestrian and Bicycle Promotion: Local jurisdictions may work with local community groups and business associations to organize and publicize walking tours and bicycle events, and to encourage pedestrian and bicycle modes of transportation.

- **GHG5**: Waste Reduction: Local jurisdictions can and may organize workshops on waste reduction activities for the home or business, such as backyard composting, or office paper recycling, and may schedule recycling drop-off events and neighborhood chipping/mulching days.

- **GHG6**: Water Conservation: Local jurisdictions may organize support and/or sponsor workshops on water conservation activities, such as selecting and planting drought tolerant, native plants in landscaping, and installing advanced irrigation systems.

- **GHG7**: Energy Efficiency: Local jurisdictions may organize workshops on steps to increase energy efficiency in the home or business, such as weatherizing the home or building envelope, installing smart lighting systems, and how to conduct a self-audit for energy use and efficiency.

- **GHG8**: Schools Programs: Local jurisdictions may develop and implement a program to present information to school children about climate change and ways to reduce GHG emissions, and may support school-based programs for GHG reduction, such as school based trip reduction and the importance of recycling.

Title 24 Energy Efficiency Standards

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

California Green Building Standards

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations (the "CCR"), is commonly referred to as the CALGreen Code. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The 2010 CALGreen

Code included mandatory requirements for state-regulated buildings and structures throughout California, including requirements for construction site selection, storm water control during construction, construction waste reduction, indoor water use reduction, material selection, natural resource conservation, site irrigation conservation and more. The CALGreen Code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The CALGreen Code also requires building commissioning which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems are functioning at their maximum efficiency. The updated 2013 CALGreen Code became effective January 1, 2014 and includes new requirements for additions to existing residential and non-residential development.

Regional

South Coast Air Quality Management District Recommendations for Significance Thresholds

The South Coast Air Quality Management District (SCAQMD) convened a GHG CEQA Significance Threshold Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. Members included government agencies implementing CEQA and representatives from stakeholder groups that will provide input to the SCAQMD staff on developing GHG CEQA significance thresholds. On December 5, 2008, the SCAQMD Governing Board adopted interim GHG significance threshold for projects where the SCAQMD is lead agency. This threshold uses a tiered approach to determine a project's significance, with 10,000 metric tons of CO_2 equivalent ($MTCO_2e$) as a screening numerical threshold for stationary sources.

The SCAQMD has not adopted guidance for CEQA projects under other lead agencies. In September 2010, the Working Group released additional revisions which recommended a screening threshold of 3,500 $MTCO_2e$ for residential projects, 1,400 $MTCO_2e$ for commercial projects, and 3,000 $MTCO_2e$ for mixed use projects, additionally the Working Group identified project-level efficiency target of 4.8 $MTCO_2e$ per service population as a 2020 target and 3.0 $MTCO_2e$ per service population as a 2035 target. The recommended area wide or plan-level target for 2020 was 6.6 $MTCO_2e$ and the plan-level target for 2035 was 4.1 $MTCO_2e$. The SCAQMD has not established a timeline for formal consideration of these thresholds.[30] In the meantime, the project level thresholds are used as a non-binding guide; GHG emissions would be considered potentially significant in the absence of mitigation measures.

The SCAQMD has also adopted Rules 2700, 2701, and 2702 that address GHG emissions reductions. However, these rules address boilers and process heaters, forestry, and manure management projects, none of which are proposed or required by the Project.

Local

[30] SCAG, *Final PEIR for the 2012-2035 RTP/SCS, Appendix G. Accessible at* http://rtpscs, scag.ca.gov/Documents/peir/2012fPEIR_AppendixG_ExampleMeasures.pdf

City of Calabasas General Plan. The City's General Plan addresses climate change directly through its Conservation Element. That Element includes an objective to "[r]educe greenhouse gas emissions to 1990 levels as stipulated in the California Global Warming Solutions Act (AB 32)." It identifies a policy that focus on GHG emissions:

IV-19 Reduce per capita emissions of greenhouse gases by at least 25% from 2005 levels as stipulated in AB 32.

Construction Phase Impacts on Climate Change

Construction of the Proposed Project would emit GHG emissions through the combustion of fossil fuels by heavy-duty construction equipment and through vehicle trips generated by construction workers and vendors traveling to and from the Project site. These impacts would vary day to day over the 34-month duration of construction activities. As illustrated in Table 7-2, construction emissions of CO_2 would peak in 2016, when up to 18,503 pounds of CO_2e per day are anticipated following implementation of recommended Mitigation Measures AQ1 through AQ6.

TABLE 7-2: ESTIMATED CONSTRUCTION EMISSIONS – MITIGATED (Pounds per Day)

Construction Year	CO_2	CH_4	N_2O	CO_2e
2016	18,408	5	0	18,503
2017	7,588	2	0	7,627
2018	3,831	1	0	3,850

Source: DKA Planning 2015, based on CalEEMod 2013.2.2

The analysis in this report uses the 2014 Revised AB 32 Scoping Plan's statewide goals as the basis for the GHG significance threshold (i.e., 15.8 percent reduction from BAU). The report's methodology is to compare the Project's emissions as proposed to the Project's emissions if the Project were built using a BAU (or No Action Taken, NAT) approach in terms of design, methodology, and technology. This means the Project's emissions were calculated as if the Project was constructed before AB 32 to the Project as constructed with project design features to reduce GHG and with several regulatory measures adopted in furtherance of AB 32.

Both one-time emissions and indirect emissions are expected to occur each year after build-out of the Project. One-time emissions from construction and vegetation removal were amortized over a 30-year period because no significance threshold has been adopted for such emissions. The Project emission reductions are results of Project's commitments and regulatory changes, which include the implementation of the Renewables Portfolio Standard (RPS) of 33 percent, the Pavley regulation and Advanced Clean Cars program mandating higher fuel efficiency standards for light-duty vehicles, and the Low Carbon Fuel Standard (LCFS).

Greenhouse gas emissions were calculated for long-term operations. As shown in Table 7-3, the emissions for the Project and its associated CARB 2020 NAT scenario are estimated to be 2,647 and 3,839 $MTCO_2e$ per year, respectively, which shows the Project will reduce emissions by 31 percent from the CARB 2020 NAT scenario. Based on these results, the Project meets the reduction target as a numeric threshold (15.8 percent) set forth in the 2014 Revised AB 32

Scoping Plan. As a result, the Project's contribution to global climate change is not "cumulatively considerable" and is considered **less than significant**.

TABLE 7-3: ESTIMATED ANNUAL CO_2e GREENHOUSE GAS EMISSIONS (Metric Tons per Year)				
Scenario and Source	Business As Usual Scenario*	As Proposed Scenario	Reduction from Business As Usual Scenario	Change from Business as Usual Scenario
Area Sources	18	18	-	0%
Energy Sources	882	512	-370	-42%
Mobile Sources	2,773	1,947	-826	-30%
Waste Sources	67	67	-	0%
Water Sources	49	49	-	0%
Construction	67	67	-	0%
Total Emissions	3,855	2,659	-1,197	-31%

Daily construction emissions amortized over 30-year period pursuant to SCAQMD guidance. Annual construction emissions derived by taking total emissions over duration of activities and dividing by construction period. To ensure a conservative estimate, emissions from existing development were not included in the calculation of net emissions increases.

* BAU scenario does not assume 30% reduction in in mobile source emissions from Pavley emission standards (19.8%), low carbon fuel standards (7.2%), vehicle efficiency measures 2.8%); does not assume 42% reduction in energy production emissions from the State's renewables portfolio standard (33%), natural gas extraction efficiency measures (1.6%), and natural gas transmission and distribution efficiency measures (7.4%).

Source: DKA Planning, 2015.

The Proposed Project includes a hotel that is subject to the City of Calabasas's green building ordinance. As such, it must achieve a rating of silver from the Leadership in Energy and Environmental Design (LEED). The hotel will employ a compact development design by minimizing its footprint, emphasizing native and drought-tolerant plants and landscape buffers, and employing other design features that will reduce its energy and resource consumption. Projects that are LEED certified generally exceed Title 24 (2013) standards by at least 10 percent.[31] The residences would incorporate energy-conserving features through CalGreen and Title 24 requirements that would reduce direct and indirect GHG emissions. As such, it would incorporate several design elements and programs that will reduce the carbon footprint of the development, including:

1. **GHG Emissions Associated with Planning and Design.** The Project must have measures to reduce storm water pollution, provide designated parking for bicycles and low-emission vehicles, have wiring for electric vehicles, reduce light pollution, and design grading and paving to keep surface water from entering buildings.

2. **GHG Emissions Associated with Energy Demand.** The Project must meet Title 24 2013 standards and include Energy Star appliances, have pre-wiring for future solar facilities, and off-grid pre-wiring for future solar facilities.

[31] U.S. Green Building Council. "Interpretation 10396" accessed at http://www.usgbc.org/leed-interpretations?keys=10396 March 5, 2015.

3. **GHG Emissions Associated with Water Use.** The Project would be required to provide a schedule of plumbing fixtures and fixture fittings that reduce potable water use within the development by at least 20 percent. It must also provide irrigation design and controllers that are weather- or soil moisture-based and automatically adjust in response to weather conditions and plants' needs. Wastewater reduction measures must be included that help reduce outdoor potable water use.

4. **GHG Emissions Associated with Solid Waste Generation.** The Project is subject to construction waste reduction of at least 50 percent. In addition, project site operations are subject to AB 939 requirements to divert 50 percent of solid waste to landfills through source reduction, recycling, and composting. The Project is required by the California Solid Waste Reuse and Recycling Access Act of 1991 to provide adequate storage areas for collection and storage of recyclable waste materials.

5. **GHG Emissions Associated with Environmental Quality.** The Project must meet strict standards for any fireplaces and woodstoves, covering of duct openings and protection of mechanical equipment during constructions, and meet other requirements for reducing emissions from flooring systems, any CFC and halon use, and other project amenities.

In addition to the GHG emission reductions described above, it is important to note that the CO_2 estimates from mobile sources (particularly CO_2, CH_4, and N_2O emissions) are likely much greater than the emissions that would actually occur. The methodology used assumes that all emissions sources are new sources and that emissions from these sources are 100 percent additive to existing conditions. This is a standard approach taken for air quality analyses. In many cases, such an assumption is appropriate because it is impossible to determine whether emissions sources associated with a project move from outside the air basin and are in effect new emissions sources, or whether they are sources that were already in the air basin and just shifted to a new location. Because the effects of GHGs are global, a project that shifts the location of a GHG-emitting activity (e.g., where people live, where vehicles drive, or where companies conduct business) would result in no net change in global GHG emissions levels.

For example, if a substantial portion of California's population migrated from the South Coast Air Basin to the San Joaquin Valley Air Basin, this would likely decrease GHG emissions in the South Coast Air Basin and increase emissions in the San Joaquin Valley Air Basin, but little change in overall global GHG emissions. However, if a person moves from one location where the land use pattern requires auto use (e.g., commuting, shopping) to a new development that promotes shorter and fewer vehicle trips, more walking, and overall less energy usage, then it could be argued that the new development would result in a potential net reduction in global GHG emissions.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? *Less Than Significant Impact.*

AB 32 Scoping Plan. The Project will contribute to cumulative increases in GHG emissions over time in the absence of policy intervention. As noted earlier, the Proposed Project would be consistent with a number of relevant plans and policies that govern climate change. In particular, the Project is consistent with the State's Executive Order S-3-05, which calls for reducing GHG emissions statewide to 1990 levels, including 15 percent reductions by 2020. In addition, the Proposed Project is consistent with SCAG's 2012-2035 RTP/SCS, which calls for regional growth and transportation emissions to be consistent with regional and State air pollution objectives. With regard to local policies and regulations, the Proposed Project will comply with the City of Calabasas's green building ordinance. As such, it must achieve a LEED silver certification that will reduce emissions beyond a BAU scenario.

The AB 32 Scoping Plan provides the basis for policies that will reduce cumulative GHG emissions within California to 1990 levels by 2020. As a result, the Proposed Project is judged against its consistency with the AB 32 Scoping Plan to determine whether it will result in adverse cumulative impacts to global climate change. As shown in Table 7-4, the Project would be consistent with all feasible and applicable strategies recommended in the Scoping Plan. As a result, the Project is consistent with the State's AB32 Scoping Plan and its impact on statewide climate change policy is considered **less than significant**.

TABLE 7-4: PROJECT CONSISTENCY WITH AB 32 SCOPING PLAN GREENHOUSE GAS EMISSION REDUCTION STRATEGIES

Strategy	Project Consistency
California Cap-and-Trade Program. Implement a broad-based California cap-and-trade program to provide a firm limit on emissions.	**Not Applicable.** The statewide program is not relevant to the Proposed Project.
California Light-Duty Vehicle Greenhouse Gas Standards. Implement adopted Pavley standards and planned second phase of the system. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.	**Not Applicable.** The development of standards is not relevant to the Proposed Project.
Energy Efficiency. Maximize energy efficiency building and appliance standards and pursue additional efficiency efforts including new technologies, and new policy and mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.	**Consistent.** The residential portion of the Project is designed to meet Cal Green building standards by including several measures designed to reduce energy consumption. The hotel will be certified to LEED silver standards and reduce energy consumption at least 10 percent beyond Title 24 standards.
Renewables Portfolio Standard. Achieve 33 percent renewable energy mix statewide.	**Consistent.** The Project will utilize energy from Southern California Edison, which has goals to diversify its portfolio of energy sources to increase the use of renewable energy. As of 2012, 20 percent of its energy portfolio came from wind, geothermal, solar, and other renewable energy sources.
Low-Carbon Fuel Standard. Develop and adopt the Low Carbon Fuel Standard.	**Not Applicable.** The statewide program is not relevant to the Proposed Project.
Regional Transportation-Related Greenhouse Gases. Develop regional greenhouse gas emissions reduction targets for passenger vehicles.	**Not Applicable.** The development of regional planning goals is not relevant to the Proposed Project.
Vehicle Efficiency Measures. Implement light-duty vehicle efficiency measures.	**Not Applicable.** State agencies are responsible for implementing efficiency measures.
Goods Movement. Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	**Not Applicable.** State agencies are responsible for implementing regulations and promoting efficiency in goods movement.

TABLE 7-4: PROJECT CONSISTENCY WITH AB 32 SCOPING PLAN GREENHOUSE GAS EMISSION REDUCTION STRATEGIES

Strategy	Project Consistency
Million Solar Roofs Program. Install 3,000 MW of solar-electric capacity under California's existing solar programs.	**Neutral.** The Proposed Project does not include solar roofs and is not part of the proposed Statewide initiative.
Medium/Heavy-Duty Vehicles. Adopt medium and heavy-duty vehicle efficiency measures.	**Not Applicable.** State agencies are responsible for implementing efficiency measures.
Industrial Emissions. Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission.	**Not Applicable.** This measure addresses industrial facilities.
High Speed Rail. Support implementation of a high speed rail system.	**Not Applicable.** This calls for the California High Speed Rail Authority and stakeholders to develop a statewide rail transportation system.
Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Consistent.** The residential portion of the Project is designed to meet Cal Green building standards and will include several measures designed to reduce energy consumption. The hotel will be certified to LEED silver standards and reduce energy consumption at least 10 percent beyond Title 24 standards.
High Global Warming Potential Gases. Adopt measures to reduce high global warming potential gases.	**Not Applicable.** State agencies are responsible for implementing these measures.
Recycling and Waste. Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials and mandate commercial recycling. Move toward zero waste.	**Consistent.** The Project is expected to have minimal impact on solid waste facilities.
Sustainable Forests. Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	**Not Applicable.** Resource Agency departments are responsible for implementing this measure.
Water. Continue efficiency programs and use cleaner energy sources to move and treat water.	**Consistent.** The Project would use water-efficient landscaping.
Agriculture. In the near-term, encourage investment in manure digester and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.	**Not Applicable.** The Proposed Project does not include agricultural facilities.

Source: DKA Planning, 2015.

City of Calabasas General Plan. The Proposed Project would be consistent with the City's General Plan Conservation Element, which includes Policy IV-19 that calls for reducing per capita emissions of GHG by at least 25 percent from 2005 levels as stipulated in AB 32. As illustrated in Table 7-3, long-term emissions of the Proposed Project would reduce GHG by 31 percent over a BAU scenario. As a result, the Project is consistent with the City's General Plan Conservation Element and its impact on citywide climate change policy is considered **less than significant**.

XII. NOISE -- Would the Project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? *Less Than Significant Impact with Mitigation Incorporated.*

Characteristics of Sound

Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. The standard unit of measurement for sound is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The "A-weighted scale," abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA. Table 12-1 provides examples of A-weighted noise levels from common sources.

TABLE 12-1: A-WEIGHTED DECIBEL SCALE

Typical A-Weighted Sound Levels	Sound Level (dBA, L_{eq})
Threshold of Pain	140
Jet Takeoff at 100 Meters	125
Jackhammer at 15 Meters	95
Heavy Diesel Truck at 15 Meters	85
Conversation at 1 Meter	60
Soft Whisper at 2 Meters	35

Source: United States Occupational Safety & Health Administration, *Noise and Hearing Conservation Technical Manual*, 1999.

Noise Definitions

This noise analysis discusses sound levels in terms of Community Noise Equivalent Level (CNEL) and Equivalent Noise Level (L_{eq}).

Community Noise Equivalent Level. CNEL is an average sound level during a 24-hour period. CNEL is a noise measurement scale, which accounts for noise source, distance, single event duration, single event occurrence, frequency, and time of day. Human reaction to sound between 7:00 p.m. and 10:00 p.m. is as if the sound were actually 5 dBA higher than if it occurred from 7:00 a.m. to 7:00 p.m. From 10:00 p.m. to 7:00 a.m., humans perceive sound as if it were 10 dBA higher due to the lower background level. Hence, the CNEL is obtained by adding an additional 5 dBA to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and 10 dBA to sound levels in the night from 10:00 p.m. to 7:00 a.m. Because CNEL accounts for human sensitivity to sound, the CNEL 24-hour figure is always a higher number than the actual 24-hour average.

Equivalent Noise Level. L_{eq} is the average noise level on an energy basis for any specific time period. The L_{eq} for one hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. L_{eq} can be thought of

as the level of a continuous noise that has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.

Effects of Noise

The degree to which noise can impact the environment ranges from levels that interfere with speech and sleep to levels that cause adverse health effects. Human response to noise is subjective and can vary from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise, the amount of background noise present before the intruding noise, and the nature of work or human activity exposed to the source.

Audible Noise Changes

Small perceptible changes in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and could produce a community reaction. A 10 dBA increase is heard as a doubling in loudness and would produce a community response.

Noise levels decrease as the distance from the noise source to the receiver increases. Noise generated by a stationary noise source, or "point source," will decrease by approximately 6 dBA over hard surfaces (e.g., reflective surfaces such as parking lots or smooth bodies of water) and 7.5 dBA over soft surfaces (e.g., absorptive surfaces such as soft dirt, grass, or scattered bushes and trees) for each doubling of distance. For example, if a noise source produces a noise level of 89 dBA at a reference distance of 50 feet, the noise level would be 83 dBA at a distance of 100 feet from the noise source, 77 dBA at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dBA over hard surfaces and 4.5 dBA over soft surfaces for each doubling of distance.

Noise is most audible when traveling by direct line-of-sight, a visual path between the noise source and noise receptor. Barriers, such as walls or buildings that break the line-of-sight between the source and the receiver can greatly reduce noise levels from the source since sound can only reach the receiver by diffraction. Sound barriers can reduce sound levels by up to 20 dBA or more. However, if a barrier is not high or long enough to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Regulatory Setting

Federal

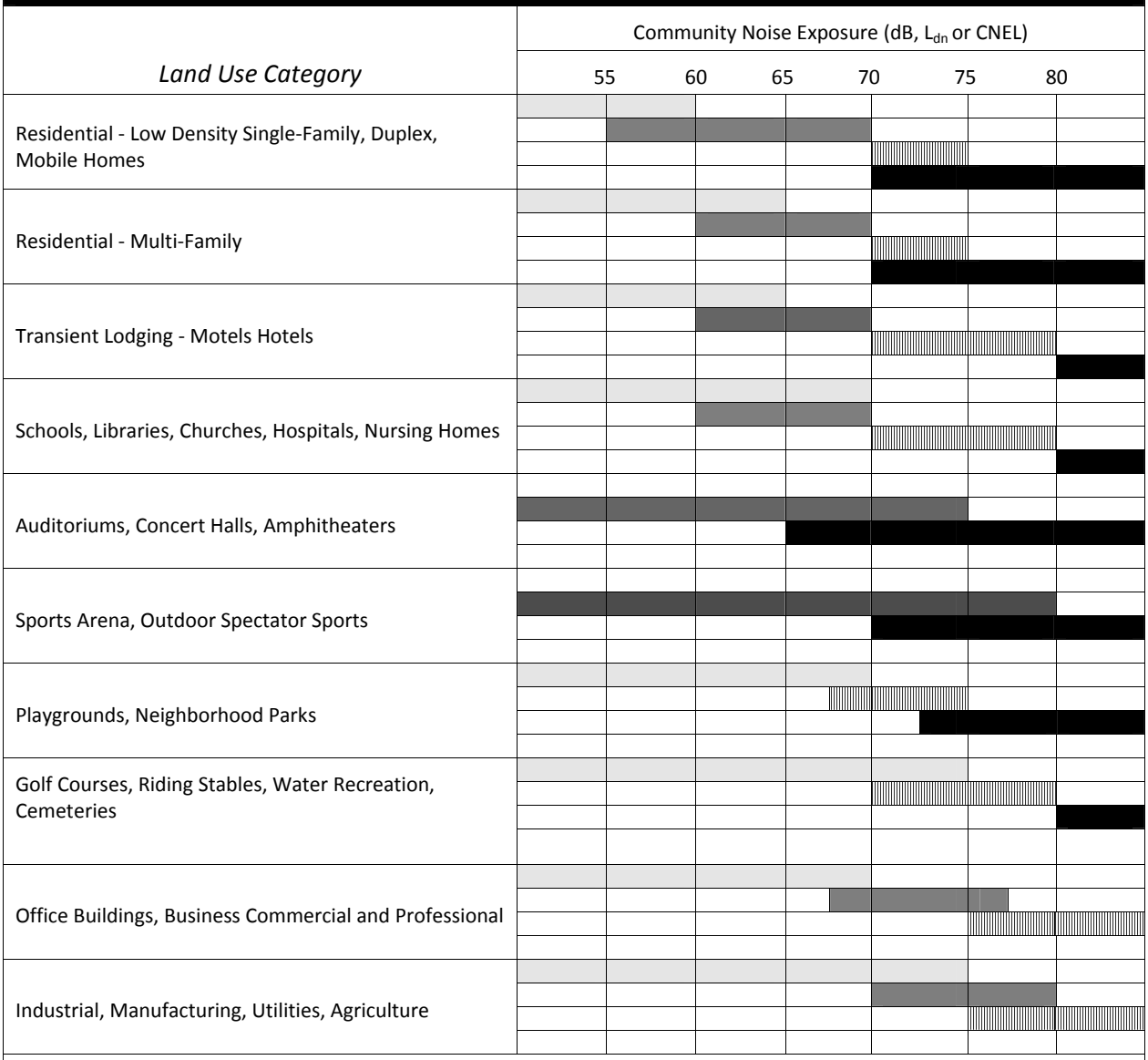
Federal noise standards do not regulate environmental noise associated with short-term construction or long-term operation of development projects.

State

The State of California's 2003 General Plan Guidelines establish guidelines for acceptable exterior noise levels for each county and city. These standards and criteria are incorporated into the land use planning process to reduce future noise and land use incompatibilities. Table 12-2

illustrates State guidelines that allow the City of Calabasas to consider the compatibility between land uses and outdoor noise.

TABLE 12-2: LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS



Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditioning will normally suffice.

Normally Unacceptable - New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable - New construction or development should generally not be undertaken.

Source: California Office of Planning and Research "General Plan Guidelines, Noise Element Guidelines (Appendix C)", 2003.

State interior noise standards were established in 1974, when the California Commission on Housing and Community Development adopted noise insulation standards for residential buildings (Title 24, Part 2, California Code of Regulations). Title 24 establishes standards for interior room noise attributable to outside noise sources. Title 24 also specifies that acoustical studies should be prepared whenever a residential building or structure is proposed to be located in areas with exterior noise levels of 60 dB Day-Night Average Noise Level (L_{dn}) or greater. The acoustical analysis must show that the building has been designed to limit intruding noise to an interior level not exceeding 45 dB L_{dn} for any habitable room.

Local

City of Calabasas 2030 General Plan provides policies that limit the exposure of the community to excessive noise levels. The Plan identifies an objective to "[a]chieve and maintain noise compatible land use relationships consistent with the nature and character of individual land uses." The City Calabasas General Plan incorporates the State's guidance on the land us compatibility of new uses and identifies nine policies:

VIII-1 Use the Land Use Compatibility for Community Noise Environments matrix to determine the compatibility of land use when evaluating proposed new land uses in the City. The matrix shall be used as a guide to assist in determining the acceptability of noise for existing or proposed land use.

In this matrix, the degree of acceptability is categorized by noise exposures that are normally acceptable, conditionally acceptable, normally unacceptable and clearly unacceptable. Action on proposed projects shall be guided according to the degree of land use/noise acceptability as follows.

- Normally Acceptable: The potential for project approval should not be encumbered by land use/noise compatibility issues
- Conditionally Acceptable: The potential for project approval should not be encumbered by land use/noise compatibility issues, provided the applicant has included measures or conditions that are acceptable to the Planning Commission or appropriate planning authority and ultimately result in land use/noise compatibility.
- Normally Unacceptable: The potential for project denial will be considered likely as a result of land use/noise incompatibility, unless extraordinary circumstances are present that do not involve adjacent properties or uses.
- Overriding project benefits cannot be utilized to justify extraordinary circumstances.
- Clearly Unacceptable: If a project falls into this category, it shall not be approved due to land use/noise compatibility issues.

VIII-2 If a proposed development project that will create or affect existing noise sensitive land uses is proposed in a location that is within a 60 dBA or greater CNEL noise contour, as determined by independent experts or consultants hired by the City, require that the project applicant demonstrate that, unless mitigation is available: (1) the project will not generate noise exceeding the "normally acceptable" range for existing uses on adjacent

properties; and (2) adjacent influences will not generate ambient noise on the project site that exceeds the "normally acceptable" range for the proposed use.

VIII-3 Locate and design noise-sensitive land uses and noise generators in such a manner that noise objectives will be maintained.

VIII-4 Emphasize the following as the City's preferred noise management strategies, and as higher priorities than construction of noise barriers:

- Avoiding placement of noise-sensitive uses within noisy areas x Increased setbacks from noise sources
- Building orientation that shields noise sensitive portions of a project from noise sources
- Use of sound attenuating architectural design and building features

VIII-5 lncorporate noise considerations into the design of transportation systems and ensure that noise impacts associated with roadway extensions and capacity enhancement projects are mitigated to acceptable levels.

VIII-6 lncorporate consideration of noise impacts to significant wildlife habitats into the development/environmental review process.

VIII-7 Prohibit the creation of helicopter pads, except where needed for emergency services.

VIII-8 Use noise standards in the review of proposed developments to determine whether the proposal promotes acceptable noise compatible land uses both during construction and subsequently.

VIII-9 Pro-actively address noise along the Ventura Freeway and other major corridors.

Construction Noise Standards

The City does not have specific standards or limits relating to construction noise. However, the Municipal Code limits construction between 7:00 a.m. and 6:00 p.m. Monday through Friday, and 8:00 a.m. and 5:00 p.m. on Saturday. Construction is not permitted on Sundays and federal holidays.

Operation Noise Standards

The City's General Plan Noise Element relies on the State of California's 2003 General Plan Guidelines to define acceptable noise exposure levels for a variety of land uses (Table 12-2). For example, "normally acceptable" noise levels for exterior areas in single-family residential areas can not exceed 60 dB, while "conditionally acceptable" levels can not exceed 70 dB (L_{dn} or CNEL).

The City's noise ordinance identifies exterior noise level standards, including standards for residential zones during weekdays (50 dBA L_{eq} from 10 p.m.-7 a.m. and 65 dBA L_{eq} from 7:00

a.m. to 10:00 p.m. for residential zones in the vicinity of the Project site). These standards do not apply to construction activities.

Significance Thresholds

This analysis addresses the Proposed Project's short- and long-term impacts on ambient noise levels in the surrounding community and particularly on noise-sensitive land uses, such as the single-family residences in the area. The Proposed Project would result in potentially significant impacts if it would lead to any of the following conditions:

- Exposure of persons to or generation of noise levels in excess of standards established in the City's General Plan or noise ordinance (i.e., 65 dBA from 7:00 a.m.-10 p.m. weekdays);
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

For construction-related impacts, a significant impact would include any temporary construction noise outside of the following hours: 7:00 a.m. and 6:00 p.m. Monday through Friday, and 8:00 a.m. and 5:00 p.m. on Saturday. Construction on Sundays and federal holidays would also be considered a significant impact.

For on-site stationary source-related impacts, a significant impact would occur if noise levels exceeded the limits identified by the State's 2003 General Plan Guidelines for compatible land uses (Table 12-2).

For off-site mobile source-related impacts, a significant impact would include any increase in traffic noise that meets or exceeds the Federal Interagency Committee on Noise (FICON), illustrated in Table 12-3.[32]

TABLE 12-3: SIGNIFICANCE OF CHANGES IN OPERATIONAL ROADWAY NOISE EXPOSURE

Post-Project Noise Level (CNEL)	Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3 dB or more
>65 dB	+1.5 dB or more
Source: City of Calabasas, "2030 General Plan EIR" (SCH #2008041030), December 2008.	

Construction Noise Impacts

[32] Federal Interagency Committee on Noise "Federal Agency Review of Selected Airport Noise Analysis Issues (1992)", accessed at http://www.fican.org/pdf/nai-8-92.pdf

During ground clearing, grading, structural work, building construction, and other noise-generating activities would occur at the Project site between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturday in accordance with the City's Municipal Code. Table 12-4 summarizes projected noise levels at nearby sensitive receptors during construction. Land uses on the properties surrounding the Project site include single-family residential buildings. There are a number of nearby sensitive receptors to the Project site, including:

- Northeast portion of "The Colony at Calabasas" subdivision on the Cielo Court cul-de-sac, approximately 10 feet west of the Proposed Project site.
- Gated entrance at "The Colony at Calabasas" subdivision (Estrella Drive), approximately 415 feet southwest of the Proposed Project site.
- 4623, 4633, 4647 Las Virgenes Road, entrances to a private road with residences approximately 300 feet west of the Proposed Project site.

To ascertain current ambient noise levels at nearby receptors, DKA Planning took short-term, 15-minute noise readings on July 30, 2014 using a Quest Technologies SoundPro DL Sound Level Meter.[33] Noise measurements were taken at these three locations near the Proposed Project site. Predominant noise was caused by motor vehicles traveling on adjacent roadways, including the US-101 (Ventura) freeway and Las Virgenes Road to the west. As shown in Table 12-4, ambient noise levels ranged from 59.9 dBA L_{eq} at the northeast corner of "The Colony" subdivision to 63.8 dBA L_{eq} at the entrance to the homes at 4623, 4633, and 4647 Las Virgenes Road.

Construction activities would generate noise from construction activities that would vary over the 34 months of activity on- and off-site, and would include on-site equipment such as scrapers, tractors, loaders and smaller equipment such as saws, hammers, and pneumatic tools associated with the Project's construction. There would be secondary noise from construction worker vehicles and vendor deliveries.

As shown in Table 12-4, ambient noise levels during construction could produce audible increases in noise at one or two of the three receptor locations. However, these construction activities would comply with the City's noise ordinance by adhering to the following hours: 7:00 a.m. and 6:00 p.m. Monday through Friday, and 8:00 a.m. and 5:00 p.m. on Saturday. Construction on Sundays and federal holidays would be prohibited..

- Noise levels of up to 80.0 dBA are projected at the northeast corner of The Colony on the homes on the Cielo Court cul-de-sac, an increase of 20.1 dBA. These increases would be greatest during the mass grading phase of construction, where grading equipment could operate within ten feet of homes in The Colony. After this phase, fine grading would occur approximately 110 feet away at the construction pads of future homes, which would be approximately 35 feet above the grade of homes in The Colony. During this phase graders, loaders, and building construction equipment would produce

[33] The SoundPro meter complies with the American National Standards Institute (ANSI) and International Electrothnical Commission (IEC) for general environmental noise measurement instrumentation. The meter was equipped with an omni-directional microphone, calibrated before the day's measurements, and set at approximately five feet above the ground. Weather conditions were clear with negligible wind.

substantially less noise because of the topographical differences and increased distance to homes in The Colony.

- Noise levels of up to 67.1 dBA are projected at the entrances to homes at 4623, 4633, and 4647 Las Virgenes Road, an increase of 3.3 dBA.

- Noise levels of up to 64.5 dBA are projected at the entrances to The Colony at Las Virgenes Road, an increase of 2.0 dBA.

Because these on-site construction-related noise impacts would comply with the City's Noise Ordinance, these impacts would be considered **less than significant**. Nevertheless, Mitigation Measures N1 through N3 are recommended to reduce the incremental increase in noise levels using standard best practices.

TABLE 12-4: CONSTRUCTION NOISE LEVELS - UNMITIGATED

Sensitive Receptor	Distance from Site (feet)	Maximum Construction Noise Level (dBA)	Existing Ambient (dBA, L_{eq})	New Ambient (dBA, L_{eq})	Increase
Northeast corner of The Colony (Cielo Circle cul-de-sac)	10	80.0	59.9	80.0	20.1
4623, 4633, 4647 Las Virgenes Road	300	64.4	63.8	67.1	3.3
Entrance to The Colony (Estrella Drive)	415	60.1	62.5	64.5	2.0

SOURCE: DKA Planning, 2015.

With regard to off-site construction-related noise impacts, any impacts would be primarily from travel by heavy-duty trucks transporting construction equipment and building materials, along with transport of construction workers and vendors, primarily involving light- and medium-duty vehicles and trucks. However, any travel along local roadways is expected to have minimal impact on sensitive receptors, such as residences in the area for two reasons. First, following the initial transport of heavy-duty trucks and off-road equipment to the Proposed Project site, there would be no substantial deployment of heavy-duty haul trips, as all earthwork on the site is expected to be balanced and not require haul trucks to import or export soil. Second, any travel by vehicles would access the site from the Ventura Freeway via an off-ramp approximately 520 feet north of the entrance to the Proposed Project site. As such, vehicles traveling to the site would be limited to Las Virgenes Road, where there are no residences that would be exposed to elevated noise levels. Similarly, any vehicles leaving the site would access an on-ramp to the Ventura Freeway approximately 0.36 miles to the north of the site via Las Virgenes Road, where there are no sensitive receptors.

Construction Phase Noise Mitigation Measures

N1 Two weeks prior to commencement of construction, notification shall be provided to the off-site residential uses within 500 feet of the Project site that discloses the construction schedule, including the types of activities and equipment that would be used throughout the duration of the construction period.

N2 All powered construction equipment shall be equipped with exhaust mufflers or other suitable noise reduction devices.

N3 All construction areas for staging and warming-up equipment shall be located as far as possible from adjacent residences.

Construction Noise Impacts After Mitigation

Construction activities would be consistent with the City's Zoning Ordinance and would be considered less than significant. Implementation of Mitigation Measures N1 through N3 would further reduce ambient noise increases at nearby residential receptors.

With regard to off-site construction-related noise impacts, haul trucks and vehicle activity associated with construction workers, vendor trips, and other on-road vehicles could generate noise. This addition of any truck trips would marginally increase ambient noise along haul route roadways, as truck deployment onto local streets would not happen simultaneously, but rather be phased over the course of site preparation, grading, and construction phases.

Operations Noise Impacts

During project operations, the development would produce both direct noise impacts on the site from residential-related activities, as well as indirect noise impacts from vehicles traveling on local roads to access the site. The direct impacts would include stationary noises from sources associated with building operations, such as heating, ventilation, and air conditioning (HVAC) systems.

The City's General Plan calls for limits to any noise generated by all sources, including mechanical equipment not exceed 1.5 to 5 dBA above ambient noise levels, depending on existing ambient noise levels. Large ground level heating, ventilation, and HVAC systems typically generate noise levels between 50 and 65 dBA at 50 feet. Roof-top mounted equipment typically produces noise levels of up to approximately 56 dBA at 50 feet. As shown in Table 12-5, there would not be any audible increase in ambient noise levels from these on-site noise sources that would approach the City's allowable increases in noise levels. Further, there noise levels would be consistent with the City's Noise Ordinance, which sets exterior noise level standards of 65 dBA L_{eq} from 7:00 a.m. to 10:00 p.m. weekdays in the residential zones near the Proposed Project site. Therefore, stationary noise would be considered a **less-than-significant** impact.

TABLE 12-5: NOISE LEVELS FROM ON-SITE OPERATIONS - UNMITIGATED

Sensitive Receptor	Distance from Site (feet)	Maximum Construction Noise Level (dBA)	Existing Ambient (dBA, L_{eq})	New Ambient (dBA, L_{eq})	Increase
Northeast corner of The Colony (Cielo Circle cul-de-sac)	10	47.0	59.9	60.1	0.2
4623, 4633, 4647 Las Virgenes Road	300	31.4	63.8	63.8	0.0

Entrance to The Colony (Estrella Drive)	415	27.1	62.5	62.5	0.0
SOURCE: DKA Planning, 2015.					

The majority of operational noise impacts would be from indirect noise impacts associated with the 1,650 net new vehicle trips each weekday.[34] The impact of this additional traffic on ambient noise levels in the Project's vicinity was modeled under existing year (2014) no project scenario, existing year (2014) plus project scenario utilizing the FHWA TNM 2.5 model. As shown in Tables 12-6 and 12-7, the greatest project-related noise increases would be 0.1 dBA L_{eq} along several roadway segments in the a.m. and 0.2 dBA L_{eq} along several roadway segments in the p.m. peak hour. These increases would be inaudible, far below the 5 dBA increase considered noticeable by the public at large.

Mobile noise generated by the Proposed Project would not cause the ambient noise level measured at the property line of the affected uses to rise to the "normally unacceptable" or "clearly unacceptable" category as defined by the 2003 California General Plan Guidelines or result in any 5 dBA or more increase in noise level. As a result, these inaudible, off-site vehicular noise impacts would be considered a **less-than-significant** impact.

TABLE 12-6: ESTIMATED AM PEAK HOUR MOBILE SOURCE NOISE LEVELS (2014)

Roadway Segment	Estimated dBA, L_{eq} 1hr			
	No Project (2014)	With Project (2014)	Project Change	Significant Impact?
NB Las Virgenes between Mureau and Parkmor	69.6	69.7	0.1	No
SB Las Virgenes between Mureau and US-101	67.8	67.8	0.0	No
SB Las Virgenes between US-101 and US-101 NB off-ramp	75.7	75.8	0.1	No
NB Las Virgenes between US-101 and US-101 NB off-ramp	73.9	74.0	0.1	No
SB Las Virgenes between US-101NB off-ramp and Agoura	74.3	74.4	0.1	No
SB Las Virgenes between Agoura and Oak Glen	72.5	72.6	0.1	No
NB Las Virgenes between Estrella and Agoura	68.0	68.1	0.1	No
NB Las Virgenes between Lost Hills and Estrella	68.5	68.6	0.1	No
SB Las Virgenes between Estrella and Lost Hills	70.0	70.1	0.1	No
SB Lost Hills between Agoura and Las Virgenes	68.3	68.3	0.0	No
NB Lost Hills between Las Virgenes and Agoura	62.0	62.1	0.1	No
NB Lost Hills between Agoura and US-101 NB on-ramp	71.5	71.5	0.0	No
SB Lost Hills between US-101 NB off-ramp and Agoura	67.9	67.9	0.0	No
SB Lost Hills between Agoura and Malibu Hills	69.0	69.0	0.0	No
NB Lost Hills between Malibu Hills and Agoura	69.1	69.2	0.1	No
WB Agoura between Lost Hills and Las Virgenes	67.6	67.6	0.0	No
EB Agoura between Lost Hills and Las Virgenes	67.7	67.7	0.0	No

[34] Associated Traffic Engineers, *Updated Traffic and Circulation Study Canyon Oaks Project*; February 2015.

Shaded cells denote a significant impact on mobile source noise levels
Source: DKA Planning, 2015.

TABLE 12-7: ESTIMATED PM PEAK HOUR MOBILE SOURCE NOISE LEVELS (2014)

Roadway Segment	Estimated dBA, L_{eq} 1hr			
	No Project (2014)	With Project (2014)	Project Change	Significant Impact?
NB Las Virgenes between Mureau and Parkmor	69.6	69.6	0.0	No
SB Las Virgenes between Mureau and US-101	67.7	67.8	0.1	No
SB Las Virgenes between US-101 and US-101 NB off-ramp	74.3	74.5	0.2	No
NB Las Virgenes between US-101 and US-101 NB off-ramp	72.3	72.5	0.2	No
SB Las Virgenes between US-101NB off-ramp and Agoura	73.1	73.3	0.2	No
SB Las Virgenes between Agoura and Oak Glen	72.1	72.2	0.1	No
NB Las Virgenes between Estrella and Agoura	68.6	68.8	0.2	No
NB Las Virgenes between Lost Hills and Estrella	68.1	68.2	0.1	No
SB Las Virgenes between Estrella and Lost Hills	70.0	70.1	0.1	No
SB Lost Hills between Agoura and Las Virgenes	67.9	68.0	0.1	No
NB Lost Hills between Las Virgenes and Agoura	62.5	62.6	0.1	No
NB Lost Hills between Agoura and US-101 NB on-ramp	71.6	71.7	0.1	No
SB Lost Hills between US-101 NB off-ramp and Agoura	67.7	67.8	0.1	No
SB Lost Hills between Agoura and Malibu Hills	69.0	69.1	0.1	No
NB Lost Hills between Malibu Hills and Agoura	69.4	69.5	0.1	No
WB Agoura between Lost Hills and Las Virgenes	65.9	66.1	0.2	No
EB Agoura between Lost Hills and Las Virgenes	66.7	66.8	0.1	No

Shaded cells denote a significant impact on mobile source noise levels
Source: DKA Planning, 2015.

Operation Phase Noise Mitigation Measures

Operational noise impacts would be less than significant, and no mitigation measures are required.

Operation Noise Impacts After Mitigation

Operational noise impacts would be less than significant.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? *Less Than Significant Impact.*

Characteristics of Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Unlike noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible. Common sources of vibration include trains, buses, and construction activities.

Vibration Definitions

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.[35]

Effects of Vibration

High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of ground-borne vibration may damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration.

Perceptible Vibration Changes

Unlike noise, ground-borne vibration is not an environmental issue that most people experience every day. The background vibration velocity level in residential areas is usually 50 RMS or lower, well below the threshold of perception for humans, which is around 65 RMS.[36] Most perceptible indoor vibration is caused by sources within buildings, such as movement of people or slamming of doors. Typical outdoor sources of ground-borne vibration are construction equipment, trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is typically not perceptible.

Applicable Regulations

To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, non-engineered timber and mason buildings can be exposed to ground-borne vibration levels of 0.2 inches per second without experiencing structural damage, while reinforced-concrete, steel, or timber buildings can be exposed to ground-borne vibration levels of 0.5 inches per second.[37]

The FTA has also established guidelines that provide thresholds for ground-borne vibration causing human annoyance. For residential land uses, which experience occasional events of

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35 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.
36 Ibid.
37 Ibid.

ground-borne vibration or noise, the FTA has established a threshold of 75 VdB.[38] Some commercial buildings, such as auditoriums and theaters have additional vibration and noise annoyance criteria.

In terms of construction-related impacts on buildings, the City of Calabasas has not adopted policies or guidelines relative to groundborne vibration. While the Los Angeles County Code (LACC Section 12.08.350) states a presumed perception threshold of 0.01 inch per second RMS, this threshold applies to groundborne vibrations from long-term operational activities, not construction. Consequently, as both the City of Calabasas and the County of Los Angeles do not have a significance threshold to assess vibration impacts during construction, the FTA and California Department of Transportation's (Caltrans) adopted vibration standards for buildings are used to evaluate potential impacts related to Project construction. Based on these standards, impacts relative to groundborne vibration would be considered significant if the following were to occur:

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.5 inches per second at any off-site reinforced-concrete, steel, or timber structure;
- Project construction activities would cause a PPV groundborne vibration level to exceed 0.2 inches per second at any non-engineered timber and masonry buildings (i.e., "fragile" buildings);[39] and
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.12 inches per second at any building that is extremely susceptible to vibration damage (i.e., "extremely fragile" buildings).[40]

In addition, the City of Calabasas has not adopted any thresholds associated with human annoyance for groundborne vibration impacts. Therefore, this analysis uses the FTA's vibration impact thresholds for human annoyance for long-term operational activities, not construction. These thresholds include 80 VdB at residences and buildings where people normally sleep (e.g., nearby residences) and 83 VdB at institutional buildings, which includes schools and churches. No thresholds have been adopted or recommended for commercial and office uses.

Table 12-8, Vibration Source Levels for Construction Equipment, identifies PPV and RMS velocity (in VdB) levels for the types of off-road and on-road equipment that could operate at the Project site during construction.

[38] Ibid.
[39] Ibid.
[40] Ibid.

TABLE 12-8 VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Approximate PPV (in/sec)					Approximate RMS (VdB)				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Caisson Drilling	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Loaded Trucks	0.076	0.027	0.020	0.015	0.010	86	77	75	72	68
Jackhammer	0.035	0.012	0.009	0.007	0.004	79	70	68	65	61
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004	58	49	47	44	40

Source: Federal Transit Administration 2006

Construction Vibration Impacts

As shown in Table 12-8, vibration velocities could range from 0.003 to 0.089 inch/sec PPV at 25 feet from the source activity, with corresponding vibration levels ranging from 58 VdB to 87 VdB at 25 feet from the source activity, depending on the type of construction equipment in use.

Groundborne vibration would be generated by a number of construction activities. Potential equipment with the highest potential for vibration would generally be bulldozers (0.089 PPV at 25 feet of distance) and similar types of equipment. Vibratory rollers could be used for compaction of the internal roadway that serves the homes. While this type of equipment has much higher vibration potential when in vibratory mode (i.e., 0.21 PPV at 25 feet of distance), such street work would be approximately 200 feet north of the nearest homes at the end of the Cielo Court cul-de-sac in The Colony subdivision.

Vibration velocities projected to occur at the nearest off-site sensitive receptor would produce up to a 0.352 PPV at The Colony homes on the Cielo Court cul-de-sac. This PPV is below the 0.5 PPV that are considered potentially harmful levels of vibration for engineered buildings like the contemporary homes in The Colony. Other potential types of construction equipment would produce less vibration and have lesser potential impacts on neighboring sensitive receptors. With regard to any use of vibratory rollers, the 200-foot distance from proposed service streets and nearby residences would reduce any potential vibration at the nearby homes to 0.009 PPV, well below the 0.5 PPV threshold for engineered homes in the area. As shown in Table 12-9, the peak particle velocity and vibration levels that would occur at these on- and off-site sensitive uses during construction would be less than the thresholds associated with building damage. As a result, construction-related vibration impacts would be considered **less than significant**.

TABLE 12-9: VIBRATION LEVELS AT OFF-SITE SENSITIVE USES FROM PROJECT CONSTRUCTION (UNMITIGATED)

Sensitive Uses Offsite	Distance to Project Site (ft.)	Estimated PPV (in/sec) [a]	Significance Threshold (in/sec)	*Significant?*	Estimated Vibration Levels (VdB) [b]
Northeast corner of The Colony (Cielo Circle cul-de-sac)	10	0.352	0.5	No	99
4623, 4633, 4647 Las Virgenes Road	300	0.002	0.5	No	55
Entrance to The Colony (Estrella Drive)	415	0.001	0.5	No	50

[a] *The vibration velocities at the off-site sensitive uses are determined with the following equation from the Federal Transit Administration's Transit Noise and Vibration Impact Assessment, Final Report: $PPV_{equip}=PPV_{ref} \times (25/D)^{1.5}$, where PPV_{equip} = peak particle velocity in in/sec of equipment, PPV_{ref} = reference vibration level in in/sec at 25 feet, D = distance from the equipment to the receive.*

[b] *The vibration levels at the off-site sensitive uses are determined with the following equation from the Federal Transit Administration's Transit Noise and Vibration Impact Assessment, Final Report: Lv(D)=Lv(25 ft) – 30log(D/25), where Lv = vibration level of equipment, D = distance from the equipment to the receiver, Lv(25 ft) = vibration level of equipment at 25 feet.*

Source: DKA Planning 2015.

In terms of human annoyance, the vibration levels experienced at off-site sensitive receptors could range from 50 VdB at the entrance to The Colony to 99 VdB at Cielo Court residences. Pursuant to FTA guidance, the vibration impacts from construction of the Project would exceed the 80 VdB considered acceptable for residences. However, any annoyance would be temporary and would not be evaluated against FTA standards that are generally applied to long-term operations.

The Proposed Project could generate vibration from some heavy-duty on-road trucks to and from the Project site. This could increase vibration along haul route roadways, though any annoyance to residents along local haul routes would be temporary. As a result, off-site vibration impacts from haul trucks would be reduced and would be considered **less than significant**.

Construction Phase Vibration Mitigation Measures

None required.

Construction Vibration Impacts After Mitigation

The use of construction equipment would neither cause short-term building damage or long-term annoyance to existing and future residences near the Project site. Off-site vibration impacts from heavy-duty trucks are expected to be less than significant.

Operations Vibration Impacts

During operation of the Proposed Project, there would not be significant stationary sources of ground-borne vibration, such as heavy equipment operations. Operational ground-borne vibration in the Project vicinity would be generated by vehicular travel on the local roadways. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic, typically heavy trucks, induces perceptible vibration in buildings, such as window rattling or shaking of small loose items, then it is most likely an effect of low-frequency airborne noise or ground

characteristics. Project-related traffic would expose nearby residential land uses and other sensitive receptors during long-term operations to a vibration level far less than 75 VdB and would be considered **less than significant**.

c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project? *Less Than Significant Impact.*

The majority of any long-term noise impacts will come from traffic traveling to and from the Proposed Project site. The addition of future traffic from new development in the area and overall ambient growth in traffic would elevate ambient noise levels; nevertheless, the Project's incremental contribution to permanent off-site ambient noise levels along local roads would be negligible.

As illustrated in Tables 12-10 and 12-11, off-site noise generated by traffic from the Project would be negligible in the a.m. and p.m. peak hours, respectively, based on projected traffic volumes in 2019. In the a.m. peak hour, the northbound segment of Las Virgenes between the US-101 and US-101 northbound offramp could experience a maximum noise increase of 0.2 dBA, while in the p.m. peak hour, the maximum increase would be 0.3 dBA on southbound Las Virgenes along that same segment. These increases would be inaudible and far below the City's thresholds. Therefore, the Project's individual and cumulative mobile source noise impacts would be considered **less-than-significant**.

TABLE 12-10: ESTIMATED AM PEAK HOUR MOBILE SOURCE NOISE LEVELS (2019)

Roadway Segment	Estimated dBA, L_{eq} 1hr			
	No Project (2019)	With Project (2019)	Project Change	Significant Impact?
NB Las Virgenes between Mureau and Parkmor	70.1	70.2	0.1	No
SB Las Virgenes between Mureau and US-101	68.2	68.3	0.1	No
SB Las Virgenes between US-101 and US-101 NB off-ramp	76.1	76.2	0.1	No
NB Las Virgenes between US-101 and US-101 NB off-ramp	74.2	74.4	0.2	No
SB Las Virgenes between US-101NB off-ramp and Agoura	74.6	74.7	0.1	No
SB Las Virgenes between Agoura and Oak Glen	72.9	72.9	0.0	No
NB Las Virgenes between Estrella and Agoura	68.3	68.4	0.1	No
NB Las Virgenes between Lost Hills and Estrella	68.8	68.8	0.0	No
SB Las Virgenes between Estrella and Lost Hills	70.3	70.4	0.1	No
SB Lost Hills between Agoura and Las Virgenes	68.5	68.5	0.0	No
NB Lost Hills between Las Virgenes and Agoura	62.3	62.3	0.0	No
NB Lost Hills between Agoura and US-101 NB on-ramp	71.8	71.8	0.0	No
SB Lost Hills between US-101 NB off-ramp and Agoura	68.1	68.2	0.1	No
SB Lost Hills between Agoura and Malibu Hills	69.3	69.3	0.0	No
NB Lost Hills between Malibu Hills and Agoura	69.4	69.5	0.1	No
WB Agoura between Lost Hills and Las Virgenes	67.9	67.9	0.0	No

EB Agoura between Lost Hills and Las Virgenes	68.0	68.0	0.0	No

Shaded cells denote a significant impact on mobile source noise levels
Source: DKA Planning, 2015.

TABLE 12-11: ESTIMATED PM PEAK HOUR MOBILE SOURCE NOISE LEVELS (2019)

Roadway Segment	Estimated dBA, L_{eq} 1hr			
	No Project (2019)	With Project (2019)	Project Change	Significant Impact?
NB Las Virgenes between Mureau and Parkmor	70.1	70.1	0.0	No
SB Las Virgenes between Mureau and US-101	68.3	68.3	0.0	No
SB Las Virgenes between US-101 and US-101 NB off-ramp	74.8	75.1	0.3	No
NB Las Virgenes between US-101 and US-101 NB off-ramp	72.9	73.1	0.2	No
SB Las Virgenes between US-101NB off-ramp and Agoura	73.5	73.7	0.2	No
SB Las Virgenes between Agoura and Oak Glen	72.5	72.6	0.1	No
NB Las Virgenes between Estrella and Agoura	68.4	68.5	0.1	No
NB Las Virgenes between Lost Hills and Estrella	68.5	68.6	0.1	No
SB Las Virgenes between Estrella and Lost Hills	70.3	70.4	0.1	No
SB Lost Hills between Agoura and Las Virgenes	68.6	68.6	0.0	No
NB Lost Hills between Las Virgenes and Agoura	63.0	63.0	0.0	No
NB Lost Hills between Agoura and US-101 NB on-ramp	72.1	72.1	0.0	No
SB Lost Hills between US-101 NB off-ramp and Agoura	68.2	68.2	0.0	No
SB Lost Hills between Agoura and Malibu Hills	69.5	69.6	0.1	No
NB Lost Hills between Malibu Hills and Agoura	69.9	69.9	0.0	No
WB Agoura between Lost Hills and Las Virgenes	66.4	66.6	0.2	No
EB Agoura between Lost Hills and Las Virgenes	67.2	67.3	0.1	No

Shaded cells denote a significant impact on mobile source noise levels
Source: DKA Planning, 2015.

Further, the on-site operations of 71 residential units would produce negligible increases in ambient noise levels at nearby sensitive receptors. As noted earlier, the relatively quiet operation of roof-mounted HVAC systems would increase ambient noise levels no more than 0.12 dBA at nearby sensitive receptors. As a result, any stationary noise increases would be considered a **less-than-significant** impact.

d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project? *Less Than Significant Impact with Mitigation Incorporated.*

Construction of the Project would contribute to cumulative noise levels. As noted earlier, construction activities would substantially increase ambient noise levels at the northeast corner of The Colony subdivision directly adjacent to the Project site (i.e., Cielo Circle cul-de-sac).

Any other future development that is built concurrently with the Proposed Project could contribute to cumulative temporary increases in ambient noise levels. There is one potential project proposed within one-half mile of the Project Site that could contribute to cumulative noise levels in the vicinity of the Proposed Project[41]:

- Calabasas Blue residences, a proposed 78-unit multi-family residential project at 4240 Las Virgenes, approximately 1060 feet southwest of the Proposed Project site.

This potential project is located immediately south of The Colony subdivision, so any concurrent construction at that site could elevate noise levels in this current single-family neighborhood. However, the sheer distance of over 1,060 feet between the two potential construction sites renders any cumulative impacts on the intervening homes insignificant. Specifically, construction of the Proposed Project would elevate ambient noise levels 0.3 dBA at the entrance to the Colony 415 feet south of the Proposed Project site, an inaudible increase. With over 600 feet of setback to the Calabasas Blue residences, there would similarly be a negligible increase in ambient noise levels at the entrance to The Colony.

Nevertheless, the Proposed Project would elevate ambient noise levels at the northeast corner of The Colony on its own. This impact is considered **significant but mitigable**.

With regard to off-site construction-related noise impacts, any heavy-duty trucks and other on-road vehicles would generate minimal noise at local receptors, particularly for single-family homes at The Colony. This addition of any truck trips would marginally increase ambient noise along haul route roadways, as truck deployment onto local streets would not happen simultaneously, but rather be phased over the course of site preparation, grading, and construction phases. Off-site noise would not increase substantially from project traffic and is considered **less than significant**.

Construction Phase Noise Mitigation Measures

Mitigation Measures N1 through N5 would reduce the Proposed Project's noise impact from on-site construction activity to less-than-significant levels. Further, appropriate mitigation of the construction impacts of the other related projects in the vicinity of the three sensitive receptors analyzed in this study would substantially reduce noise impacts below the 5 dBA audible threshold of significance. Specifically, the use of noise-attenuating exhaust mufflers on construction equipment and the erection of temporary sound barriers for any future related projects near the Project site would properly mitigate noise impacts on sensitive receptors.

Construction Noise Impacts After Mitigation

With implementation of Mitigation Measures N1 through N5, the Proposed Project's contribution to increases in ambient noise would be considered less than significant. The further application of standard noise mitigation measures to any future development projects would reduce cumulative noise increases from multiple construction projects below significance thresholds of 5 dBA.

[41] Associated Traffic Engineers, *Updated Traffic and Circulation Study Canyon Oaks Project*; February 2015.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels? *No Impact.*

The Proposed Project site is not located within an airport land use plan or within two miles of a public airport or public use airport. As a result, the Proposed Project will not expose future residents to excessive noise levels from aircraft. This would be considered **no impact** on residents living in the Project area.

f) For a project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels? *No Impact.*

The Proposed Project site is not in the vicinity of a private airstrip. As a result, the Proposed Project will not expose future residents to excessive noise levels from any private airstrip. This would be considered **no impact** on people residing in the Project area.

UNMITIGATED EMISSIONS BY CONSTRUCTION PHASE

ON-SITE	2016				2017				2018			
ROG	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	6.9545											
Grading		9.8046	9.8046	9.8046								
Underground Improvements				5.5942								
Street Improvements				4.9808								
Landscape					3.8656							
House Contruction				3.9484	3.6279	3.6279	3.6279	3.6279	3.0812	3.0812	3.0812	3.0812
Architectural Coatings					6.8476	6.8476	6.8476	6.8476	6.814	6.814	6.814	6.814
NOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	75.8436											
Grading		109.7874	109.7874	109.7874								
Underground Improvements				60.4084								
Street Improvements				50.9267								
Landscape					43.6648							
House Contruction				35.8774	33.1362	33.1362	33.1362	33.1362	28.1116	28.1116	28.1116	28.1116
Architectural Coatings					2.185	2.185	2.185	2.185	2.0058	2.0058	2.0058	2.0058
CO	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	52.7919											
Grading		49.7188	49.7188	49.7188								
Underground Improvements				43.7198								
Street Improvements				31.4974								
Landscape					31.1403							
House Contruction				19.0022	18.4915	18.4915	18.4915	18.4915	17.4654	17.4654	17.4654	17.4654
Architectural Coatings					1.8681	1.8681	1.8681	1.8681	1.8542	1.8542	1.8542	1.8542
SOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0592											
Grading		0.0842	0.0842	0.0842								
Underground Improvements				0.0455								
Street Improvements				0.0523								
Landscape					0.0316							
House Contruction				0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326
Architectural Coatings					0.000297	0.000297	0.000297	0.000297	0.000297	0.000297	0.000297	0.000297
PM10 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	3.9356											
Grading		5.3019	5.3019	5.3019								
Underground Improvements				3.2332								
Street Improvements				2.8075								
Landscape					1.9719							
House Contruction				2.0102	1.8264	1.8264	1.8264	1.8264	1.4988	1.4988	1.4988	1.4988
Architectural Coatings					0.1733	0.1733	0.1733	0.1733	0.1506	0.1506	0.1506	0.1506
PM10 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	19.0002											
Grading		12.2819	12.2819	12.2819								
Underground Improvements				18.0663								
Street Improvements				0								
Landscape					18.0663							
House Contruction				0	0	0	0	0	0	0	0	0
Architectural Coatings					0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0
PM2.5 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	3.6208											
Grading		4.8993	4.8993	4.8993								
Underground Improvements				2.9745								
Street Improvements				2.6268								
Landscape					1.8142							
House Contruction				1.8878	1.7145	1.7145	1.7145	1.7145	1.4089	1.4089	1.4089	1.4089
Architectural Coatings					0.1733	0.1733	0.1733	0.1733	0.156	0.156	0.156	0.156
PM2.5 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	10.032											
Grading		6.6461	6.6461	6.6461								
Underground Improvements				9.9307								
Street Improvements				0								
Landscape					0.1523							
House Contruction				0	0	0	0	0	0	0	0	0
Architectural Coatings					0	0	0	0	0	0	0	0
TOTAL ON-SITE												
ROG	6.9545	9.8046	9.8046	24.328	14.3411	10.4755	10.4755	10.4755	9.8952	9.8952	9.8952	9.8952
NOx	75.8436	109.7874	109.7874	256.9999	78.986	35.3212	35.3212	35.3212	30.1174	30.1174	30.1174	30.1174
CO	52.7919	49.7188	49.7188	143.9382	51.4999	20.3596	20.3596	20.3596	19.3196	19.3196	19.3196	19.3196
SOx	0.0592	0.0842	0.0842	0.2146	0.064497	0.032897	0.032897	0.032897	0.032897	0.032897	0.032897	0.032897
PM10	22.621	17.1812	17.1812	42.7366	21.7683	1.8878	1.8878	1.8878	1.5649	1.5649	1.5649	1.5649
PM2.5	13.6528	11.5454	11.5454	28.9652	3.8543	1.8878	1.8878	1.8878	1.5649	1.5649	1.5649	1.5649

OFF-SITE	2016	2017	2018

ROG	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.1171											
Grading		0.2492	0.2492	0.2492								
Underground Improvements				0.2224								
Street Improvements				0.2492								
Landscape					0.3065							
House Contruction				0.0891	0.0801	0.0801	0.0801	0.0801	0.0721	0.0721	0.0721	0.0721
Architectural Coatings					0.0396	0.0396	0.0396	0.0396	0.0396	0.0396	0.0396	0.0396

NOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.6638											
Grading		1.7748	1.7748	1.7748								
Underground Improvements				1.7412								
Street Improvements				1.7748								
Landscape					1.7185							
House Contruction				0.1121	0.1014	0.1014	0.1014	0.1014	0.092	0.092	0.092	0.092
Architectural Coatings					0.0506	0.0506	0.0506	0.0506	0.0506	0.0506	0.0506	0.0506

CO	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	1.8874											
Grading		3.3191	3.3191	3.3191								
Underground Improvements				2.9029								
Street Improvements				3.3191								
Landscape					4.3277							
House Contruction				1.3874	1.257	1.257	1.257	1.257	1.1422	1.1422	1.1422	1.1422
Architectural Coatings					0.6282	0.6282	0.6282	0.6282	0.6282	0.6282	0.6282	0.6282

SOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000251											
Grading		0.000708	0.000708	0.000708								
Underground Improvements				0.000621								
Street Improvements				0.000708								
Landscape					0.000998							
House Contruction				0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291
Architectural Coatings					0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016

PM10 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000778											
Grading		0.0281	0.0281	0.0281								
Underground Improvements				0.0275								
Street Improvements				0.0281								
Landscape					0.5929							
House Contruction				0.000211	0.000203	0.000203	0.000203	0.000203	0.000196	0.000196	0.000196	0.000196
Architectural Coatings					0.000108	0.000108	0.000108	0.000108	0.000108	0.000108	0.000108	0.000108

PM10 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.1169											
Grading		0.342	0.342	0.342								
Underground Improvements				0.275								
Street Improvements				0.342								
Landscape					0.0272							
House Contruction				0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236
Architectural Coatings					0.123	0.123	0.123	0.123	0.123	0.123	0.123	0.123

PM2.5 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000715											
Grading		0.0258	0.0258	0.0258								
Underground Improvements				0.0253								
Street Improvements				0.0258								
Landscape					0.025							
House Contruction				0.000194	0.000187	0.000187	0.000187	0.000187	0.000181	0.000181	0.000181	0.000181
Architectural Coatings					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

PM2.5 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0312											
Grading		0.093	0.093	0.093								
Underground Improvements				0.0752								
Street Improvements				0.093								
Landscape					0.1523							
House Contruction				0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593
Architectural Coatings					0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326

TOTAL OFF-SITE												
ROG	0.1171	0.2492	0.2492	0.8099	0.4262	0.1197	0.1197	0.1197	0.1117	0.1117	0.1117	0.1117
NOx	0.6638	1.7748	1.7748	5.4029	1.8705	0.152	0.152	0.152	0.1426	0.1426	0.1426	0.1426
CO	1.8874	3.3191	3.3191	10.9285	6.2129	1.8852	1.8852	1.8852	1.7704	1.7704	1.7704	1.7704
SOx	0.000251	0.000708	0.000708	0.002328	0.001449	0.000451	0.000451	0.000451	0.000451	0.000451	0.000451	0.000451
PM10	0.117615	0.3678	0.3678	1.259694	0.399087	0.346887	0.346887	0.346887	0.346881	0.346881	0.346881	0.346881
PM2.5	0.031915	0.1188	0.1188	0.397594	0.269487	0.092187	0.092187	0.092187	0.092181	0.092181	0.092181	0.092181

MITIGATED EMISSIONS BY CONSTRUCTION PHASE

ON-SITE	2016				2017				2018			
ROG	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.7243											
Grading		1.0345	1.0345	1.0345								
Underground Improvements				0.5553								
Street Improvements				0.6208								
Landscape					0.3845							
House Contruction				0.3993	0.0503	0.0503	0.0503	0.0503	0.0721	0.0721	0.0721	0.0721
Architectural Coatings					6.545	6.545	6.545	6.545	6.545	6.545	6.545	6.545
NOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	3.1387											
Grading		4.483	4.483	4.483								
Underground Improvements				2.4061								
Street Improvements				2.69								
Landscape					1.6662							
House Contruction				2.5443	2.5443	2.5443	2.5443	2.5443	2.5443	2.5443	2.5443	2.5443
Architectural Coatings					0.1288	0.1288	0.1288	0.1288	0.1288	0.1288	0.1288	0.1288
CO	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	33.8719											
Grading		50.1096	50.1096	50.1096								
Underground Improvements				24.6282								
Street Improvements				35.2458								
Landscape					14.0984							
House Contruction				18.8656	18.8656	18.8656	18.8656	18.8656	18.8656	18.8656	18.8656	18.8656
Architectural Coatings					1.8324	1.8324	1.8324	1.8324	1.8324	1.8324	1.8324	1.8324
SOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0592											
Grading		0.0842	0.0842	0.0842								
Underground Improvements				0.0455								
Street Improvements				0.0523								
Landscape					0.0316							
House Contruction				0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326
Architectural Coatings					0.000297	0.000297	0.000297	0.000297	0.000297	0.000297	0.000297	0.000297
PM10 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0966											
Grading		0.1379	0.1379	0.1379								
Underground Improvements				0.074								
Street Improvements				0.0828								
Landscape					0.0513							
House Contruction				0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503
Architectural Coatings					0.000396	0.000396	0.000396	0.000396	0.000396	0.000396	0.000396	0.000396
PM10 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	7.0396											
Grading		4.5504	4.5504	4.5504								
Underground Improvements				6.6936								
Street Improvements				0								
Landscape					6.6936							
House Contruction				0	0	0	0	0	0	0	0	0
Architectural Coatings					0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0
PM2.5 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0966											
Grading		0.1379	0.1379	0.1379								
Underground Improvements				2.9745								
Street Improvements				0.0828								
Landscape					0.0513							
House Contruction				0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503	0.0503
Architectural Coatings					0.000396	0.000396	0.000396	0.000396	0.000396	0.000396	0.000396	0.000396
PM2.5 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	3.7169											
Grading		2.4624	2.4624	2.4624								
Underground Improvements				9.9307								
Street Improvements				0								
Landscape					3.6793							
House Contruction				0	0	0	0	0	0	0	0	0
Architectural Coatings					0	0	0	0	0	0	0	0
TOTAL ON-SITE												
ROG	0.7243	1.0345	1.0345	2.6099	6.9798	6.5953	6.5953	6.5953	6.6171	6.6171	6.6171	6.6171
NOx	3.1387	4.483	4.483	12.1234	4.3393	2.6731	2.6731	2.6731	2.6731	2.6731	2.6731	2.6731
CO	33.8719	50.1096	50.1096	128.8492	34.7964	20.698	20.698	20.698	20.698	20.698	20.698	20.698
SOx	0.0592	0.0842	0.0842	0.2146	0.064497	0.032897	0.032897	0.032897	0.032897	0.032897	0.032897	0.032897
PM10	7.1362	4.6883	4.6883	11.589	6.795596	0.050696	0.050696	0.050696	0.050696	0.050696	0.050696	0.050696
PM2.5	3.8135	2.6003	2.6003	15.6386	3.781296	0.050696	0.050696	0.050696	0.050696	0.050696	0.050696	0.050696

OFF-SITE	2016	2017	2018

ROG	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.1171											
Grading		0.2492	0.2492	0.2492								
Underground Improvements				0.2224								
Street Improvements				0.2492								
Landscape					0.3065							
House Contruction				0.0891	0.0801	0.0801	0.0801	0.0801	0.0721	0.0721	0.0721	0.0721
Architectural Coatings					0.044	0.044	0.044	0.044	0.0396	0.0396	0.0396	0.0396

NOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.6638											
Grading		1.7748	1.7748	1.7748								
Underground Improvements				1.7412								
Street Improvements				1.7748								
Landscape					1.7185							
House Contruction				0.1121	0.1014	0.1014	0.1014	0.1014	0.092	0.092	0.092	0.092
Architectural Coatings					0.0558	0.0558	0.0558	0.0558	0.0506	0.0506	0.0506	0.0506

CO	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	1.8874											
Grading		3.3191	3.3191	3.3191								
Underground Improvements				2.9029								
Street Improvements				3.3191								
Landscape					4.3277							
House Contruction				1.3874	1.257	1.257	1.257	1.257	1.1422	1.1422	1.1422	1.1422
Architectural Coatings					0.6914	0.6914	0.6914	0.6914	0.6282	0.6282	0.6282	0.6282

SOx	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000251											
Grading		0.000708	0.000708	0.000708								
Underground Improvements				0.000621								
Street Improvements				0.000708								
Landscape					0.000998							
House Contruction				0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291	0.000291
Architectural Coatings					0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016

PM10 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000778											
Grading		0.0281	0.0281	0.0281								
Underground Improvements				0.0275								
Street Improvements				0.0281								
Landscape					0.5929							
House Contruction				0.000211	0.000203	0.000203	0.000203	0.000203	0.000196	0.000196	0.000196	0.000196
Architectural Coatings					0.000111	0.000111	0.000111	0.000111	0.000108	0.000108	0.000108	0.000108

PM10 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.1169											
Grading		0.342	0.342	0.342								
Underground Improvements				0.275								
Street Improvements				0.342								
Landscape					0.0272							
House Contruction				0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236	0.2236
Architectural Coatings					0.0738	0.0738	0.0738	0.0738	0.0738	0.0738	0.0738	0.0738

PM2.5 Exhaust	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.000715											
Grading		0.0258	0.0258	0.0258								
Underground Improvements				0.0253								
Street Improvements				0.0258								
Landscape					0.025							
House Contruction				0.000194	0.000187	0.000187	0.000187	0.000187	0.000181	0.000181	0.000181	0.000181
Architectural Coatings					0.000103	0.000103	0.000103	0.000103	0.0001	0.0001	0.0001	0.0001

PM2.5 Fugitive	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Clearing	0.0312											
Grading		0.093	0.093	0.093								
Underground Improvements				0.0752								
Street Improvements				0.093								
Landscape					0.1523							
House Contruction				0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593	0.0593
Architectural Coatings					0.0205	0.0205	0.0205	0.0205	0.0205	0.0205	0.0205	0.0205

TOTAL OFF-SITE												
ROG	0.1171	0.2492	0.2492	0.8099	0.4306	0.1241	0.1241	0.1241	0.1117	0.1117	0.1117	0.1117
NOx	0.6638	1.7748	1.7748	5.4029	1.8757	0.1572	0.1572	0.1572	0.1426	0.1426	0.1426	0.1426
CO	1.8874	3.3191	3.3191	10.9285	6.2761	1.9484	1.9484	1.9484	1.7704	1.7704	1.7704	1.7704
SOx	0.000251	0.000708	0.000708	0.002328	0.001449	0.000451	0.000451	0.000451	0.000451	0.000451	0.000451	0.000451
PM10	0.117615	0.3678	0.3678	1.259694	0.34989	0.29769	0.29769	0.29769	0.297681	0.297681	0.297681	0.297681
PM2.5	0.031915	0.1188	0.1188	0.397594	0.25739	0.08009	0.08009	0.08009	0.080081	0.080081	0.080081	0.080081

Canyon Oaks

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hotel	120.00	Room	2.91	67,580.00	0
Condo/Townhouse	4.00	Dwelling Unit	1.03	4,950.00	11
Single Family Housing	67.00	Dwelling Unit	12.00	193,818.00	192

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project description information

Land Use - Project information

Construction Phase - Developer information

Off-road Equipment - Developer information

Off-road Equipment -

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Trips and VMT - Developer information

Grading - Developer information. Assumes 12 haul trips during clearing and grubbing x 20 days with 10 CY capacity per haul truck

Vehicle Trips - Traffic Study, Associated Transportation Engineers "Canyon Oaks Project"

Woodstoves - Consultant assumptions

Construction Off-road Equipment Mitigation - Tier 3 engines required to reduce NOx emissions
AQMD Rule 403 and AQMD recommended control efficiencies for PM control

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	46
tblConstEquipMitigation	DPF	No Change	Level 1
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	12/3/2018	12/31/2018
tblConstructionPhase	PhaseEndDate	1/30/2019	12/31/2018
tblConstructionPhase	PhaseEndDate	1/30/2019	12/31/2016
tblConstructionPhase	PhaseEndDate	1/30/2017	11/30/2016
tblConstructionPhase	PhaseStartDate	2/1/2017	3/1/2017
tblConstructionPhase	PhaseStartDate	12/1/2016	11/1/2016
tblConstructionPhase	PhaseStartDate	1/1/2019	12/1/2016
tblConstructionPhase	PhaseStartDate	12/1/2016	10/1/2016
tblFireplaces	NumberGas	3.40	4.00
tblFireplaces	NumberGas	56.95	67.00
tblFireplaces	NumberNoFireplace	0.40	0.00

tblFireplaces	NumberNoFireplace	6.70	0.00
tblFireplaces	NumberWood	0.20	0.00
tblFireplaces	NumberWood	3.35	0.00
tblGrading	AcresOfGrading	1,000.50	39.00
tblGrading	AcresOfGrading	11.50	39.00
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	MaterialExported	0.00	2,400.00
tblLandUse	LandUseSquareFeet	174,240.00	67,580.00
tblLandUse	LandUseSquareFeet	4,000.00	4,950.00
tblLandUse	LandUseSquareFeet	120,600.00	193,818.00
tblLandUse	LotAcreage	4.00	2.91
tblLandUse	LotAcreage	0.25	1.03
tblLandUse	LotAcreage	21.75	12.00
tblOffRoadEquipment	HorsePower	208.00	174.00
tblOffRoadEquipment	HorsePower	16.00	361.00
tblOffRoadEquipment	HorsePower	400.00	97.00
tblOffRoadEquipment	HorsePower	199.00	255.00
tblOffRoadEquipment	HorsePower	9.00	255.00
tblOffRoadEquipment	HorsePower	400.00	84.00
tblOffRoadEquipment	HorsePower	84.00	361.00
tblOffRoadEquipment	HorsePower	255.00	89.00
tblOffRoadEquipment	HorsePower	255.00	162.00
tblOffRoadEquipment	HorsePower	361.00	226.00
tblOffRoadEquipment	HorsePower	97.00	174.00
tblOffRoadEquipment	HorsePower	162.00	226.00
tblOffRoadEquipment	HorsePower	400.00	84.00
tblOffRoadEquipment	HorsePower	199.00	89.00
tblOffRoadEquipment	HorsePower	9.00	84.00
tblOffRoadEquipment	HorsePower	400.00	226.00
tblOffRoadEquipment	HorsePower	64.00	125.00
tblOffRoadEquipment	HorsePower	9.00	89.00
tblOffRoadEquipment	HorsePower	174.00	226.00
tblOffRoadEquipment	HorsePower	400.00	130.00

tblOffRoadEquipment	HorsePower	6.00	97.00
tblOffRoadEquipment	HorsePower	97.00	80.00
tblOffRoadEquipment	HorsePower	16.00	84.00
tblOffRoadEquipment	HorsePower	400.00	89.00
tblOffRoadEquipment	HorsePower	97.00	226.00
tblOffRoadEquipment	LoadFactor	0.43	0.41
tblOffRoadEquipment	LoadFactor	0.38	0.48
tblOffRoadEquipment	LoadFactor	0.38	0.37
tblOffRoadEquipment	LoadFactor	0.36	0.40
tblOffRoadEquipment	LoadFactor	0.56	0.40
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.74	0.48
tblOffRoadEquipment	LoadFactor	0.40	0.20
tblOffRoadEquipment	LoadFactor	0.40	0.38
tblOffRoadEquipment	LoadFactor	0.48	0.29
tblOffRoadEquipment	LoadFactor	0.37	0.41
tblOffRoadEquipment	LoadFactor	0.38	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.36	0.20
tblOffRoadEquipment	LoadFactor	0.56	0.74
tblOffRoadEquipment	LoadFactor	0.38	0.29
tblOffRoadEquipment	LoadFactor	0.46	0.42
tblOffRoadEquipment	LoadFactor	0.56	0.20
tblOffRoadEquipment	LoadFactor	0.41	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.36
tblOffRoadEquipment	LoadFactor	0.82	0.37
tblOffRoadEquipment	LoadFactor	0.37	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.38	0.20
tblOffRoadEquipment	LoadFactor	0.37	0.29
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	HaulingTripLength	20.00	3.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	19.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	WorkerTripNumber	33.00	8.00
tblTripsAndVMT	WorkerTripNumber	65.00	20.00
tblTripsAndVMT	WorkerTripNumber	33.00	14.00
tblTripsAndVMT	WorkerTripNumber	55.00	20.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	15.00	40.00
tblVehicleTrips	ST_TR	7.16	8.00
tblVehicleTrips	ST_TR	8.19	8.17
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	SU_TR	6.07	8.00
tblVehicleTrips	SU_TR	5.95	8.17
tblVehicleTrips	SU_TR	8.77	9.52
tblVehicleTrips	WD_TR	6.59	8.00
tblVehicleTrips	WD_TR	9.57	9.52
tblWoodstoves	NumberCatalytic	0.20	0.00
tblWoodstoves	NumberCatalytic	3.35	0.00

tblWoodstoves	NumberNoncatalytic	0.20	0.00
tblWoodstoves	NumberNoncatalytic	3.35	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	19.9080	209.7012	120.0501	0.1785	31.5340	10.6030	42.1369	16.8416	9.8147	26.6563	0.0000	18,407.7539	18,407.7539	4.5423	0.0000	18,503.1428
2017	10.5996	78.6209	55.2164	0.0771	19.5303	3.8275	23.3578	10.2152	3.5556	13.7707	0.0000	7,587.7655	7,587.7655	1.8622	0.0000	7,626.8712
2018	10.0069	30.2600	21.0900	0.0401	0.3465	1.6524	1.9989	0.0919	1.5623	1.6542	0.0000	3,831.3169	3,831.3169	0.8659	0.0000	3,849.5002
Total	**40.5145**	**318.5821**	**196.3565**	**0.2957**	**51.4108**	**16.0828**	**67.4936**	**27.1486**	**14.9325**	**42.0811**	**0.0000**	**29,826.8363**	**29,826.8363**	**7.2704**	**0.0000**	**29,979.5142**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	2.5497	13.0615	101.2127	0.1785	11.8914	0.3193	12.2106	6.3042	0.3146	6.6188	0.0000	18,407.7539	18,407.7539	4.5423	0.0000	18,503.1428
2017	7.0684	6.0304	38.5487	0.0771	7.4247	0.1301	7.5548	3.8423	0.1278	3.9700	0.0000	7,587.7655	7,587.7655	1.8622	0.0000	7,626.8712
2018	7.0560	2.8157	22.4684	0.0401	0.2079	0.0566	0.2645	0.0579	0.0564	0.1142	0.0000	3,831.3169	3,831.3169	0.8659	0.0000	3,849.5002
Total	**16.6742**	**21.9076**	**162.2297**	**0.2957**	**19.5240**	**0.5059**	**20.0299**	**10.2044**	**0.4987**	**10.7031**	**0.0000**	**29,826.8363**	**29,826.8363**	**7.2704**	**0.0000**	**29,979.5142**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**58.84**	**93.12**	**17.38**	**0.00**	**62.02**	**96.85**	**70.32**	**62.41**	**96.66**	**74.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	6.4479	0.0683	5.9065	3.1000e-004		0.1275	0.1275		0.1265	0.1265	0.0000	1,514.1029	1,514.1029	0.0392	0.0276	1,523.4720
Energy	0.1107	0.9728	0.6022	6.0400e-003		0.0765	0.0765		0.0765	0.0765		1,207.1358	1,207.1358	0.0231	0.0221	1,214.4822
Mobile	4.8597	13.0697	52.7409	0.1506	9.8313	0.2087	10.0400	2.6291	0.1925	2.8216		12,100.3300	12,100.3300	0.4479		12,109.7365
Total	**11.4183**	**14.1108**	**59.2496**	**0.1570**	**9.8313**	**0.4127**	**10.2440**	**2.6291**	**0.3954**	**3.0246**	**0.0000**	**14,821.5686**	**14,821.5686**	**0.5103**	**0.0497**	**14,847.6907**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	6.4479	0.0683	5.9065	3.1000e-004		0.1275	0.1275		0.1265	0.1265	0.0000	1,514.1029	1,514.1029	0.0392	0.0276	1,523.4720
Energy	0.1107	0.9728	0.6022	6.0400e-003		0.0765	0.0765		0.0765	0.0765		1,207.1358	1,207.1358	0.0231	0.0221	1,214.4822
Mobile	4.8597	13.0697	52.7409	0.1506	9.8313	0.2087	10.0400	2.6291	0.1925	2.8216		12,100.3300	12,100.3300	0.4479		12,109.7365
Total	**11.4183**	**14.1108**	**59.2496**	**0.1570**	**9.8313**	**0.4127**	**10.2440**	**2.6291**	**0.3954**	**3.0246**	**0.0000**	**14,821.5686**	**14,821.5686**	**0.5103**	**0.0497**	**14,847.6907**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	3/1/2016	3/31/2016	5	23	
2	Grading	Grading	4/1/2016	11/30/2016	5	174	
3	Underground Improvements	Site Preparation	10/1/2016	11/30/2016	5	43	
4	House Construction	Building Construction	11/1/2016	12/31/2018	5	565	
5	Street Improvements	Paving	12/1/2016	12/31/2016	5	22	
6	Landscape	Site Preparation	1/1/2017	1/31/2017	5	22	
7	Architectural Coatings	Architectural Coating	3/1/2017	12/31/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 39

Acres of Paving: 0

Residential Indoor: 402,505; Residential Outdoor: 134,168; Non-Residential Indoor: 101,370; Non-Residential Outdoor: 33,790 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clearing	Crawler Tractors	1	8.00	174	0.41
Clearing	Dumpers/Tenders	2	8.00	361	0.48
Clearing	Excavators	1	8.00	162	0.38
Clearing	Off-Highway Trucks	1	8.00	97	0.37
Clearing	Rubber Tired Dozers	3	8.00	255	0.40
Clearing	Rubber Tired Loaders	1	8.00	255	0.40
Clearing	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Cement and Mortar Mixers	8	8.00	255	0.40
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Off-Highway Trucks	2	8.00	84	0.74
Grading	Pumps	1	8.00	361	0.48
Grading	Rubber Tired Dozers	2	8.00	89	0.20
Grading	Rubber Tired Dozers	2	8.00	162	0.38
Grading	Scrapers	6	7.00	226	0.29
Grading	Tractors/Loaders/Backhoes	2	8.00	174	0.41

Underground Improvements		0	0.00	0	
Underground Improvements	Excavators	1	7.00	226	0.29
Underground Improvements	Off-Highway Trucks	4	8.00	84	0.74
Underground Improvements	Rubber Tired Dozers	3	8.00	255	0.40
Underground Improvements	Rubber Tired Loaders	1	8.00	89	0.20
Underground Improvements	Tractors/Loaders/Backhoes	4	8.00	97	0.37
House Construction	Cement and Mortar Mixers	1	8.00	84	0.74
House Construction	Cranes	1	7.00	226	0.29
House Construction	Forklifts	1	8.00	89	0.20
House Construction	Generator Sets	1	8.00	84	0.74
House Construction	Off-Highway Trucks	2	7.00	226	0.29
House Construction	Sweepers/Scrubbers	1	8.00	125	0.42
House Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
House Construction	Welders	1	8.00	46	0.45
Street Improvements	Cement and Mortar Mixers	2	8.00	89	0.20
Street Improvements	Graders	2	7.00	226	0.29
Street Improvements	Off-Highway Trucks	3	8.00	130	0.36
Street Improvements	Pavers	1	8.00	125	0.42
Street Improvements	Paving Equipment	2	8.00	130	0.36
Street Improvements	Rollers	2	8.00	80	0.38
Street Improvements	Signal Boards	3	7.00	97	0.37
Street Improvements	Tractors/Loaders/Backhoes	1	8.00	80	0.38
Landscape	Dumpers/Tenders	1	8.00	84	0.74
Landscape	Off-Highway Trucks	1	8.00	89	0.20
Landscape	Rubber Tired Dozers	3	8.00	255	0.40
Landscape	Tractors/Loaders/Backhoes	1	7.00	226	0.29
Architectural Coatings	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clearing	13	8.00	0.00	300.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Grading	26	20.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT

Underground Improvements	13	14.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
House Construction	9	20.00	0.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Street Improvements	16	20.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Landscape	6	40.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	11.00	0.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Clean Paved Roads

3.2 Clearing - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.8763	0.0000	19.8763	10.1266	0.0000	10.1266			0.0000			0.0000
Off-Road	6.9545	75.8436	52.7919	0.0592		3.9356	3.9356		3.6208	3.6208		6,151.8880	6,151.8880	1.8556		6,190.8562
Total	**6.9545**	**75.8436**	**52.7919**	**0.0592**	**19.8763**	**3.9356**	**23.8119**	**10.1266**	**3.6208**	**13.7474**		**6,151.8880**	**6,151.8880**	**1.8556**		**6,190.8562**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.1018	0.7738	1.6656	1.6800e-003	0.0343	8.6700e-003	0.0430	9.4100e-003	7.9600e-003	0.0174		167.4305	167.4305	1.6500e-003		167.4653
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0356	0.0448	0.5550	1.1600e-003	0.0894	8.5000e-004	0.0903	0.0237	7.8000e-004	0.0245		98.3217	98.3217	5.3500e-003		98.4341
Total	**0.1374**	**0.8186**	**2.2205**	**2.8400e-003**	**0.1237**	**9.5200e-003**	**0.1332**	**0.0331**	**8.7400e-003**	**0.0419**		**265.7522**	**265.7522**	**7.0000e-003**		**265.8994**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.3642	0.0000	7.3642	3.7519	0.0000	3.7519			0.0000			0.0000
Off-Road	0.7243	3.1387	33.8719	0.0592		0.0966	0.0966		0.0966	0.0966	0.0000	6,151.8880	6,151.8880	1.8556		6,190.8562
Total	**0.7243**	**3.1387**	**33.8719**	**0.0592**	**7.3642**	**0.0966**	**7.4607**	**3.7519**	**0.0966**	**3.8485**	**0.0000**	**6,151.8880**	**6,151.8880**	**1.8556**		**6,190.8562**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1018	0.7738	1.6656	1.6800e-003	0.0224	8.6700e-003	0.0311	6.4900e-003	7.9600e-003	0.0145		167.4305	167.4305	1.6500e-003		167.4653
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0356	0.0448	0.5550	1.1600e-003	0.0537	8.5000e-004	0.0545	0.0149	7.8000e-004	0.0157		98.3217	98.3217	5.3500e-003		98.4341
Total	**0.1374**	**0.8186**	**2.2205**	**2.8400e-003**	**0.0761**	**9.5200e-003**	**0.0856**	**0.0214**	**8.7400e-003**	**0.0302**		**265.7522**	**265.7522**	**7.0000e-003**		**265.8994**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.2819	0.0000	12.2819	6.6461	0.0000	6.6461			0.0000			0.0000
Off-Road	9.8046	109.7874	49.7188	0.0842		5.3019	5.3019		4.8993	4.8993		8,901.4905	8,901.4905	2.2284		8,948.2860
Total	**9.8046**	**109.7874**	**49.7188**	**0.0842**	**12.2819**	**5.3019**	**17.5838**	**6.6461**	**4.8993**	**11.5454**		**8,901.4905**	**8,901.4905**	**2.2284**		**8,948.2860**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.1185	0.0260	0.1445	0.0337	0.0239	0.0576		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.2236	2.1100e-003	0.2257	0.0593	1.9400e-003	0.0612		245.8043	245.8043	0.0134		246.0853
Total	**0.2492**	**1.7748**	**3.3191**	**7.0800e-003**	**0.3420**	**0.0281**	**0.3702**	**0.0930**	**0.0258**	**0.1188**		**664.2234**	**664.2234**	**0.0165**		**664.5689**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.5504	0.0000	4.5504	2.4624	0.0000	2.4624			0.0000			0.0000
Off-Road	1.0345	4.4830	50.1096	0.0842		0.1379	0.1379		0.1379	0.1379	0.0000	8,901.4905	8,901.4905	2.2284		8,948.2860

Total	**1.0345**	**4.4830**	**50.1096**	**0.0842**	**4.5504**	**0.1379**	**4.6884**	**2.4624**	**0.1379**	**2.6003**	**0.0000**	**8,901.4905**	**8,901.4905**	**2.2284**		**8,948.2860**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.0786	0.0260	0.1046	0.0239	0.0239	0.0478		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.1342	2.1100e-003	0.1363	0.0373	1.9400e-003	0.0393		245.8043	245.8043	0.0134		246.0853
Total	**0.2492**	**1.7748**	**3.3191**	**7.0800e-003**	**0.2128**	**0.0281**	**0.2409**	**0.0613**	**0.0258**	**0.0871**		**664.2234**	**664.2234**	**0.0165**		**664.5689**

3.4 Underground Improvements - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.4115	0.0000	18.4115	9.9680	0.0000	9.9680			0.0000			0.0000
Off-Road	5.5942	60.4084	43.7198	0.0455		3.2332	3.2332		2.9745	2.9745		4,734.1840	4,734.1840	1.4280		4,764.1719
Total	**5.5942**	**60.4084**	**43.7198**	**0.0455**	**18.4115**	**3.2332**	**21.6447**	**9.9680**	**2.9745**	**12.9425**		**4,734.1840**	**4,734.1840**	**1.4280**		**4,764.1719**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.1185	0.0260	0.1445	0.0337	0.0239	0.0576		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0624	0.0785	0.9712	2.0400e-003	0.1565	1.4800e-003	0.1580	0.0415	1.3600e-003	0.0429		172.0630	172.0630	9.3700e-003		172.2597
Total	**0.2224**	**1.7412**	**2.9029**	**6.2100e-003**	**0.2750**	**0.0275**	**0.3025**	**0.0752**	**0.0253**	**0.1005**		**590.4821**	**590.4821**	**0.0124**		**590.7434**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8215	0.0000	6.8215	3.6931	0.0000	3.6931			0.0000			0.0000
Off-Road	0.5553	2.4061	24.6282	0.0455		0.0740	0.0740		0.0740	0.0740	0.0000	4,734.1840	4,734.1840	1.4280		4,764.1719
Total	**0.5553**	**2.4061**	**24.6282**	**0.0455**	**6.8215**	**0.0740**	**6.8955**	**3.6931**	**0.0740**	**3.7672**	**0.0000**	**4,734.1840**	**4,734.1840**	**1.4280**		**4,764.1719**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.0786	0.0260	0.1046	0.0239	0.0239	0.0478		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0624	0.0785	0.9712	2.0400e-003	0.0939	1.4800e-003	0.0954	0.0261	1.3600e-003	0.0275		172.0630	172.0630	9.3700e-003		172.2597
Total	**0.2224**	**1.7412**	**2.9029**	**6.2100e-003**	**0.1725**	**0.0275**	**0.2000**	**0.0501**	**0.0253**	**0.0753**		**590.4821**	**590.4821**	**0.0124**		**590.7434**

3.5 House Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9484	35.8774	19.0022	0.0326		2.0102	2.0102		1.8878	1.8878		3,271.5696	3,271.5696	0.8437		3,289.2873
Total	**3.9484**	**35.8774**	**19.0022**	**0.0326**		**2.0102**	**2.0102**		**1.8878**	**1.8878**		**3,271.5696**	**3,271.5696**	**0.8437**		**3,289.2873**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.2236	2.1100e-003	0.2257	0.0593	1.9400e-003	0.0612		245.8043	245.8043	0.0134		246.0853
Total	**0.0891**	**0.1121**	**1.3874**	**2.9100e-003**	**0.2236**	**2.1100e-003**	**0.2257**	**0.0593**	**1.9400e-003**	**0.0612**		**245.8043**	**245.8043**	**0.0134**		**246.0853**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3993	2.5443	18.8656	0.0326		0.0496	0.0496		0.0496	0.0496	0.0000	3,271.5696	3,271.5696	0.8437		3,289.2873

Total	**0.3993**	**2.5443**	**18.8656**	**0.0326**		**0.0496**	**0.0496**		**0.0496**	**0.0496**	**0.0000**	**3,271.5696**	**3,271.5696**	**0.8437**		**3,289.2873**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.1342	2.1100e-003	0.1363	0.0373	1.9400e-003	0.0393		245.8043	245.8043	0.0134		246.0853
Total	**0.0891**	**0.1121**	**1.3874**	**2.9100e-003**	**0.1342**	**2.1100e-003**	**0.1363**	**0.0373**	**1.9400e-003**	**0.0393**		**245.8043**	**245.8043**	**0.0134**		**246.0853**

3.5 House Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6279	33.1362	18.4915	0.0326		1.8264	1.8264		1.7145	1.7145		3,233.6582	3,233.6582	0.8317		3,251.1230
Total	**3.6279**	**33.1362**	**18.4915**	**0.0326**		**1.8264**	**1.8264**		**1.7145**	**1.7145**		**3,233.6582**	**3,233.6582**	**0.8317**		**3,251.1230**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0801	0.1014	1.2570	2.9100e-003	0.2236	2.0300e-003	0.2256	0.0593	1.8700e-003	0.0612		236.6055	236.6055	0.0124		236.8652
Total	**0.0801**	**0.1014**	**1.2570**	**2.9100e-003**	**0.2236**	**2.0300e-003**	**0.2256**	**0.0593**	**1.8700e-003**	**0.0612**		**236.6055**	**236.6055**	**0.0124**		**236.8652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3993	2.5443	18.8656	0.0326		0.0496	0.0496		0.0496	0.0496	0.0000	3,233.6582	3,233.6582	0.8317		3,251.1230
Total	**0.3993**	**2.5443**	**18.8656**	**0.0326**		**0.0496**	**0.0496**		**0.0496**	**0.0496**	**0.0000**	**3,233.6582**	**3,233.6582**	**0.8317**		**3,251.1230**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0801	0.1014	1.2570	2.9100e-003	0.1342	2.0300e-003	0.1362	0.0373	1.8700e-003	0.0392		236.6055	236.6055	0.0124		236.8652
Total	**0.0801**	**0.1014**	**1.2570**	**2.9100e-003**	**0.1342**	**2.0300e-003**	**0.1362**	**0.0373**	**1.8700e-003**	**0.0392**		**236.6055**	**236.6055**	**0.0124**		**236.8652**

3.5 House Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.0812	28.1116	17.4654	0.0326		1.4988	1.4988		1.4089	1.4089		3,196.5503	3,196.5503	0.8213		3,213.7981
Total	**3.0812**	**28.1116**	**17.4654**	**0.0326**		**1.4988**	**1.4988**		**1.4089**	**1.4089**		**3,196.5503**	**3,196.5503**	**0.8213**		**3,213.7981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0721	0.0920	1.1422	2.9100e-003	0.2236	1.9600e-003	0.2255	0.0593	1.8100e-003	0.0611		227.9472	227.9472	0.0115		228.1884
Total	**0.0721**	**0.0920**	**1.1422**	**2.9100e-003**	**0.2236**	**1.9600e-003**	**0.2255**	**0.0593**	**1.8100e-003**	**0.0611**		**227.9472**	**227.9472**	**0.0115**		**228.1884**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3993	2.5443	18.8656	0.0326		0.0496	0.0496		0.0496	0.0496	0.0000	3,196.5503	3,196.5503	0.8213		3,213.7981

Total	**0.3993**	**2.5443**	**18.8656**	**0.0326**		**0.0496**	**0.0496**		**0.0496**	**0.0496**	**0.0000**	**3,196.5503**	**3,196.5503**	**0.8213**		**3,213.7981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0721	0.0920	1.1422	2.9100e-003	0.1342	1.9600e-003	0.1361	0.0373	1.8100e-003	0.0392		227.9472	227.9472	0.0115		228.1884
Total	**0.0721**	**0.0920**	**1.1422**	**2.9100e-003**	**0.1342**	**1.9600e-003**	**0.1361**	**0.0373**	**1.8100e-003**	**0.0392**		**227.9472**	**227.9472**	**0.0115**		**228.1884**

3.6 Street Improvements - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.9808	50.9267	31.4974	0.0523		2.8075	2.8075		2.6268	2.6268		5,347.8086	5,347.8086	1.4197		5,377.6211
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.9808**	**50.9267**	**31.4974**	**0.0523**		**2.8075**	**2.8075**		**2.6268**	**2.6268**		**5,347.8086**	**5,347.8086**	**1.4197**		**5,377.6211**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.1185	0.0260	0.1445	0.0337	0.0239	0.0576		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.2236	2.1100e-003	0.2257	0.0593	1.9400e-003	0.0612		245.8043	245.8043	0.0134		246.0853
Total	**0.2492**	**1.7748**	**3.3191**	**7.0800e-003**	**0.3420**	**0.0281**	**0.3702**	**0.0930**	**0.0258**	**0.1188**		**664.2234**	**664.2234**	**0.0165**		**664.5689**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6208	2.6900	35.2458	0.0523		0.0828	0.0828		0.0828	0.0828	0.0000	5,347.8086	5,347.8086	1.4197		5,377.6211
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6208**	**2.6900**	**35.2458**	**0.0523**		**0.0828**	**0.0828**		**0.0828**	**0.0828**	**0.0000**	**5,347.8086**	**5,347.8086**	**1.4197**		**5,377.6211**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1601	1.6627	1.9317	4.1700e-003	0.0786	0.0260	0.1046	0.0239	0.0239	0.0478		418.4192	418.4192	3.0700e-003		418.4837
Worker	0.0891	0.1121	1.3874	2.9100e-003	0.1342	2.1100e-003	0.1363	0.0373	1.9400e-003	0.0393		245.8043	245.8043	0.0134		246.0853
Total	**0.2492**	**1.7748**	**3.3191**	**7.0800e-003**	**0.2128**	**0.0281**	**0.2409**	**0.0613**	**0.0258**	**0.0871**		**664.2234**	**664.2234**	**0.0165**		**664.5689**

3.7 Landscape - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.7411	0.0000	18.7411	10.0036	0.0000	10.0036			0.0000			0.0000
Off-Road	3.8656	43.6648	31.1403	0.0316		1.9719	1.9719		1.8142	1.8142		3,232.5533	3,232.5533	0.9905		3,253.3527
Total	**3.8656**	**43.6648**	**31.1403**	**0.0316**	**18.7411**	**1.9719**	**20.7130**	**10.0036**	**1.8142**	**11.8177**		**3,232.5533**	**3,232.5533**	**0.9905**		**3,253.3527**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1464	1.5157	1.8136	4.1700e-003	0.1185	0.0232	0.1417	0.0337	0.0213	0.0550		411.7375	411.7375	2.9700e-003		411.7999
Worker	0.1601	0.2028	2.5141	5.8100e-003	0.4471	4.0500e-003	0.4512	0.1186	3.7300e-003	0.1223		473.2110	473.2110	0.0247		473.7304
Total	**0.3065**	**1.7185**	**4.3277**	**9.9800e-003**	**0.5657**	**0.0272**	**0.5929**	**0.1523**	**0.0250**	**0.1773**		**884.9485**	**884.9485**	**0.0277**		**885.5303**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.9436	0.0000	6.9436	3.7063	0.0000	3.7063			0.0000			0.0000

Off-Road	0.3845	1.6662	14.0984	0.0316		0.0513	0.0513		0.0513	0.0513	0.0000	3,232.5533	3,232.5533	0.9905		3,253.3527
Total	**0.3845**	**1.6662**	**14.0984**	**0.0316**	**6.9436**	**0.0513**	**6.9949**	**3.7063**	**0.0513**	**3.7576**	**0.0000**	**3,232.5533**	**3,232.5533**	**0.9905**		**3,253.3527**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1464	1.5157	1.8136	4.1700e-003	0.0787	0.0232	0.1018	0.0240	0.0213	0.0452		411.7375	411.7375	2.9700e-003		411.7999
Worker	0.1601	0.2028	2.5141	5.8100e-003	0.2683	4.0500e-003	0.2724	0.0747	3.7300e-003	0.0784		473.2110	473.2110	0.0247		473.7304
Total	**0.3065**	**1.7185**	**4.3277**	**9.9800e-003**	**0.3470**	**0.0272**	**0.3742**	**0.0986**	**0.0250**	**0.1237**		**884.9485**	**884.9485**	**0.0277**		**885.5303**

3.8 Architectural Coatings - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.5153					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**6.8476**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0440	0.0558	0.6914	1.6000e-003	0.1230	1.1100e-003	0.1241	0.0326	1.0300e-003	0.0336		130.1330	130.1330	6.8000e-003		130.2759
Total	**0.0440**	**0.0558**	**0.6914**	**1.6000e-003**	**0.1230**	**1.1100e-003**	**0.1241**	**0.0326**	**1.0300e-003**	**0.0336**		**130.1330**	**130.1330**	**6.8000e-003**		**130.2759**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.5153					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**6.5450**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0440	0.0558	0.6914	1.6000e-003	0.0738	1.1100e-003	0.0749	0.0205	1.0300e-003	0.0216		130.1330	130.1330	6.8000e-003		130.2759
Total	**0.0440**	**0.0558**	**0.6914**	**1.6000e-003**	**0.0738**	**1.1100e-003**	**0.0749**	**0.0205**	**1.0300e-003**	**0.0216**		**130.1330**	**130.1330**	**6.8000e-003**		**130.2759**

3.8 Architectural Coatings - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.5153					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	**6.8140**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.0102**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0396	0.0506	0.6282	1.6000e-003	0.1230	1.0800e-003	0.1240	0.0326	1.0000e-003	0.0336		125.3709	125.3709	6.3200e-003		125.5036
Total	**0.0396**	**0.0506**	**0.6282**	**1.6000e-003**	**0.1230**	**1.0800e-003**	**0.1240**	**0.0326**	**1.0000e-003**	**0.0336**		**125.3709**	**125.3709**	**6.3200e-003**		**125.5036**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.5153					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4485	281.4485	0.0267		282.0102
Total	**6.5450**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.0102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0396	0.0506	0.6282	1.6000e-003	0.0738	1.0800e-003	0.0749	0.0205	1.0000e-003	0.0215		125.3709	125.3709	6.3200e-003		125.5036
Total	**0.0396**	**0.0506**	**0.6282**	**1.6000e-003**	**0.0738**	**1.0800e-003**	**0.0749**	**0.0205**	**1.0000e-003**	**0.0215**		**125.3709**	**125.3709**	**6.3200e-003**		**125.5036**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.8597	13.0697	52.7409	0.1506	9.8313	0.2087	10.0400	2.6291	0.1925	2.8216		12,100.3300	12,100.3300	0.4479		12,109.7365
Unmitigated	4.8597	13.0697	52.7409	0.1506	9.8313	0.2087	10.0400	2.6291	0.1925	2.8216		12,100.3300	12,100.3300	0.4479		12,109.7365

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	32.00	32.00	32.00	109,349	109,349
Hotel	980.40	980.40	980.40	2,339,402	2,339,402
Single Family Housing	637.84	637.84	637.84	2,179,596	2,179,596
Total	1,650.24	1,650.24	1,650.24	4,628,347	4,628,347

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1107	0.9728	0.6022	6.0400e-003		0.0765	0.0765		0.0765	0.0765		1,207.1358	1,207.1358	0.0231	0.0221	1,214.4822
NaturalGas Unmitigated	0.1107	0.9728	0.6022	6.0400e-003		0.0765	0.0765		0.0765	0.0765		1,207.1358	1,207.1358	0.0231	0.0221	1,214.4822

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	157.874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Hotel	4632.47	0.0500	0.4542	0.3815	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.9965	544.9965	0.0105	9.9900e-003	548.3132
Single Family Housing	5470.31	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Total		**0.1107**	**0.9728**	**0.6022**	**6.0300e-003**		**0.0765**	**0.0765**		**0.0765**	**0.0765**		**1,207.1358**	**1,207.1358**	**0.0232**	**0.0221**	**1,214.4822**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Hotel	4.63247	0.0500	0.4542	0.3815	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.9965	544.9965	0.0105	9.9900e-003	548.3132
Single Family Housing	5.47031	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Condo/Townhouse	0.157874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Total		**0.1107**	**0.9728**	**0.6022**	**6.0300e-003**		**0.0765**	**0.0765**		**0.0765**	**0.0765**		**1,207.1358**	**1,207.1358**	**0.0232**	**0.0221**	**1,214.4822**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	6.4479	0.0683	5.9065	3.1000e-004		0.1275	0.1275		0.1265	0.1265	0.0000	1,514.1029	1,514.1029	0.0392	0.0276	1,523.4720
Unmitigated	6.4479	0.0683	5.9065	3.1000e-004		0.1275	0.1275		0.1265	0.1265	0.0000	1,514.1029	1,514.1029	0.0392	0.0276	1,523.4720

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.8550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2737					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1378	1.0000e-005	7.5200e-003	0.0000		0.0952	0.0952		0.0942	0.0942	0.0000	1,503.5294	1,503.5294	0.0288	0.0276	1,512.6796
Landscaping	0.1814	0.0683	5.8990	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5735	10.5735	0.0104		10.7924
Total	**6.4479**	**0.0683**	**5.9065**	**3.1000e-004**		**0.1275**	**0.1275**		**0.1265**	**0.1265**	**0.0000**	**1,514.1029**	**1,514.1029**	**0.0392**	**0.0276**	**1,523.4720**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.8550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.2737					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1378	1.0000e-005	7.5200e-003	0.0000		0.0952	0.0952		0.0942	0.0942	0.0000	1,503.5294	1,503.5294	0.0288	0.0276	1,512.6796
Landscaping	0.1814	0.0683	5.8990	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5735	10.5735	0.0104		10.7924
Total	**6.4479**	**0.0683**	**5.9065**	**3.1000e-004**		**0.1275**	**0.1275**		**0.1265**	**0.1265**	**0.0000**	**1,514.1029**	**1,514.1029**	**0.0392**	**0.0276**	**1,523.4720**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hotel	120.00	Room	2.91	67,580.00	0
Condo/Townhouse	4.00	Dwelling Unit	1.03	4,950.00	11
Single Family Housing	67.00	Dwelling Unit	12.00	193,818.00	192

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project description information

Land Use - Project information

Construction Phase - Developer information

Off-road Equipment - Developer information

Off-road Equipment -

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Off-road Equipment - Developer information

Trips and VMT - Developer information

Grading - Developer information. Assumes 12 haul trips during clearing and grubbing x 20 days with 10 CY capacity per haul truck

Vehicle Trips - Traffic Study, Associated Transportation Engineers "Canyon Oaks Project"

Woodstoves - Consultant assumptions

Construction Off-road Equipment Mitigation - Tier 3 engines required to reduce NOx emissions
AQMD Rule 403 and AQMD recommended control efficiencies for PM control

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	46
tblConstEquipMitigation	DPF	No Change	Level 1
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	12/3/2018	12/31/2018
tblConstructionPhase	PhaseEndDate	1/30/2019	12/31/2018
tblConstructionPhase	PhaseEndDate	1/30/2019	12/31/2016
tblConstructionPhase	PhaseEndDate	1/30/2017	11/30/2016

tblConstructionPhase	PhaseStartDate	2/1/2017	3/1/2017
tblConstructionPhase	PhaseStartDate	12/1/2016	11/1/2016
tblConstructionPhase	PhaseStartDate	1/1/2019	12/1/2016
tblConstructionPhase	PhaseStartDate	12/1/2016	10/1/2016
tblFireplaces	NumberGas	3.40	4.00
tblFireplaces	NumberGas	56.95	67.00
tblFireplaces	NumberNoFireplace	0.40	0.00
tblFireplaces	NumberNoFireplace	6.70	0.00
tblFireplaces	NumberWood	0.20	0.00
tblFireplaces	NumberWood	3.35	0.00
tblGrading	AcresOfGrading	1,000.50	39.00
tblGrading	AcresOfGrading	11.50	39.00
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	MaterialExported	0.00	2,400.00
tblLandUse	LandUseSquareFeet	174,240.00	67,580.00
tblLandUse	LandUseSquareFeet	4,000.00	4,950.00
tblLandUse	LandUseSquareFeet	120,600.00	193,818.00
tblLandUse	LotAcreage	4.00	2.91
tblLandUse	LotAcreage	0.25	1.03
tblLandUse	LotAcreage	21.75	12.00
tblOffRoadEquipment	HorsePower	208.00	174.00
tblOffRoadEquipment	HorsePower	16.00	361.00
tblOffRoadEquipment	HorsePower	400.00	97.00
tblOffRoadEquipment	HorsePower	199.00	255.00
tblOffRoadEquipment	HorsePower	9.00	255.00
tblOffRoadEquipment	HorsePower	400.00	84.00
tblOffRoadEquipment	HorsePower	84.00	361.00
tblOffRoadEquipment	HorsePower	255.00	89.00
tblOffRoadEquipment	HorsePower	255.00	162.00
tblOffRoadEquipment	HorsePower	361.00	226.00

tblOffRoadEquipment	HorsePower	97.00	174.00
tblOffRoadEquipment	HorsePower	162.00	226.00
tblOffRoadEquipment	HorsePower	400.00	84.00
tblOffRoadEquipment	HorsePower	199.00	89.00
tblOffRoadEquipment	HorsePower	9.00	84.00
tblOffRoadEquipment	HorsePower	400.00	226.00
tblOffRoadEquipment	HorsePower	64.00	125.00
tblOffRoadEquipment	HorsePower	9.00	89.00
tblOffRoadEquipment	HorsePower	174.00	226.00
tblOffRoadEquipment	HorsePower	400.00	130.00
tblOffRoadEquipment	HorsePower	6.00	97.00
tblOffRoadEquipment	HorsePower	97.00	80.00
tblOffRoadEquipment	HorsePower	16.00	84.00
tblOffRoadEquipment	HorsePower	400.00	89.00
tblOffRoadEquipment	HorsePower	97.00	226.00
tblOffRoadEquipment	LoadFactor	0.43	0.41
tblOffRoadEquipment	LoadFactor	0.38	0.48
tblOffRoadEquipment	LoadFactor	0.38	0.37
tblOffRoadEquipment	LoadFactor	0.36	0.40
tblOffRoadEquipment	LoadFactor	0.56	0.40
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.74	0.48
tblOffRoadEquipment	LoadFactor	0.40	0.20
tblOffRoadEquipment	LoadFactor	0.40	0.38
tblOffRoadEquipment	LoadFactor	0.48	0.29
tblOffRoadEquipment	LoadFactor	0.37	0.41
tblOffRoadEquipment	LoadFactor	0.38	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.36	0.20
tblOffRoadEquipment	LoadFactor	0.56	0.74
tblOffRoadEquipment	LoadFactor	0.38	0.29

tblOffRoadEquipment	LoadFactor	0.46	0.42
tblOffRoadEquipment	LoadFactor	0.56	0.20
tblOffRoadEquipment	LoadFactor	0.41	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.36
tblOffRoadEquipment	LoadFactor	0.82	0.37
tblOffRoadEquipment	LoadFactor	0.37	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.74
tblOffRoadEquipment	LoadFactor	0.38	0.20
tblOffRoadEquipment	LoadFactor	0.37	0.29
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	HaulingTripLength	20.00	3.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	19.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00
tblTripsAndVMT	VendorTripNumber	0.00	19.00

tblTripsAndVMT	WorkerTripNumber	33.00	8.00
tblTripsAndVMT	WorkerTripNumber	65.00	20.00
tblTripsAndVMT	WorkerTripNumber	33.00	14.00
tblTripsAndVMT	WorkerTripNumber	55.00	20.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	15.00	40.00
tblVehicleTrips	ST_TR	7.16	8.00
tblVehicleTrips	ST_TR	8.19	8.17
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	SU_TR	6.07	8.00
tblVehicleTrips	SU_TR	5.95	8.17
tblVehicleTrips	SU_TR	8.77	9.52
tblVehicleTrips	WD_TR	6.59	8.00
tblVehicleTrips	WD_TR	9.57	9.52
tblWoodstoves	NumberCatalytic	0.20	0.00
tblWoodstoves	NumberCatalytic	3.35	0.00
tblWoodstoves	NumberNoncatalytic	0.20	0.00
tblWoodstoves	NumberNoncatalytic	3.35	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.2288	13.3068	7.1157	0.0112	1.7379	0.6547	2.3925	0.9212	0.6055	1.5267	0.0000	1,054.5327	1,054.5327	0.2561	0.0000	1,059.9116
2017	1.2788	5.0681	3.2282	5.5500e-003	0.2539	0.2787	0.5326	0.1227	0.2624	0.3851	0.0000	489.1690	489.1690	0.1133	0.0000	491.5486

2018	1.3055	3.9515	2.7413	5.2100e-003	0.0443	0.2156	0.2600	0.0118	0.2039	0.2157	0.0000	451.8627	451.8627	0.1025	0.0000	454.0153
Total	**3.8132**	**22.3263**	**13.0852**	**0.0219**	**2.0361**	**1.1490**	**3.1851**	**1.0557**	**1.0717**	**2.1274**	**0.0000**	**1,995.5644**	**1,995.5644**	**0.4720**	**0.0000**	**2,005.4755**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.1598	0.7982	6.5599	0.0112	0.6552	0.0202	0.6754	0.3448	0.0199	0.3648	0.0000	1,054.5315	1,054.5315	0.2561	0.0000	1,059.9105
2017	0.7878	0.4050	3.0855	5.5500e-003	0.1052	8.1300e-003	0.1133	0.0488	8.0700e-003	0.0569	0.0000	489.1685	489.1685	0.1133	0.0000	491.5480
2018	0.9204	0.3700	2.9212	5.2100e-003	0.0267	7.3800e-003	0.0340	7.4400e-003	7.3500e-003	0.0148	0.0000	451.8622	451.8622	0.1025	0.0000	454.0148
Total	**1.8680**	**1.5733**	**12.5666**	**0.0219**	**0.7870**	**0.0357**	**0.8227**	**0.4011**	**0.0354**	**0.4364**	**0.0000**	**1,995.5622**	**1,995.5622**	**0.4720**	**0.0000**	**2,005.4733**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**51.01**	**92.95**	**3.96**	**0.00**	**61.35**	**96.89**	**74.17**	**62.01**	**96.70**	**79.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.1429	8.5400e-003	0.7375	4.0000e-005		5.2300e-003	5.2300e-003		5.2200e-003	5.2200e-003	0.0000	18.2488	18.2488	1.5100e-003	3.1000e-004	18.3773
Energy	0.0202	0.1775	0.1099	1.1000e-003		0.0140	0.0140		0.0140	0.0140	0.0000	509.1354	509.1354	0.0181	6.6100e-003	511.5621
Mobile	0.8792	2.5485	9.7404	0.0265	1.7547	0.0380	1.7927	0.4700	0.0351	0.5051	0.0000	1,933.6811	1,933.6811	0.0739	0.0000	1,935.2331

Waste						0.0000	0.0000		0.0000	0.0000	29.6895	0.0000	29.6895	1.7546	0.0000	66.5360
Water						0.0000	0.0000		0.0000	0.0000	2.4333	38.9269	41.3602	0.2517	6.2700e-003	48.5904
Total	**2.0423**	**2.7346**	**10.5877**	**0.0276**	**1.7547**	**0.0572**	**1.8119**	**0.4700**	**0.0542**	**0.5242**	**32.1228**	**2,499.9921**	**2,532.1149**	**2.0998**	**0.0132**	**2,580.2989**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.1429	8.5400e-003	0.7375	4.0000e-005		5.2300e-003	5.2300e-003		5.2200e-003	5.2200e-003	0.0000	18.2488	18.2488	1.5100e-003	3.1000e-004	18.3773
Energy	0.0202	0.1775	0.1099	1.1000e-003		0.0140	0.0140		0.0140	0.0140	0.0000	509.1354	509.1354	0.0181	6.6100e-003	511.5621
Mobile	0.8792	2.5485	9.7404	0.0265	1.7547	0.0380	1.7927	0.4700	0.0351	0.5051	0.0000	1,933.6811	1,933.6811	0.0739	0.0000	1,935.2331
Waste						0.0000	0.0000		0.0000	0.0000	29.6895	0.0000	29.6895	1.7546	0.0000	66.5360
Water						0.0000	0.0000		0.0000	0.0000	2.4333	38.9269	41.3602	0.2517	6.2600e-003	48.5865
Total	**2.0423**	**2.7346**	**10.5877**	**0.0276**	**1.7547**	**0.0572**	**1.8119**	**0.4700**	**0.0542**	**0.5242**	**32.1228**	**2,499.9921**	**2,532.1149**	**2.0997**	**0.0132**	**2,580.2950**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.08**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	3/1/2016	3/31/2016	5	23	
2	Grading	Grading	4/1/2016	11/30/2016	5	174	

3	Underground Improvements	Site Preparation	10/1/2016	11/30/2016	5	43	
4	House Construction	Building Construction	11/1/2016	12/31/2018	5	565	
5	Street Improvements	Paving	12/1/2016	12/31/2016	5	22	
6	Landscape	Site Preparation	1/1/2017	1/31/2017	5	22	
7	Architectural Coatings	Architectural Coating	3/1/2017	12/31/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 39

Acres of Paving: 0

Residential Indoor: 402,505; Residential Outdoor: 134,168; Non-Residential Indoor: 101,370; Non-Residential Outdoor: 33,790 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Clearing	Crawler Tractors	1	8.00	174	0.41
Clearing	Dumpers/Tenders	2	8.00	361	0.48
Clearing	Excavators	1	8.00	162	0.38
Clearing	Off-Highway Trucks	1	8.00	97	0.37
Clearing	Rubber Tired Dozers	3	8.00	255	0.40
Clearing	Rubber Tired Loaders	1	8.00	255	0.40
Clearing	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Cement and Mortar Mixers	8	8.00	255	0.40
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Off-Highway Trucks	2	8.00	84	0.74
Grading	Pumps	1	8.00	361	0.48
Grading	Rubber Tired Dozers	2	8.00	89	0.20
Grading	Rubber Tired Dozers	2	8.00	162	0.38
Grading	Scrapers	6	7.00	226	0.29
Grading	Tractors/Loaders/Backhoes	2	8.00	174	0.41
Underground Improvements		0	0.00	0	
Underground Improvements	Excavators	1	7.00	226	0.29

Underground Improvements	Off-Highway Trucks	4	8.00	84	0.74
Underground Improvements	Rubber Tired Dozers	3	8.00	255	0.40
Underground Improvements	Rubber Tired Loaders	1	8.00	89	0.20
Underground Improvements	Tractors/Loaders/Backhoes	4	8.00	97	0.37
House Construction	Cement and Mortar Mixers	1	8.00	84	0.74
House Construction	Cranes	1	7.00	226	0.29
House Construction	Forklifts	1	8.00	89	0.20
House Construction	Generator Sets	1	8.00	84	0.74
House Construction	Off-Highway Trucks	2	7.00	226	0.29
House Construction	Sweepers/Scrubbers	1	8.00	125	0.42
House Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
House Construction	Welders	1	8.00	46	0.45
Street Improvements	Cement and Mortar Mixers	2	8.00	89	0.20
Street Improvements	Graders	2	7.00	226	0.29
Street Improvements	Off-Highway Trucks	3	8.00	130	0.36
Street Improvements	Pavers	1	8.00	125	0.42
Street Improvements	Paving Equipment	2	8.00	130	0.36
Street Improvements	Rollers	2	8.00	80	0.38
Street Improvements	Signal Boards	3	7.00	97	0.37
Street Improvements	Tractors/Loaders/Backhoes	1	8.00	80	0.38
Landscape	Dumpers/Tenders	1	8.00	84	0.74
Landscape	Off-Highway Trucks	1	8.00	89	0.20
Landscape	Rubber Tired Dozers	3	8.00	255	0.40
Landscape	Tractors/Loaders/Backhoes	1	7.00	226	0.29
Architectural Coatings	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Clearing	13	8.00	0.00	300.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Grading	26	20.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT

Underground Improvements	13	14.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
House Construction	9	20.00	0.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Street Improvements	16	20.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Landscape	6	40.00	19.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	11.00	0.00	0.00	14.70	6.90	0.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Clean Paved Roads

3.2 Clearing - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2286	0.0000	0.2286	0.1165	0.0000	0.1165	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0800	0.8722	0.6071	6.8000e-004		0.0453	0.0453		0.0416	0.0416	0.0000	64.1803	64.1803	0.0194	0.0000	64.5869
Total	**0.0800**	**0.8722**	**0.6071**	**6.8000e-004**	**0.2286**	**0.0453**	**0.2738**	**0.1165**	**0.0416**	**0.1581**	**0.0000**	**64.1803**	**64.1803**	**0.0194**	**0.0000**	**64.5869**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2800e-003	9.2400e-003	0.0230	2.0000e-005	3.9000e-004	1.0000e-004	4.9000e-004	1.1000e-004	9.0000e-005	2.0000e-004	0.0000	1.7366	1.7366	2.0000e-005	0.0000	1.7370
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-004	5.9000e-004	6.1200e-003	1.0000e-005	1.0100e-003	1.0000e-005	1.0200e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9837	0.9837	6.0000e-005	0.0000	0.9849
Total	**1.6800e-003**	**9.8300e-003**	**0.0291**	**3.0000e-005**	**1.4000e-003**	**1.1000e-004**	**1.5100e-003**	**3.8000e-004**	**1.0000e-004**	**4.8000e-004**	**0.0000**	**2.7204**	**2.7204**	**8.0000e-005**	**0.0000**	**2.7219**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0847	0.0000	0.0847	0.0432	0.0000	0.0432	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3300e-003	0.0361	0.3895	6.8000e-004		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	64.1803	64.1803	0.0194	0.0000	64.5868
Total	**8.3300e-003**	**0.0361**	**0.3895**	**6.8000e-004**	**0.0847**	**1.1100e-003**	**0.0858**	**0.0432**	**1.1100e-003**	**0.0443**	**0.0000**	**64.1803**	**64.1803**	**0.0194**	**0.0000**	**64.5868**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2800e-003	9.2400e-003	0.0230	2.0000e-005	2.5000e-004	1.0000e-004	3.5000e-004	7.0000e-005	9.0000e-005	1.7000e-004	0.0000	1.7366	1.7366	2.0000e-005	0.0000	1.7370
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	4.0000e-004	5.9000e-004	6.1200e-003	1.0000e-005	6.1000e-004	1.0000e-005	6.2000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.9837	0.9837	6.0000e-005	0.0000	0.9849
Total	**1.6800e-003**	**9.8300e-003**	**0.0291**	**3.0000e-005**	**8.6000e-004**	**1.1000e-004**	**9.7000e-004**	**2.4000e-004**	**1.0000e-004**	**3.5000e-004**	**0.0000**	**2.7204**	**2.7204**	**8.0000e-005**	**0.0000**	**2.7219**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0685	0.0000	1.0685	0.5782	0.0000	0.5782	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.8530	9.5515	4.3255	7.3200e-003		0.4613	0.4613		0.4262	0.4262	0.0000	702.5508	702.5508	0.1759	0.0000	706.2441
Total	**0.8530**	**9.5515**	**4.3255**	**7.3200e-003**	**1.0685**	**0.4613**	**1.5298**	**0.5782**	**0.4262**	**1.0045**	**0.0000**	**702.5508**	**702.5508**	**0.1759**	**0.0000**	**706.2441**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0149	0.1512	0.1964	3.6000e-004	0.0101	2.2700e-003	0.0124	2.8900e-003	2.0900e-003	4.9800e-003	0.0000	32.9086	32.9086	2.5000e-004	0.0000	32.9138
Worker	7.6000e-003	0.0111	0.1157	2.4000e-004	0.0191	1.8000e-004	0.0193	5.0600e-003	1.7000e-004	5.2300e-003	0.0000	18.6055	18.6055	1.0600e-003	0.0000	18.6276
Total	**0.0225**	**0.1623**	**0.3122**	**6.0000e-004**	**0.0292**	**2.4500e-003**	**0.0317**	**7.9500e-003**	**2.2600e-003**	**0.0102**	**0.0000**	**51.5141**	**51.5141**	**1.3100e-003**	**0.0000**	**51.5414**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3959	0.0000	0.3959	0.2142	0.0000	0.2142	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0900	0.3900	4.3595	7.3200e-003		0.0120	0.0120		0.0120	0.0120	0.0000	702.5499	702.5499	0.1759	0.0000	706.2433
Total	**0.0900**	**0.3900**	**4.3595**	**7.3200e-003**	**0.3959**	**0.0120**	**0.4079**	**0.2142**	**0.0120**	**0.2262**	**0.0000**	**702.5499**	**702.5499**	**0.1759**	**0.0000**	**706.2433**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0149	0.1512	0.1964	3.6000e-004	6.7500e-003	2.2700e-003	9.0200e-003	2.0600e-003	2.0900e-003	4.1500e-003	0.0000	32.9086	32.9086	2.5000e-004	0.0000	32.9138
Worker	7.6000e-003	0.0111	0.1157	2.4000e-004	0.0115	1.8000e-004	0.0117	3.2000e-003	1.7000e-004	3.3700e-003	0.0000	18.6055	18.6055	1.0600e-003	0.0000	18.6276
Total	**0.0225**	**0.1623**	**0.3122**	**6.0000e-004**	**0.0182**	**2.4500e-003**	**0.0207**	**5.2600e-003**	**2.2600e-003**	**7.5200e-003**	**0.0000**	**51.5141**	**51.5141**	**1.3100e-003**	**0.0000**	**51.5414**

3.4 Underground Improvements - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3959	0.0000	0.3959	0.2143	0.0000	0.2143	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.1203	1.2988	0.9400	9.8000e-004		0.0695	0.0695		0.0640	0.0640	0.0000	92.3378	92.3378	0.0279	0.0000	92.9227
Total	**0.1203**	**1.2988**	**0.9400**	**9.8000e-004**	**0.3959**	**0.0695**	**0.4654**	**0.2143**	**0.0640**	**0.2783**	**0.0000**	**92.3378**	**92.3378**	**0.0279**	**0.0000**	**92.9227**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6700e-003	0.0374	0.0486	9.0000e-005	2.5100e-003	5.6000e-004	3.0700e-003	7.1000e-004	5.2000e-004	1.2300e-003	0.0000	8.1326	8.1326	6.0000e-005	0.0000	8.1339
Worker	1.3100e-003	1.9200e-003	0.0200	4.0000e-005	3.3000e-003	3.0000e-005	3.3300e-003	8.8000e-004	3.0000e-005	9.1000e-004	0.0000	3.2185	3.2185	1.8000e-004	0.0000	3.2224
Total	**4.9800e-003**	**0.0393**	**0.0686**	**1.3000e-004**	**5.8100e-003**	**5.9000e-004**	**6.4000e-003**	**1.5900e-003**	**5.5000e-004**	**2.1400e-003**	**0.0000**	**11.3511**	**11.3511**	**2.4000e-004**	**0.0000**	**11.3562**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1467	0.0000	0.1467	0.0794	0.0000	0.0794	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0517	0.5295	9.8000e-004		1.5900e-003	1.5900e-003		1.5900e-003	1.5900e-003	0.0000	92.3377	92.3377	0.0279	0.0000	92.9226
Total	**0.0119**	**0.0517**	**0.5295**	**9.8000e-004**	**0.1467**	**1.5900e-003**	**0.1483**	**0.0794**	**1.5900e-003**	**0.0810**	**0.0000**	**92.3377**	**92.3377**	**0.0279**	**0.0000**	**92.9226**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6700e-003	0.0374	0.0486	9.0000e-005	1.6700e-003	5.6000e-004	2.2300e-003	5.1000e-004	5.2000e-004	1.0300e-003	0.0000	8.1326	8.1326	6.0000e-005	0.0000	8.1339
Worker	1.3100e-003	1.9200e-003	0.0200	4.0000e-005	1.9800e-003	3.0000e-005	2.0200e-003	5.5000e-004	3.0000e-005	5.8000e-004	0.0000	3.2185	3.2185	1.8000e-004	0.0000	3.2224
Total	**4.9800e-003**	**0.0393**	**0.0686**	**1.3000e-004**	**3.6500e-003**	**5.9000e-004**	**4.2500e-003**	**1.0600e-003**	**5.5000e-004**	**1.6100e-003**	**0.0000**	**11.3511**	**11.3511**	**2.4000e-004**	**0.0000**	**11.3562**

3.5 House Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0869	0.7893	0.4181	7.2000e-004		0.0442	0.0442		0.0415	0.0415	0.0000	65.2942	65.2942	0.0168	0.0000	65.6478
Total	**0.0869**	**0.7893**	**0.4181**	**7.2000e-004**		**0.0442**	**0.0442**		**0.0415**	**0.0415**	**0.0000**	**65.2942**	**65.2942**	**0.0168**	**0.0000**	**65.6478**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9200e-003	2.8100e-003	0.0293	6.0000e-005	4.8200e-003	5.0000e-005	4.8700e-003	1.2800e-003	4.0000e-005	1.3200e-003	0.0000	4.7048	4.7048	2.7000e-004	0.0000	4.7104
Total	**1.9200e-003**	**2.8100e-003**	**0.0293**	**6.0000e-005**	**4.8200e-003**	**5.0000e-005**	**4.8700e-003**	**1.2800e-003**	**4.0000e-005**	**1.3200e-003**	**0.0000**	**4.7048**	**4.7048**	**2.7000e-004**	**0.0000**	**4.7104**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.7800e-003	0.0560	0.4150	7.2000e-004		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003	0.0000	65.2941	65.2941	0.0168	0.0000	65.6477
Total	**8.7800e-003**	**0.0560**	**0.4150**	**7.2000e-004**		**1.0900e-003**	**1.0900e-003**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**65.2941**	**65.2941**	**0.0168**	**0.0000**	**65.6477**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9200e-003	2.8100e-003	0.0293	6.0000e-005	2.9000e-003	5.0000e-005	2.9500e-003	8.1000e-004	4.0000e-005	8.5000e-004	0.0000	4.7048	4.7048	2.7000e-004	0.0000	4.7104
Total	**1.9200e-003**	**2.8100e-003**	**0.0293**	**6.0000e-005**	**2.9000e-003**	**5.0000e-005**	**2.9500e-003**	**8.1000e-004**	**4.0000e-005**	**8.5000e-004**	**0.0000**	**4.7048**	**4.7048**	**2.7000e-004**	**0.0000**	**4.7104**

3.5 House Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4716	4.3077	2.4039	4.2400e-003		0.2374	0.2374		0.2229	0.2229	0.0000	381.3583	381.3583	0.0981	0.0000	383.4180
Total	**0.4716**	**4.3077**	**2.4039**	**4.2400e-003**		**0.2374**	**0.2374**		**0.2229**	**0.2229**	**0.0000**	**381.3583**	**381.3583**	**0.0981**	**0.0000**	**383.4180**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0102	0.0150	0.1562	3.6000e-004	0.0285	2.6000e-004	0.0288	7.5700e-003	2.4000e-004	7.8100e-003	0.0000	26.7594	26.7594	1.4600e-003	0.0000	26.7900
Total	**0.0102**	**0.0150**	**0.1562**	**3.6000e-004**	**0.0285**	**2.6000e-004**	**0.0288**	**7.5700e-003**	**2.4000e-004**	**7.8100e-003**	**0.0000**	**26.7594**	**26.7594**	**1.4600e-003**	**0.0000**	**26.7900**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.0519	0.3308	2.4525	4.2400e-003		6.4500e-003	6.4500e-003		6.4500e-003	6.4500e-003	0.0000	381.3578	381.3578	0.0981	0.0000	383.4175
Total	**0.0519**	**0.3308**	**2.4525**	**4.2400e-003**		**6.4500e-003**	**6.4500e-003**		**6.4500e-003**	**6.4500e-003**	**0.0000**	**381.3578**	**381.3578**	**0.0981**	**0.0000**	**383.4175**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0102	0.0150	0.1562	3.6000e-004	0.0171	2.6000e-004	0.0174	4.7800e-003	2.4000e-004	5.0200e-003	0.0000	26.7594	26.7594	1.4600e-003	0.0000	26.7900
Total	**0.0102**	**0.0150**	**0.1562**	**3.6000e-004**	**0.0171**	**2.6000e-004**	**0.0174**	**4.7800e-003**	**2.4000e-004**	**5.0200e-003**	**0.0000**	**26.7594**	**26.7594**	**1.4600e-003**	**0.0000**	**26.7900**

3.5 House Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4021	3.6686	2.2792	4.2600e-003		0.1956	0.1956		0.1839	0.1839	0.0000	378.4319	378.4319	0.0972	0.0000	380.4739
Total	**0.4021**	**3.6686**	**2.2792**	**4.2600e-003**		**0.1956**	**0.1956**		**0.1839**	**0.1839**	**0.0000**	**378.4319**	**378.4319**	**0.0972**	**0.0000**	**380.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1600e-003	0.0137	0.1420	3.6000e-004	0.0286	2.6000e-004	0.0289	7.6000e-003	2.4000e-004	7.8300e-003	0.0000	25.8779	25.8779	1.3600e-003	0.0000	25.9064
Total	**9.1600e-003**	**0.0137**	**0.1420**	**3.6000e-004**	**0.0286**	**2.6000e-004**	**0.0289**	**7.6000e-003**	**2.4000e-004**	**7.8300e-003**	**0.0000**	**25.8779**	**25.8779**	**1.3600e-003**	**0.0000**	**25.9064**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0521	0.3320	2.4620	4.2600e-003		6.4700e-003	6.4700e-003		6.4700e-003	6.4700e-003	0.0000	378.4315	378.4315	0.0972	0.0000	380.4734
Total	**0.0521**	**0.3320**	**2.4620**	**4.2600e-003**		**6.4700e-003**	**6.4700e-003**		**6.4700e-003**	**6.4700e-003**	**0.0000**	**378.4315**	**378.4315**	**0.0972**	**0.0000**	**380.4734**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1600e-003	0.0137	0.1420	3.6000e-004	0.0172	2.6000e-004	0.0175	4.8000e-003	2.4000e-004	5.0300e-003	0.0000	25.8779	25.8779	1.3600e-003	0.0000	25.9064
Total	**9.1600e-003**	**0.0137**	**0.1420**	**3.6000e-004**	**0.0172**	**2.6000e-004**	**0.0175**	**4.8000e-003**	**2.4000e-004**	**5.0300e-003**	**0.0000**	**25.8779**	**25.8779**	**1.3600e-003**	**0.0000**	**25.9064**

3.6 Street Improvements - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0548	0.5602	0.3465	5.8000e-004		0.0309	0.0309		0.0289	0.0289	0.0000	53.3660	53.3660	0.0142	0.0000	53.6635
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0548**	**0.5602**	**0.3465**	**5.8000e-004**		**0.0309**	**0.0309**		**0.0289**	**0.0289**	**0.0000**	**53.3660**	**53.3660**	**0.0142**	**0.0000**	**53.6635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8800e-003	0.0191	0.0248	5.0000e-005	1.2800e-003	2.9000e-004	1.5700e-003	3.7000e-004	2.6000e-004	6.3000e-004	0.0000	4.1609	4.1609	3.0000e-005	0.0000	4.1615
Worker	9.6000e-004	1.4000e-003	0.0146	3.0000e-005	2.4100e-003	2.0000e-005	2.4300e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.3524	2.3524	1.3000e-004	0.0000	2.3552
Total	**2.8400e-003**	**0.0205**	**0.0395**	**8.0000e-005**	**3.6900e-003**	**3.1000e-004**	**4.0000e-003**	**1.0100e-003**	**2.8000e-004**	**1.2900e-003**	**0.0000**	**6.5133**	**6.5133**	**1.6000e-004**	**0.0000**	**6.5167**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.8300e-003	0.0296	0.3877	5.8000e-004		9.1000e-004	9.1000e-004		9.1000e-004	9.1000e-004	0.0000	53.3659	53.3659	0.0142	0.0000	53.6634
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.8300e-003**	**0.0296**	**0.3877**	**5.8000e-004**		**9.1000e-004**	**9.1000e-004**		**9.1000e-004**	**9.1000e-004**	**0.0000**	**53.3659**	**53.3659**	**0.0142**	**0.0000**	**53.6634**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8800e-003	0.0191	0.0248	5.0000e-005	8.5000e-004	2.9000e-004	1.1400e-003	2.6000e-004	2.6000e-004	5.2000e-004	0.0000	4.1609	4.1609	3.0000e-005	0.0000	4.1615
Worker	9.6000e-004	1.4000e-003	0.0146	3.0000e-005	1.4500e-003	2.0000e-005	1.4700e-003	4.0000e-004	2.0000e-005	4.3000e-004	0.0000	2.3524	2.3524	1.3000e-004	0.0000	2.3552
Total	**2.8400e-003**	**0.0205**	**0.0395**	**8.0000e-005**	**2.3000e-003**	**3.1000e-004**	**2.6100e-003**	**6.6000e-004**	**2.8000e-004**	**9.5000e-004**	**0.0000**	**6.5133**	**6.5133**	**1.6000e-004**	**0.0000**	**6.5167**

3.7 Landscape - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.2062	0.0000	0.2062	0.1100	0.0000	0.1100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0425	0.4803	0.3425	3.5000e-004		0.0217	0.0217		0.0200	0.0200	0.0000	32.2578	32.2578	9.8800e-003	0.0000	32.4653
Total	**0.0425**	**0.4803**	**0.3425**	**3.5000e-004**	**0.2062**	**0.0217**	**0.2278**	**0.1100**	**0.0200**	**0.1300**	**0.0000**	**32.2578**	**32.2578**	**9.8800e-003**	**0.0000**	**32.4653**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7100e-003	0.0174	0.0235	5.0000e-005	1.2800e-003	2.6000e-004	1.5400e-003	3.7000e-004	2.4000e-004	6.0000e-004	0.0000	4.0944	4.0944	3.0000e-005	0.0000	4.0950
Worker	1.7200e-003	2.5400e-003	0.0264	6.0000e-005	4.8200e-003	4.0000e-005	4.8700e-003	1.2800e-003	4.0000e-005	1.3200e-003	0.0000	4.5285	4.5285	2.5000e-004	0.0000	4.5337
Total	**3.4300e-003**	**0.0200**	**0.0499**	**1.1000e-004**	**6.1000e-003**	**3.0000e-004**	**6.4100e-003**	**1.6500e-003**	**2.8000e-004**	**1.9200e-003**	**0.0000**	**8.6229**	**8.6229**	**2.8000e-004**	**0.0000**	**8.6287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0764	0.0000	0.0764	0.0408	0.0000	0.0408	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2300e-003	0.0183	0.1551	3.5000e-004		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	32.2577	32.2577	9.8800e-003	0.0000	32.4653
Total	**4.2300e-003**	**0.0183**	**0.1551**	**3.5000e-004**	**0.0764**	**5.6000e-004**	**0.0769**	**0.0408**	**5.6000e-004**	**0.0413**	**0.0000**	**32.2577**	**32.2577**	**9.8800e-003**	**0.0000**	**32.4653**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7100e-003	0.0174	0.0235	5.0000e-005	8.5000e-004	2.6000e-004	1.1100e-003	2.6000e-004	2.4000e-004	5.0000e-004	0.0000	4.0944	4.0944	3.0000e-005	0.0000	4.0950
Worker	1.7200e-003	2.5400e-003	0.0264	6.0000e-005	2.9000e-003	4.0000e-005	2.9400e-003	8.1000e-004	4.0000e-005	8.5000e-004	0.0000	4.5285	4.5285	2.5000e-004	0.0000	4.5337
Total	**3.4300e-003**	**0.0200**	**0.0499**	**1.1000e-004**	**3.7500e-003**	**3.0000e-004**	**4.0500e-003**	**1.0700e-003**	**2.8000e-004**	**1.3500e-003**	**0.0000**	**8.6229**	**8.6229**	**2.8000e-004**	**0.0000**	**8.6287**

3.8 Architectural Coatings - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7102					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0362	0.2382	0.2036	3.2000e-004		0.0189	0.0189		0.0189	0.0189	0.0000	27.8305	27.8305	2.9400e-003	0.0000	27.8922
Total	**0.7464**	**0.2382**	**0.2036**	**3.2000e-004**		**0.0189**	**0.0189**		**0.0189**	**0.0189**	**0.0000**	**27.8305**	**27.8305**	**2.9400e-003**	**0.0000**	**27.8922**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6900e-003	6.9200e-003	0.0720	1.7000e-004	0.0131	1.2000e-004	0.0133	3.4900e-003	1.1000e-004	3.6000e-003	0.0000	12.3402	12.3402	6.7000e-004	0.0000	12.3543
Total	**4.6900e-003**	**6.9200e-003**	**0.0720**	**1.7000e-004**	**0.0131**	**1.2000e-004**	**0.0133**	**3.4900e-003**	**1.1000e-004**	**3.6000e-003**	**0.0000**	**12.3402**	**12.3402**	**6.7000e-004**	**0.0000**	**12.3543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7102					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2400e-003	0.0140	0.1997	3.2000e-004		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	27.8304	27.8304	2.9400e-003	0.0000	27.8921
Total	**0.7134**	**0.0140**	**0.1997**	**3.2000e-004**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**27.8304**	**27.8304**	**2.9400e-003**	**0.0000**	**27.8921**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6900e-003	6.9200e-003	0.0720	1.7000e-004	7.9000e-003	1.2000e-004	8.0200e-003	2.2000e-003	1.1000e-004	2.3200e-003	0.0000	12.3402	12.3402	6.7000e-004	0.0000	12.3543

Total	**4.6900e-003**	**6.9200e-003**	**0.0720**	**1.7000e-004**	**7.9000e-003**	**1.2000e-004**	**8.0200e-003**	**2.2000e-003**	**1.1000e-004**	**2.3200e-003**	**0.0000**	**12.3402**	**12.3402**	**6.7000e-004**	**0.0000**	**12.3543**

3.8 Architectural Coatings - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.8503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0390	0.2618	0.2420	3.9000e-004		0.0197	0.0197		0.0197	0.0197	0.0000	33.3200	33.3200	3.1700e-003	0.0000	33.3865
Total	**0.8892**	**0.2618**	**0.2420**	**3.9000e-004**		**0.0197**	**0.0197**		**0.0197**	**0.0197**	**0.0000**	**33.3200**	**33.3200**	**3.1700e-003**	**0.0000**	**33.3865**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0400e-003	7.5200e-003	0.0781	2.0000e-004	0.0157	1.4000e-004	0.0159	4.1800e-003	1.3000e-004	4.3100e-003	0.0000	14.2328	14.2328	7.5000e-004	0.0000	14.2485
Total	**5.0400e-003**	**7.5200e-003**	**0.0781**	**2.0000e-004**	**0.0157**	**1.4000e-004**	**0.0159**	**4.1800e-003**	**1.3000e-004**	**4.3100e-003**	**0.0000**	**14.2328**	**14.2328**	**7.5000e-004**	**0.0000**	**14.2485**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.8503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8800e-003	0.0168	0.2391	3.9000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	33.3200	33.3200	3.1700e-003	0.0000	33.3865
Total	**0.8541**	**0.0168**	**0.2391**	**3.9000e-004**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**33.3200**	**33.3200**	**3.1700e-003**	**0.0000**	**33.3865**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0400e-003	7.5200e-003	0.0781	2.0000e-004	9.4600e-003	1.4000e-004	9.6000e-003	2.6400e-003	1.3000e-004	2.7700e-003	0.0000	14.2328	14.2328	7.5000e-004	0.0000	14.2485
Total	**5.0400e-003**	**7.5200e-003**	**0.0781**	**2.0000e-004**	**9.4600e-003**	**1.4000e-004**	**9.6000e-003**	**2.6400e-003**	**1.3000e-004**	**2.7700e-003**	**0.0000**	**14.2328**	**14.2328**	**7.5000e-004**	**0.0000**	**14.2485**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Mitigated	0.8792	2.5485	9.7404	0.0265	1.7547	0.0380	1.7927	0.4700	0.0351	0.5051	0.0000	1,933.6811	1,933.6811	0.0739	0.0000	1,935.2331
Unmitigated	0.8792	2.5485	9.7404	0.0265	1.7547	0.0380	1.7927	0.4700	0.0351	0.5051	0.0000	1,933.6811	1,933.6811	0.0739	0.0000	1,935.2331

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	32.00	32.00	32.00	109,349	109,349
Hotel	980.40	980.40	980.40	2,339,402	2,339,402
Single Family Housing	637.84	637.84	637.84	2,179,596	2,179,596
Total	1,650.24	1,650.24	1,650.24	4,628,347	4,628,347

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	309.2805	309.2805	0.0142	2.9400e-003	310.4909
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	309.2805	309.2805	0.0142	2.9400e-003	310.4909
NaturalGas Mitigated	0.0202	0.1775	0.1099	1.1000e-003		0.0140	0.0140		0.0140	0.0140	0.0000	199.8549	199.8549	3.8300e-003	3.6600e-003	201.0712
NaturalGas Unmitigated	0.0202	0.1775	0.1099	1.1000e-003		0.0140	0.0140		0.0140	0.0140	0.0000	199.8549	199.8549	3.8300e-003	3.6600e-003	201.0712

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse	57624.1	3.1000e-004	2.6600e-003	1.1300e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0750	3.0750	6.0000e-005	6.0000e-005	3.0938
Hotel	1.69085e+006	9.1200e-003	0.0829	0.0696	5.0000e-004		6.3000e-003	6.3000e-003		6.3000e-003	6.3000e-003	0.0000	90.2303	90.2303	1.7300e-003	1.6500e-003	90.7794
Single Family Housing	1.99666e+006	0.0108	0.0920	0.0392	5.9000e-004		7.4400e-003	7.4400e-003		7.4400e-003	7.4400e-003	0.0000	106.5495	106.5495	2.0400e-003	1.9500e-003	107.1980
Total		**0.0202**	**0.1775**	**0.1099**	**1.1100e-003**		**0.0140**	**0.0140**		**0.0140**	**0.0140**	**0.0000**	**199.8549**	**199.8549**	**3.8300e-003**	**3.6600e-003**	**201.0712**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse	57624.1	3.1000e-004	2.6600e-003	1.1300e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0750	3.0750	6.0000e-005	6.0000e-005	3.0938
Hotel	1.69085e+006	9.1200e-003	0.0829	0.0696	5.0000e-004		6.3000e-003	6.3000e-003		6.3000e-003	6.3000e-003	0.0000	90.2303	90.2303	1.7300e-003	1.6500e-003	90.7794

Single Family Housing	1.99666e+006	0.0108	0.0920	0.0392	5.9000e-004		7.4400e-003	7.4400e-003		7.4400e-003	7.4400e-003	0.0000	106.5495	106.5495	2.0400e-003	1.9500e-003	107.1980
Total		**0.0202**	**0.1775**	**0.1099**	**1.1100e-003**		**0.0140**	**0.0140**		**0.0140**	**0.0140**	**0.0000**	**199.8549**	**199.8549**	**3.8300e-003**	**3.6600e-003**	**201.0712**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	17591.5	5.0341	2.3000e-004	5.0000e-005	5.0538
Hotel	574430	164.3829	7.5600e-003	1.5600e-003	165.0262
Single Family Housing	488748	139.8636	6.4300e-003	1.3300e-003	140.4109
Total		**309.2805**	**0.0142**	**2.9400e-003**	**310.4909**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	17591.5	5.0341	2.3000e-004	5.0000e-005	5.0538
Hotel	574430	164.3829	7.5600e-003	1.5600e-003	165.0262
Single Family Housing	488748	139.8636	6.4300e-003	1.3300e-003	140.4109
Total		**309.2805**	**0.0142**	**2.9400e-003**	**310.4909**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.1429	8.5400e-003	0.7375	4.0000e-005		5.2300e-003	5.2300e-003		5.2200e-003	5.2200e-003	0.0000	18.2488	18.2488	1.5100e-003	3.1000e-004	18.3773
Unmitigated	1.1429	8.5400e-003	0.7375	4.0000e-005		5.2300e-003	5.2300e-003		5.2200e-003	5.2200e-003	0.0000	18.2488	18.2488	1.5100e-003	3.1000e-004	18.3773

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1560					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9625					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.7200e-003	0.0000	9.0000e-005	0.0000		1.1900e-003	1.1900e-003		1.1800e-003	1.1800e-003	0.0000	17.0497	17.0497	3.3000e-004	3.1000e-004	17.1535
Landscaping	0.0227	8.5400e-003	0.7374	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1990	1.1990	1.1800e-003	0.0000	1.2238
Total	**1.1429**	**8.5400e-003**	**0.7375**	**4.0000e-005**		**5.2300e-003**	**5.2300e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**18.2488**	**18.2488**	**1.5100e-003**	**3.1000e-004**	**18.3773**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1560					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.9625					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.7200e-003	0.0000	9.0000e-005	0.0000		1.1900e-003	1.1900e-003		1.1800e-003	1.1800e-003	0.0000	17.0497	17.0497	3.3000e-004	3.1000e-004	17.1535
Landscaping	0.0227	8.5400e-003	0.7374	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1990	1.1990	1.1800e-003	0.0000	1.2238
Total	**1.1429**	**8.5400e-003**	**0.7375**	**4.0000e-005**		**5.2300e-003**	**5.2300e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**18.2488**	**18.2488**	**1.5100e-003**	**3.1000e-004**	**18.3773**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	41.3602	0.2517	6.2600e-003	48.5865
Unmitigated	41.3602	0.2517	6.2700e-003	48.5904

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			

Condo/Townhouse	0.260616 / 0.164301	1.5762	8.5600e-003	2.1000e-004	1.8225
Hotel	3.04401 / 0.338224	13.3836	0.0998	2.4600e-003	16.2412
Single Family Housing	4.36532 / 2.75205	26.4005	0.1434	3.6000e-003	30.5267
Total		**41.3602**	**0.2517**	**6.2700e-003**	**48.5904**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	0.260616 / 0.164301	1.5762	8.5600e-003	2.1000e-004	1.8224
Hotel	3.04401 / 0.338224	13.3836	0.0997	2.4600e-003	16.2397
Single Family Housing	4.36532 / 2.75205	26.4005	0.1434	3.5900e-003	30.5245
Total		**41.3602**	**0.2517**	**6.2600e-003**	**48.5865**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	29.6895	1.7546	0.0000	66.5360
Unmitigated	29.6895	1.7546	0.0000	66.5360

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	1.84	0.3735	0.0221	0.0000	0.8371
Hotel	65.7	13.3365	0.7882	0.0000	29.8880
Single Family Housing	78.72	15.9795	0.9444	0.0000	35.8110
Total		**29.6895**	**1.7546**	**0.0000**	**66.5360**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	1.84	0.3735	0.0221	0.0000	0.8371
Hotel	65.7	13.3365	0.7882	0.0000	29.8880
Single Family Housing	78.72	15.9795	0.9444	0.0000	35.8110
Total		**29.6895**	**1.7546**	**0.0000**	**66.5360**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

PROJECTED N2O EMISSIONS FROM MOBILE SOURCES

Mobile Sources	Column1	Column2	Column3	Column4	Column5	Column6
	VMT	Fleet Share	N2O (g/mi)	N2O (lb/year	N2O (MMT/y	CO2e (MMT/yr)
LDA	2,457,199	53.1%	0.0079	42.8	0.01939444	5.13952669
LDT1	267,708	5.8%	0.0101	6.0	0.00270143	0.71587771
LDT2	827,081	17.9%	0.0101	18.4	0.00834602	2.21169466
MDV	577,571	12.5%	0.0177	22.5	0.01021384	2.70666635
LHD1	180,797	3.9%	0.0048	1.9	0.00086705	0.22976745
LHD2	29,149	0.6%	0.0048	0.3	0.00013979	0.03704466
MHD	78,455	1.7%	0.0048	0.8	0.00037625	0.0997053
HHD	156,938	3.4%	0.0048	1.7	0.00075263	0.19944589
OBUS	11,552	0.2%	0.0048	0.1	5.5402E-05	0.0146814
UBUS	14,575	0.3%	0.0048	0.2	6.9896E-05	0.01852233
MCY	17,074	0.4%	0.0048	0.2	8.1881E-05	0.02169859
SBUS	2,481	0.1%	0.0048	0.0	1.1897E-05	0.00315274
MH	7,766	0.2%	0.0048	0.1	3.7245E-05	0.00986995
		100.0%		94.9	0.0430	11.4077
Total	4,628,347					
Assumes 2005 average vintage for fleet category						
Assumes 2005 gasoline MDV trucks and buses						
Assumes 2005 diesel HD trucks and buses						
Source: Emission factors from "The Climate Registry" 2015 Climate Registry Default Emission Factors (released April 2015)						

GHG Emissions Impact Compared to "Business as Usual" Scenario

Source	BAU (2019)	As Proposed (2019)	Reduction from BAU	Change from BAU
Area	18	18	-	0%
Energy	882	512	(370)	-42%
Mobile	2,757	1,935	(822)	-30%
Waste	67	67	-	0%
Water	49	49	-	0%
Construction	67	67	-	0%
Total Emissions	3,839	2,647	(1,192)	-31%

Land Use	BAU	As Proposed	Difference
Land Use	71 DU, hotel	71 DU, hotel	None
Traffic	1,650 net weekday A	1,650 net weekday A	None
Area	Same as proposed	Project assumptions	None
Energy	No State measures	See below	State measures
Mobile	No State measures	See below	State measures
Waste	Reduce construction	Reduce construction	None
Water	Project assumptions	Project assumptions	None

Mobile source emissions	Pavley emission standards (19.8% reduction)
	Low carbon fuel standard (7.2% reduction)
	Vehicle efficiency measures (2.8% reduction)
Energy Production Assumptions	Natural gas transmission and distribution efficiency measures (7.4% reduction)
	Natural gas extraction efficiency measures (1.6% reduction)
	Renewables (electricity) portfolio standard (33% reduction)

Ventura Fwy
101
Albertsons
Starbucks
Good Nite Inn
Agoura Rd
N1
4
4790 Las Virgenes Rd
1
3
2
Camino Del Sol
Cielo Ct
La Paz
Country Creek Ln
1. Northeast Hillside at "The Colony"
2. Gated Entrance at "The Colony"
3. 4623, 4633, 4647 Las Virgenes Road
4. Entrance Gate at 4790 Las Virgenes Road
Imagery ©2014 DigitalGlobe, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2014 Google
200 ft

Calabasas

The first reading was taken at approximately 1:15 on the hillside above Las Virgenes Road south of the intersection with Agoura Road and close to the backyard of a home in the adjacent development called “The Colony”. Noise is primarily from Las Virgenes Road. There are shopping centers across the street on both the north and south sides of Agoura Road; freeway entrances are adjacent to the project site, all contributing to traffic generation.

The second reading was taken at approximately 1:35 in front of the gates of "The Colony" development off Las Virgenes Road. This site was chosen to get as close to the affected homes as possible. Noise was from Las Virgenes Road; while cars did exit the development through the gates this noise was minimal as compared to moving traffic on the road.

The third reading was taken at approximately 1:55 at the entrance to a private road coming off Las Virgenes across from the proposed project. The proposed project is in direct line of sight to the monitoring location. While no homes were seen from here, there are three mailboxes (numbers 4623, 4633 and 4647) at the entry to the private road and a search of the address on Google Maps points to a building. In addition, the buildings appear to be residences from the aerial photos. Due to it being slightly below grade of Las Virgenes Road it seemed somewhat quieter than being up on the main road.

The fourth monitoring site was the 24-hour monitoring location. Due to the unavailability of access to the site, this location was chosen because it is closest to the proposed development and where the equipment could be secured. It is directly across from the intersection of Agoura and Las Virgenes Road thus impacted by traffic from both roads.

Northeast Hillside at "The Colony"

7/31/2014

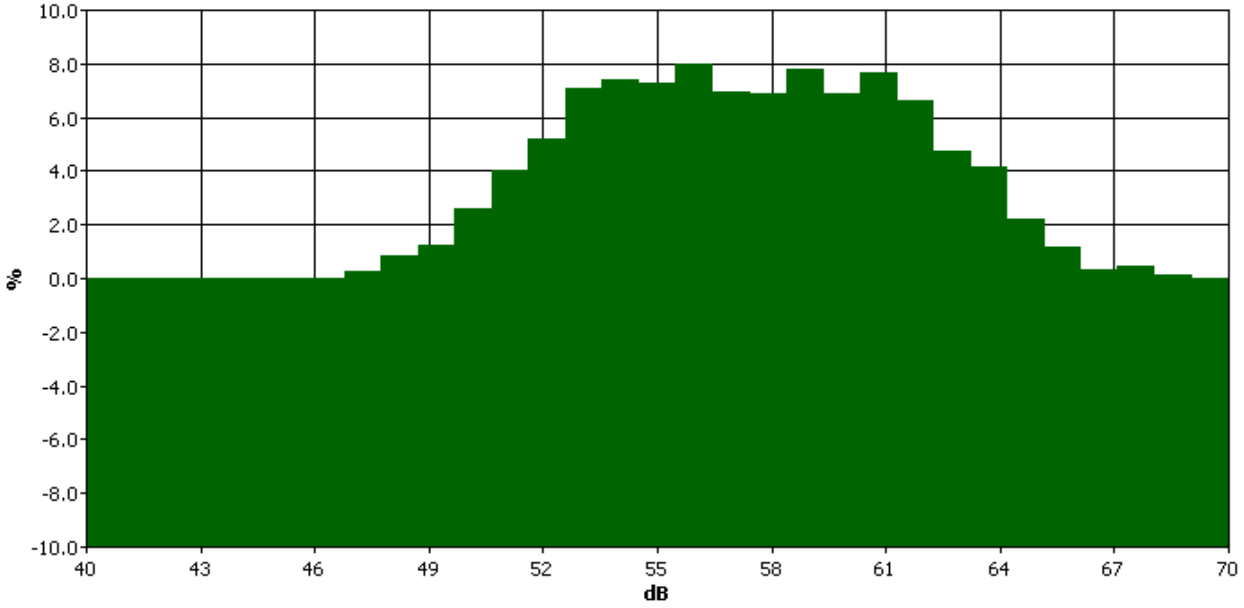
Information Panel

Name	S051_BIJ050019_31072014_162756
Start Time	Wednesday, July 30, 2014 13:16:07
Stop Time	Wednesday, July 30, 2014 13:31:07
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	59.9 dB	Dose	1	0 %
Pdose	1	0 %	Lmin	1	47.6 dB
Lmax	1	69.6 dB	Lpk	1	92.7 dB
TWA	1	44.8 dB	OL%	1	0 %
CNEL	1	59.9 dB	ULtime	1	00:00:00
Takt	1	61.2 dB	SEL	1	89.4 dB
ExpSec	1	0.3 Pa2-Sec	LDN	1	59.9 dB
UR%	1	0 %	L1	1	66.6 dB
L10	1	63.5 dB	L50	1	57.7 dB
L90	1	52.1 dB	Mntime	1	7/30/2014 1:22:34 PM
Mxtime	1	7/30/2014 1:21:42 PM	PKtime	1	7/30/2014 1:21:42 PM
Projected TWA	1	59.9 dB	Dose8	1	0 %
ExpHrs	1	0.00 Pa2-Hours	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	SLOW

Statistics Chart



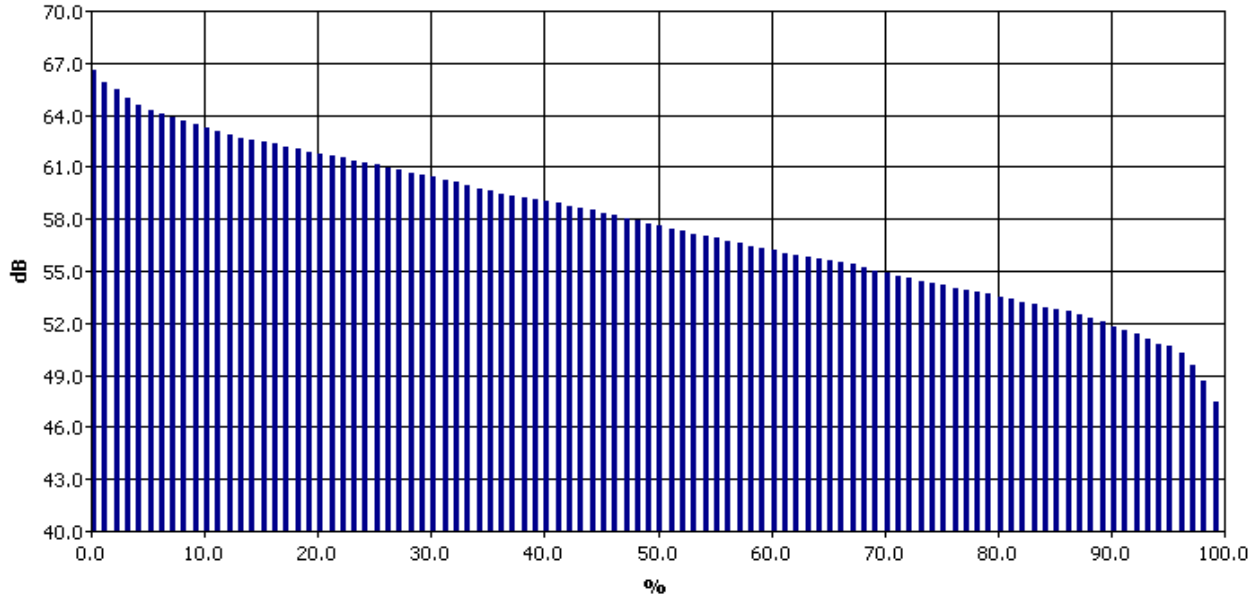
Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.3
48.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9
49.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.1	1.2
50.0	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.6	0.6	2.6
51.0	0.4	0.5	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4	4.1
52.0	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	5.2
53.0	0.8	0.8	0.5	0.8	0.8	0.7	0.7	0.7	0.7	0.7	7.1
54.0	0.8	0.9	0.9	0.9	0.7	0.7	0.6	0.6	0.7	0.7	7.4
55.0	0.7	0.6	0.5	0.7	0.7	0.8	0.9	0.8	0.8	0.9	7.3
56.0	1.1	1.0	0.7	0.8	0.8	0.8	0.7	0.8	0.7	0.6	8.0
57.0	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.8	0.7	0.6	7.0
58.0	0.6	0.6	0.5	0.7	0.8	0.6	0.9	0.7	0.7	0.7	6.9
59.0	0.9	0.9	0.7	0.9	0.9	1.0	0.7	0.6	0.6	0.6	7.8
60.0	0.7	0.6	0.6	0.7	0.6	0.8	0.8	0.6	0.6	0.8	6.9
61.0	0.7	0.6	0.7	0.7	1.0	0.7	0.7	0.9	1.0	0.7	7.7
62.0	0.7	0.6	0.5	0.4	1.0	0.9	0.6	0.6	0.7	0.7	6.6
63.0	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	4.8
64.0	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.4	0.3	0.3	4.1
65.0	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.3	0.3	0.2	2.2
66.0	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	1.2
67.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
68.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.5
69.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		66.6	65.9	65.5	65.0	64.6	64.3	64.1	63.9	63.7
10%	63.5	63.3	63.1	62.9	62.7	62.6	62.4	62.3	62.1	62.0
20%	61.8	61.7	61.6	61.5	61.3	61.2	61.1	60.9	60.8	60.6
30%	60.5	60.4	60.2	60.1	59.9	59.7	59.6	59.4	59.3	59.2
40%	59.1	59.0	58.9	58.7	58.6	58.5	58.3	58.2	58.0	57.9
50%	57.7	57.6	57.4	57.3	57.1	57.0	56.9	56.7	56.6	56.4
60%	56.3	56.2	56.0	55.9	55.8	55.7	55.6	55.5	55.4	55.2
70%	55.0	54.9	54.7	54.6	54.4	54.3	54.2	54.0	53.9	53.8
80%	53.7	53.5	53.4	53.2	53.1	52.9	52.8	52.7	52.5	52.3
90%	52.1	51.8	51.6	51.4	51.1	50.8	50.7	50.3	49.6	48.7
100%	47.5									

Gated Entrance at "the Colony"

7/31/2014

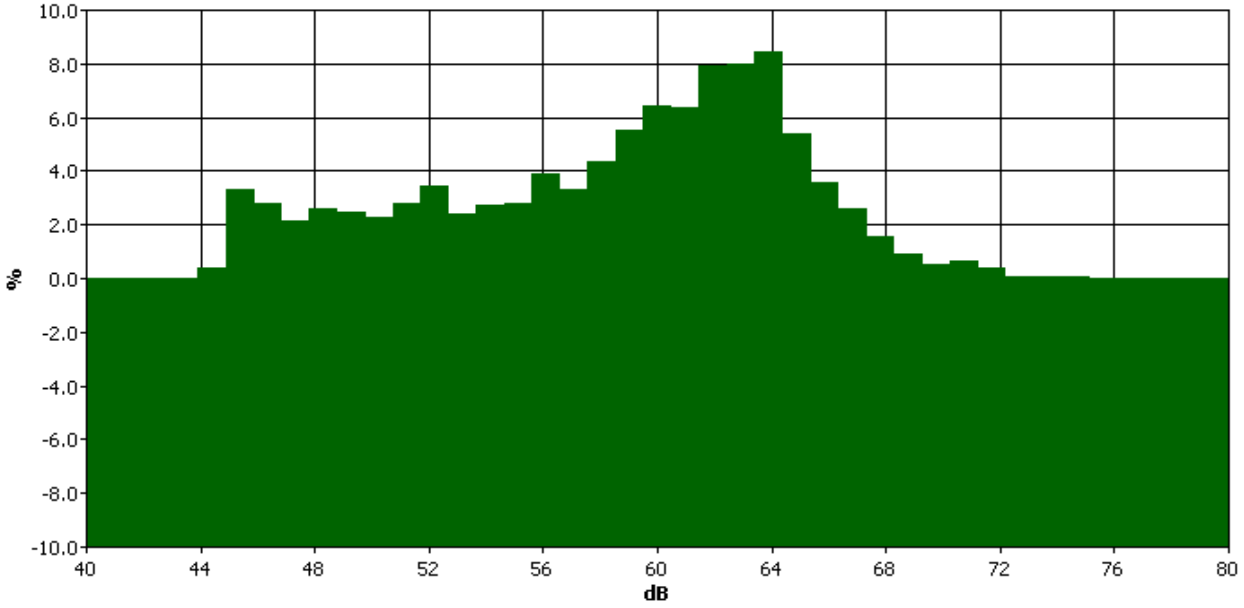
Information Panel

Name	S052_BIJ050019_31072014_162757
Start Time	Wednesday, July 30, 2014 13:35:45
Stop Time	Wednesday, July 30, 2014 13:50:45
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	62.5 dB	Dose	1	0 %
Pdose	1	0.1 %	Lmin	1	44.5 dB
Lmax	1	75.1 dB	Lpk	1	90.6 dB
TWA	1	47.5 dB	OL%	1	0 %
CNEL	1	62.5 dB	ULtime	1	00:00:00
Takt	1	64.7 dB	SEL	1	92.1 dB
ExpSec	1	0.6 Pa2-Sec	LDN	1	62.5 dB
UR%	1	0 %	L1	1	71.3 dB
L10	1	65.9 dB	L50	1	60.3 dB
L90	1	48.3 dB	Mntime	1	7/30/2014 1:36:26 PM
Mxtime	1	7/30/2014 1:44:30 PM	PKtime	1	7/30/2014 1:40:56 PM
Projected TWA	1	62.5 dB	Dose8	1	0.1 %
ExpHrs	1	0.00 Pa2-Hours	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	SLOW

Statistics Chart



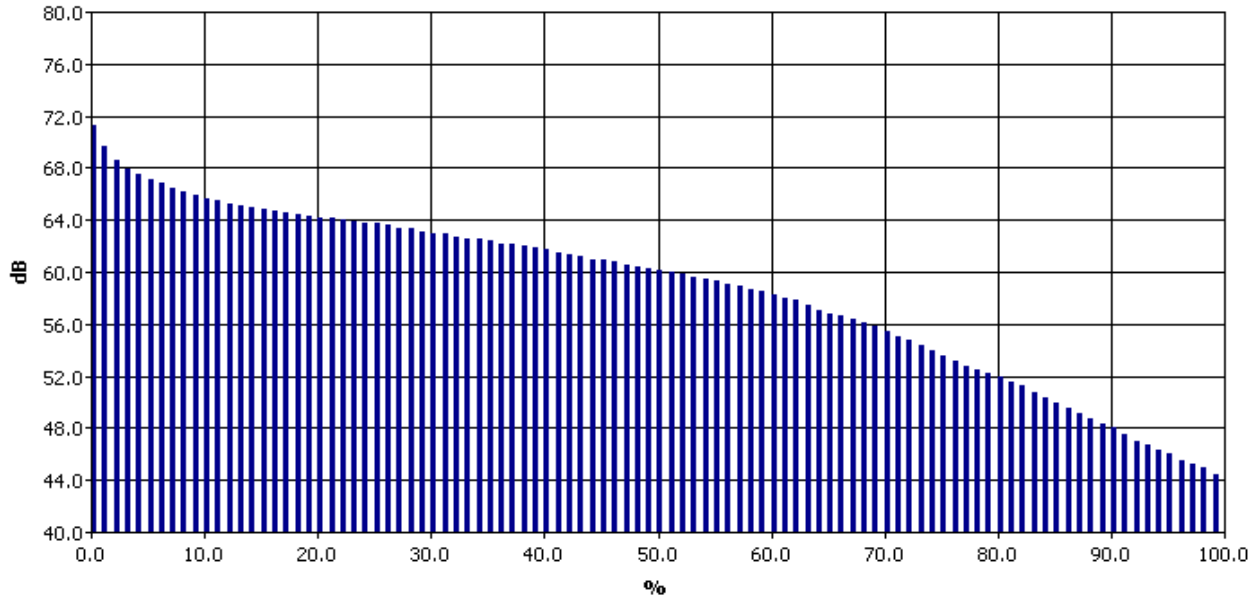
Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.4
45.0	0.6	0.4	0.3	0.5	0.4	0.2	0.3	0.2	0.2	0.2	3.3
46.0	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.4	2.8

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
47.0	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.4	2.1
48.0	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.3	2.6
49.0	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	2.5
50.0	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	2.3
51.0	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	2.8
52.0	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	3.4
53.0	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	2.4
54.0	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.7
55.0	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	2.8
56.0	0.3	0.4	0.3	0.3	0.4	0.4	0.6	0.4	0.4	0.4	3.9
57.0	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	3.3
58.0	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.6	4.4
59.0	0.5	0.6	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	5.5
60.0	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	6.4
61.0	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	6.3
62.0	0.8	0.9	0.8	0.5	0.8	0.8	0.8	0.9	0.8	0.8	7.9
63.0	0.8	0.7	0.7	0.7	0.6	0.7	0.8	1.0	1.0	1.1	8.0
64.0	1.0	1.0	0.9	0.8	0.9	0.8	0.9	0.8	0.7	0.6	8.4
65.0	0.7	0.8	0.7	0.4	0.6	0.6	0.4	0.4	0.4	0.5	5.4
66.0	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.3	3.6
67.0	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	2.6
68.0	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.5
69.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9
70.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
71.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7
72.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		71.3	69.6	68.6	67.9	67.5	67.1	66.8	66.4	66.2
10%	65.9	65.7	65.5	65.3	65.1	64.9	64.8	64.7	64.5	64.4
20%	64.3	64.2	64.1	64.0	63.9	63.8	63.7	63.6	63.4	63.3
30%	63.1	63.0	62.9	62.7	62.6	62.5	62.4	62.2	62.1	62.0
40%	61.9	61.7	61.5	61.4	61.2	61.0	60.9	60.8	60.6	60.4
50%	60.3	60.1	60.0	59.8	59.6	59.5	59.3	59.1	58.9	58.7
60%	58.5	58.3	58.0	57.8	57.4	57.1	56.8	56.6	56.4	56.1
70%	55.8	55.4	55.1	54.7	54.4	54.0	53.6	53.1	52.8	52.5
80%	52.2	51.9	51.6	51.3	50.8	50.4	50.0	49.5	49.1	48.7
90%	48.3	48.0	47.5	47.0	46.7	46.3	46.0	45.5	45.2	44.9
100%	44.4									

Entrance Gate at 4790 Las Virgenes Road

7/31/2014

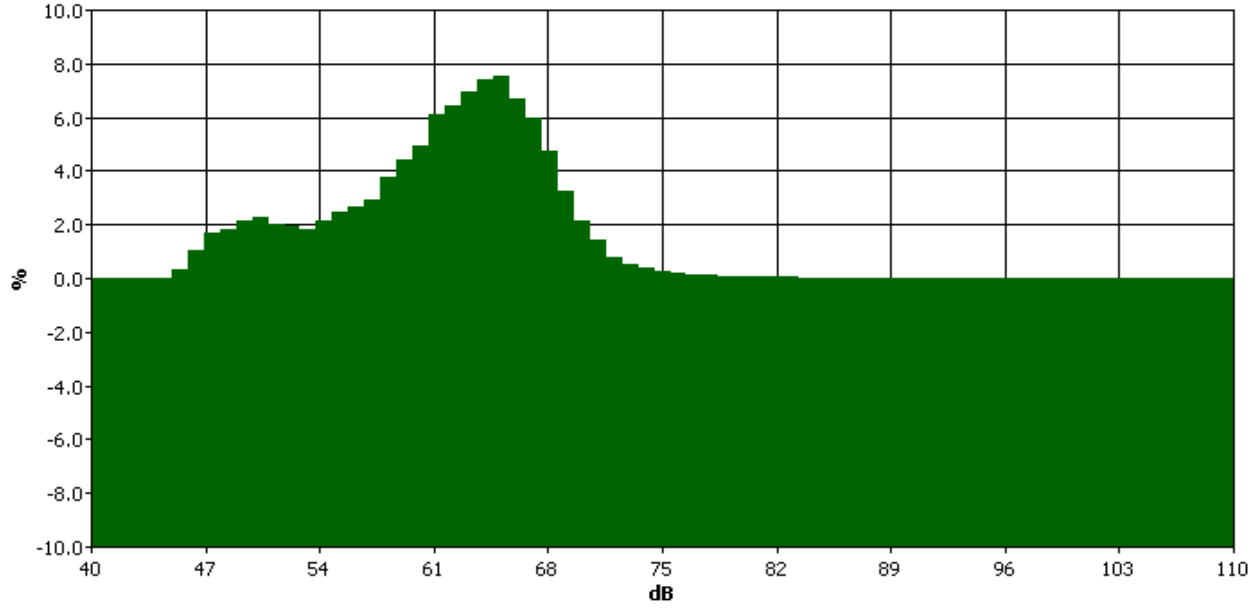
Information Panel

Name	S054_BIJ050019_31072014_162758
Start Time	Wednesday, July 30, 2014 14:30:00
Stop Time	Thursday, July 31, 2014 14:29:59
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	68.6 dB	Dose	1	2.1 %
Pdose	1	0.7 %	Lmin	1	44.5 dB
Lmax	1	101.1 dB	Lpk	1	110.2 dB
TWA	1	73.4 dB	OL%	1	0 %
CNEL	1	73.4 dB	ULtime	1	00:00:00
Takt	1	70.7 dB	SEL	1	117.9 dB
ExpSec	1	251 Pa2-Sec	LDN	1	71.1 dB
UR%	1	0 %	L1	1	75.7 dB
L10	1	68.8 dB	L50	1	62.7 dB
L90	1	51.2 dB	Mntime	1	7/31/2014 2:24:03 AM
Mxtime	1	7/30/2014 8:36:50 PM	PKtime	1	7/30/2014 8:36:49 PM
Projected TWA	1	68.6 dB	Dose8	1	0.7 %
ExpHrs	1	0.07 Pa2-Hours	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	SLOW

Statistics Chart



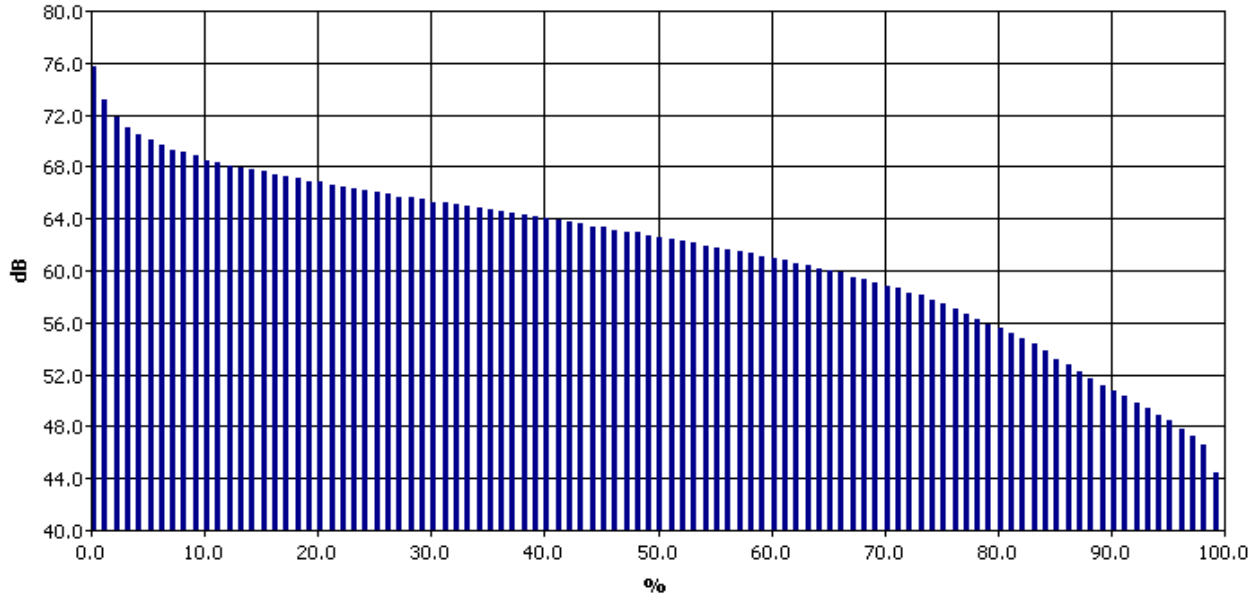
Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3
46.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	1.0

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
47.0	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.7
48.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.8
49.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.2
50.0	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.3
51.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.0
52.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.9
53.0	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.8
54.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.2
55.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	2.5
56.0	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.6
57.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.9
58.0	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.7
59.0	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	4.4
60.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.9
61.0	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	6.1
62.0	0.7	0.7	0.6	0.4	0.7	0.7	0.7	0.7	0.7	0.7	6.5
63.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	6.9
64.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	7.4
65.0	0.8	0.9	0.9	0.5	0.8	0.8	0.7	0.7	0.7	0.7	7.5
66.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	6.7
67.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	6.0
68.0	0.6	0.6	0.6	0.4	0.5	0.5	0.4	0.4	0.4	0.4	4.7
69.0	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.3
70.0	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.2
71.0	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4
72.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8
73.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.5
74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
77.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
79.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
81.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
82.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
83.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
84.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
86.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
87.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
88.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
89.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
91.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
92.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
94.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
97.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
99.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
106.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
108.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		75.7	73.1	71.8	71.0	70.5	70.1	69.7	69.3	69.1
10%	68.8	68.5	68.3	68.1	67.9	67.8	67.6	67.4	67.3	67.1
20%	66.9	66.8	66.6	66.5	66.3	66.2	66.0	65.9	65.7	65.6
30%	65.5	65.3	65.2	65.1	64.9	64.8	64.7	64.6	64.4	64.3
40%	64.1	64.0	63.9	63.7	63.6	63.4	63.3	63.1	63.0	62.9
50%	62.7	62.6	62.4	62.3	62.1	61.9	61.8	61.6	61.5	61.3
60%	61.1	61.0	60.8	60.6	60.4	60.2	60.0	59.8	59.5	59.3
70%	59.1	58.8	58.6	58.3	58.1	57.7	57.4	57.1	56.7	56.3
80%	55.9	55.6	55.2	54.7	54.3	53.8	53.2	52.7	52.2	51.7
90%	51.2	50.7	50.3	49.8	49.4	48.9	48.4	47.8	47.2	46.6
100%	44.4									

4623 4633 4647 Las Virgenes Road

7/31/2014

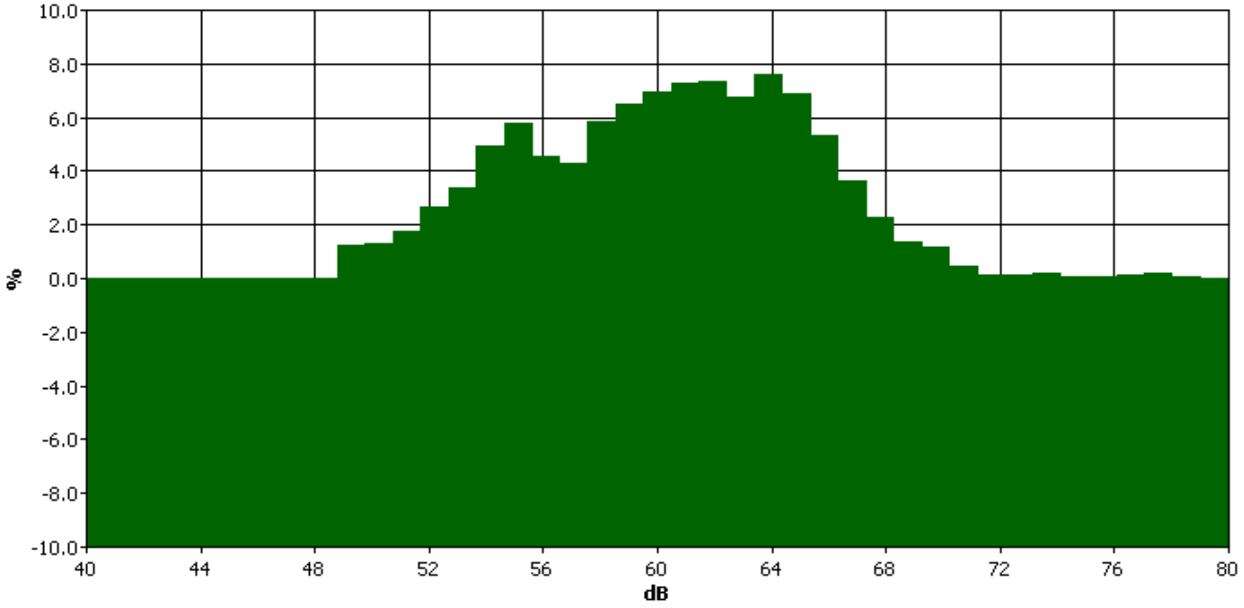
Information Panel

Name	S053_BIJ050019_31072014_162758
Start Time	Wednesday, July 30, 2014 13:59:19
Stop Time	Wednesday, July 30, 2014 14:14:19
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	63.8 dB	Dose	1	0 %
Pdose	1	0.2 %	Lmin	1	49.1 dB
Lmax	1	79.6 dB	Lpk	1	96.8 dB
TWA	1	48.7 dB	OL%	1	0 %
CNEL	1	63.8 dB	ULtime	1	00:00:00
Takt	1	65.7 dB	SEL	1	93.3 dB
ExpSec	1	0.8 Pa2-Sec	LDN	1	63.8 dB
UR%	1	0 %	L1	1	71.4 dB
L10	1	66.8 dB	L50	1	61 dB
L90	1	53.8 dB	Mntime	1	7/30/2014 2:01:22 PM
Mxtime	1	7/30/2014 2:02:16 PM	PKtime	1	7/30/2014 2:04:13 PM
Projected TWA	1	63.8 dB	Dose8	1	0.2 %
ExpHrs	1	0.00 Pa2-Hours	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	SLOW

Statistics Chart



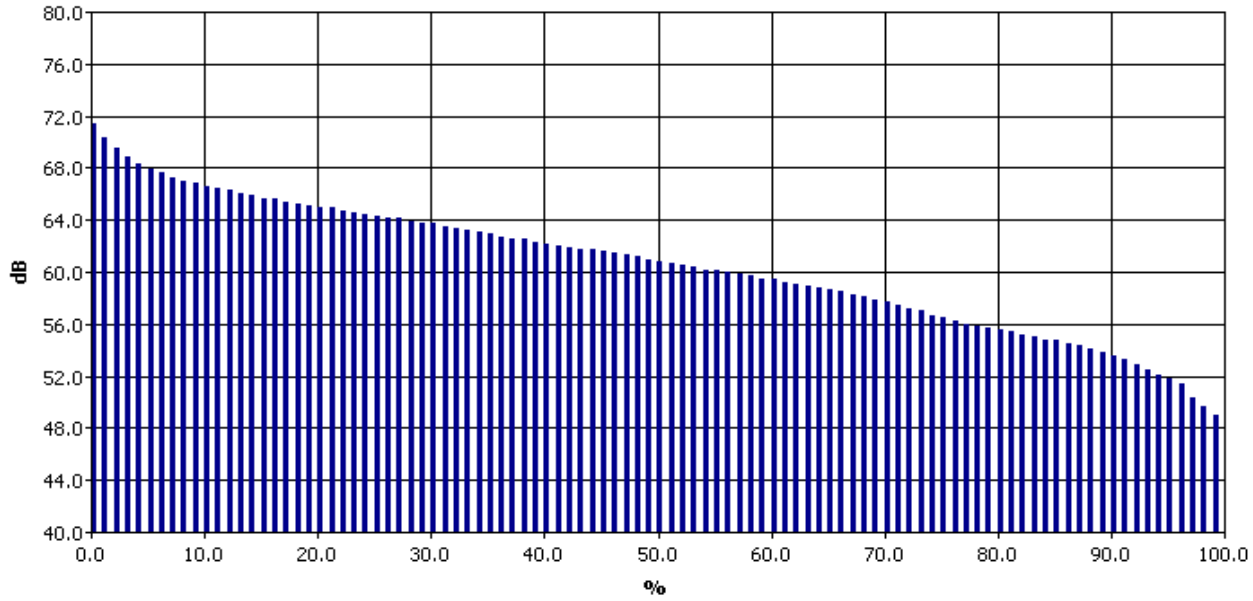
Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
47.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.1	0.1	0.2	0.1	0.3	0.2	0.1	0.1	1.2
50.0	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	1.3
51.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.4	1.8
52.0	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	2.6
53.0	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.4	3.3
54.0	0.3	0.4	0.5	0.5	0.4	0.4	0.5	0.6	0.6	0.7	4.9
55.0	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.7	0.7	5.8
56.0	0.6	0.6	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	4.6
57.0	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.4	0.5	4.3
58.0	0.5	0.5	0.5	0.5	0.5	0.7	0.6	0.5	0.7	0.8	5.8
59.0	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	6.5
60.0	0.7	0.8	0.9	0.7	0.8	0.7	0.7	0.6	0.6	0.6	7.0
61.0	0.6	0.5	0.6	0.7	0.6	0.7	0.7	0.9	1.0	0.9	7.3
62.0	1.0	1.1	0.7	0.4	0.7	0.7	0.8	0.7	0.6	0.6	7.3
63.0	0.6	0.6	0.6	0.8	0.6	0.7	0.7	0.7	0.7	0.7	6.7
64.0	0.7	0.7	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	7.6
65.0	0.8	0.7	0.8	0.5	0.8	0.7	0.6	0.7	0.7	0.6	6.9
66.0	0.5	0.6	0.4	0.4	0.6	0.9	0.6	0.4	0.4	0.4	5.3
67.0	0.5	0.5	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	3.6
68.0	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	2.3
69.0	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	1.4
70.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	1.2
71.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
77.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
79.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		71.4	70.3	69.5	68.8	68.3	67.9	67.6	67.3	67.0
10%	66.8	66.6	66.4	66.3	66.1	65.9	65.7	65.6	65.4	65.3
20%	65.1	65.0	64.9	64.7	64.6	64.4	64.3	64.2	64.1	63.9
30%	63.8	63.7	63.5	63.4	63.2	63.1	62.9	62.7	62.6	62.5
40%	62.3	62.1	62.0	61.9	61.8	61.7	61.6	61.5	61.3	61.2
50%	61.0	60.8	60.7	60.5	60.4	60.2	60.1	60.0	59.8	59.7
60%	59.5	59.4	59.2	59.0	58.9	58.8	58.6	58.5	58.3	58.1
70%	57.9	57.7	57.5	57.2	57.0	56.7	56.5	56.3	56.0	55.9
80%	55.7	55.6	55.4	55.2	55.0	54.8	54.7	54.5	54.3	54.1
90%	53.8	53.6	53.3	52.9	52.5	52.1	51.8	51.4	50.4	49.6
100%	49.0									

DKA Planning
Noah Tanski
4 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Canyon Oaks
RUN: AM Existing v3
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	69.6	0	69.6	0	Snd Lvl	69.6	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	67.8	0	67.8	0	Snd Lvl	67.8	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	75.7	0	75.7	0	Snd Lvl	75.7	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	73.9	0	73.9	0	Snd Lvl	73.9	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	74.3	0	74.3	0	Snd Lvl	74.3	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.5	0	72.5	0	Snd Lvl	72.5	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	68.6	0	68.6	0	Snd Lvl	68.6	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.0	0	68.0	0	Snd Lvl	68.0	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.5	0	68.5	0	Snd Lvl	68.5	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.0	0	70.0	0	Snd Lvl	70.0	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.3	0	68.3	0	Snd Lvl	68.3	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.0	0	62.0	0	Snd Lvl	62.0	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.5	0	71.5	0	Snd Lvl	71.5	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	67.9	0	67.9	0	Snd Lvl	67.9	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.0	0	69.0	0	Snd Lvl	69.0	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.1	0	69.1	0	Snd Lvl	69.1	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	67.6	0	67.6	0	Snd Lvl	67.6	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	67.7	0	67.7	0	Snd Lvl	67.7	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

RESULTS: SOUND LEVELS **Canyon Oaks**

DKA Planning **4 May 2015**
Noah Tanski **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **Canyon Oaks**
RUN: **v3 PM Existing**
BARRIER DESIGN: **INPUT HEIGHTS**
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	69.6	0	69.6	0	Snd Lvl	69.6	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	67.7	0	67.7	0	Snd Lvl	67.7	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	74.3	0	74.3	0	Snd Lvl	74.3	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	72.3	0	72.3	0	Snd Lvl	72.3	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	73.1	0	73.1	0	Snd Lvl	73.1	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.1	0	72.1	0	Snd Lvl	72.1	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	68.6	0	68.6	0	Snd Lvl	68.6	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.0	0	68.0	0	Snd Lvl	68.0	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.1	0	68.1	0	Snd Lvl	68.1	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.0	0	70.0	0	Snd Lvl	70.0	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	67.9	0	67.9	0	Snd Lvl	67.9	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.5	0	62.5	0	Snd Lvl	62.5	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.6	0	71.6	0	Snd Lvl	71.6	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	67.7	0	67.7	0	Snd Lvl	67.7	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.0	0	69.0	0	Snd Lvl	69.0	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.4	0	69.4	0	Snd Lvl	69.4	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	65.9	0	65.9	0	Snd Lvl	65.9	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	66.7	0	66.7	0	Snd Lvl	66.7	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

DKA Planning
Noah Tanski
4 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Canyon Oaks
RUN: v3 AM Existing PLUS
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	69.7	0	69.7	0	Snd Lvl	69.7	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	67.8	0	67.8	0	Snd Lvl	67.8	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	75.8	0	75.8	0	Snd Lvl	75.8	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	74.0	0	74.0	0	Snd Lvl	74.0	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	74.4	0	74.4	0	Snd Lvl	74.4	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.6	0	72.6	0	Snd Lvl	72.6	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	68.7	0	68.7	0	Snd Lvl	68.7	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.1	0	68.1	0	Snd Lvl	68.1	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.6	0	68.6	0	Snd Lvl	68.6	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.1	0	70.1	0	Snd Lvl	70.1	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.3	0	68.3	0	Snd Lvl	68.3	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.1	0	62.1	0	Snd Lvl	62.1	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.5	0	71.5	0	Snd Lvl	71.5	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	67.9	0	67.9	0	Snd Lvl	67.9	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.0	0	69.0	0	Snd Lvl	69.0	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.2	0	69.2	0	Snd Lvl	69.2	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	67.6	0	67.6	0	Snd Lvl	67.6	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	67.7	0	67.7	0	Snd Lvl	67.7	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

RESULTS: SOUND LEVELS **Canyon Oaks**

DKA Planning **4 May 2015**
Noah Tanski **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **Canyon Oaks**
RUN: **v3 PM Existing PLUS**
BARRIER DESIGN: **INPUT HEIGHTS** **Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.**
ATMOSPHERICS: **68 deg F, 50% RH**

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	69.6	0	69.6	0	Snd Lvl	69.6	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	67.8	0	67.8	0	Snd Lvl	67.8	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	74.5	0	74.5	0	Snd Lvl	74.5	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	72.5	0	72.5	0	Snd Lvl	72.5	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	73.3	0	73.3	0	Snd Lvl	73.3	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.2	0	72.2	0	Snd Lvl	72.2	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	68.8	0	68.8	0	Snd Lvl	68.8	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.1	0	68.1	0	Snd Lvl	68.1	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.2	0	68.2	0	Snd Lvl	68.2	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.1	0	70.1	0	Snd Lvl	70.1	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.0	0	68.0	0	Snd Lvl	68.0	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.6	0	62.6	0	Snd Lvl	62.6	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.7	0	71.7	0	Snd Lvl	71.7	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	67.8	0	67.8	0	Snd Lvl	67.8	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.1	0	69.1	0	Snd Lvl	69.1	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.5	0	69.5	0	Snd Lvl	69.5	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	66.1	0	66.1	0	Snd Lvl	66.1	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	66.8	0	66.8	0	Snd Lvl	66.8	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

DKA Planning
Noah Tanski
5 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Canyon Oaks
RUN: v3 AM Future
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	70.1	0	70.1	0	Snd Lvl	70.1	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	68.2	0	68.2	0	Snd Lvl	68.2	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	76.1	0	76.1	0	Snd Lvl	76.1	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	74.2	0	74.2	0	Snd Lvl	74.2	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	74.6	0	74.6	0	Snd Lvl	74.6	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.9	0	72.9	0	Snd Lvl	72.9	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	69.0	0	69.0	0	Snd Lvl	69.0	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.3	0	68.3	0	Snd Lvl	68.3	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.8	0	68.8	0	Snd Lvl	68.8	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.3	0	70.3	0	Snd Lvl	70.3	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.5	0	68.5	0	Snd Lvl	68.5	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.3	0	62.3	0	Snd Lvl	62.3	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.8	0	71.8	0	Snd Lvl	71.8	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	68.1	0	68.1	0	Snd Lvl	68.1	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.3	0	69.3	0	Snd Lvl	69.3	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.4	0	69.4	0	Snd Lvl	69.4	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	67.9	0	67.9	0	Snd Lvl	67.9	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	68.0	0	68.0	0	Snd Lvl	68.0	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min dB	Noise Reduction Avg dB	Noise Reduction Max dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

DKA Planning
Noah Tanski
5 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Canyon Oaks
RUN: v3 AM Future PLUS
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	70.2	0	70.2	0	Snd Lvl	70.2	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	68.3	0	68.3	0	Snd Lvl	68.3	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	76.2	0	76.2	0	Snd Lvl	76.2	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	74.4	0	74.4	0	Snd Lvl	74.4	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	74.7	0	74.7	0	Snd Lvl	74.7	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.9	0	72.9	0	Snd Lvl	72.9	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	69.0	0	69.0	0	Snd Lvl	69.0	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.4	0	68.4	0	Snd Lvl	68.4	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.8	0	68.8	0	Snd Lvl	68.8	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.4	0	70.4	0	Snd Lvl	70.4	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.5	0	68.5	0	Snd Lvl	68.5	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	62.3	0	62.3	0	Snd Lvl	62.3	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	71.8	0	71.8	0	Snd Lvl	71.8	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	68.2	0	68.2	0	Snd Lvl	68.2	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.3	0	69.3	0	Snd Lvl	69.3	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.5	0	69.5	0	Snd Lvl	69.5	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	67.9	0	67.9	0	Snd Lvl	67.9	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	68.0	0	68.0	0	Snd Lvl	68.0	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

DKA Planning
Noah Tanski
5 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: Canyon Oaks
RUN: v3 PM Future PLUS
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NE INT of Las Virgenes and Mureau	1	1	0.0	70.1	0	70.1	0	Snd Lvl	70.1	0.0	0	0.0
W of Las Virgenes btwn Mureau and 101S	2	1	0.0	68.3	0	68.3	0	Snd Lvl	68.3	0.0	0	0.0
SW INT of Las Virgenes and 101N offramp	3	1	0.0	75.1	0	75.1	0	Snd Lvl	75.1	0.0	0	0.0
NW INT of Las Virgenes and 101N onramp	4	1	0.0	73.1	0	73.1	0	Snd Lvl	73.1	0.0	0	0.0
NW INT of Las Virgenes and Agoura	5	1	0.0	73.7	0	73.7	0	Snd Lvl	73.7	0.0	0	0.0
SW INT of Las Virgenes and Agoura	6	1	0.0	72.6	0	72.6	0	Snd Lvl	72.6	0.0	0	0.0
SE INT of Las Virgenes and Agoura	7	1	0.0	69.1	0	69.1	0	Snd Lvl	69.1	0.0	0	0.0
E of Las Virgenes btwn Agoura and Lost H	8	1	0.0	68.5	0	68.5	0	Snd Lvl	68.5	0.0	0	0.0
W of Las Virgenes btwn Agoura and Lost H	9	1	0.0	68.6	0	68.6	0	Snd Lvl	68.6	0.0	0	0.0
N INT Las Virgenes and Lost Hills	10	1	0.0	70.4	0	70.4	0	Snd Lvl	70.4	0.0	0	0.0
W of Lost Hills btwn Agoura and Las Virge	11	1	0.0	68.6	0	68.6	0	Snd Lvl	68.6	0.0	0	0.0
E of Lost Hills btwn Agoura and Las Virger	12	1	0.0	63.0	0	63.0	0	Snd Lvl	63.0	0.0	0	0.0
NE INT Agoura and Lost Hills	13	1	0.0	72.1	0	72.1	0	Snd Lvl	72.1	0.0	0	0.0
NW INT Agoura and Lost Hills	14	1	0.0	68.2	0	68.2	0	Snd Lvl	68.2	0.0	0	0.0
SW INT Agoura and Lost Hills	15	1	0.0	69.6	0	69.6	0	Snd Lvl	69.6	0.0	0	0.0
SE INT Agoura and Lost Hills	16	1	0.0	69.9	0	69.9	0	Snd Lvl	69.9	0.0	0	0.0
W of Agoura btwn Lost Hills and Las Virge	17	1	0.0	66.6	0	66.6	0	Snd Lvl	66.6	0.0	0	0.0
E of Agoura btwn Lost Hills and Las Virger	18	1	0.0	67.3	0	67.3	0	Snd Lvl	67.3	0.0	0	0.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	18	0.0	0.0	0.0
All Impacted	18	0.0	0.0	0.0

Canyon Oaks - Parking Lot Noise - Unmitigated

Reference Noise Distance 50

Reference Noise Level 58.1

Sensitive Receptor	Distance (feet)	Attenuation Factors	Maximum Parking Noise Level (dBA)	Existing Ambient (dBA, Leq)
Northeast corner of The Colony	10	9	35.1	59.9
4623, 4633, 4647 Las Virgenes Road	300	6	48.6	63.8
Entrance to The Colony	415	10.5	26.0	62.5

A 6 dBA attenuation was given for a point source over a hard ground surfuce, and 3 dBA reduction was given fo
intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening structu
Caltrans Technical Noise Supplement.

New Ambient (dBA, Leq)	Increase
72.2	0.0
63.3	0.2
58.1	0.0

›r the first row of buildings
res), as recommended by the

Canyon Oaks - Rooftop HVAC Stationary Noise - Unmitigated

Reference Noise Distance 50

Reference Noise Level 56

Sensitive Receptor	Distance (feet)	Attenuation Factors	Maximum Noise Level (dBA)	Existing Ambient (dBA, Leq)	New Ambient (dBA, Leq)	Increase
Northeast corner of The Colony	10	9	47.0	59.9	60.1	0.2
4623, 4633, 4647 Las Virgenes Road	300	9	31.4	63.8	63.8	0.0
Entrance to The Colony	415	10.5	27.1	62.5	62.5	0.0

A 6 dBA attenuation was given for a point source over a hard ground surfuce, and 3 dBA reduction was given for the first row of buildings intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening

Canyon Oaks - Construction Noise - Unmitigated

Reference Noise Distance	50
Reference Noise Level	89

Sensitive Receptor	Distance (feet)	Attenuation Factors	Maximum Construction Noise Level (dBA)	Existing Ambient (dBA, Leq)	New Ambient (dBA, Leq)	Increase
Northeast corner of The Colony	10	9	80.0	59.9	80.0	20.1
4623, 4633, 4647 Las Virgenes Road	300	9	64.4	63.8	67.1	3.3
Entrance to The Colony	415	10.5	60.1	62.5	64.5	2.0

A 6 dBA attenuation was given for hard ground surfuce, an additional 1.5 dBA reduction for soft ground surface, and 3 dBA reduction was given for the first row of buildings intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening structures), as recommended by the Caltrans Technical Noise Supplement.

Canyon Oaks - Construction Noise - Mitigated

Reference Noise Distance 50

Reference Noise Level 89

Sensitive Receptor	Distance (feet)	Mitigation Factors	Attenuation Factors	Maximum Construction Noise Level (dBA)	Existing Ambient (dBA, Leq)	New Ambient (dBA, Leq)	Increase
Northeast corner of The Colony	10	18	9	62.0	59.9	64.1	4.2
4623, 4633, 4647 Las Virgenes Road	300	3	9	61.4	63.8	65.8	2.0
Entrance to The Colony	415	3	10.5	57.1	62.5	63.6	1.1

A 3 dBA reduction was given for mufflers.

A 6 dBA attenuation was given for hard ground surface, an additional 1.5 dBA reduction for soft ground surface, and 3 dBA reduction was given for the first row of buildings intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening structures), as recommended by the Caltrans Technical Noise Supplement.

Mitigation factors assume temporary sound barriers are installed that reduce reference noise levels by 15 dBA or more at 50 feet of distance.

Canyon Oaks Construction Vibration

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.21	Based on type of equipment
RefD=	25	
D=	210	Distance from equipment to sensitive receptor
Equip=	0.009	
Annoyance VdB		
Ref=	94	Based on type of equipment
RefD=	25	
D=	210	Distance from equipment to sensitive receptor
Equip=	66	

Peak construction vibration based on utilizing a vibratory roller.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Canyon Oaks Construction Vibration

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.21	Based on type of equipment
RefD=	25	
D=	300	Distance from equipment to sensitive receptor
Equip=	0.005	
Annoyance VdB		
Ref=	94	Based on type of equipment
RefD=	25	
D=	300	Distance from equipment to sensitive receptor
Equip=	62	

Peak construction vibration based on utilizing a vibratory roller.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Canyon Oaks Construction Vibration

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.21	Based on type of equipment
RefD=	25	
D=	615	Distance from equipment to sensitive receptor
Equip=	0.002	
Annoyance VdB		
Ref=	94	Based on type of equipment
RefD=	25	
D=	615	Distance from equipment to sensitive receptor
Equip=	52	

Peak construction vibration based on utilizing a vibratory roller.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Canyon Oaks Alternative 2

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	180.00	Dwelling Unit	12.00	180,000.00	515
Strip Mall	155.00	1000sqft	4.00	155,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	19.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	10/1/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/31/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	9/28/2016
tblConstructionPhase	PhaseStartDate	11/30/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	9/29/2016	9/1/2016
tblConstructionPhase	PhaseStartDate	11/1/2018	10/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	8/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	153.00	0.00
tblFireplaces	NumberNoFireplace	18.00	0.00
tblFireplaces	NumberWood	9.00	0.00
tblGrading	AcresOfGrading	107.50	75.00
tblGrading	AcresOfGrading	107.50	0.00
tblGrading	MaterialImported	0.00	79,600.00
tblLandUse	LotAcreage	11.25	12.00
tblLandUse	LotAcreage	3.56	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	WorkerTripNumber	38.00	18.00
tblTripsAndVMT	WorkerTripNumber	38.00	20.00
tblWoodstoves	NumberCatalytic	9.00	0.00
tblWoodstoves	NumberNoncatalytic	9.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**35.27**	**87.33**	**14.36**	**0.00**	**50.61**	**95.49**	**62.41**	**57.38**	**95.33**	**73.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5178	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988
Energy	0.0152	0.1310	0.0611	8.3000e-004		0.0105	0.0105		0.0105	0.0105	0.0000	1,012.7417	1,012.7417	0.0425	0.0110	1,017.0326
Mobile	3.6990	9.2680	37.0015	0.0926	6.0756	0.1343	6.2099	1.6274	0.1238	1.7512	0.0000	6,756.9958	6,756.9958	0.2628	0.0000	6,762.5145
Waste						0.0000	0.0000		0.0000	0.0000	49.8444	0.0000	49.8444	2.9457	0.0000	111.7046
Water						0.0000	0.0000		0.0000	0.0000	7.3631	132.3597	139.7229	0.7624	0.0191	161.6581
Total	**5.2320**	**9.4206**	**38.9300**	**0.0935**	**6.0756**	**0.1550**	**6.2306**	**1.6274**	**0.1446**	**1.7720**	**57.2076**	**7,905.1333**	**7,962.3409**	**4.0164**	**0.0301**	**8,056.0085**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5178	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988
Energy	0.0152	0.1310	0.0611	8.3000e-004		0.0105	0.0105		0.0105	0.0105	0.0000	1,012.7417	1,012.7417	0.0425	0.0110	1,017.0326
Mobile	3.6990	9.2680	37.0015	0.0926	6.0756	0.1343	6.2099	1.6274	0.1238	1.7512	0.0000	6,756.9958	6,756.9958	0.2628	0.0000	6,762.5145
Waste						0.0000	0.0000		0.0000	0.0000	49.8444	0.0000	49.8444	2.9457	0.0000	111.7046
Water						0.0000	0.0000		0.0000	0.0000	7.3631	132.3597	139.7229	0.7622	0.0191	161.6463
Total	**5.2320**	**9.4206**	**38.9300**	**0.0935**	**6.0756**	**0.1550**	**6.2306**	**1.6274**	**0.1446**	**1.7720**	**57.2076**	**7,905.1333**	**7,962.3409**	**4.0162**	**0.0301**	**8,055.9968**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.10**	**0.00**

3.0 Construction Detail

Construction Phase

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.6990	9.2680	37.0015	0.0926	6.0756	0.1343	6.2099	1.6274	0.1238	1.7512	0.0000	6,756.9958	6,756.9958	0.2628	0.0000	6,762.5145
Unmitigated	3.6990	9.2680	37.0015	0.0926	6.0756	0.1343	6.2099	1.6274	0.1238	1.7512	0.0000	6,756.9958	6,756.9958	0.2628	0.0000	6,762.5145

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,186.20	1,288.80	1092.60	4,057,819	4,057,819
Strip Mall	6,869.60	6,516.20	3166.65	11,967,555	11,967,555
Total	8,055.80	7,805.00	4,259.25	16,025,374	16,025,374

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	861.9812	861.9812	0.0396	8.2000e-003	865.3545
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	861.9812	861.9812	0.0396	8.2000e-003	865.3545
NaturalGas Mitigated	0.0152	0.1310	0.0611	8.3000e-004		0.0105	0.0105		0.0105	0.0105	0.0000	150.7606	150.7606	2.8900e-003	2.7600e-003	151.6781
NaturalGas Unmitigated	0.0152	0.1310	0.0611	8.3000e-004		0.0105	0.0105		0.0105	0.0105	0.0000	150.7606	150.7606	2.8900e-003	2.7600e-003	151.6781

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	2.56165e+006	0.0138	0.1180	0.0502	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6992	136.6992	2.6200e-003	2.5100e-003	137.5312
Strip Mall	263500	1.4200e-003	0.0129	0.0109	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0614	14.0614	2.7000e-004	2.6000e-004	14.1469
Total		**0.0152**	**0.1310**	**0.0611**	**8.3000e-004**		**0.0105**	**0.0105**		**0.0105**	**0.0105**	**0.0000**	**150.7606**	**150.7606**	**2.8900e-003**	**2.7700e-003**	**151.6781**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Strip Mall	263500	1.4200e-003	0.0129	0.0109	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0614	14.0614	2.7000e-004	2.6000e-004	14.1469
Apartments Low Rise	2.56165e+006	0.0138	0.1180	0.0502	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6992	136.6992	2.6200e-003	2.5100e-003	137.5312
Total		**0.0152**	**0.1310**	**0.0611**	**8.3000e-004**		**0.0105**	**0.0105**		**0.0105**	**0.0105**	**0.0000**	**150.7606**	**150.7606**	**2.8900e-003**	**2.7700e-003**	**151.6781**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	660812	189.1026	8.6900e-003	1.8000e-003	189.8427
Strip Mall	2.35135e+006	672.8785	0.0309	6.4000e-003	675.5118
Total		**861.9812**	**0.0396**	**8.2000e-003**	**865.3545**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	660812	189.1026	8.6900e-003	1.8000e-003	189.8427
Strip Mall	2.35135e+006	672.8785	0.0309	6.4000e-003	675.5118
Total		**861.9812**	**0.0396**	**8.2000e-003**	**865.3545**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.5178	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988
Unmitigated	1.5178	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2500					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.2105					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0573	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988
Total	**1.5178**	**0.0216**	**1.8675**	**1.0000e-004**		**0.0102**	**0.0102**		**0.0102**	**0.0102**	**0.0000**	**3.0361**	**3.0361**	**2.9900e-003**	**0.0000**	**3.0988**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2500					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.2105					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0573	0.0216	1.8675	1.0000e-004		0.0102	0.0102		0.0102	0.0102	0.0000	3.0361	3.0361	2.9900e-003	0.0000	3.0988
Total	**1.5178**	**0.0216**	**1.8675**	**1.0000e-004**		**0.0102**	**0.0102**		**0.0102**	**0.0102**	**0.0000**	**3.0361**	**3.0361**	**2.9900e-003**	**0.0000**	**3.0988**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	139.7229	0.7622	0.0191	161.6463
Unmitigated	139.7229	0.7624	0.0191	161.6581

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	11.7277 / 7.39357	70.9267	0.3852	9.6600e-003	82.0121
Strip Mall	11.4812 / 7.03689	68.7961	0.3771	9.4500e-003	79.6460
Total		**139.7229**	**0.7624**	**0.0191**	**161.6581**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	11.7277 / 7.39357	70.9267	0.3852	9.6500e-003	82.0062
Strip Mall	11.4812 / 7.03689	68.7961	0.3770	9.4400e-003	79.6402
Total		**139.7229**	**0.7622**	**0.0191**	**161.6463**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	49.8444	2.9457	0.0000	111.7046
Unmitigated	49.8444	2.9457	0.0000	111.7046

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	82.8	16.8077	0.9933	0.0000	37.6670
Strip Mall	162.75	33.0368	1.9524	0.0000	74.0376
Total		**49.8444**	**2.9457**	**0.0000**	**111.7046**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	82.8	16.8077	0.9933	0.0000	37.6670
Strip Mall	162.75	33.0368	1.9524	0.0000	74.0376
Total		**49.8444**	**2.9457**	**0.0000**	**111.7046**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks Alternative 2

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	180.00	Dwelling Unit	12.00	180,000.00	515
Strip Mall	155.00	1000sqft	4.00	155,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	19.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	10/1/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/31/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	9/28/2016
tblConstructionPhase	PhaseStartDate	11/30/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	9/29/2016	9/1/2016
tblConstructionPhase	PhaseStartDate	11/1/2018	10/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	8/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	153.00	0.00
tblFireplaces	NumberNoFireplace	18.00	0.00
tblFireplaces	NumberWood	9.00	0.00
tblGrading	AcresOfGrading	107.50	75.00
tblGrading	AcresOfGrading	107.50	0.00
tblGrading	MaterialImported	0.00	79,600.00
tblLandUse	LotAcreage	11.25	12.00
tblLandUse	LotAcreage	3.56	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	WorkerTripNumber	38.00	18.00
tblTripsAndVMT	WorkerTripNumber	38.00	20.00
tblWoodstoves	NumberCatalytic	9.00	0.00
tblWoodstoves	NumberNoncatalytic	9.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Energy	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
Mobile	22.2729	51.9636	214.8381	0.5739	37.1175	0.8036	37.9211	9.9261	0.7410	10.6671		46,100.9838	46,100.9838	1.7367		46,137.4534
Total	**30.8176**	**52.8542**	**230.1125**	**0.5792**	**37.1175**	**0.9431**	**38.0606**	**9.9261**	**0.8805**	**10.8066**	**0.0000**	**47,038.3604**	**47,038.3604**	**1.7804**	**0.0167**	**47,080.9249**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Energy	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
Mobile	22.2729	51.9636	214.8381	0.5739	37.1175	0.8036	37.9211	9.9261	0.7410	10.6671		46,100.9838	46,100.9838	1.7367		46,137.4534
Total	**30.8176**	**52.8542**	**230.1125**	**0.5792**	**37.1175**	**0.9431**	**38.0606**	**9.9261**	**0.8805**	**10.8066**	**0.0000**	**47,038.3604**	**47,038.3604**	**1.7804**	**0.0167**	**47,080.9249**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	1/1/2016	2/2/2016	5	23	
2	Grading	Grading	2/3/2016	10/3/2016	5	174	
3	Underground Improvements	Site Preparation	8/1/2016	9/28/2016	5	43	
4	Construction	Building Construction	9/1/2016	10/31/2018	5	565	
5	Street Improvements	Paving	10/1/2016	10/30/2016	5	20	
6	Landscape	Site Preparation	10/31/2016	11/29/2016	5	22	
7	Architectural Coating	Architectural Coating	1/1/2017	11/1/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 435

Acres of Paving: 0

Residential Indoor: 364,500; Residential Outdoor: 121,500; Non-Residential Indoor: 232,500; Non-Residential Outdoor: 77,500 (Architectural Coating – sqft)

OffRoad Equipment

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	22.2729	51.9636	214.8381	0.5739	37.1175	0.8036	37.9211	9.9261	0.7410	10.6671		46,100.9838	46,100.9838	1.7367		46,137.4534
Unmitigated	22.2729	51.9636	214.8381	0.5739	37.1175	0.8036	37.9211	9.9261	0.7410	10.6671		46,100.9838	46,100.9838	1.7367		46,137.4534

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,186.20	1,288.80	1092.60	4,057,819	4,057,819
Strip Mall	6,869.60	6,516.20	3166.65	11,967,555	11,967,555
Total	8,055.80	7,805.00	4,259.25	16,025,374	16,025,374

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
NaturalGas Unmitigated	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	7018.21	0.0757	0.6468	0.2752	4.1300e-003		0.0523	0.0523		0.0523	0.0523		825.6718	825.6718	0.0158	0.0151	830.6967
Strip Mall	721.918	7.7900e-003	0.0708	0.0595	4.2000e-004		5.3800e-003	5.3800e-003		5.3800e-003	5.3800e-003		84.9315	84.9315	1.6300e-003	1.5600e-003	85.4484
Total		**0.0835**	**0.7176**	**0.3347**	**4.5500e-003**		**0.0577**	**0.0577**		**0.0577**	**0.0577**		**910.6033**	**910.6033**	**0.0175**	**0.0167**	**916.1450**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Strip Mall	0.721918	7.7900e-003	0.0708	0.0595	4.2000e-004		5.3800e-003	5.3800e-003		5.3800e-003	5.3800e-003		84.9315	84.9315	1.6300e-003	1.5600e-003	85.4484
Apartments Low Rise	7.01821	0.0757	0.6468	0.2752	4.1300e-003		0.0523	0.0523		0.0523	0.0523		825.6718	825.6718	0.0158	0.0151	830.6967
Total		**0.0835**	**0.7176**	**0.3347**	**4.5500e-003**		**0.0577**	**0.0577**		**0.0577**	**0.0577**		**910.6033**	**910.6033**	**0.0175**	**0.0167**	**916.1450**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Unmitigated	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.6330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4584	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818		26.7733	26.7733	0.0263		27.3265
Total	**8.4612**	**0.1730**	**14.9398**	**7.9000e-004**		**0.0818**	**0.0818**		**0.0818**	**0.0818**	**0.0000**	**26.7733**	**26.7733**	**0.0263**	**0.0000**	**27.3265**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.6330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4584	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818		26.7733	26.7733	0.0263		27.3265
Total	**8.4612**	**0.1730**	**14.9398**	**7.9000e-004**		**0.0818**	**0.0818**		**0.0818**	**0.0818**	**0.0000**	**26.7733**	**26.7733**	**0.0263**	**0.0000**	**27.3265**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks Alternative 2

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	180.00	Dwelling Unit	12.00	180,000.00	515
Strip Mall	155.00	1000sqft	4.00	155,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	19.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	10/1/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/31/2018
tblConstructionPhase	PhaseEndDate	11/28/2018	10/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	9/28/2016
tblConstructionPhase	PhaseStartDate	11/30/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	9/29/2016	9/1/2016
tblConstructionPhase	PhaseStartDate	11/1/2018	10/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	8/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	153.00	0.00
tblFireplaces	NumberNoFireplace	18.00	0.00
tblFireplaces	NumberWood	9.00	0.00
tblGrading	AcresOfGrading	107.50	75.00
tblGrading	AcresOfGrading	107.50	0.00
tblGrading	MaterialImported	0.00	79,600.00
tblLandUse	LotAcreage	11.25	12.00
tblLandUse	LotAcreage	3.56	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	WorkerTripNumber	38.00	18.00
tblTripsAndVMT	WorkerTripNumber	38.00	20.00
tblWoodstoves	NumberCatalytic	9.00	0.00
tblWoodstoves	NumberNoncatalytic	9.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Energy	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
Mobile	23.5218	54.5326	222.5482	0.5481	37.1175	0.8078	37.9253	9.9261	0.7449	10.6710		44,119.6192	44,119.6192	1.7392		44,156.1423
Total	**32.0665**	**55.4232**	**237.8226**	**0.5534**	**37.1175**	**0.9473**	**38.0648**	**9.9261**	**0.8844**	**10.8105**	**0.0000**	**45,056.9958**	**45,056.9958**	**1.7830**	**0.0167**	**45,099.6138**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Energy	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
Mobile	23.5218	54.5326	222.5482	0.5481	37.1175	0.8078	37.9253	9.9261	0.7449	10.6710		44,119.6192	44,119.6192	1.7392		44,156.1423
Total	**32.0665**	**55.4232**	**237.8226**	**0.5534**	**37.1175**	**0.9473**	**38.0648**	**9.9261**	**0.8844**	**10.8105**	**0.0000**	**45,056.9958**	**45,056.9958**	**1.7830**	**0.0167**	**45,099.6138**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	1/1/2016	2/2/2016	5	23	
2	Grading	Grading	2/3/2016	10/3/2016	5	174	
3	Underground Improvements	Site Preparation	8/1/2016	9/28/2016	5	43	
4	Construction	Building Construction	9/1/2016	10/31/2018	5	565	
5	Street Improvements	Paving	10/1/2016	10/30/2016	5	20	
6	Landscape	Site Preparation	10/31/2016	11/29/2016	5	22	
7	Architectural Coating	Architectural Coating	1/1/2017	11/1/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 435

Acres of Paving: 0

Residential Indoor: 364,500; Residential Outdoor: 121,500; Non-Residential Indoor: 232,500; Non-Residential Outdoor: 77,500 (Architectural Coating – sqft)

OffRoad Equipment

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.5218	54.5326	222.5482	0.5481	37.1175	0.8078	37.9253	9.9261	0.7449	10.6710		44,119.6192	44,119.6192	1.7392		44,156.1423
Unmitigated	23.5218	54.5326	222.5482	0.5481	37.1175	0.8078	37.9253	9.9261	0.7449	10.6710		44,119.6192	44,119.6192	1.7392		44,156.1423

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,186.20	1,288.80	1092.60	4,057,819	4,057,819
Strip Mall	6,869.60	6,516.20	3166.65	11,967,555	11,967,555
Total	8,055.80	7,805.00	4,259.25	16,025,374	16,025,374

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450
NaturalGas Unmitigated	0.0835	0.7176	0.3347	4.5500e-003		0.0577	0.0577		0.0577	0.0577		910.6033	910.6033	0.0175	0.0167	916.1450

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	7018.21	0.0757	0.6468	0.2752	4.1300e-003		0.0523	0.0523		0.0523	0.0523		825.6718	825.6718	0.0158	0.0151	830.6967
Strip Mall	721.918	7.7900e-003	0.0708	0.0595	4.2000e-004		5.3800e-003	5.3800e-003		5.3800e-003	5.3800e-003		84.9315	84.9315	1.6300e-003	1.5600e-003	85.4484
Total		**0.0835**	**0.7176**	**0.3347**	**4.5500e-003**		**0.0577**	**0.0577**		**0.0577**	**0.0577**		**910.6033**	**910.6033**	**0.0175**	**0.0167**	**916.1450**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	7.01821	0.0757	0.6468	0.2752	4.1300e-003		0.0523	0.0523		0.0523	0.0523		825.6718	825.6718	0.0158	0.0151	830.6967
Strip Mall	0.721918	7.7900e-003	0.0708	0.0595	4.2000e-004		5.3800e-003	5.3800e-003		5.3800e-003	5.3800e-003		84.9315	84.9315	1.6300e-003	1.5600e-003	85.4484
Total		**0.0835**	**0.7176**	**0.3347**	**4.5500e-003**		**0.0577**	**0.0577**		**0.0577**	**0.0577**		**910.6033**	**910.6033**	**0.0175**	**0.0167**	**916.1450**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265
Unmitigated	8.4612	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818	0.0000	26.7733	26.7733	0.0263	0.0000	27.3265

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.6330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4584	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818		26.7733	26.7733	0.0263		27.3265
Total	**8.4612**	**0.1730**	**14.9398**	**7.9000e-004**		**0.0818**	**0.0818**		**0.0818**	**0.0818**	**0.0000**	**26.7733**	**26.7733**	**0.0263**	**0.0000**	**27.3265**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.6330					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4584	0.1730	14.9398	7.9000e-004		0.0818	0.0818		0.0818	0.0818		26.7733	26.7733	0.0263		27.3265
Total	**8.4612**	**0.1730**	**14.9398**	**7.9000e-004**		**0.0818**	**0.0818**		**0.0818**	**0.0818**	**0.0000**	**26.7733**	**26.7733**	**0.0263**	**0.0000**	**27.3265**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks Alternative 3

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	4.00	Dwelling Unit	0.25	4,000.00	11
Hotel	111.00	Room	4.00	161,172.00	0
Single Family Housing	67.00	Dwelling Unit	11.75	120,600.00	192

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	21.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	9/3/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/28/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	8/30/2016
tblConstructionPhase	PhaseStartDate	11/2/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	8/31/2016	8/1/2016
tblConstructionPhase	PhaseStartDate	9/29/2018	9/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	7/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	3.40	0.00
tblFireplaces	NumberGas	56.95	0.00
tblFireplaces	NumberNoFireplace	0.40	0.00
tblFireplaces	NumberNoFireplace	6.70	0.00
tblFireplaces	NumberWood	0.20	0.00

tblFireplaces	NumberWood	3.35	0.00
tblGrading	AcresOfGrading	435.00	75.00
tblLandUse	LotAcreage	3.70	4.00
tblLandUse	LotAcreage	21.75	11.75
tblProjectCharacteristics	OperationalYear	2014	2019
tblWoodstoves	NumberCatalytic	0.20	0.00
tblWoodstoves	NumberCatalytic	3.35	0.00
tblWoodstoves	NumberNoncatalytic	0.20	0.00
tblWoodstoves	NumberNoncatalytic	3.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**37.28**	**89.06**	**17.04**	**0.00**	**53.85**	**96.11**	**67.55**	**60.16**	**95.95**	**77.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.2908	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236
Energy	0.0328	0.2923	0.2063	1.7900e-003		0.0227	0.0227		0.0227	0.0227	0.0000	861.7508	861.7508	0.0309	0.0111	865.8289
Mobile	0.8212	2.3928	9.1317	0.0249	1.6501	0.0357	1.6858	0.4420	0.0329	0.4749	0.0000	1,817.8802	1,817.8802	0.0694	0.0000	1,819.3384
Waste						0.0000	0.0000		0.0000	0.0000	28.6887	0.0000	28.6887	1.6955	0.0000	64.2933
Water						0.0000	0.0000		0.0000	0.0000	2.3609	37.9956	40.3565	0.2442	6.0900e-003	47.3723
Total	**2.1448**	**2.6936**	**10.0753**	**0.0267**	**1.6501**	**0.0624**	**1.7126**	**0.4420**	**0.0597**	**0.5017**	**31.0496**	**2,718.8254**	**2,749.8750**	**2.0412**	**0.0172**	**2,798.0565**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.2908	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236
Energy	0.0328	0.2923	0.2063	1.7900e-003		0.0227	0.0227		0.0227	0.0227	0.0000	861.7508	861.7508	0.0309	0.0111	865.8289
Mobile	0.8212	2.3928	9.1317	0.0249	1.6501	0.0357	1.6858	0.4420	0.0329	0.4749	0.0000	1,817.8802	1,817.8802	0.0694	0.0000	1,819.3384
Waste						0.0000	0.0000		0.0000	0.0000	28.6887	0.0000	28.6887	1.6955	0.0000	64.2933
Water						0.0000	0.0000		0.0000	0.0000	2.3609	37.9956	40.3565	0.2442	6.0800e-003	47.3686
Total	**2.1448**	**2.6936**	**10.0753**	**0.0267**	**1.6501**	**0.0624**	**1.7126**	**0.4420**	**0.0597**	**0.5017**	**31.0496**	**2,718.8254**	**2,749.8750**	**2.0412**	**0.0171**	**2,798.0527**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.06**	**0.00**

3.0 Construction Detail

Construction Phase

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.8212	2.3928	9.1317	0.0249	1.6501	0.0357	1.6858	0.4420	0.0329	0.4749	0.0000	1,817.8802	1,817.8802	0.0694	0.0000	1,819.3384
Unmitigated	0.8212	2.3928	9.1317	0.0249	1.6501	0.0357	1.6858	0.4420	0.0329	0.4749	0.0000	1,817.8802	1,817.8802	0.0694	0.0000	1,819.3384

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	26.36	28.64	24.28	90,174	90,174
Hotel	906.87	909.09	660.45	2,080,704	2,080,704
Single Family Housing	641.19	675.36	587.59	2,181,559	2,181,559
Total	1,574.42	1,613.09	1,272.32	4,352,436	4,352,436

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	536.9354	536.9354	0.0247	5.1100e-003	539.0368
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	536.9354	536.9354	0.0247	5.1100e-003	539.0368
NaturalGas Mitigated	0.0328	0.2923	0.2063	1.7900e-003		0.0227	0.0227		0.0227	0.0227	0.0000	324.8154	324.8154	6.2300e-003	5.9500e-003	326.7922
NaturalGas Unmitigated	0.0328	0.2923	0.2063	1.7900e-003		0.0227	0.0227		0.0227	0.0227	0.0000	324.8154	324.8154	6.2300e-003	5.9500e-003	326.7922

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse	57624.1	3.1000e-004	2.6600e-003	1.1300e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0750	3.0750	6.0000e-005	6.0000e-005	3.0938
Hotel	4.03252e+006	0.0217	0.1977	0.1661	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	215.1908	215.1908	4.1200e-003	3.9500e-003	216.5004
Single Family Housing	1.99666e+006	0.0108	0.0920	0.0392	5.9000e-004		7.4400e-003	7.4400e-003		7.4400e-003	7.4400e-003	0.0000	106.5495	106.5495	2.0400e-003	1.9500e-003	107.1980
Total		**0.0328**	**0.2923**	**0.2063**	**1.8000e-003**		**0.0227**	**0.0227**		**0.0227**	**0.0227**	**0.0000**	**324.8154**	**324.8154**	**6.2200e-003**	**5.9600e-003**	**326.7922**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse	57624.1	3.1000e-004	2.6600e-003	1.1300e-003	2.0000e-005		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	3.0750	3.0750	6.0000e-005	6.0000e-005	3.0938
Hotel	4.03252e+006	0.0217	0.1977	0.1661	1.1900e-003		0.0150	0.0150		0.0150	0.0150	0.0000	215.1908	215.1908	4.1200e-003	3.9500e-003	216.5004
Single Family Housing	1.99666e+006	0.0108	0.0920	0.0392	5.9000e-004		7.4400e-003	7.4400e-003		7.4400e-003	7.4400e-003	0.0000	106.5495	106.5495	2.0400e-003	1.9500e-003	107.1980
Total		**0.0328**	**0.2923**	**0.2063**	**1.8000e-003**		**0.0227**	**0.0227**		**0.0227**	**0.0227**	**0.0000**	**324.8154**	**324.8154**	**6.2200e-003**	**5.9600e-003**	**326.7922**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	17591.5	5.0341	2.3000e-004	5.0000e-005	5.0538
Hotel	1.36996e+006	392.0378	0.0180	3.7300e-003	393.5720
Single Family Housing	488748	139.8636	6.4300e-003	1.3300e-003	140.4109
Total		**536.9355**	**0.0247**	**5.1100e-003**	**539.0368**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	17591.5	5.0341	2.3000e-004	5.0000e-005	5.0538
Hotel	1.36996e+006	392.0378	0.0180	3.7300e-003	393.5720
Single Family Housing	488748	139.8636	6.4300e-003	1.3300e-003	140.4109
Total		**536.9355**	**0.0247**	**5.1100e-003**	**539.0368**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.2908	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236
Unmitigated	1.2908	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2355					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0326					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0227	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236
Total	**1.2908**	**8.5400e-003**	**0.7373**	**4.0000e-005**		**4.0400e-003**	**4.0400e-003**		**4.0400e-003**	**4.0400e-003**	**0.0000**	**1.1988**	**1.1988**	**1.1800e-003**	**0.0000**	**1.2236**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2355					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0326					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0227	8.5400e-003	0.7373	4.0000e-005		4.0400e-003	4.0400e-003		4.0400e-003	4.0400e-003	0.0000	1.1988	1.1988	1.1800e-003	0.0000	1.2236
Total	**1.2908**	**8.5400e-003**	**0.7373**	**4.0000e-005**		**4.0400e-003**	**4.0400e-003**		**4.0400e-003**	**4.0400e-003**	**0.0000**	**1.1988**	**1.1988**	**1.1800e-003**	**0.0000**	**1.2236**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	40.3565	0.2442	6.0800e-003	47.3686
Unmitigated	40.3565	0.2442	6.0900e-003	47.3723

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	0.260616 / 0.164301	1.5762	8.5600e-003	2.1000e-004	1.8225
Hotel	2.81571 / 0.312857	12.3798	0.0923	2.2800e-003	15.0231
Single Family Housing	4.36532 / 2.75205	26.4005	0.1434	3.6000e-003	30.5267
Total		**40.3565**	**0.2442**	**6.0900e-003**	**47.3723**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	0.260616 / 0.164301	1.5762	8.5600e-003	2.1000e-004	1.8224
Hotel	2.81571 / 0.312857	12.3798	0.0923	2.2700e-003	15.0217
Single Family Housing	4.36532 / 2.75205	26.4005	0.1434	3.5900e-003	30.5245
Total		**40.3565**	**0.2442**	**6.0700e-003**	**47.3686**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	28.6887	1.6955	0.0000	64.2933
Unmitigated	28.6887	1.6955	0.0000	64.2933

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	1.84	0.3735	0.0221	0.0000	0.8371
Hotel	60.77	12.3358	0.7290	0.0000	27.6452
Single Family Housing	78.72	15.9795	0.9444	0.0000	35.8110
Total		**28.6887**	**1.6955**	**0.0000**	**64.2933**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	1.84	0.3735	0.0221	0.0000	0.8371
Hotel	60.77	12.3358	0.7290	0.0000	27.6452
Single Family Housing	78.72	15.9795	0.9444	0.0000	35.8110
Total		**28.6887**	**1.6955**	**0.0000**	**64.2933**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks Alternative 3

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	4.00	Dwelling Unit	0.25	4,000.00	11
Hotel	111.00	Room	4.00	161,172.00	0
Single Family Housing	67.00	Dwelling Unit	11.75	120,600.00	192

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	21.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	9/3/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/28/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	8/30/2016
tblConstructionPhase	PhaseStartDate	11/2/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	8/31/2016	8/1/2016
tblConstructionPhase	PhaseStartDate	9/29/2018	9/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	7/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	3.40	0.00
tblFireplaces	NumberGas	56.95	0.00
tblFireplaces	NumberNoFireplace	0.40	0.00
tblFireplaces	NumberNoFireplace	6.70	0.00
tblFireplaces	NumberWood	0.20	0.00

tblFireplaces	NumberWood	3.35	0.00
tblGrading	AcresOfGrading	435.00	75.00
tblLandUse	LotAcreage	3.70	4.00
tblLandUse	LotAcreage	21.75	11.75
tblProjectCharacteristics	OperationalYear	2014	2019
tblWoodstoves	NumberCatalytic	0.20	0.00
tblWoodstoves	NumberCatalytic	3.35	0.00
tblWoodstoves	NumberNoncatalytic	0.20	0.00
tblWoodstoves	NumberNoncatalytic	3.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Energy	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
Mobile	4.7667	12.8942	51.9845	0.1488	9.7178	0.2062	9.9240	2.5988	0.1901	2.7889		11,956.7353	11,956.7353	0.4423		11,966.0243
Total	**12.0765**	**14.5643**	**59.0131**	**0.1590**	**9.7178**	**0.3627**	**10.0805**	**2.5988**	**0.3467**	**2.9454**	**0.0000**	**13,929.2119**	**13,929.2119**	**0.4904**	**0.0360**	**13,950.6595**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Energy	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
Mobile	4.7667	12.8942	51.9845	0.1488	9.7178	0.2062	9.9240	2.5988	0.1901	2.7889		11,956.7353	11,956.7353	0.4423		11,966.0243
Total	**12.0765**	**14.5643**	**59.0131**	**0.1590**	**9.7178**	**0.3627**	**10.0805**	**2.5988**	**0.3467**	**2.9454**	**0.0000**	**13,929.2119**	**13,929.2119**	**0.4904**	**0.0360**	**13,950.6595**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	1/1/2016	2/2/2016	5	23	
2	Grading	Grading	2/3/2016	10/3/2016	5	174	
3	Underground Improvements	Site Preparation	7/1/2016	8/30/2016	5	43	
4	Construction	Building Construction	8/1/2016	9/28/2018	5	565	
5	Street Improvements	Paving	9/1/2016	9/30/2016	5	22	
6	Landscape	Site Preparation	10/1/2016	11/1/2016	5	22	
7	Architectural Coating	Architectural Coating	1/1/2017	11/1/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 252,315; Residential Outdoor: 84,105; Non-Residential Indoor: 241,758; Non-Residential Outdoor: 80,586 (Architectural Coating – sqft)

OffRoad Equipment

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.7667	12.8942	51.9845	0.1488	9.7178	0.2062	9.9240	2.5988	0.1901	2.7889		11,956.7353	11,956.7353	0.4423		11,966.0243
Unmitigated	4.7667	12.8942	51.9845	0.1488	9.7178	0.2062	9.9240	2.5988	0.1901	2.7889		11,956.7353	11,956.7353	0.4423		11,966.0243

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	26.36	28.64	24.28	90,174	90,174
Hotel	906.87	909.09	660.45	2,080,704	2,080,704
Single Family Housing	641.19	675.36	587.59	2,181,559	2,181,559
Total	1,574.42	1,613.09	1,272.32	4,352,436	4,352,436

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
NaturalGas Unmitigated	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	157.874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Hotel	11048	0.1192	1.0831	0.9098	6.5000e-003		0.0823	0.0823		0.0823	0.0823		1,299.7658	1,299.7658	0.0249	0.0238	1,307.6760
Single Family Housing	5470.31	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Total		**0.1798**	**1.6018**	**1.1306**	**9.8100e-003**		**0.1243**	**0.1243**		**0.1243**	**0.1243**		**1,961.9051**	**1,961.9051**	**0.0376**	**0.0360**	**1,973.8449**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Hotel	11.048	0.1192	1.0831	0.9098	6.5000e-003		0.0823	0.0823		0.0823	0.0823		1,299.7658	1,299.7658	0.0249	0.0238	1,307.6760
Single Family Housing	5.47031	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Condo/Townhouse	0.157874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Total		**0.1798**	**1.6018**	**1.1306**	**9.8100e-003**		**0.1243**	**0.1243**		**0.1243**	**0.1243**		**1,961.9051**	**1,961.9051**	**0.0376**	**0.0360**	**1,973.8449**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Unmitigated	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1813	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5715	10.5715	0.0104		10.7903
Total	**7.1299**	**0.0683**	**5.8980**	**3.1000e-004**		**0.0323**	**0.0323**		**0.0323**	**0.0323**	**0.0000**	**10.5715**	**10.5715**	**0.0104**	**0.0000**	**10.7903**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1813	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5715	10.5715	0.0104		10.7903
Total	**7.1299**	**0.0683**	**5.8980**	**3.1000e-004**		**0.0323**	**0.0323**		**0.0323**	**0.0323**	**0.0000**	**10.5715**	**10.5715**	**0.0104**	**0.0000**	**10.7903**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Canyon Oaks Alternative 3

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse	4.00	Dwelling Unit	0.25	4,000.00	11
Hotel	111.00	Room	4.00	161,172.00	0
Single Family Housing	67.00	Dwelling Unit	11.75	120,600.00	192

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	9			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Lot acreages are based upon site plans provided by the applicant.

Construction Phase - Construction schedule is based on information from the applicant.

Grading - Acres disturbed is based on the size of the site and the landslide remediation area.

Trips and VMT - Number of worker trips per day is based on the clearing and grading numbers.

Woodstoves - No woodstoves or fireplaces would be proposed.

Construction Off-road Equipment Mitigation - Percent reduction for watering 3 times per day is based on SCAQMD guidance.

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	68
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	68
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	21.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	479.00
tblConstructionPhase	NumDays	300.00	565.00
tblConstructionPhase	NumDays	30.00	174.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	PhaseEndDate	9/3/2018	11/1/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/28/2018
tblConstructionPhase	PhaseEndDate	10/30/2018	9/30/2016
tblConstructionPhase	PhaseEndDate	12/1/2016	8/30/2016
tblConstructionPhase	PhaseStartDate	11/2/2016	1/1/2017
tblConstructionPhase	PhaseStartDate	8/31/2016	8/1/2016
tblConstructionPhase	PhaseStartDate	9/29/2018	9/1/2016
tblConstructionPhase	PhaseStartDate	10/4/2016	7/1/2016
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	3.40	0.00
tblFireplaces	NumberGas	56.95	0.00
tblFireplaces	NumberNoFireplace	0.40	0.00
tblFireplaces	NumberNoFireplace	6.70	0.00
tblFireplaces	NumberWood	0.20	0.00

tblFireplaces	NumberWood	3.35	0.00
tblGrading	AcresOfGrading	435.00	75.00
tblLandUse	LotAcreage	3.70	4.00
tblLandUse	LotAcreage	21.75	11.75
tblProjectCharacteristics	OperationalYear	2014	2019
tblWoodstoves	NumberCatalytic	0.20	0.00
tblWoodstoves	NumberCatalytic	3.35	0.00
tblWoodstoves	NumberNoncatalytic	0.20	0.00
tblWoodstoves	NumberNoncatalytic	3.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Energy	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
Mobile	5.0017	13.5606	52.6479	0.1421	9.7178	0.2070	9.9248	2.5988	0.1909	2.7896		11,442.8575	11,442.8575	0.4428		11,452.1571
Total	**12.3115**	**15.2307**	**59.6765**	**0.1522**	**9.7178**	**0.3636**	**10.0813**	**2.5988**	**0.3474**	**2.9462**	**0.0000**	**13,415.3341**	**13,415.3341**	**0.4909**	**0.0360**	**13,436.7923**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Energy	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
Mobile	5.0017	13.5606	52.6479	0.1421	9.7178	0.2070	9.9248	2.5988	0.1909	2.7896		11,442.8575	11,442.8575	0.4428		11,452.1571
Total	**12.3115**	**15.2307**	**59.6765**	**0.1522**	**9.7178**	**0.3636**	**10.0813**	**2.5988**	**0.3474**	**2.9462**	**0.0000**	**13,415.3341**	**13,415.3341**	**0.4909**	**0.0360**	**13,436.7923**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Clearing	Site Preparation	1/1/2016	2/2/2016	5	23	
2	Grading	Grading	2/3/2016	10/3/2016	5	174	
3	Underground Improvements	Site Preparation	7/1/2016	8/30/2016	5	43	
4	Construction	Building Construction	8/1/2016	9/28/2018	5	565	
5	Street Improvements	Paving	9/1/2016	9/30/2016	5	22	
6	Landscape	Site Preparation	10/1/2016	11/1/2016	5	22	
7	Architectural Coating	Architectural Coating	1/1/2017	11/1/2018	5	479	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 252,315; Residential Outdoor: 84,105; Non-Residential Indoor: 241,758; Non-Residential Outdoor: 80,586 (Architectural Coating – sqft)

OffRoad Equipment

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.0017	13.5606	52.6479	0.1421	9.7178	0.2070	9.9248	2.5988	0.1909	2.7896		11,442.8575	11,442.8575	0.4428		11,452.1571
Unmitigated	5.0017	13.5606	52.6479	0.1421	9.7178	0.2070	9.9248	2.5988	0.1909	2.7896		11,442.8575	11,442.8575	0.4428		11,452.1571

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	26.36	28.64	24.28	90,174	90,174
Hotel	906.87	909.09	660.45	2,080,704	2,080,704
Single Family Housing	641.19	675.36	587.59	2,181,559	2,181,559
Total	1,574.42	1,613.09	1,272.32	4,352,436	4,352,436

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.530902	0.057841	0.178699	0.124790	0.039063	0.006298	0.016951	0.033908	0.002496	0.003149	0.003689	0.000536	0.001678

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449
NaturalGas Unmitigated	0.1798	1.6018	1.1306	9.8100e-003		0.1243	0.1243		0.1243	0.1243		1,961.9051	1,961.9051	0.0376	0.0360	1,973.8449

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	157.874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Hotel	11048	0.1192	1.0831	0.9098	6.5000e-003		0.0823	0.0823		0.0823	0.0823		1,299.7658	1,299.7658	0.0249	0.0238	1,307.6760
Single Family Housing	5470.31	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Total		**0.1798**	**1.6018**	**1.1306**	**9.8100e-003**		**0.1243**	**0.1243**		**0.1243**	**0.1243**		**1,961.9051**	**1,961.9051**	**0.0376**	**0.0360**	**1,973.8449**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Hotel	11.048	0.1192	1.0831	0.9098	6.5000e-003		0.0823	0.0823		0.0823	0.0823		1,299.7658	1,299.7658	0.0249	0.0238	1,307.6760
Single Family Housing	5.47031	0.0590	0.5041	0.2145	3.2200e-003		0.0408	0.0408		0.0408	0.0408		643.5658	643.5658	0.0123	0.0118	647.4825
Condo/Townhouse	0.157874	1.7000e-003	0.0146	6.1900e-003	9.0000e-005		1.1800e-003	1.1800e-003		1.1800e-003	1.1800e-003		18.5735	18.5735	3.6000e-004	3.4000e-004	18.6865
Total		**0.1798**	**1.6018**	**1.1306**	**9.8100e-003**		**0.1243**	**0.1243**		**0.1243**	**0.1243**		**1,961.9051**	**1,961.9051**	**0.0376**	**0.0360**	**1,973.8449**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903
Unmitigated	7.1299	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323	0.0000	10.5715	10.5715	0.0104	0.0000	10.7903

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1813	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5715	10.5715	0.0104		10.7903
Total	**7.1299**	**0.0683**	**5.8980**	**3.1000e-004**		**0.0323**	**0.0323**		**0.0323**	**0.0323**	**0.0000**	**10.5715**	**10.5715**	**0.0104**	**0.0000**	**10.7903**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	5.6583					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1813	0.0683	5.8980	3.1000e-004		0.0323	0.0323		0.0323	0.0323		10.5715	10.5715	0.0104		10.7903
Total	**7.1299**	**0.0683**	**5.8980**	**3.1000e-004**		**0.0323**	**0.0323**		**0.0323**	**0.0323**	**0.0000**	**10.5715**	**10.5715**	**0.0104**	**0.0000**	**10.7903**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix C

Biological Technical Reports

City of Calabasas

Calabasas Canyon Oaks Project

Focused Rare Plant Survey Report, 2013 Update

July 2013

rincon

Environmental Scientists Planners Engineers

Calabasas Canyon Oaks Project
Calabasas, California

Focused Rare Plant Survey Report, 2013 Update

Prepared for:

City of Calabasas
100 Civic Center Way
Calabasas, CA 91302-3172

Prepared by:

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

July 2013

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CALABASAS CANYON OAKS PROJECT, CALABASAS, CALIFORNIA RARE PLANT SURVEY REPORT, 2013 UPDATE

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Appendix A – Observed Plant Species

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INTRODUCTION

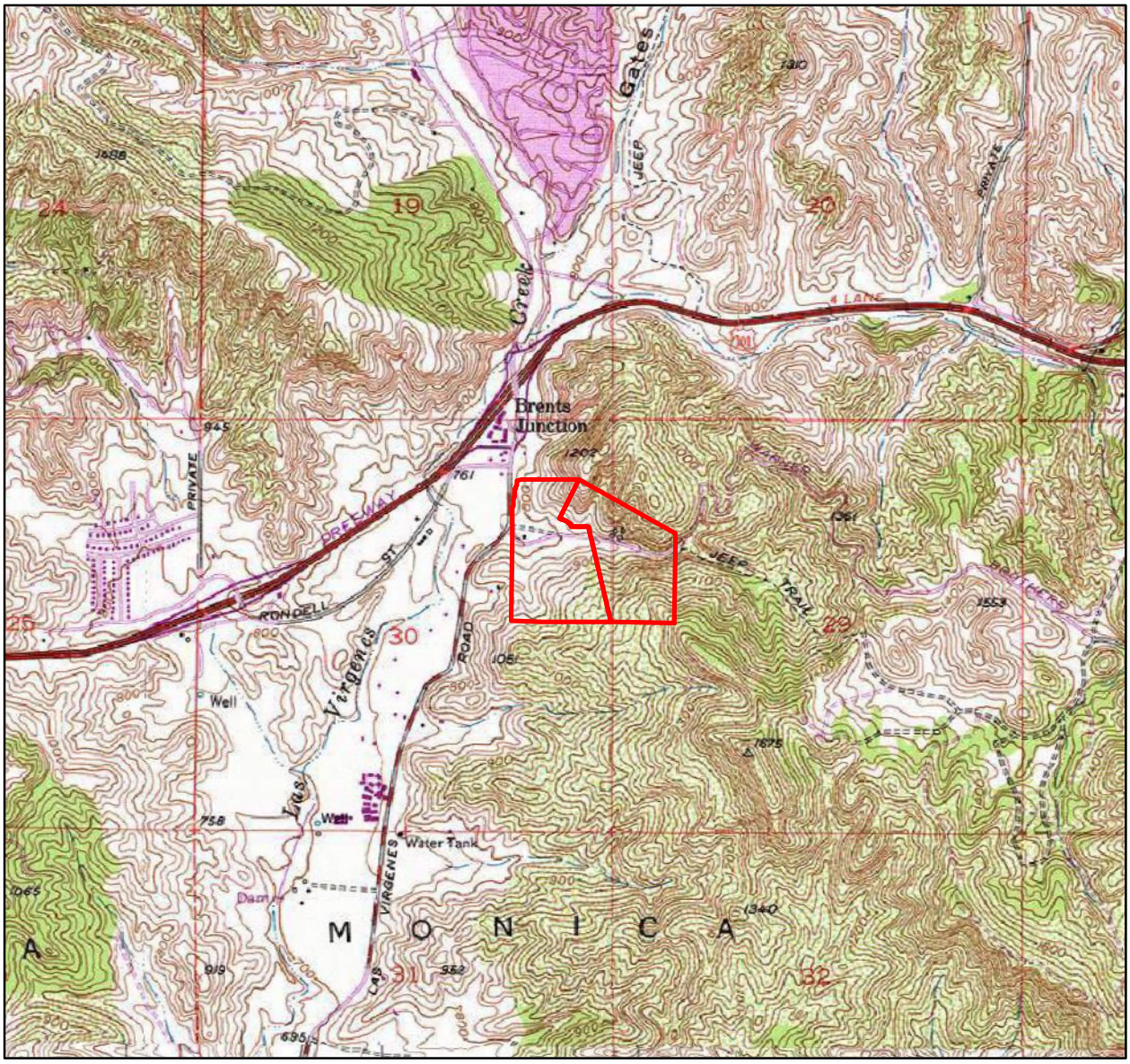
Rincon Consultants herein presents the results of the 2013 focused rare plant surveys conducted to update an existing Focused Rare Plant Survey completed in June 2010 to determine the presence or absence of any rare, threatened, or endangered plant species (rare plants) within the proposed footprint of the Calabasas Canyon Oaks project. The project site encompasses 77.54 acres located at 4790 Las Virgenes Road (Assessor's Parcel Numbers [APN] 2069-078-009 and 2069-078-011) in the city of Calabasas, County of Los Angeles. The project site is located immediately east of the intersection of Las Virgenes Road and Agoura Road; U.S Highway 101 is located approximately one-quarter mile northwest of the project site.

The project site (Figure 1) contains undeveloped open space with a high level of disturbance caused by fire clearance, grading or grazing, interspersed with native scrub and oak woodland habitat. A residential development and Las Virgenes Road are along the western boundary with the eastern boundary containing open space and undeveloped lands. Disturbed open areas are present along the north and south boundaries of the project area. Two seep/spring (water seepage) areas were mapped within the project boundary adjacent to the main ephemeral stream and within canyon to the north of the stream.

METHODOLOGY

Prior to conducting a field survey of the project site, Rincon Consultants reviewed the 2010 Focused Rare Plant Survey Report, aerial photography of the study area (Google Maps 2013) and consulted the California Natural Diversity Data Base (CNDDB, current May 2013) for information on general biological resources, special-status species and critical habitat occurrences within a five-mile radius of the project site.

For the purpose of this report, special-status species are those plants listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (ESA); those considered "species of concern" by the USFWS; those listed or proposed for listing as rare, threatened, or endangered by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act (CESA); the CDFW *Special Vascular Plants, Bryophytes, and Lichens List* (April 2013); the CDFW *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (April 2013); and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California Sixth Edition (http://www.rareplants.cnps.org/) as accessed May 2013. CNPS has developed a California Rare Plant Ranks ranking system (Ranks 1 – 4, Table 1; Rank Threat Code Extensions, Table 2) tailored specifically for plants within California.



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0 0.25 0.5 Miles

N

Site Boundary

Regional Location

Figure 1

Table 1. California Rare Plant Rank Definitions

Ranks	Definition
1A	Presumed Extinct in California
1B	Rare, Threatened, or Endangered in California and elsewhere
2	Rare, Threatened, or Endangered in California, but more common elsewhere
3	Need more information (a Review List)
4	Plants of Limited Distribution (a Watch List)

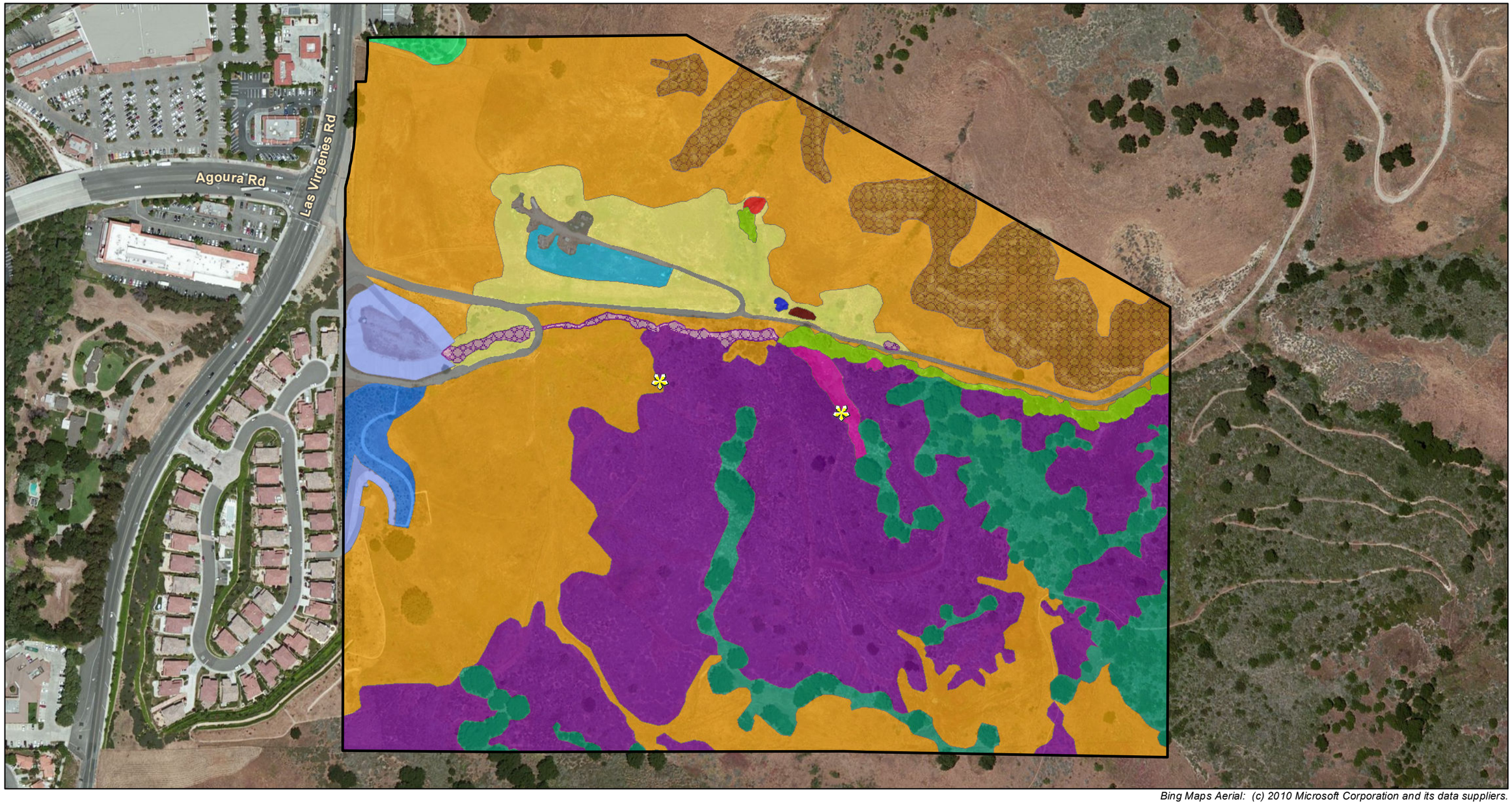
Table 2. California Rare Plant Rank Threat Code Extensions

Threat Ranks	Definition
.1	Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2	Fairly endangered in California (20-80% occurrences threatened)
.3	Not very endangered in California (<20% of occurrences threatened)

Please note that some species are considered rare (but not formally listed) by resource agencies, organizations with biological interests/expertise (e.g. CNPS), and the scientific community.

Rare plant surveys were performed by Rincon Consultants' botanists Julie Broughton and Stephanie Lopez on May 3 and June 5, 2013 to update the existing Focused Rare Plant Survey, to identify areas that could potentially contain sensitive biological resources and to determine presence/absence of any special status plants. Precipitation for the current rain season (November 2013 to present) is at 4.59 inches which is almost ten inches below the average annual precipitation levels (http://www.noaa.gov/). During the survey plant species observed were noted, recorded, and added to the 2010 list (Appendix A) and plant identification was taken to the lowest possible taxonomic name as identified within *The Jepson Manual* (Baldwin et al. eds. 2012) and The Jepson Online Interchange California Floristics (http://ucjeps.berkeley.edu).

The assessment was performed by walking transects of convenience as allowed by the vegetation cover and steepness of canyon slopes to characterize the existing biological resources present. Plant communities are defined herein as an assemblage of plants occurring together within a relatively uniform area of land. Habitats are defined herein as a cohesive plant, wildlife or ecological unit within an area of land. The on-site plant community and habitat types were not updated as no changes were observed (Figure 2). Definition of plant communities followed the California Department of Fish and Game's (CDFG) *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and *A Manual of California Vegetation* (Sawyer et al. 2009). The probability of special status species occurrence was based on the current biological conditions found on site and are discussed below.



Bing Maps Aerial: (c) 2010 Microsoft Corporation and its data suppliers.

- Catalina Mariposa Lily Locality
- Parcel Boundary
- Road/Disturbed
- Detention Basin
- Ornamental
- Annual Brome Grassland
- Cattail-Saltgrass Marsh
- Bulrush-Saltgrass Marsh
- Dwarf Nettle Herbaceous Stand
- Stinging Nettle Herbaceous Stand
- Summer Mustard Herbaceous Stand
- Coyote Brush Scrub
- Coastal Buckwheat Scrub
- Purple Sage Scrub
- Mulefat Thickets
- Coast Live Oak Woodland
- Arroyo Willow Thickets
- Yerba Mansa Meadow

N

0 125 250 Feet

Habitat Map

Figure 2

SPECIAL-STATUS SPECIES

A list of special-status species targeted in this survey was developed based on our review of the California Natural Diversity Database RareFind 3 as well as our own knowledge of the area. Table 3 details an updated list of those plants with a low potential to occur within the project site. Special-status species targeted for the 2009 survey with no potential for occurrence due to lack of habitat or lack of preferred soils were omitted from the 2013 table.

Table 3. Special-Status Species with Potential to Occur On-site

Common Name	Scientific Name	Status* Fed/State Listing/State Rank/CNPS	Habitat Requirements and Potential for Occurrence
Catalina mariposa lily	*Calochortus catalinae*	--/--/S3.2/4.2	Coastal scrub, chaparral, grassland and woodland. Rocky and sandy sites. *Found on site in 2010, none observed in 2013.*
Slender mariposa lily	*Calochortus clavatus var. gracilis*	--/--/S2/1B.2	Chaparral, coastal scrub and grasslands between 1050 – 3200 feet. Blooms March – June. *Low potential for occurrence.*
Plummer's mariposa lily	*Calochortus plummerae*	--/--/S3.2/1B.2	Chaparral, cismontane woodland, coastal scrub, lower coniferous forest and grassland. Prefers granitic, rocky soils. Found at elevations between 325 – 5570 feet. Blooms May – July. *Low potential for occurrence.*
Santa Susana tarplant	*Deinandra minthornii*	--/SR/S2.2/1B.2	Chaparral and coastal scrub at 980 – 1600 feet. Blooming period July – November. Perennial shrub, if present would have been seen during survey. *Low potential to occur on site.*

Source: CDFW CNDDB Special Vascular Plants, Bryophytes, and Lichens List, April 2013; CNDDB 5-mile search radius, April 2013.

**Special Status Codes*
SR = State Rare;
S1=<6 Eos (viable element occurrences) or <1,000 individuals or <2,000 acres
S2=6-20 Eos or 1,000-3,000 individuals or 2,000-10,000 acres
S3=21-80 Eos or 3,000-10,000 individuals or 10,000-50,000 acres

No critical habitat for listed threatened or endangered plants occurs within the survey area. The following discusses the above listed plants with the potential to occur and their regulatory status, habitat and ecological requirements.

- **Catalina mariposa lily (*Calochortus catalinae*).** Catalina mariposa lily is ranked S3.2 by CDFW, has a California Rare Plant Rank of 4.2, and currently has no state or federal listing status. Catalina mariposa lily is a perennial bulbiferous herb in the lily family (Liliaceae) that occurs in a variety of habitat types throughout southern California ranging from grasslands to woodlands. This species generally blooms from February to May, and is known to occur from the Los Angeles area northward to San Luis Obispo County. In those locations where this plant is common, the bulbs are abundant and number in the hundreds. Approximately 5 individuals in two separate locations during the 2010 survey. No plants were observed during the 2013 survey, probably due to below normal precipitation.

- **Plummer's mariposa lily (*Calochortus plummerae*).** Plummer's mariposa lily is a bulbiferous perennial herbaceous plant species in the lily family. Plummer's mariposa lily is listed as CDFW S3.2 and California Rare Plant Rank 1B.2. Plummer's mariposa lily is known from Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties where it has been found growing on rocky soils in chaparral, coastal scrub, woodland, and grassland habitat types. This species typically flowers from May to July. All potentially suitable habitats for this species onsite were thoroughly searched during the rare plant surveys. Surveys conducted in 2010 and 2013 yielded no specimens of Plummer's mariposa lily, either of blooms or seed pods. The near normal rainfall recorded in the 2009-2010 rain season would have been sufficient to produce blooms of the species if it was present on-site. This plant is not expected to occur in the project area.

- **Slender mariposa lily (*Calochortus clavatus* var. *gracilis*).** Slender mariposa lily, a bulbiferous perennial herbaceous plant species in the lily family, is listed as CDFW S2 and California Rare Plant Rank 1B.2. It occurs in chaparral, coastal scrub and grasslands between 1050 – 3280 feet. This species typically flowers from March to June. The project site (780 to 1100 feet above mean sea level) is at the lower elevation limits described for this species. All potentially suitable habitats for this species onsite were thoroughly searched during the 2010 and 2013 rare plant surveys yielding no specimens of slender mariposa lily, either of blooms or seed pods. The near normal rainfall recorded in the 2009-2010 rain season would have been sufficient to produce blooms of the species if it was present on-site. This plant is not expected to occur in the project area.

- **Santa Susana tarplant (*Deinandra minthornii*).** Santa Susana tarplant, a deciduous shrub in the sunflower family (Asteraceae), is listed as California rare, CDFW S2.2, and California Rare Plant Rank 1B.2. It occurs in chaparral and rocky, coastal scrub areas in southern Western Transverse Ranges (Santa Susana and Santa Monica Mountains) commonly associated with Santa Susana sandstone outcrops. It has also been found on rocky outcrops of Conejo volcanics. The blooming period is July to November. This plant is a perennial shrub that if present would have been visible even without inflorescence present. Santa Susana tarplant was not observed during the 2010 or 2013 rare plant surveys nor is its typical soil habitat present onsite. This plant is not expected to occur in the project area.

RESULTS AND DISCUSSION

The survey area contained one special-status species (Catalina mariposa lily), observed in 2010, included in our review of the CNDDB and found on the CNPS watch list. The 2013 survey yielded previously unrecorded plant species but no new observations of special-status species.

Special-Status Plants

The Catalina mariposa lily is listed as a California Rare Plant Rank 4.2. Rank 4 includes plants of limited distribution or those that occur infrequently throughout a broader area in California. Their vulnerability or susceptibility to threat appears relatively low at this time. While plants falling under this category are not "rare" from a statewide perspective, they are uncommon enough that in the CDFW's opinion their status should be monitored regularly (CDFG, 2013). The CDFW will transfer them to other lists or eliminate them at such time that their status changes.

Within the study area 5 specimens were noted during the 2010 survey but none were observed during the 2013 survey. During the 2010 survey, the species was found within the northern section of the seep and at the western edge of the sage scrub habitat. Catalina mariposa lily was not found within the disturbed areas. No Catalina mariposa lily plants, inflorescences, or seed pods were observed in the 2013 survey.

CONCLUSION

The intent of this survey was to determine the presence or absence of any rare, threatened, or endangered plant species or communities. During the 2010 spring surveys, one special status plant was found; the Catalina mariposa lily. No special status species were observed during the 2013 spring surveys.

One sensitive habitat, Southern Coast Live Oak Riparian Forest was observed and described in the 2010 report. No new sensitive habitats were observed during the 2013 surveys. The *Anemopsis californica* Herbaceous Alliance/*Distichlis spicata* Herbaceous Alliance/Riparian Community, although not specifically designated as a sensitive habitat by CDFW may be regulated by the US Army Corps of Engineers (USACE), the Los Angeles Regional Water Quality Control Board (RWQCB), or the city of Calabasas as a wetland resource. A Jurisdictional Delineation was completed in May 2012 (Rincon Consultants, 2012). Based upon the findings of the jurisdictional delineation, an unnamed ephemeral drainage traversing the length of the property would be subject to USACE, CDFW, and RWQCB jurisdiction. In addition, two small wetlands resulting from seeps on the south side of the main drainage comprise both USACE and RWQCB jurisdiction with two additional isolated seep wetlands considered RWQCB jurisdictional waters of the State.

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Photograph 1. Overview of project site looking east from the western paved access road at Las Virgenes Road.

Photograph 2. View looking west toward Las Virgenes Road with the oak woodland on the left.

Scientific Name*	Common Name	Family	2010 Survey	2013 Survey
*Acmispon glaber (Lotus scoparius)**	deerweed	Fabaceae	x	x
*Amsinckia menziesii**	fiddleneck	Boraginaceae	x	
Anagallis arvensis	scarlet pimpernel	Myrsinaceae	x	
*Anemopsis californica**	yerba mansa	Saururaceae	x	x
*Artemisia californica**	California sagebrush	Asteraceae	x	x
*Artemisia douglasiana**	mugwort	Asteraceae	x	x
*Asclepias fascicularis**	narrow-leaf milkweed	Apocynaceae	x	x
Atriplex semibaccata	Australian saltbush	Chenopodiaceae	x	x
Avena fatua	wild oats	Poaceae	x	x
*Baccharis pilularis**	coyote brush	Asteraceae	x	x
*Baccharis salicifolia**	mulefat	Asteraceae	x	x
*Bloomeria crocea**	common goldenstar	Themidaceae	x	x
Brassica nigra	mustard	Brassicaceae	x	x
Brassica rapa	field mustard	Brassicaceae	x	
Bromus diandrus	ripgut	Poaceae		x
Bromus hordeaceus	soft chess	Poaceae	x	x
Bromus madritensis ssp. *rubens*	red brome	Poaceae	x	x
*Calandrinia ciliata**	red maids	Themidaceae	x	x
*Calochortus catalinae**	catalina mariposa lily	Liliaceae	x	
*Calystegia macrostegia**	morning glory	Solanaceae	x	
Carduus pycnocephalus	Italian thistle	Asteraceae	x	
Carex sp.	sedge	Cyperaceae	x	
*Castilleja affinis**	indian paintbrush	Scrophulariaceae	x	x
*Castilleja exserta**	owl's clover	Scrophulariaceae	x	
Centaurea calcitrapa	purple star thistle	Asteraceae	x	x
Centaurea melitensis	tocalote	Asteraceae	x	x
*Chlorogalum pomeridianum**	soap plant, leaf only	Agavaceae	x	
*Cirsium occidentale**	western thistle	Asteraceae	x	
*Cirsium vulgare**	bullthistle	Asteraceae	x	x
*Clarkia bottae**	punch bowl godetia	Onegraceae		x
*Clarkia unguiculata**	elegant clarkia	Onegraceae		x

Scientific Name*	Common Name	Family	2010 Survey	2013 Survey
Cucurbita foetidissima	calabazilla	Cucurbitaceae	x	x
Cyperus sp.	flatsedge	Cyperaceae	x	x
*Datura wrightii**	jimsomweed	Solanaceae		x
*Distichlis spicata**	saltgrass	Poaceae	x	x
*Dudleya lanceolata**	lanceleaf liveforever	Crassulaceae		x
*Elymus condensatus**	giant wild rye	Poaceae	x	x
*Elymus trachycaulus**	slender wheatgrass	Poaceae	x	
*Encelia californica**	California sunflower	Asteraceae		x
*Eremocarpus setigerus**	turkey mullein	Euphorbiaceae	x	
*Eriogonum fasciculatum**	California buckwheat	Polygonaceae	x	x
Erodium cicutarium	red leaf filaree	Geraniaceae	x	x
*Eschscholzia californica**	California poppy	Papaveraceae	x	x
Gazania linearis	Gazania	Asteraceae		x
*Gnaphalium californicum**	California everlasting	Asteraceae	x	
*Hazardia squarrosa**	sawtooth goldenbush	Asteraceae	x	x
*Heliotropium curassavicum**	seaside heliotrope	Boraginaceae		x
Helminthotheca (Picris) echioides	bristly ox-tongue	Asteraceae		x
Hordeum marinum	seaside barley	Poaceae	x	
Hordeum marinum ssp. *gussoneanum*	Mediterranean barley	Poaceae	x	x
*Juglans californica**	California black walnut	Juglandaceae	x	x
*Juncus mexicanus**	Mexican rush	Juncaceae	x	
*Keckiella cordifolia**	heartleaf keckiella	Plantaginaceae	x	
*Layia platyglossa**	coastal tidytips	Asteraceae		x
*Lupinus nanus**	sky lupine	Fabaceae	x	
*Lupinus succulentus**	arroyo lupine	Fabaceae	x	
*Malacothamnus fasciculatus**	chaparral mallow	Malvaceae	x	
*Malacothrix saxatilis**	cliff aster	Asteraceae	x	x
Malva parviflora	cheeseweed	Malvaceae		x
*Marah macrocarpus**	wild cucumber	Cucurbitaceae	x	x
Marrubium vulgare	horehound	Lamiaceae	x	x
Medicago polymorpha	bur clover	Fabaceae	x	x

Scientific Name*	Common Name	Family	2010 Survey	2013 Survey
Melilotus indicus	yellow sweetclover	Fabaceae	x	x
Mentha spicata	spearmint	Lamiaceae	x	
*Mimulus aurantiacus**	sticky monkeyflower	Phrymaceae	x	x
Nicotiana glauca	tree tobacco	Solanaceae	x	x
*Phacelia cicutaria**	caterpillar phacelia	Boraginaceae	x	
*Plantago erecta**	California plantain	Plantaginaceae	x	
Plantago lanceolata	narrowleaf plantain	Plantaginaceae	x	
Polypogon interruptus	beard grass	Poaceae		x
Polypogon monspeliensis	rabbitfoot grass	Poaceae	x	
*Quercus agrifolia**	coast live oak	Fagaceae	x	x
*Quercus lobata**	valley oak	Fagaceae	x	x
Rumex crispus	curly dock	Polygonaceae	x	
*Salix lasiolepis**	arroyo willow	Salicaceae	x	x
Salsola tragus	Russian thistle	Chenopodiaceae	x	x
*Salvia apiana**	white sage	Lamiaceae	x	x
*Salvia mellifera**	black sage	Lamiaceae	x	x
Sambucus nigra ssp. *canadensis**	blue elderberry	Caprifoliaceae	x	x
Schinus molle	pepper tree	Anacardiaceae	x	
*Scrophularia californica**	California figwort	Scrophulariaceae	x	
*Selaginella biglovii**	moss fern	Selaginellaceae	x	x
Sonchus asper	spiny sowthistle	Asteraceae	x	
Tamarix parviflora	tamarisk	Tamaricaceae	x	
*Typha angustifolia**	narrowleaf cattail	Typhaceae	x	x
*Urtica dioica**	stinging nettle	Urticaceae	x	x
Verbena lasiostachys	common verbena	Verbenaceae	x	x
Vulpia myuros var. *hirsuta*	rat tail fescue	Poaceae	x	
*Yucca whipplei**	chaparral yucca	Agavaceae	x	x

*Native Species

City of Calabasas

Canyon Oaks Project

Jurisdictional Delineation Report

rincon

May 2012
Revised June 2015

JURISDICTIONAL DELINEATION REPORT

CANYON OAKS PROJECT
CITY OF CALABASAS
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

City of Calabasas
26135 Mureau Road
Calabasas, California 91302-3172

Prepared by:

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

May 2012
Revised June 2015

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Rincon Consultants, Inc.

2015 *Jurisdictional Delineation Report – Canyon Oaks Project, Los Angeles County, CA.* Rincon Consultants Project No. 10-66150. Revised June.

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Appendix A Regulatory Overview and Definitions
Appendix B Wetland Determination Data Forms
Appendix C Site Photographs

1.0 INTRODUCTION

Rincon Consultants, Inc. (Rincon) conducted a jurisdictional delineation for the Canyon Oaks Project (project). The delineation was conducted to determine the location and extent of aquatic features within the project site that are potentially subject to jurisdiction of the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW; formerly known as the California Department of Fish and Game [CDFG]).

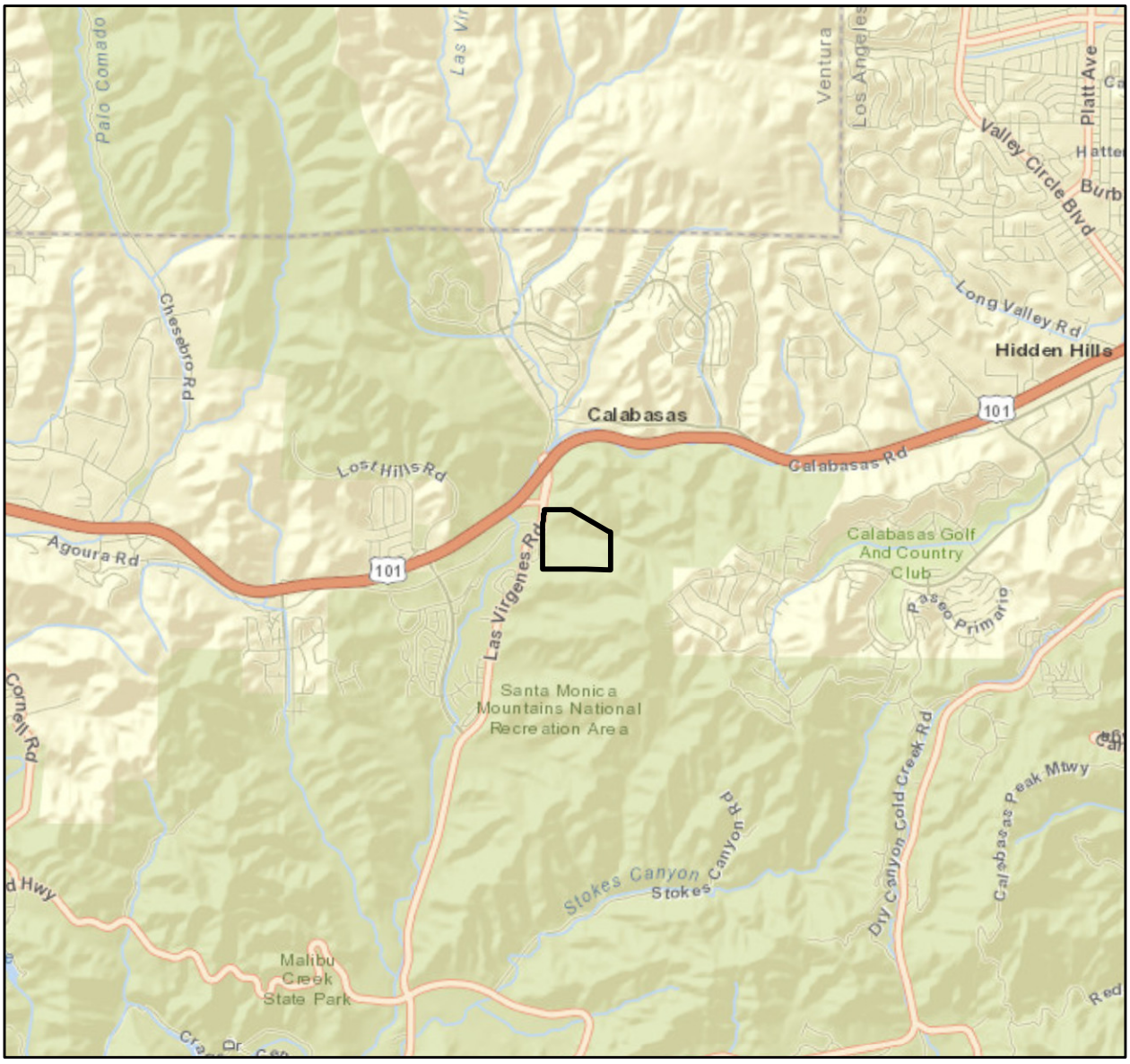
Any proposed development in areas identified as jurisdictional waters and/or wetlands may be subject to the permit/authorization requirements of the USACE pursuant to Section 404 of the Clean Water Act (CWA), RWQCB pursuant to Section 401 of the CWA and Section 13263 of the Porter-Cologne Water Quality Act (Porter-Cologne), and CDFW pursuant to Section 1600 et. seq. of the California Fish and Game Code (CFGC). Actual jurisdictional areas are determined by the State and Federal authorities at the time that permits are requested.

1.1 PROJECT LOCATION

The project site consists of approximately 77.22 acres located at 4790 Las Virgenes Road (portions of Assessor's Parcel Numbers [APN] 2069-078-009 and 2069-078-011) in the City of Calabasas, Los Angeles County, California. The project site is located immediately east of the intersection of Las Virgenes Road and Agoura Road and approximately one-quarter mile southeast of U.S. Highway 101 (U.S. 101), within the U.S. Geologic Survey (USGS) *Calabasas, California* 7.5-minute topographic quadrangle map. A residential subdivision and Las Virgenes Road exist to the west, a gas station and undeveloped open space exist to the north, and additional open space is east and south of the property. Figure 1 shows the location of the project site within the greater Los Angeles region and within the City of Calabasas.

1.2 PROJECT DESCRIPTION

The project applicant is requesting approval of a Development Plan, a Conditional Use Permit, a Scenic Corridor Permit, a Vesting Tentative Tract Map, a Site Plan Review, a General Plan Amendment, a Zone Change, and an Oak Tree Permit. The proposed project involves the development of residential, commercial, and public open space/trail uses on the undeveloped site (see Figure 2 for the project footprint). The residential component would include a gated community with 67 single-family detached homes and four affordable units within two duplexes, each linked via pathways to a resident-exclusive clubhouse with resort-style amenities. The commercial component would consist of a 67,580 square-foot, 120-room, four-story hotel. Approximately 80 percent of the site (61.5 acres) would be preserved as open space. The project also provides an internal walkway system and public sidewalk linkages to afford access to existing, local trail systems surrounding the site. To enable access to and from the project site, a new Street "A" extension to Agoura Road would be constructed.



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Site Boundary

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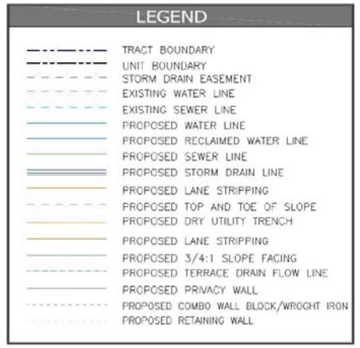
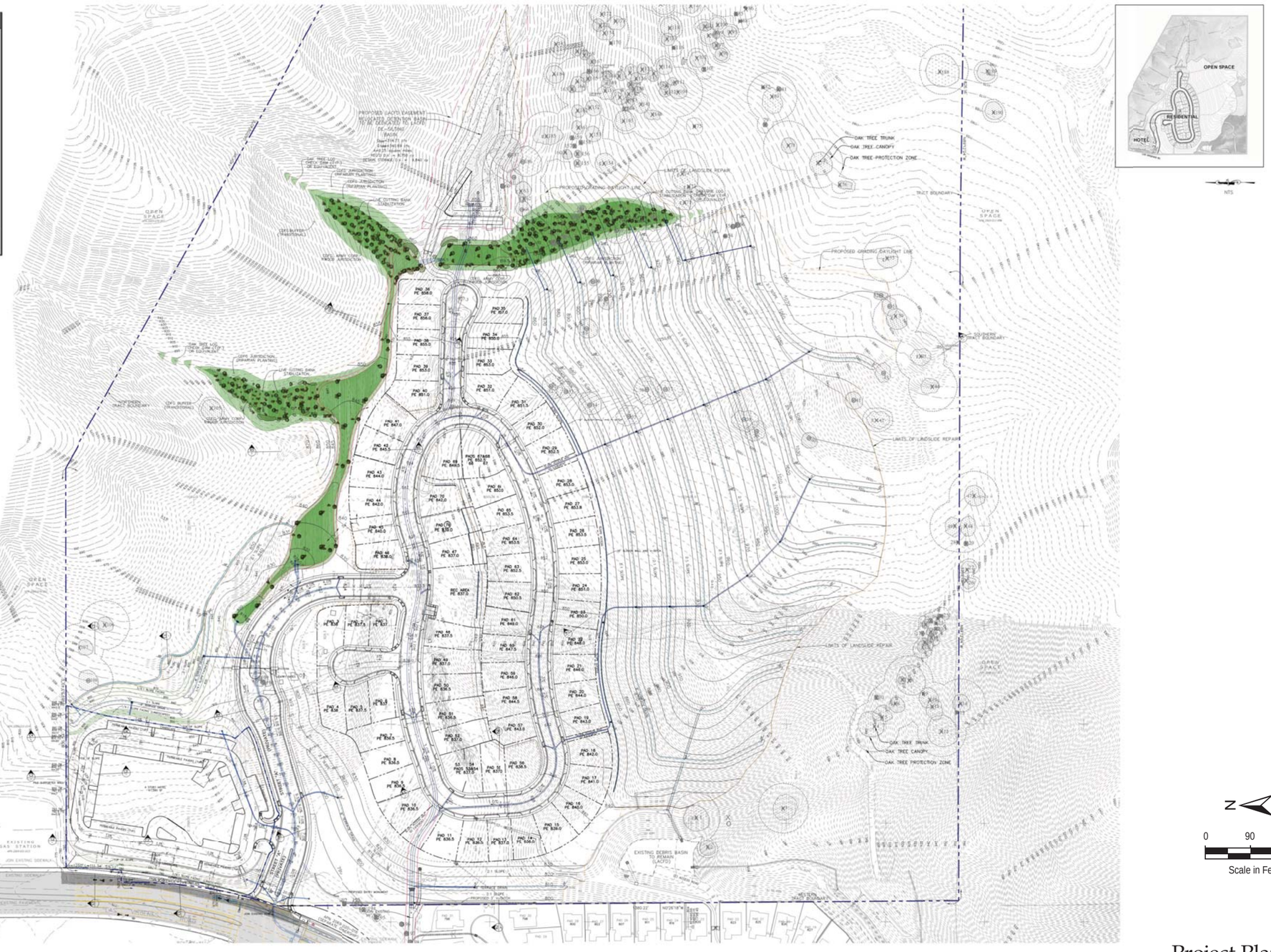
Miles

Regional Location

Figure 1



NOTE:
AFFORDABLE UNITS ARE LOCATED ON PADS 53, 54, 67, 68.



Project Plan Map

Source: RJR Engineering Group, 2015.

Figure 2
City of Calabasas

2.0 METHODOLOGY

The project site was delineated for USACE-jurisdictional wetland waters of the U.S. in accordance with the traditional methods described in the USACE's *Wetland Delineation Manual* (Environmental Laboratory, 1987) and the USACE's most recent guidance presented in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE, 2008a) and *Jurisdictional Determination Form Instructional Guidebook* (2007). In addition, USACE-jurisdictional non-wetland waters of the U.S were delineated in accordance with the methodology set forth in the USACE's *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (August 2008b). RWQCB jurisdiction was determined in accordance with the previously listed methodologies to identify wetland and non-wetland waters subject to Federal jurisdiction, as well as "Waters of the State" based on the Cowardin (1979) wetland definition, and thus closely resembles the lateral limits of Federal jurisdiction pursuant to Section 401 of the CWA. Finally, CDFW jurisdiction was delineated in accordance with Section 1602(a) of the CFGC using methodology described in *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607* (CDFG 1994). Appendix A presents a discussion of regulations and definitions pertinent to this jurisdictional delineation.

2.1 LITERATURE REVIEW

Prior to the formal delineation survey, areas of potential jurisdiction were identified through analysis of recent aerial photos, topographic maps, and other available background information to better characterize the nature and extent of potentially jurisdictional areas within the project limits. The National Wetlands Inventory (USFWS 2015) was also reviewed to determine if any wetlands had been previously mapped and documented on or in the vicinity of the project site.

2.2 FIELD SURVEY

Rincon biologist Jonathan Appelbaum surveyed the project site on July 7 and 8, 2010 (sampling points 1 through 14), to identify and delineate areas potentially subject to USACE, RWQCB, and CDFW regulatory jurisdiction. The site conditions were confirmed and updated per a supplemental site visit conducted by Rincon senior biologist Cher Batchelor on April 12, 2012 (sampling points 15 through 17).

For the purpose of the delineation, dominance of hydrophytic vegetation (i.e., water-dependent plants) was determined by creating a plant species list for those plants occurring at each data point (wetland and upland data points only) and then estimating absolute percent cover for each species by stratum, assigning an indicator status category to each species using Reed (1988) (updated using Lichvar et al. [2014]) and determining whether hydrophytic plants dominated the subject area using the dominance and/or prevalence tests (USACE 2008a). While in the field, the boundaries of potentially jurisdictional areas were measured and recorded onto scaled aerial photographs, with representative photographs taken to document existing conditions and other noteworthy biological resources. In accordance with the USACE's standard wetland delineation methodology, potential wetland areas were sampled to determine the presence or absence of each of the three requisite wetland indicators (vegetation, soils, and hydrology).

Wetland indicator status for plant species is based on *The National Wetland Plant List: 2014 update of wetland ratings* (Lichvar 2014). Taxonomic nomenclature for plant species is provided in accordance with The Jepson Manual (Baldwin et al. 2012). To establish whether hydric soils were present, a soil pit approximately 18 inches deep was dug to determine the presence or absence of positive field indicators for hydric soils as described in *Field Indicators of Hydric Soils in the United States* (U.S. Department of Agriculture [USDA], Natural Resources Conservation Service [NRCS] 2010) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008a). Soil color was determined using Munsell® (2000) Soil Color Charts. Wetland hydrology was determined by the presence or absence of primary and secondary indicators, such as surface water and drainage patterns, respectively. In total, 17 points were sampled. The data for each sampling location was recorded on standardized wetland determination data forms (attached as Appendix B). Figure 3 illustrates the locations where data was collected for this delineation.

On May 13, 2015, an on-site meeting was held with representatives from Rincon, The New Home Company, Envicom, CDFW, RWQCB, and USACE to verify jurisdictional limits with the agencies prior to circulation of the Draft Environmental Impact Report for the project. An updated delineation map (Figure 6) was provided to the representatives of each agency following the meeting. On May 26, 2015, Mr. Antal Szijj of USACE and Mr. Brock Warmuth of CDFW provided concurrence of the revised Figure 6 (see Section 4.0 below) during a teleconference held with Mr. Dan Rosie of Rincon.

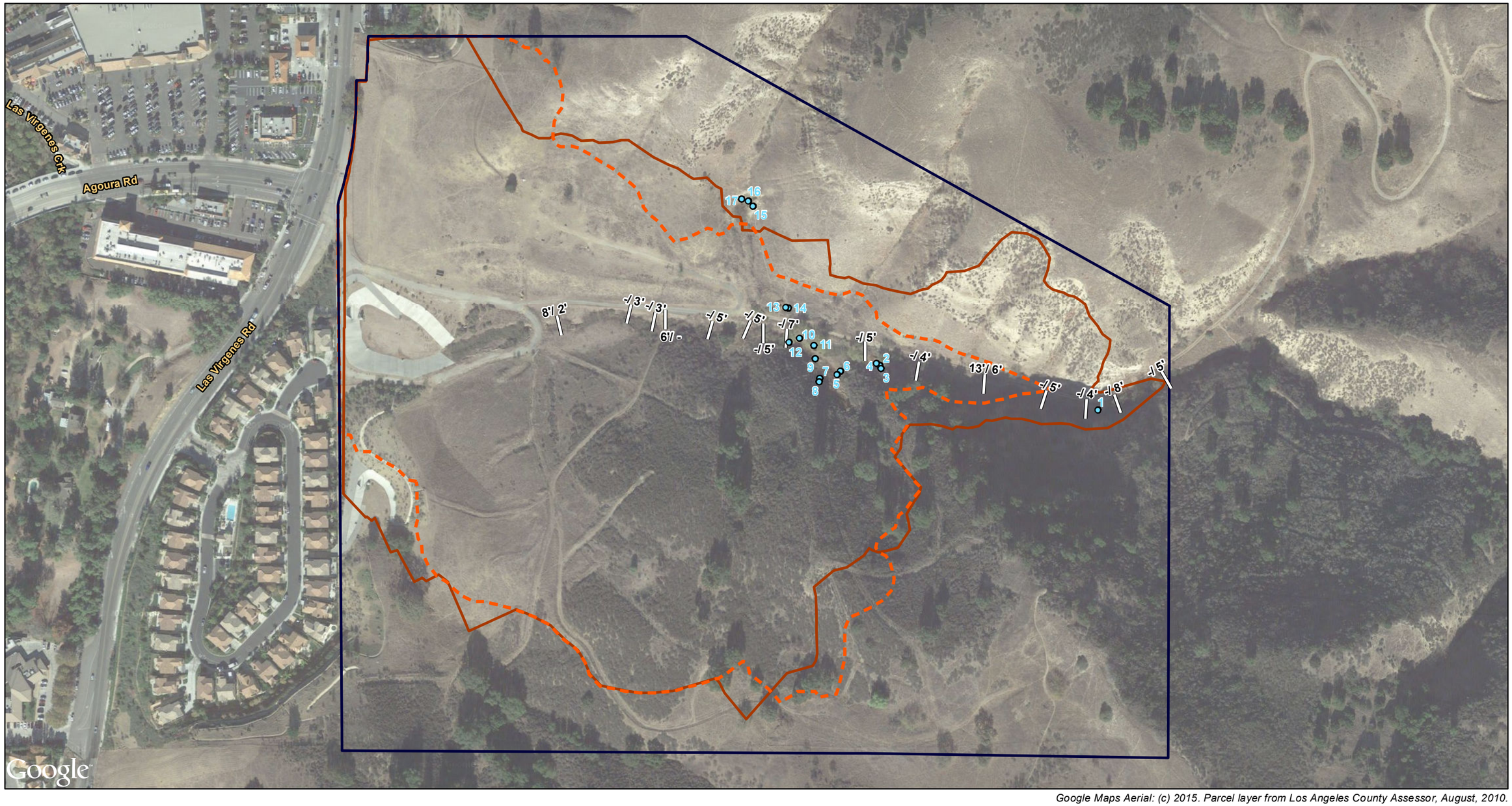
3.0 RESULTS

3.1 ENVIRONMENTAL SETTING

The 77.22-acre project site is primarily undeveloped with a high level of disturbance caused by fire clearance, grading, and grazing. The western half of the project site is primarily undeveloped; however, some grading and dirt roadways exist. Similarly, the northern portion of the site includes some grading and dirt roadways. The northern portion of the project site also contains abandoned structures from a former sheep husbandry operation. The remainder of the site is relatively natural and undisturbed. Surrounding land uses are primarily open space to the north, east, and south, and commercial/retail and residential uses to the west.

The project site is located within the foothills of the northern Santa Monica Mountains, west of the San Fernando Valley and east of the Conejo Valley. The site is generally characterized by hillside terrain and elevations ranging from just below 800 feet above sea level (amsl) to over 1,100 feet amsl. The canyon bottom maintains a gradual increase in elevation, roughly 4 percent from the western-most boundary to the eastern-most boundary of the site. A prehistoric landslide is evident on the southern portion of the site.

The main drainage system on the project site, which is potentially subject to CDFW, RWQCB, and USACE jurisdiction, is ephemeral and conveys flows east to west, eventually discharging into Las Virgenes Creek west of the project site. Two adjacent wetlands located to the south, fed by natural seeps, are also subject to jurisdiction of the three regulatory agencies. In addition, an ephemeral feature located to the north of the main drainage includes two separate wetland



Google Maps Aerial: (c) 2015. Parcel layer from Los Angeles County Assessor, August, 2010.

Parcel Boundary
Current Development Footprint
Previous Development Footprint
CDFG TOB/Corps OHWM
Sampling Point (Soil Pit)

N

0 125 250 Feet

Location Map and Sampling Points

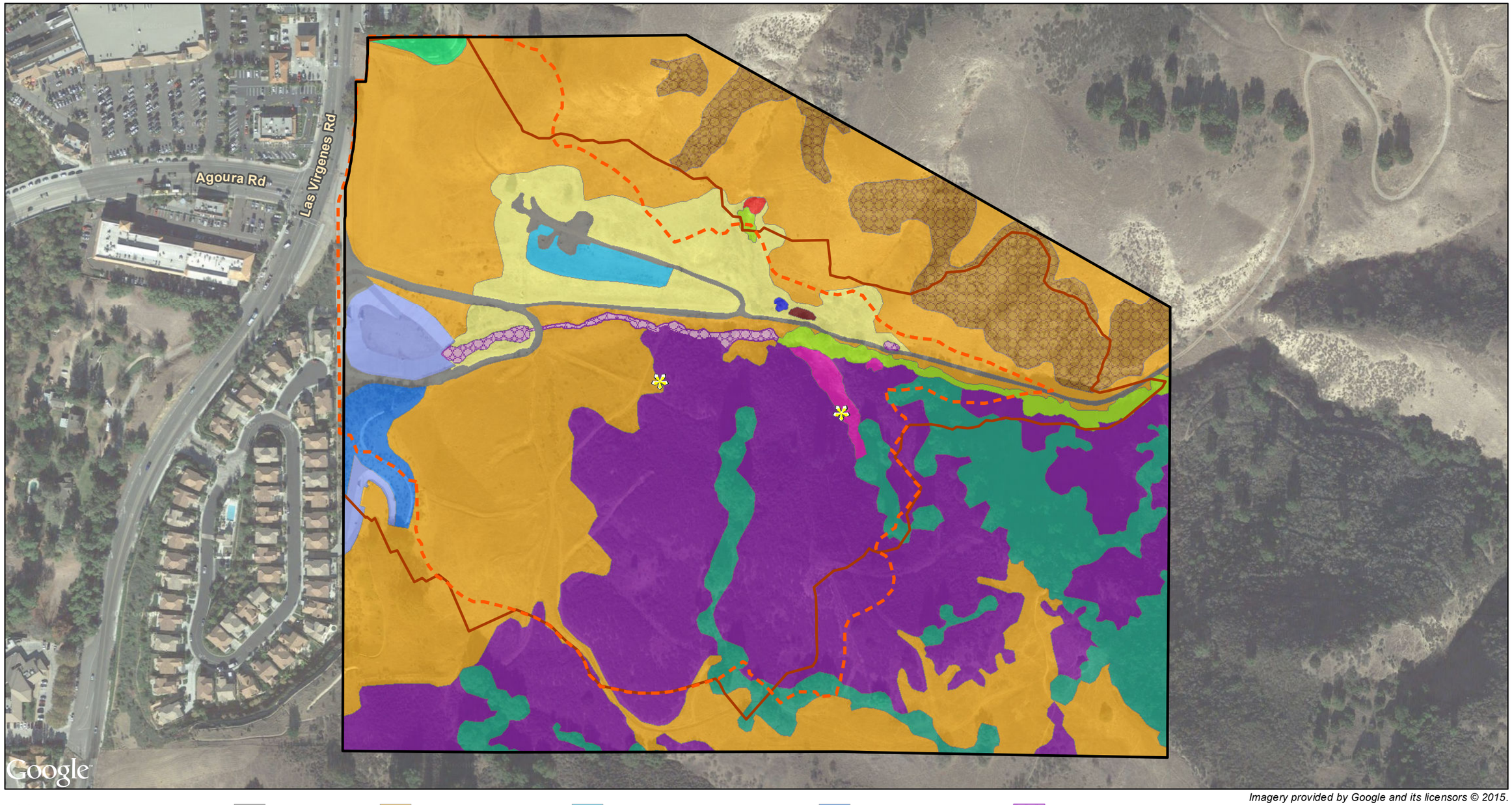
Figure 3

features, both also fed by natural seeps. Note that the hydrological connection between the upper and lower wetland features is not classified as waters of the U.S. subject to USACE jurisdiction according to Mr. Szijj of the USACE. This portion of the feature is considered waters of the State subject to RWQCB jurisdiction and streambed/banks and associated riparian vegetation subject to CDFW jurisdiction, including the upper wetland feature. The hydrological connection between, and including, the lower wetland feature and the main drainage is classified as waters of the U.S. and streambed/banks and associated riparian vegetation subject to jurisdiction of all three regulatory agencies.

3.2 VEGETATION

Vegetation communities and land cover types were classified based on descriptions provided in the CDFG's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and *A Manual of California Vegetation* (Sawyer et al. 2009). Waters and riparian habitats are present as inclusions within these vegetation communities and land cover types, and are addressed in more detail under subsequent sections. The vegetation communities on-site are mapped in Figure 4. Project site vegetative cover was categorized into 14 vegetation classifications. Vegetation communities and land cover types on-site are primarily upland, including the following:

- Annual Brome Grassland (*Bromus diandrus* Semi-Natural Herbaceous Stands), with other non-natives in the herbaceous layer.
- Dwarf Nettle Stand (*Urtica urens* Semi-Natural Herbaceous Stand), a non-native herbaceous species. This stand included approximately 70 percent cover by dwarf nettle.
- Upland Mustards (*Hirschfeldia incana* Semi-Natural Herbaceous Stands), a summer-blooming, short-lived perennial mustard with an open to continuous canopy.
- Tree Tobacco Scrub (*Nicotiana glauca* Semi-Natural Shrubland), a non-native shrub/tree listed by the California Invasive Plant Council (Cal-IPC) as a species that can cause serious displacement of native species.
- Purple Sage Scrub (*Salvia leucophylla* Shrubland Alliance), a native shrub, with important associate species such as California sagebrush (*Artemisia californica*) and emergent coast live oak (*Quercus agrifolia*).
- Coyote Brush Scrub (*Baccharis pilularis* Shrubland Alliance), a native shrub that inhabits river mouths, stream sides, terraces, stabilized dunes of coastal bars, spits along the coastline, coastal bluffs, open slopes and ridges. Important associate species within the alliance are California sagebrush, California buckwheat (*Eriogonum fasciculatum*), and annual grasses.
- Coastal Buckwheat Scrub (*Eriogonum cinereum* Shrubland Alliance) with associates including California sagebrush, and purple sage, and deerweed (*Lotus scoparius*). Observed on the sandstone rock out-crops of the northern slopes.
- Coast Live Oak Woodland (*Quercus agrifolia* Woodland Alliance) occurs on very steep slopes and on raised stream banks or terraces with California sycamore (*Platanus racemosa*) and southern California black walnut (*Juglans californica* var. *californica*).



Imagery provided by Google and its licensors © 2015.

Habitat Map

Figure 4

The plant communities associated with the jurisdictional areas on-site, typically dominated by hydrophytic vegetation, and surveyed for the purposes of this report include the following:

- Stinging Nettle Herbaceous Stand (*Urtica dioica* Semi-Natural Herbaceous Stands) is dominated by stinging nettle (*Urtica dioica* ssp. *holosericea*), a perennial herb that is native to California. *The National Wetland Plant List: 2014 update of wetland ratings* (Lichvar et al. 2014) lists stinging nettle with a wetland indicator status of FACW (facultative wetland species). This small pure stand of stinging nettle was observed along the northern boundary of the existing roadway mid-way through the site.
- Cattail-Saltgrass Marsh (*Typha domingensis-Distichlis spicata* Herbaceous Alliance) is co-dominated in the herbaceous layer by cattail and saltgrass with an intermittent to continuous canopy cover. *The National Wetland Plants List* (Lichvar et al. 2014) lists cattail with a wetland indicator status of OBL (obligate wetland species), and saltgrass as FAC (facultative). This alliance is found in semi-permanently flooded fresh water or brackish marshes. Within the project site, the alliance associated with the smaller southern-most isolated wetland on the north side of the ephemeral drainage.
- Yerba Mansa Meadow (*Anemopsis californica* Herbaceous Alliance) is dominated by yerba mansa (*Anemopsis californica*) with saltgrass as an important associate species. This alliance occurs in intermittently flooded areas, meadows, marshes, seeps, floodplains and stream terraces, with deep, poorly-drained soils. Yerba mansa has a wetland indicator status of OBL. Stands of yerba mansa are commonly found in isolated inland wetlands and riparian zones. Saltgrass has physiological adaptations that allow it to occupy saline or alkaline environments from the coast to mountains and deserts of California. Other important associate species observed in the alliance include Mexican rush (*Juncus mexicanus*) and flatsedges (*Cyperus* spp.). This alliance occupies the largest spring south of the main drainage on-site.
- Bulrush-Saltgrass Marsh (*Schoenoplectus americanus-Distichlis spicata* Herbaceous Alliance) co- dominated in the herbaceous layer by chairmaker's bulrush (*Schoenoplectus americanus*; OBL) and saltgrass, with a continuous canopy cover. This alliance is generally found along streams, ponds, lakes, and in sloughs. Within the project site, the alliance is associated with the larger northern-most spring north of the main drainage.
- Mulefat Thickets (*Baccharis salicifolia* Shrubland Alliance) is dominated by the native shrub, mulefat (*Baccharis salicifolia*; FAC). Mulefat thickets are found on canyon bottoms, floodplains, irrigation ditches, lake margins, and stream channels. Dominant species observed in mulefat thickets on-site include stinging nettle, blue elderberry (*Sambucus nigra* ssp. *caerulea*; FAC), coyote brush (*Baccharis pilularis*; UPL [upland species]), and annual grasses. This alliance occurs primarily in the western portion of the site along the main drainage.
- Arroyo Willow Thickets (*Salix lasiolepis* Shrubland Alliance) is dominated by arroyo willow (*Salix lasiolepis*; FACW). The canopy of this habitat is open to continuous with a variable herbaceous layer. This alliance is most commonly found on stream banks and benches, temporary floodplains, streamside deposits, slope seeps and springs. Important associate species commonly found within the alliance are mulefat, Fremont cottonwood (*Populus fremontii*), California black walnut, and blue elderberry. This alliance occurs

primarily in the middle and eastern portion of the site along the main drainage. This also occurs south of and adjacent to the Bulrush-Saltgrass Marsh associated with the larger northern-most spring north of the main drainage.

3.3 HYDROLOGY

The project site is located within the Santa Monica Bay watershed in the Malibu Creek Hydrologic Unit. An unnamed ephemeral drainage, including a minor tributary and adjacent wetlands, occurs on the project site. Although no surface water was observed in the drainage at the time of the field survey, it appears to have a clear hydrologic connection to Las Virgenes Creek downstream via the City of Calabasas MS4 system. The unnamed drainage on-site conveys flows in a westerly direction to Las Virgenes Creek as determined through aerial imagery interpretation. Las Virgenes Creek subsequently conveys flows to the Pacific Ocean via Malibu Creek.

Positive indicators of hydrology observed and noted at sampling points within the property included drift deposits, drainage patterns, oxidized rhizospheres, presence of reduced iron, thin muck surface, saturation, and surface water.

3.4 SOILS

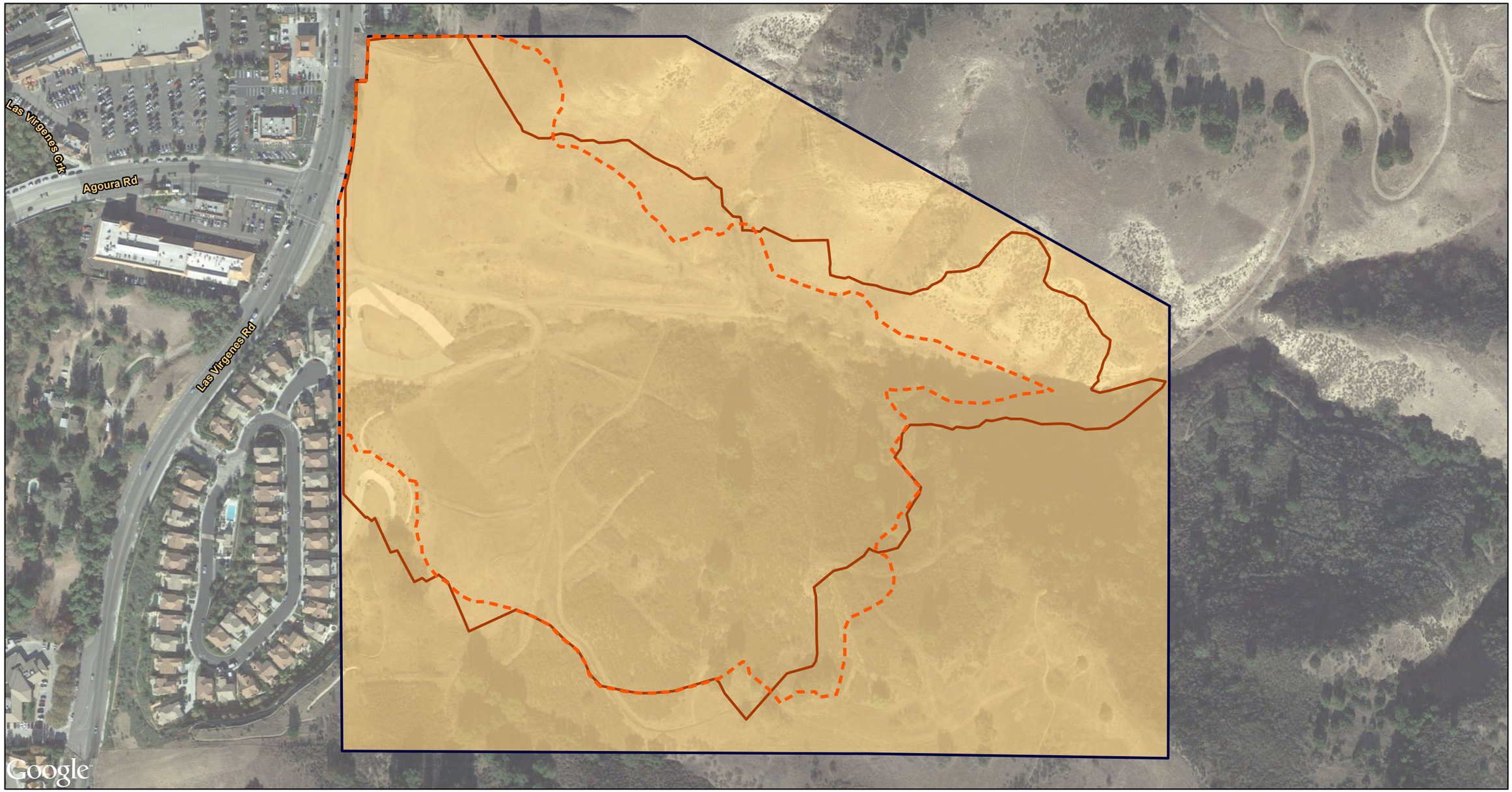
The entire project site, including all of the hydrologic features therein, is mapped as Linne- Los Osos Haploxerepts Association, 30-75 percent slopes, according to the Web Soil Survey (USDA NRCS 2015a) interactive soil mapping. According to the List of Hydric Soils (USDA NRCS 2015b), this association is not rated as hydric (Figure 5).

Positive indicators of hydric soils observed and noted at sampling points within the property included depleted matrix, black Histic, hydrogen sulfide, thick dark surface, loamy mucky mineral, loamy gleyed matrix, and bright redox features in dark soil.

4.0 ASSESSMENT OF JURISDICTIONAL RESOURCES

Observations of vegetation, hydrology, and soils were documented and the limits of USACE/RWQCB-jurisdictional wetlands and non-wetland waters of the U.S., RWQCB-jurisdictional waters of the State, and CDFW jurisdictional streambed/banks and associated riparian vegetation were mapped within the survey area. Approximately 2,559 linear feet (approximately 0.48 mile) of aquatic features were assessed for the presence of waters and wetlands. This included the central unnamed drainage, ephemeral tributary, and adjacent wetland features. A total of 17 sampling points were sampled during the delineation to clearly identify the boundaries of USACE wetland jurisdiction within the survey area.

Based upon the findings of the jurisdictional delineation, the main unnamed ephemeral drainage traversing the length of the property is expected to be subject to USACE, CDFW, and RWQCB jurisdiction. In addition, two adjacent wetland features resulting from seeps on the south side of the main drainage comprise jurisdiction of all three regulatory agencies. Finally, an ephemeral tributary north of the main drainage feature, which includes two seep-fed



Parcel Boundary
Current Development Footprint
Previous Development Footprint
CA692, Linne-Los Osos-Haploxerepts association, 30 to 75 percent slopes

N
0 125 250 Feet

Imagery provided by Google and its licensors © 2015. Additional baselayers from: U.S. Department of Agriculture, Natural Resources Conservation Service, and Los Angeles County Assessor, August, 2010.

Soils Map

Figure 5

wetlands, is subject to RWQCB and CDFW jurisdiction, with the lower seep-fed wetland and ephemeral tributary downstream also subject to USACE jurisdiction. As noted in Section 2.2 above, these findings were verified by the resource agencies during the field visit on May 13, 2015.

Table 1 below presents the total acreages of each regulatory jurisdiction. Figure 6, also showing total acreages) depicts the locations of jurisdictional features located within the current proposed development footprint, as well as those limits held within the previous (May 2012) development footprint to show the reduction in impacts to jurisdictional features. Appendix B provides the wetland determination data forms, Appendix C includes representative photographs, and the following subsections discusses each jurisdiction, specifically.

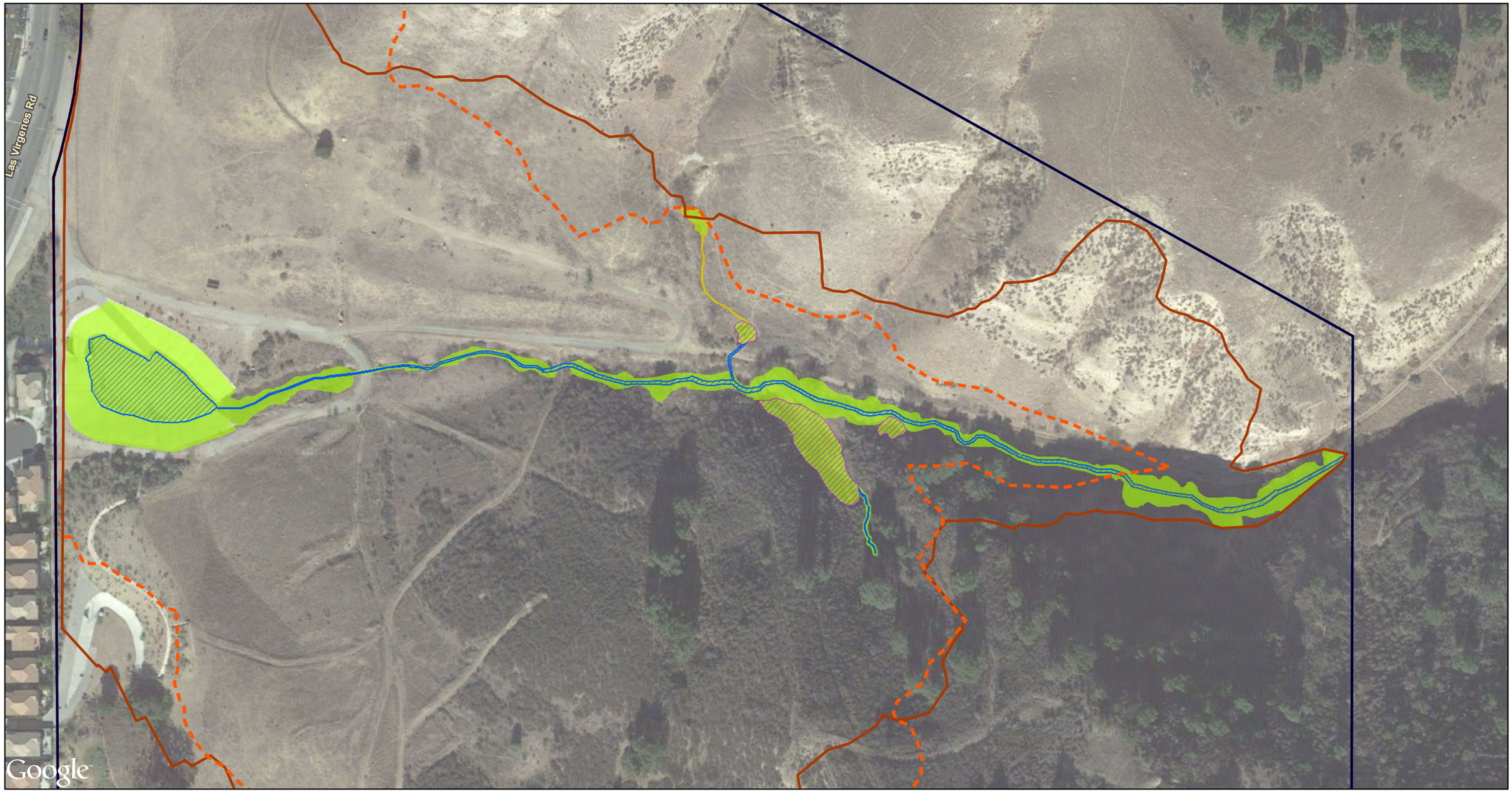
Table 1 - Jurisdictional Features of the Canyon Oaks Project Site

Feature	Jurisdiction			
	USACE (Acres)	RWQCB (Acres)	CDFW (Acres)	Linear Feet
Non-Wetland Waters of the U.S.	0.61	0.61	0.00	1,961
Wetland Waters of the U.S.	0.28	0.28	0.00	290
Waters of the State	0.00	0.05	0.00	229
Streambed/Banks and Associated Riparian Vegetation	0.00	0.00	2.27	2,559
Total	**0.89**	**0.94**	**2.27**	**2,559**

4.1 USACE JURISDICTION

Approximately 0.61 acre (1,961 linear feet) of potential USACE-jurisdictional non-wetland waters of the U.S. pursuant to Section 404 of the CWA is present within the project site (Table 1). The main unnamed ephemeral drainage traverses the project footprint from east to west with an OHWM ranging from approximately 2 to 8 feet in width. A concrete-lined detention basin (approximately 116 linear feet) on the western edge of the site is also potential USACE jurisdictional non-wetland waters of the U.S.

Approximately 0.28 acre (290 linear feet) of potential three-parameter USACE-jurisdictional wetlands are located on-site adjacent to the mapped non-wetland waters of the U.S. These three mapped, seep-fed wetland features supply perennial or nearly perennial moisture to the soils adequate to support freshwater marsh plant species such as yerba mansa, saltgrass, cattail, Mexican rush, and/or flatsedge. Based on field sampling, the lateral limits of these potential wetlands generally correspond to the extent of the Yerba Mansa Meadow (*Anemopsis californica* Herbaceous Alliance) and Cattail-Saltgrass Marsh (*Typha domingensis-Distichlis spicata*



Imagery provided by Google and its licensors © 2015.

Parcel and Survey Area Boundary
Current Development Footprint
Previous Development Footprint

Jurisdictional Features (Acreages: Current/Previous)

RWQCB Waters of the State (0.05/0.04)
USACE/RWQCB Wetland Waters of the U.S. (0.28/0.28)
USACE/RWQCB non-Wetland Waters of the U.S. (0.61/0.66)
CDFW Streambed/Banks and Associated Riparian Vegetation (2.27/2.61)

N

0 80 160 Feet

Jurisdictional Delineation Map

Figure 6

Herbaceous Alliance) vegetation communities described above. The sampling points that resulted in positive indicators for all three wetland parameters at these potentially USACE-jurisdictional wetland features include 2, 4, 5, 7, 9, and 13.

While sampling points 15 and 16 noted positive indicators for all three wetland parameters at the upper seep-fed wetlands present on the north side of the project site, pursuant to the Solid Waste Agency of Northern Cook County (SWANCC) vs. USACE decision, USACE jurisdiction does not include this isolated wetland feature (Figure 6).

USACE Significant Nexus Evaluation

The ephemeral drainage on-site is not a traditional navigable water (TNW) or relatively permanent waters (RPW). Furthermore, the hydrologic periodicity of this feature is not known; however, due to the fact that most of the drainages in the southern California region are ephemeral and only convey flows during and immediately following rainfall events, this drainage feature and others similar are assumed to not be RPWs. Therefore, a significant nexus evaluation would be required to determine USACE jurisdiction. The significant nexus evaluation must include consideration of both hydrological and ecological factors associated with the subject features.

Hydrological Factors

From the detention basin located at the western boundary of the project site, waters are conveyed approximately 750 feet to the west through the City of Calabasas MS4 system before discharging to Las Virgenes Creek, a RPW. From this confluence, Las Virgenes Creek flows south for approximately 3 river miles before converging with Malibu Creek, and then an additional 7.25 river miles to Malibu Lagoon and the Pacific Ocean, a TNW. Therefore, the on-site drainage is two orders removed and approximately 10.25 river miles away from the nearest TNW.

Ecological Factors

The lands surrounding the project site consist mainly of open space to the north, east, and south, and mixed commercial and residential development to the west. Seeps and springs located on the property contribute perennial or nearly perennial flows to the on-site drainage, which in addition to ephemeral flows derived from storm events would have the potential to transport development-related pollutants and sediment downstream to Las Virgenes Creek and eventually to the Pacific Ocean. In addition, the site is located within a region that displays high rates of soil weathering and loss, which further contributes to downstream sedimentation. Therefore, impacts to hydrologic features on-site, including the unnamed ephemeral drainage, may affect water quality within the receiving waters and TNW located downstream.

In addition, the unnamed drainage and its adjacent wetlands on-site support native riparian and freshwater marsh vegetation potentially utilized by wildlife species typically occurring within RPWs and their associated riparian corridors in the southern California region.

Significant Nexus Determination

Both Las Virgenes Creek and Malibu Creek are RPWs that maintain a direct hydrologic surface connection to the Pacific Ocean, a TNW. Based on our observations of a direct hydrologic surface connection between the unnamed drainage located on-site and the Pacific Ocean via the aforementioned RPWs and the City of Calabasas' MS4 system, and the existence of more than speculative or insubstantial ecological influence of the unnamed drainage upon USACE jurisdictional TNWs, there exists a clear "significant nexus" potentially establishing USACE jurisdiction over on-site waters of the U.S. and adjacent wetlands.

4.2 RWQCB JURISDICTION

Based on the findings of the jurisdictional delineation survey, a total of approximately 0.28 acre of wetland waters of the U.S. and approximately 0.61 acre of non-wetland waters of the U.S. (totaling 2,251 linear feet) are subject to RWQCB jurisdiction pursuant to Section 401 of the CWA. In addition, approximately 0.05 acre (229 linear feet) of potential waters of the State pursuant to Section 13263 of Porter-Cologne was determined to be present within the project footprint (Table 1 and Figure 6). Potential RWQCB-jurisdictional waters of the State present within the project site include the ephemeral tributary and upper seep-fed wetland feature located north of the main drainage. Note that this upper wetland feature lies outside of USACE jurisdiction pursuant to the SWANCC decision.

4.3 CDFW JURISDICTION

Because the lateral limits of potentially CDFW-jurisdictional areas are based on the tops of active banks or the lateral extent of the riparian canopy, they tend to be more expansive than USACE jurisdiction alone. Based on the findings of the jurisdictional delineation, a total of 2.27 acres (2,559 linear feet) of potential CDFW-jurisdictional streambed/banks and associated riparian vegetation were determined to be present within the project footprint. CDFW-jurisdictional areas present within the project site include streambed/banks and associated riparian vegetation within the unnamed main drainage, the two seep-fed wetland features located south of and adjacent to the main drainage, the ephemeral tributary and its adjacent seep-fed wetlands, and the concrete-lined debris basin to the top of bank.

5.0 LIMITATIONS, ASSUMPTIONS, AND USE RELIANCE

This Jurisdictional Delineation has been performed in accordance with professionally accepted jurisdictional delineation practices conducted at this time and in this geographic area. The jurisdictional delineation is limited by the scope of work performed. The survey is limited also by the environmental conditions present at the time of the survey. Our field studies were based on current industry practices, which change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, jurisdictional delineation, and specified historical and literature sources. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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Appendix A

Regulatory Overview and Definitions

USACE Jurisdiction

The USACE, under provisions of Section 404 of the Clean Water Act and USACE implementing regulations, has jurisdiction over the "waters of the United States." "Waters" include all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, seasonal drainage channels, etc.), all impoundments of waters otherwise defined as waters of the U.S., tributaries of waters otherwise defined as waters of the U.S., territorial seas, and wetlands adjacent to waters of the U.S. USACE jurisdictional limits are typically identified by the presence of an Ordinary High Water Mark (OHWM). The OHWM is the line on the shore or banks of a water course established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology.

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds excavated on dry land used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (51 Fed. Reg. 41, 217 1986). In addition, a Supreme Court ruling (SWANCC vs. USACE, January 9, 2001) determined that the USACE exceeded its statutory authority by asserting Clean Water Act jurisdiction over "an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds." Based solely on the use of such waters by migratory birds, the Supreme Court's holding was strictly limited to waters that are "non-navigable, isolated, and intrastate."

The Supreme Court further addressed the extent of the USACE jurisdiction in Rapanos v. U.S. (June 19, 2006). There, a sharply divided Court issued multiple opinions, none of which garnered the support of a majority of Justices. This created substantial uncertainty as to which jurisdictional test should be used. The Ninth Circuit Court of Appeal, which encompasses California, answered this in Northern California River Watch v. City of Healdsburg (August 11, 2006). There, the Court held that Justice Kennedy's opinion in Rapanos provides the controlling rule of law. Under that rule, wetlands or other waters which are not navigable in fact are subject to USACE jurisdiction if they have a "significant nexus" to a navigable-in-fact waterway. As Justice Kennedy explained, whether a significant nexus exists in any given situation will have to be decided on a case-by-case basis, depending on site-specific circumstances.

USACE Headquarters in Washington, D.C. issued substantive guidance on June 5, 2007, to its District Offices as to how to apply these rulings. Based on this guidance, additional quantitative, qualitative, and other physical data is required for the USACE to make a determination of jurisdictional authority. This determination is reviewed by the United States Environmental Protection Agency (USEPA).

In accordance with the Rapanos guidance, the USACE will assert jurisdiction over traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are relatively permanent waters (RPWs), and wetlands that directly abut such tributaries. TNWs include all of the

"navigable waters of the U.S.," defined in 33 CFR Part 329 and by pertinent federal court decisions. RPWs convey water flow seasonally, typically for at least 3 months. In addition, non-navigable tributaries that are not relatively permanent (non-RPWs), wetlands adjacent to non-RPWs, and wetlands adjacent to but that do not directly abut a TNW will be found jurisdictional based on a fact-specific analysis that they have a significant nexus with a TNW. The significant nexus evaluation considers the volume, duration, and frequency of water flow in the tributary and the proximity of the tributary to a TNW, as well as the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

RWQCB Jurisdiction

The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to "isolated" waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction). The local RWQCB enforces actions under this general order, and is also responsible for Clean Water Act Section 401 certification determinations over USACE defined jurisdictional waters.

CDFG Jurisdiction

The CDFG has regulatory authority over any work within rivers, streams, and lakes of the State of California (California Fish and Game Code Section 1600 et. seq.) on public, private, and agricultural lands. Water features that are regulated by CDFG include all rivers, streams, or lakes, including man-made watercourses with or without wetlands, if they contain a definable bed and bank and support a fish or wildlife resource.

Wetlands

The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. The following is a discussion of each of these parameters.

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USFWS published the *National List of Plant Species That Occur In Wetlands* (1988, revised 1997), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- Obligate Wetland (OBL). Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

- Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- Obligate Upland (UPL). May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

The Corps considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the USFWS list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying, which indicates reducing conditions by a blue-grey color, or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Appendix B

Wetland Determination Data Forms

Wetland and Other Waters Determination Data Form

Habitat Type: Willow Riparian
Wetland/Other Waters Type: Waters of U.S.

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 1
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Drainage Local relief (concave, convex, none) None Slope % 1
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? No Wetland hydrology? Yes Is sampled area a wetland? No Other waters? Yes

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☑ Shelving ☑ Changes in Character of Soil ☑ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☑ Presence of Litter and Debris ☑ Scour ☑ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☑ Blue-line on USGS Quad ☐
Natural Drainage ☑ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	75	Yes	FACW
2.			
3.			
4.			
50%= 1 20%= 1 Total Cover:	75		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%= 20%= Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Sampling Point 1

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10 YR 4/3	100		None			Loamy Sand	
14-18	7.5 YR 3/4	100		None			Loamy Sand	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☑ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

OHWM - Shelving, Debris Lines/Drift Deposits

Wetland and Other Waters Determination Data Form

Habitat Type: Freshwater marsh
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 2
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) None Slope % 2
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Anemopsis californica	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= 1 Total Cover:	100		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species	_____	x 1 =	_____
FACW Species	_____	x 2 =	_____
FAC Species	_____	x 3 =	_____
FACU Species	_____	x 4 =	_____
UPL Species	_____	x 5 =	_____
Column Totals	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Sampling Point 2

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 4/1	95	7.5 YE 4/4	5	C	M	Clay	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☑ No ☐ Depth (inches) 0 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Freshwater Marsh / CSS
Wetland/Other Waters Type: None

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 3
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) None Slope %: 25
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? No Wetland hydrology? No Is sampled area a wetland? No Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters _____ Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salvia leucophylla	50	Yes	None
2. Urtica dioica	20	Yes	FACW
3.			
4.			
50%=1 20%=1 Total Cover:	70		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Anemopsis californica	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%=1 20%=1 Total Cover:	100		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)
Total number of dominant species across all strata: 3 (B)
Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 3/2	100					Sandy Clay Loa	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Freshwater Marsh
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 4
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Terrace Local relief (concave, convex, none) None Slope % 0
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Distichlis spicata	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= 1 Total Cover:	100		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5 YR 4/2	100					Clay	
14-18	10 YR 4/1	90	7.5 YR 4/4	10	C	M	Clay	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Freshwater Marsh
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 5
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Concave Slope % 5
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Possible Historic landslide

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Distichlis spicata	50	Yes	FACW
2. Anemopsis californica	50	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= 1 Total Cover:	100		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 4/2	95	7.5 YR 4/6	5	C	M	Clay	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Annual Grassland
Wetland/Other Waters Type: None

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 6
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Concave Slope % 5
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? No Hydric soil? No Wetland hydrology? Yes Is sampled area a wetland? No Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters _____ Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

No indicators of OHWM

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Distichlis spicata	50	Yes	FACW
2. Brassica nigra	20	Yes	None
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%= 1 Total Cover:	70		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 50 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species	1	x 2 =	2
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	1	x 5 =	5
Column Totals	2 (A)		7 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators

No Dominance Text is >50%
No Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? No

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10 YR 3/2	100					Loam	
14-18	2.5 Y 4/3	98	7.5 YR 4/6	2	C	M	Clay Loam	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Redox concentrations (i.e. mottles <2% @ >14 inches).

Wetland and Other Waters Determination Data Form

Habitat Type: Freshwater marsh
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 7
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Concave Slope % 2
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Possible historic landslide

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Cyperus spp.	80	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 1 20%=_____ Total Cover:	80		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species	_____	x 1 =	_____
FACW Species	_____	x 2 =	_____
FAC Species	_____	x 3 =	_____
FACU Species	_____	x 4 =	_____
UPL Species	_____	x 5 =	_____
Column Totals	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 4/3	100					Clay	
2-18	Gley 1 2.5/10Y	100					Clay	Muck (A3)

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☑ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo. Gleyed mucky soils.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☑ No ☐ Depth (inches) 0 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturated to surface. Hydrogen sulfide odor.

Wetland and Other Waters Determination Data Form

Habitat Type: CSS
Wetland/Other Waters Type: None

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/7/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 8
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Hillslope Local relief (concave, convex, none) Concave Slope %: 45
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? No Hydric soil? No Wetland hydrology? No Is sampled area a wetland? No Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters _____ Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salvia leucophylla	50	Yes	None
2. Leymus condensatus	25	Yes	FACU
3. Malacothamnus spp.	10	No	None
4. Baccharis pilularis	10	No	None
50%= 1 20%= 1 Total Cover:	95		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%=_____ 20%=_____ Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	1	x 4 =	4
UPL Species	1	x 5 =	5
Column Totals	2 (A)		9 (B)

Prevalence Index = B/A = 4.5

Hydrophytic Vegetation Indicators

No Dominance Text is >50%
No Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Common CSS Species

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5 YR 4/3	100					Loamy Sand	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Willow Riparian
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 9
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Arroyo Local relief (concave, convex, none) None Slope % 1
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☑ Shelving ☑ Changes in Character of Soil ☑ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☑ Presence of Litter and Debris ☑ Scour ☑ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☑ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Within channel located below spring / seep

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	80	Yes	FACW
2.			
3.			
4.			
50%= 1 20%= Total Cover:	80		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Baccharis salicifolia	25	Yes	FACW
2.			
3.			
4.			
50%= 20%= 1 Total Cover:	25		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Common Southern willow scrub species

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 4/2	90	10 YR 6/8	10	C	M	Sandy clay loam	Prominent Mottling

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☑ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Willow Riparian
Wetland/Other Waters Type: Waters of U.S.

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 10
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Arroyo Local relief (concave, convex, none) None Slope % 1
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? No Wetland hydrology? Yes Is sampled area a wetland? No Other waters? Yes

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☑ Changes in Character of Soil ☐ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☑ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☑ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	75	Yes	FACW
2.			
3.			
4.			
50%= 1 20%= Total Cover:	75		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Urtica dioica	5	No	FACW
2. Artemesia californica	5	No	UPL
3.			
4.			
50%= 20%= Total Cover:	10		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Beneath willow canopy

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 3/3	100					Silty clay loam	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☑ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Willow Riparian
Wetland/Other Waters Type: Waters of U.S.

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 11
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Arroyo Local relief (concave, convex, none) None Slope % 1
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? No Wetland hydrology? Yes Is sampled area a wetland? No Other waters? Yes

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☑ Changes in Character of Soil ☐ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☑ Presence of Litter and Debris ☑ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☑ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	75	Yes	FACW
2.			
3.			
4.			
50%= 1 20%= Total Cover:	75		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Baccharis salicifolia	25	Yes	FACW
2.			
3.			
4.			
50%= 20%= 1 Total Cover:	25		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%= 20%= Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%= 20%= Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

Beneath willow canopy

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 3/2	100					sandy clay loam	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☑ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Mule fat Scrub
Wetland/Other Waters Type: Waters of U.S.

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 12
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Arroyo Local relief (concave, convex, none) None Slope % 1
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yes
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? No Wetland hydrology? Yes Is sampled area a wetland? No Other waters? Yes

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters Yes Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☑ Shelving ☑ Changes in Character of Soil ☑ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☑ Presence of Litter and Debris ☑ Scour ☑ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☑ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☑ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:			

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Baccharis salicifolia	85	Yes	FACW
2.			
3.			
4.			
50%= 1 20%=_____ Total Cover:	85		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50%=_____ 20%=_____ Total Cover:	0		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species	_____	x 1 =	_____
FACW Species	_____	x 2 =	_____
FAC Species	_____	x 3 =	_____
FACU Species	_____	x 4 =	_____
UPL Species	_____	x 5 =	_____
Column Totals	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

mule fat thicket

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 3/3	100					Clay loam	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☑ Drift Deposits (B3) (Riverine)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Wetland and Other Waters Determination Data Form

Habitat Type: Artificial Water Trough
Wetland/Other Waters Type: Wetland

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 13
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Swale Local relief (concave, convex, none) None Slope % 0
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? No
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? Yes Hydric soil? Yes Wetland hydrology? Yes Is sampled area a wetland? Yes Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters _____ Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) Yes
Explain:

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☑ Shelving ☑ Changes in Character of Soil ☑ Bed and Bank ☑
Destruction of Terrestrial Vegetation ☑ Presence of Litter and Debris ☑ Scour ☑ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☑ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☑ Artificial Drainage ☐ Navigable Water ☐

Remarks

Apparent artificial water trough for livestock

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Typha spp.	25	Yes	OBL
2. Distichlis spicata	75	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
50%=1 20%=1 Total Cover:	100		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 2 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? Yes

saltgrass and cattail marsh

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	Gley 1 3/10Y	100					Clay	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? Yes

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☑ No ☐ Depth (inches) 6

Saturation Present? Yes ☑ No ☐ Depth (inches) 0 *(includes capillary fringe)*

Wetland Hydrology? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

Saturated to surface.

Wetland and Other Waters Determination Data Form

Habitat Type: Annual Grassland
Wetland/Other Waters Type: None

Project/Site: Messenger Development Project City/County: Calabasas, Los Angeles County Sampling Date: 7/8/2010
Applicant/Owner: City of Calabasas State: CA Sampling Point: 14
Investigator(s): J. Appelbaum NWI Classification: None
Landform (hillslope, terrace, etc.) Swale Local relief (concave, convex, none) None Slope % 2
Subregion (LRR) LRR C (Mediterranean CA) Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes
Are climatic/hydrologic conditions on the site typical for this time of year? Yes *(If no, explain in remarks.)*
Are vegetation No, soil No, or hydrology No significantly disturbed? Are normal circumstances present? Yrd
Are vegetation No, soil No, or hydrology No naturally problematic? *(If needed, explain any answers in Remarks.)*

Summary of Findings (Attach site map showing sampling point locations, transects, important features, etc.)

Hydrophytic vegetation? No Hydric soil? No Wetland hydrology? No Is sampled area a wetland? No Other waters? No

USACE Jurisdiction

Abutting Waters ____ Adjacent to Waters _____ Tributary to Waters _____ Isolated (with interstate commerce) _____ Isolated (non-jurisdictional) _____
Explain: None

Evaluation of Features Designated "Other Waters of the United States"

Ordinary High Water Mark (OHWM) Characteristics: Line Impressed on Bank ☐ Shelving ☐ Changes in Character of Soil ☐ Bed and Bank ☐
Destruction of Terrestrial Vegetation ☐ Presence of Litter and Debris ☐ Scour ☐ Deposition ☐ Other (please specify) ☐
Feature Designation: Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on USGS Quad ☐
Natural Drainage ☐ Artificial Drainage ☐ Navigable Water ☐

Remarks

Vegetation

Tree Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Sapling/Shrub Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
3.			
4.			
50%=_____ 20%=_____ Total Cover:	0		

Herb Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. Brassica nigra	25	Yes	None
2. Centaurea melitensis	25	Yes	None
3. Bromus Hordeaceous	5	No	FACU
4.			
5.			
6.			
7.			
8.			
50%= 0 20%= 2 Total Cover:	55		

Woody/Vine Stratum (use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. None	0		
2.			
50%=_____ 20%=_____ Total Cover:	0		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust 0

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 0 (A)

Total number of dominant species across all strata: 2 (B)

Percent of dominant species that are OBL, FACW, or FAC: 0 (AB)

Prevalence Index Worksheet

Total % Cover of:		Multiply by	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	2	x 5 =	10
Column Totals	2 (A)		10 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators

Yes Dominance Text is >50%
_____ Prevalence Index is ≤ 3.0[1]
_____ Morphological Adaptations[1] (provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation? No

Annual grasses and forbs

Soils

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 3/3	100					Sandy Clay Loa	

[1]Types: C = Concentration D = Depletion RM = Reduced Matrix [2]Location: PL = Pore Lining RC = Root Channel M = Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (AG) (LRR C)
- ☐ 1 cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vetric (F18)
- ☐ Red Parent Materials (TF2)
- ☐ Vegetated Sand/Gravel Bars
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present): Type: _____ Depth (Inches) _____ Hydric Soil? No

Remarks

See Photo.

Hydrology

Wetland Indicators

Primary Indicators (Any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (Nonriverine)
- ☐ Sediment Deposits (B2) (Nonriverine)
- ☐ Drift Deposits (B3) (Nonriverine)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations

Surface Water Present? Yes ☐ No ☑ Depth (inches) N/A

Water Table Present? Yes ☐ No ☑ Depth (inches) >18

Saturation Present? Yes ☐ No ☑ Depth (inches) >18 *(includes capillary fringe)*

Wetland Hydrology? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, and previous inspections), if available:

Remarks

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Messenger Development | City/County: Calabasas/Los Angeles | Sampling Date: 4/12/2012

Applicant/Owner: City of Calabasas | State: CA | Sampling Point: 15

Investigator(s): Cher Batchelor | Section, Township, Range: Calabasas California Quadrangle

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Concave | Slope (%): 5%

Subregion (LRR): C - Mediterranean California | Lat: 34°08'37.56" N | Long: 118°41'40.82" W | Datum: NAD 83

Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

Isolated spring area in northern erosional swale area north of main drainage onsite. Spring drains ~90 feet, then sheet flows into upland vegetation. No connectivity to the main drainage on site.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	30%	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	0 %		
Herb Stratum			
1. *Scirpus americanus*	30%	Yes	OBL
2. *Distichlis spicata*	40%	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	0 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
~10	10YR3/1	80	None				Loam	20% Black/Glayed

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Black gleyed at 2 inches

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ◉ No ○ Depth (inches): 1/2 inch

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): Surface

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water surfacing from spring approximately 30 feet to the northeast.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Messenger Development | City/County: Calabasas/Los Angeles | Sampling Date: 4/12/2012

Applicant/Owner: City of Calabasas | State: CA | Sampling Point: 16

Investigator(s): Cher Batchelor | Section, Township, Range: Calabasas California Quadrangle

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Concave | Slope (%): 5%

Subregion (LRR): C - Mediterranean California | Lat: 34°08'37.61" N | Long: 118°41'40.89" W | Datum: NAD 83

Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks: Immediately west of Point 15 in saltgrass spring/seep area in northern portion of the site.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Distichlis spicata*	100	Yes	FAC
2.			
3.			
4.			
5.			
Total Cover:	100%		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	100	x 3 =	300
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: point completely covered by saltgrass.

SOIL

Sampling Point: 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-15	10YR4/3	90	10YR5/8	10	RM	M	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Strong redox features, wetland hydrology and hydrophytic vegetation present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 10 inches

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil saturated at surface.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Messenger Development | City/County: Calabasas/Los Angeles | Sampling Date: 4/12/2012

Applicant/Owner: City of Calabasas | State: CA | Sampling Point: 17

Investigator(s): Cher Batchelor | Section, Township, Range: Calabasas California Quadrangle

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Concave | Slope (%): 5%

Subregion (LRR): C - Mediterranean California | Lat: 34°08'37.64" N | Long: 118°41'41.02" W | Datum: NAD 83

Soil Map Unit Name: Linne-Los Osos Haploxerepts Association 30-75% slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks: Immediately west of Point 16 just outside of saltgrass area near northern spring.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Hirshfeldia incana*	30	Yes	Not Listed
2. *Marrubium vulgare*	10	No	FAC
3. *Bromus diandrus*	20	Yes	Not Listed
4. *Bromus madritensis*	10	No	NI
5. *Cardus pycnocephalus*	1	No	Not Listed
Total Cover:	71 %		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 29 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	10	x 3 =	30
FACU species		x 4 =	0
UPL species	61	x 5 =	305
Column Totals:	71 (A)		335 (B)

Prevalence Index = B/A = 4.72

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-15	10YR3/2	80	none				Rocky sandy loam	20% rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks: No hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No well defined bank. Location is just outside of where saltgrass ends.

Appendix C

Site Photographs

APPENDIX C. SITE PHOTOGRAPHS

Photo 1. *View northeast at the existing concrete debris basin and upstream vegetation. Photo taken 02/2012.*

Photo 2. *View west/northwest, downstream of riparian vegetation along the primary drainage. Photo taken 02/2012.*

Photo 3. *View east, upstream at the riparian vegetation and adjacent road. Photo taken 02/2012.*

Photo 4. *View southeast of the yerba mansa wet meadow and spring immediately adjacent to primary drainage. Photo taken 02/2012.*

APPENDIX C. SITE PHOTOGRAPHS

Photo 5. *View of spring/yerba mansa meadow through willow thicket; salt grass rim visible in foreground. Photo taken 06/2010.*

Photo 6. *Surface water of southern large spring adjacent to the primary drainage. Photo taken 06/2010.*

Photo 7. *View north of the larger north-south tributary in the middle-north portion of the property. Photo taken 06/2010.*

Photo 8. *Surface water of southern large spring adjacent to the primary drainage. Photo taken 06/2010.*

APPENDIX C. SITE PHOTOGRAPHS

Photo 9: *View south of northern most isolated spring; bulrush leading to willow and saltgrass in foreground. Photo taken 4/2012.*

Photo 11. *View south of upland erosional feature. Non-jurisdictional. Photo taken 4/2012.*

Photo 10. *View south of northern most isolated spring. Photo taken: 4/2012.*

Photo 12. *View north of smaller isolated seep on the north side of the road/main drainage. Cattail-Saltgrass Alliance. Photo taken 4/2012.*

Carlberg ASSOCIATES

Horticulturists and
Registered Consulting
ARBORISTS

OAK TREE REPORT – REVISION 1
CANYON OAKS DEVELOPMENT PROJECT
4790 LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

SUBMITTED TO:

RICK BIANCHI
TNHC CANYON OAKS, LLC
95 ENTERPRISE, SUITE 325
ALISO VIEJO, CALIFORNIA 92656

PREPARED BY:

CHRISTY CUBA
ASCA REGISTERED CONSULTING ARBORIST #502
ISA CERTIFIED ARBORIST #WE 1982A
ISA QUALIFIED TREE RISK ASSESSOR

Sierra Madre Office
80 West Sierra Madre Boulevard, #241
Sierra Madre, California 91024
Office: 626.428.5072

Santa Monica Office
2402 California Avenue
Santa Monica, California 90403
Office: 310.453.TREE (8733)

www.cycarlberg.com

30 OCTOBER 2014

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OAK TREE LOCATION MAP (24” X 36”) ..... BACK POCKET
OAK TREE IMPACT MAP (24” X 36”) ..... BACK POCKET

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Carlberg ASSOCIATES
Horticulturists and Registered Consulting ARBORISTS

30 October 2014

Rick Bianchi
TNHC Canyon Oaks, LLC
95 Enterprise, Suite 325
Aliso Viejo, California 92656

RE: OAK TREE REPORT – REVISION 1: CANYON OAKS DEVELOPMENT PROJECT
4790 LAS VIRGENES ROAD, CALABASAS, CALIFORNIA

EXECUTIVE SUMMARY

The New Home Company (TNHC) proposes development of a residential community with appurtenant utilities and drainage structures, a community recreation lot, an hotel, and dedicated open space lots on the currently vacant 'Canyon Oaks' property located in Calabasas, California. Remediation of an ancient landslide is required as part of the project. This report addresses a revision to the originally proposed project that was the subject of our February 20, 2014 oak tree report (OTR). Additionally, comments received from the City of Calabasas' environmental consultant on the February 2014 OTR are addressed in this report.

The 77-acre property contains indigenous oak trees that are protected by the City of Calabasas Municipal Code. A total of 198 ordinance-sized oak trees were located during the inventory. These trees comprise a canopy area of approximately 3.61 acres. Of the 198 oaks inventoried, 39 are proposed for removal, 14 are proposed for encroachment, and 145 are proposed to remain without impact. Eighteen (18) of 39 removals, 11 of the 14 encroachments, and 43 of the 145 preservation oaks qualify as Heritage status trees. Implementation of this development scheme will result in removal of roughly 0.97 acres of canopy area (27% of the total oak canopy) and approximately 1037.5 additive trunk diameter-inches. Recommendations for preservation, mitigation, construction monitoring, and long-term maintenance are included in this report. Specific mitigation planting plans are being prepared by the project's landscape architect.

INTRODUCTION

This report describes the condition of, and potential impacts to, the protected oak trees existing on the proposed 'Canyon Oaks' property, Vesting Tentative Tract Map No. 71546, in the City of Calabasas.

Sierra Madre Office
80 West Sierra Madre Boulevard, #241
Sierra Madre, California 91024
Office: 626.428.5072

Santa Monica Office
2402 California Avenue
Santa Monica, California 90403
Office: 310.453.TREE (8733)

www.cycarlberg.com

The tree inventory information gathered and represented herein was produced in accordance with the City of Calabasas Oak Tree Preservation and Protection Guidelines, Section 17.26.070 of the Calabasas Municipal Code. Off-property trees located within reasonable distance from the potential construction limits were included as access allowed and as deemed necessary by the undersigned arborist.

The 77-acre property is generally located on the east side of the intersection of Las Virgenes Road and Agoura Road, south of the U.S. Route 101, in the City of Calabasas, County of Los Angeles, California. The Canyon Oaks project consists of grading for the development and associated infrastructure, and construction of the proposed land uses. Remediation of an ancient landslide will also be required in order to prepare the site for land development. The Canyon Oaks project comprises three development components: residential, hotel commercial, and designated open space.

A total of 198 oak trees were found to fall within or immediately adjacent to the property boundaries when the site was inventoried. Of that, 184 are coast live oaks and 14 are valley oaks. The inventory was conducted by Carlberg Associates' arborists in December 2013. About 60% of the surveyed oaks are in good to very good condition overall and 72 meet the minimum size requirement of 24-inches in diameter for the Heritage Tree designation. The enclosed Oak Tree Location Map illustrates the locations of on- and immediately off-site oak trees noted during the field inventory.

METHODOLOGY AND DEFINITIONS

The following discussion expands on the information summarized in the oak tree inventory field worksheet attached in Appendix I.

Oak trees are field-mapped on an Oak Tree Location Map that illustrates the approximate trunk location, canopy spread, and protected zone for each tree (or group of trees when in a grove). Oak trees were located by walking the project site and utilizing a base topographic and boundary map that was provided by the civil engineer, RJR Engineering. The base map included previously mapped locations of the majority of the oak tree trunks[1]. All of the ordinance-sized oak tree locations and canopies were visually recorded in the field by Carlberg Associates' arborists. The full-size Oak Tree Location map is included in the back pocket of this report. The property line was not staked, continuously fenced, or otherwise accurately marked. Therefore, we used topographic features to generally determine the boundaries of the property. Since we did not have authorization to access neighboring properties, we included off-site oak trees in the inventory only when their trunks were immediately adjacent or their canopies appeared to physically cross the property boundary. GPS data was also recorded for each inventoried tree or, when in close proximity, each group of trees. The GPS data is on record in our files and can be produced upon request.

The oak trees were numbered and tagged with an embossed, circular metal tag that was placed on the north side of the trunk. All of the recorded trees have a diameter breast height (DBH; 4.5 feet above the natural grade surrounding the tree) of two (2) inches or greater, and therefore, are protected by the City of Calabasas Oak Tree Preservation and Protection Guidelines and Section 17.26.070 of the Calabasas Municipal Code. In anticipation of future growth during the processing and build-out of the project, oaks with a DBH of less than two inches but more than one inch were located and mapped with a specific symbol on the Oak Tree Location Map. However, these trees are not protected, were not inventoried for health and condition evaluations, and did not receive tags.

[1] To our knowledge, the previous oak tree locations were not surveyed by a licensed land surveyor.

Heritage Trees, by City of Calabasas definition, are those trees with a DBH of 24 inches or greater. For trees with multiple trunks, the cumulative DBH must total 24 inches or greater to be considered a Heritage Tree. However, the City of Calabasas Planning Commission and/or the City Council may classify trees that do not meet these criteria as Heritage Trees. In order to be classified in this manner, the tree must be determined to have "exceptional historic, aesthetic and/or environmental qualities of major significance or prominence to the community" (City of Calabasas Oak Tree Preservation and Protection Guidelines).

The protected zone of a non-Heritage oak tree includes the dripline and extends out to a point at least five feet outside the dripline, or 15 feet from the trunk of a tree, whichever distance is greater. Heritage oak trees have a protected zone that extends to a point at least five feet outside the dripline and no less than 50 feet from the trunk of the tree.

Each tree was assigned three letter grades, one health and one aesthetic rating as required by the City, and an overall grade that incorporates ecological value in addition to health and aesthetic values. The health and aesthetic rating of the trees are based on the guidelines established in the City of Calabasas Oak Tree Preservation and Protection Guidelines. The overall grade of each tree was determined through a subjective evaluation of its health, aesthetic value, and ecological value.

The health of the tree depends on soil conditions, presence or absence of drought or other stressors, and the level of damage caused by fire or infestation of various pests. Mechanical damage can also contribute to health issues. Pests can include termites, wood boring beetles, cambium eating beetles, fungus of various types, and parasitic plants (i.e., mistletoe). Climbing plants which use the oak for support are also included as infestations when physiological function is interrupted. Other factors affecting tree health are discussed later in this report.

While the aesthetic value of a tree is subjective, a tree is usually considered highly aesthetic if it has generally dense foliage, a relatively uniform or spectacular irregular shape, and large size. Ecological value is based on many factors, not all of which have a positive correlation with the health and aesthetic value of the tree. Most important is the likelihood that the tree will continue to survive (this factor is positively correlated to tree health). The following criteria are used to establish each overall grade:

"A" = Outstanding: A healthy and vigorous tree characteristic of its species and reasonably free of any visible signs of stress, disease or pest infestation.

"B" = Above Average: A healthy and vigorous tree with less than 25% of the tree affected by visible signs of stress, disease and/or pest infestation.

"C" = Average: Although healthy in overall appearance, 25% - 75% of the tree shows evidence of stress, disease and/or pest infestation.

"D" = Below Average/Poor: Greater than 75% of this tree shows evidence of stress, disease and/or pest infestation and appears to be in a state of rapid decline. The degree of decline may vary greatly.

"F" = Dead: This tree exhibits no signs of life at all.

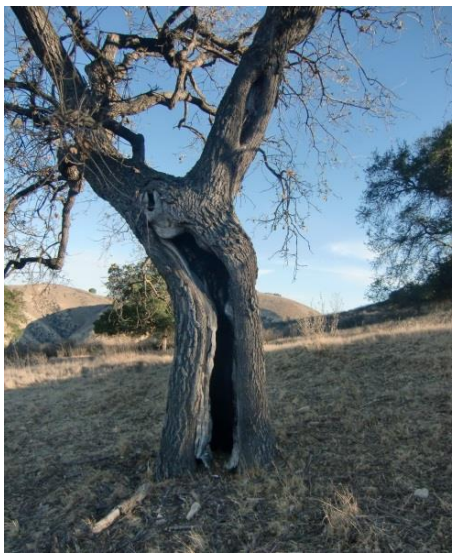
A multi-trunked tree has more than one trunk originating from a single root system or basal burl. In some cases the trunks may not appear to be joined, but their direction of growth and orientation to adjacent trunks indicates the presence of a subsurface connection. This can occur when a large tree declines and the main trunk is

removed or decays, or when a fire or mechanical damage destroys a main stem. The basal burl or root crown will often produce new shoots around the perimeter of the former trunk. In some cases, a basal cavity may persist surrounded by smaller trunks. These trunks may, or may not, be obviously connected. It is not always clear whether a tree is multi-trunked or just has several main branches that diverge near ground level. In these cases the tree is considered multi-trunked if the diverging stems do not exit the ground perpendicularly, but at an angle away from the center of the tree. Oaks with multiple trunks originating from fire-related root or stump sprouting are considered as single trees.

Trunk diameter is measured at breast height, approximately 4½ feet (54") above the natural grade. This measurement system was developed primarily for forestry applications and is most appropriate for trees with vertical growth forms. Oak trees often have large lateral branches diverging from the trunk at or near breast height. Measuring a tree of this type at exactly 4½' above natural grade would often result in an inaccurate impression of tree size. For trees that exhibit lateral branching at breast height, the trunk diameter measurement is made at the nearest point where the measurement can be accomplished without being impeded by the branches. For multi-trunked trees, the number of trunks and the diameter of each trunk is recorded. Measurements that deviate from the standard dbh are noted on the field worksheets.

Evaluation of canopy characteristics includes two sets of measurements; the dripline radius and the height of the branch from the natural grade at the dripline (canopy to grade). The dripline radius is measured along a line extending from the center of the trunk outward in four magnetic compass directions. The measurement is made from the center of the trunk to the outermost living part of the tree. Where a tree has several trunks, the dripline radius is measured from the center of the group. In order to determine canopy to grade, a measurement is taken from the lowest living leaf on the outer-most branch to the natural grade for each compass direction. Four compass directions were recorded for canopy to grade unless the intermediate compass directions were significantly different. Leaves on small sucker stems growing directly from the trunk are not used for branch height measurements. The canopy spread measurement is the maximum canopy diameter of the tree in question.

The health rating of the tree is based on the guidelines established in the City of Calabasas Oak Tree Preservation and Protection Guidelines. The following discussion summarizes some of the most common threats to the health of oak trees. The most important threat to the health of a tree is physical or mechanical damage of a non-biotic origin. This damage may be the result of human activities such as improper pruning, activities resulting in soil compaction, or carelessness and vandalism. However, it is not uncommon for trees growing along watercourses to be undercut by erosion and become unstable.



The most common source of natural mechanical damage is fire. Often, fire will burn through an oak woodland or savanna, eliminating the undergrowth and defoliating the trees, but doing little permanent damage. Oak trees often quickly recover from fire defoliation. A hotter fire will often char the outer bark of the tree but not damage the living cambium tissue beneath the bark. Frequently, the outer bark is so damaged that it sloughs off in a process known as checking. Occasionally, the cambium is killed: usually this is on the lee side of the tree where the fire tends to linger and on the bottom sides of lower

branches where the fire is hottest. When this happens, the dead portion stops growing. However, the remainder of the tree will continue to grow and will often cover the wound with new callous tissue.

Injuries and prolonged periods of drought leave trees vulnerable to many potential sources of damage and disease. Insect pests will take advantage of an injured or stressed tree to invade compromised wood and cambium. Some fungi which break down wood will also take advantage of a wound to enter the tree. These fungi will result in the softening of the wood called heart rot. Heart rot, in combination with the activities of insects, animals and/or fire, will eventually produce cavities in the trunk or branches of the tree.

Structural stability also affects the potential survival of a tree. Trees that are structurally unstable are assumed to have a shorter potential life span than structurally stable trees. Oaks frequently grow in loose soil on steep slopes; this soil is prone to down slope movement, resulting in trees that have been undermined and lean precariously downhill. The action of streams, as described above, also results in unstable trees. Young oaks are highly phototrophic (growing toward light). In woodland environment this trait often causes young trees to grow toward an opening in the canopy that may be far from directly overhead, resulting in a poorly balanced tree. Another common cause of structural instability is severe cavitation or mechanical damage as described above.

The most common health problem affecting oak trees is some form of biological infestation. Almost all oak trees have subcritical infestations of one type or another. Only when the tree has been significantly injured or drought-stressed are the infesting organisms able to invade the tree and become a severe problem. Termites are one of the most common pests to utilize oak trees as a food source. Termites eat only dead wood and must enter the tree through an opening in the bark or root. Most oaks have a limited (and usually harmless) number of termites in the smaller terminal twigs and branches that have died. Wood boring beetles are similar to termites in their requirements and have a similar effect on the tree. Only when the infestation becomes severe do wood eating insects pose a threat to the tree. However, beetles that eat cambium can be a serious threat to a tree even in small numbers. Cambium eaters can easily kill a small branch or trunk by girdling the structure and curtailing the flow of nutrients through the cambium.

There are a host of other insects and arthropods which utilize oaks in a variety of ways. In natural situations these potential threats are kept in check by abundant natural enemies and the oak's natural protective features. Climbing plants, though not technically an infestation, are also included in this category. Two of the most common climbing plants in the southern California oak woodland are the honeysuckle (*Lonicera subspicata*) and poison oak (*Toxicodendron diversilobum*). These species, which utilize oaks (and other trees) for support, can create such a burden and block out enough sunlight as to become a threat to the well-being of a tree.

BACKGROUND AND ASSIGNMENT

The Canyon Oaks project is in the planning review stage. The tentative tract map, grading, drainage, and architectural plans are in preliminary stages of design. An inventory of the oak trees and an impact analysis is required as part of the development application process. This report addresses revisions to the project design resultant from review of the first application package (early 2014), feedback from the Development Review Committee, and review of our February 20, 2014 Oak Tree Report by the City's environmental consultant.

Carlberg Associates was retained to conduct an oak tree inventory, document the existing condition of the trees, analyze the potential impacts of the revised project design, and prepare a comprehensive oak tree report for review and consideration by the City of Calabasas. Preservation guidelines and mitigation

recommendations are also included in this report. In accordance with City guidelines, the Production Replacement Cost (PRC) values for all the inventoried oak trees are included in Appendix III.

OBSERVATIONS

The 77-acre Canyon Oaks project site comprises an east-west trending main canyon that is relatively narrow and steep in the eastern portion, but gradually widens and becomes more shallow to the west. An ephemeral drainage traverses the site from east to west, culminating in a large debris basin at the western boundary. Several small side drainages occur to the north and south of the main stream course. The Anza Calabash Loop Trail cuts through the center of the property and continues off-site. Oak trees are concentrated on the north-facing slopes on the southern portion of the property. A few scattered individuals and groves occur in other portions of the site. Other vegetation on-site comprises native coastal sage scrub, riparian woodland, and a variety of native and non-native grasses and herbaceous plants.

There are 184 ordinance-sized coast live oaks (*Quercus agrifolia*) and 14 valley oaks (*Quercus lobata*) located on or immediately adjacent to the project site. Seventy-two (72) oak trees qualify as Heritage Trees based on their trunk diameters. One coast live oak with a DBH of less than two inches but more than one inch was located and mapped on the Oak Tree Location Map. Small trees were not surveyed for health or condition evaluations and did not receive tags, but were mapped for reference.

Exhibit 1 provides an aerial perspective of the Canyon Oaks project site and the GPS locations of the inventoried oaks. Exhibit 2 illustrates the topography and boundary of the site as it relates to Las Virgenes Road, Agoura Road, and the neighboring community to the west. The full-sized Oak Tree Location Map (back pocket) illustrates the location of the oak trees' trunks, driplines, and protected zones on the base topography. Appendix I and Appendix II contain the full field data matrix and photographs for each inventoried tree, respectively. Table 1 provides a summary of the oak tree resources found on-site, including their tag number, common and botanical names, diameters, heritage status, health, structure, and overall grades.

Panoramic view of the site facing south from near the northwest boundary.

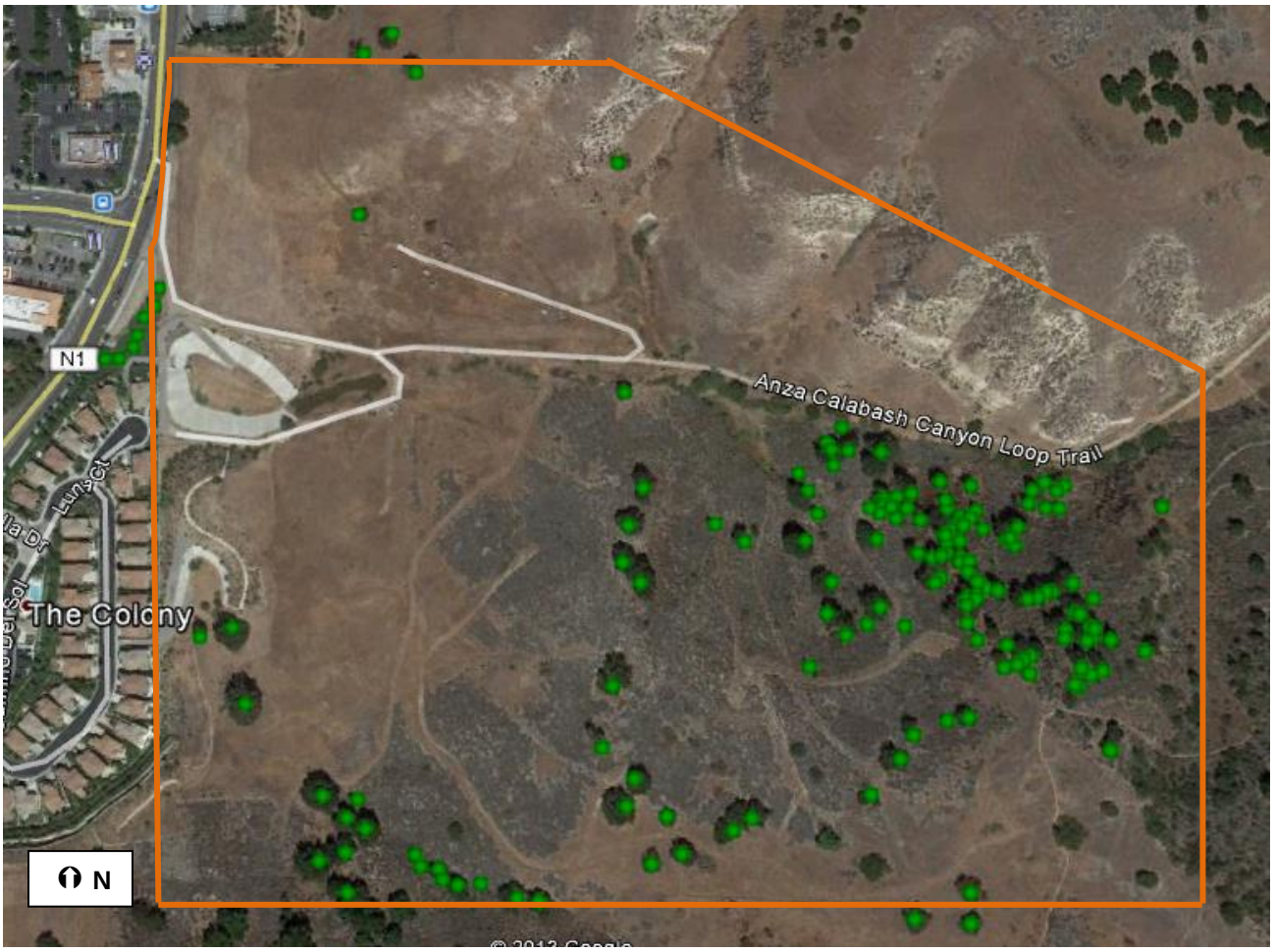


EXHIBIT 1 – AERIAL VIEW OF CANYON OAKS PROPERTY
WITH INVENTORIED OAK TREES
(property line is approximate)
Source: GoogleEarth Not to Scale

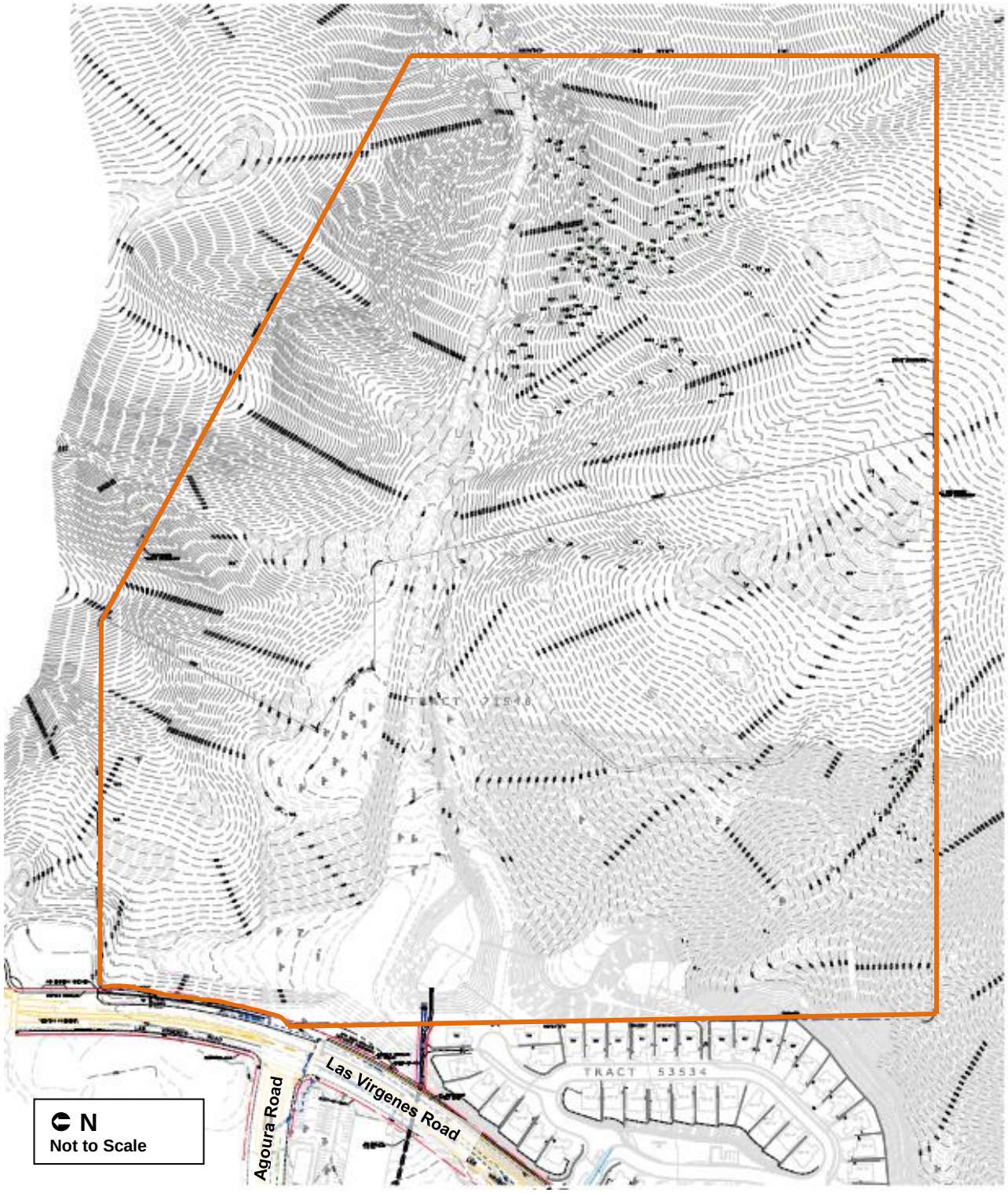


EXHIBIT 2 - CANYON OAKS PROPERTY (77 acres)
(property line is approximate)

TABLE 1 – SUMMARY OF THE OAK TREE INVENTORY

TAG NO.	COMMON NAME	BOTANICAL NAME	DBH	HERITAGE	HEALTH	STRUCTURE	OVERALL GRADE
1	Coast live oak	*Quercus agrifolia*	48	X	B	B	B
2	Coast live oak	*Quercus agrifolia*	16 @ 3'		B	A	B+
3	Valley oak	*Quercus lobata*	46	X	B	B	B
4	Coast live oak	*Quercus agrifolia*	36	X	B-	B-	B-
5	Coast live oak	*Quercus agrifolia*	18		B	B	B
6	Coast live oak	*Quercus agrifolia*	24	X	B	A-	B+
7	Coast live oak	*Quercus agrifolia*	11		B	C+	C+
8	Coast live oak	*Quercus agrifolia*	30	X	B	B	B
9	Coast live oak	*Quercus agrifolia*	2, 3		A	B	A
10	Coast live oak	*Quercus agrifolia*	23		B	B-	B-
11	Coast live oak	*Quercus agrifolia*	5, 9, 12, 23	X	B	B	B
12	Coast live oak	*Quercus agrifolia*	50	X	B	B	B
13	Coast live oak	*Quercus agrifolia*	2		B+	B+	B+
14	Coast live oak	*Quercus agrifolia*	30	X	A	C+	B-
15	Coast live oak	*Quercus agrifolia*	6, 6.5, 7		A	A	A
16	Coast live oak	*Quercus agrifolia*	5, 6		A	A	A
17	Coast live oak	*Quercus agrifolia*	2, 3, 4, 5 @ 3'		A	A	A
18	Coast live oak	*Quercus agrifolia*	10		B	A	B+
19	Coast live oak	*Quercus agrifolia*	7, 7		B	B	B
20	Coast live oak	*Quercus agrifolia*	3, 3.5		B+	B+	B+
21	Coast live oak	*Quercus agrifolia*	3.5, 7		A	A	A
22	Coast live oak	*Quercus agrifolia*	4.5, 5.5		A	A	A
23	Coast live oak	*Quercus agrifolia*	2, 5.5		A	A	A
24	Coast live oak	*Quercus agrifolia*	3		A	A	A
25	Coast live oak	*Quercus agrifolia*	4, 5 @ 3'		A	A	A
26	Coast live oak	*Quercus agrifolia*	20		A	B	B+
27	Coast live oak	*Quercus agrifolia*	18		A-	B	B+
28	Coast live oak	*Quercus agrifolia*	2.5		A	A	A
29	Coast live oak	*Quercus agrifolia*	2.5, 3.5 @ 3'		A	A	A
30	Coast live oak	*Quercus agrifolia*	5		A	A	A
31	Coast live oak	*Quercus agrifolia*	13.5, 17.5	X	A	A	A
32	Coast live oak	*Quercus agrifolia*	24	X	B-	B	B-
33	Coast live oak	*Quercus agrifolia*	18, 18	X	C-	D	C-
34	Coast live oak	*Quercus agrifolia*	48	X	C-	C	C
35	Coast live oak	*Quercus agrifolia*	43 @ base	X	B-	B-	B-
36	Coast live oak	*Quercus agrifolia*	33	X	B	B-	B-
37	Coast live oak	*Quercus agrifolia*	23		B+	B-	B-
38	Coast live oak	*Quercus agrifolia*	8, 23, 25	X	C+	B	C+
39	Coast live oak	*Quercus agrifolia*	30 @ 3'	X	B	C-	C+
40	Coast live oak	*Quercus agrifolia*	38	X	C-	D	D

TAG NO.	COMMON NAME	BOTANICAL NAME	DBH	HERITAGE	HEALTH	STRUCTURE	OVERALL GRADE
41	Coast live oak	*Quercus agrifolia*	42	X	B	B	B
42	Coast live oak	*Quercus agrifolia*	41	X	A-	B	B+
43	Coast live oak	*Quercus agrifolia*	20		A	B	B
44	Valley oak	*Quercus lobata*	27.5	X	B	C	C+
45	Coast live oak	*Quercus agrifolia*	18, 19, 22	X	C+	B	B-
46	Valley oak	*Quercus lobata*	32	X	n/a	n/a	F
47	Coast live oak	*Quercus agrifolia*	30	X	B	B	B
48	Coast live oak	*Quercus agrifolia*	25	X	C	B	C
49	Coast live oak	*Quercus agrifolia*	40	X	C	D	C-
50	Coast live oak	*Quercus agrifolia*	13.5, 14, 14.5, 21	X	C-	D	C-
51	Coast live oak	*Quercus agrifolia*	28	X	C-	C-	C-
52	Coast live oak	*Quercus agrifolia*	20		B	B-	B-
53	Coast live oak	*Quercus agrifolia*	40	X	B-	C-	C-
54	Coast live oak	*Quercus agrifolia*	3.5		A	A	A
55	Coast live oak	*Quercus agrifolia*	2, 3, 4.5 @3'		A	A	A
56	Coast live oak	*Quercus agrifolia*	2.5, 3.5, 4, 6		A	A	A
57	Coast live oak	*Quercus agrifolia*	23		B	B	B
58	Coast live oak	*Quercus agrifolia*	5, 6, 6, 6		A-	A	A
59	Coast live oak	*Quercus agrifolia*	1, 1, 2, 2.5, 3, 4		A-	A	A
60	Coast live oak	*Quercus agrifolia*	5 @ 3'		A-	A	A
61	Coast live oak	*Quercus agrifolia*	23 @3'		C	C	C
62	Coast live oak	*Quercus agrifolia*	14, 16	X	C-	D	C-
63	Coast live oak	*Quercus agrifolia*	23 @ 2'		B-	B-	B-
64	Coast live oak	*Quercus agrifolia*	24	X	B+	B	B
65	Coast live oak	*Quercus agrifolia*	4.5		A	A	A
66	Coast live oak	*Quercus agrifolia*	38	X	B-	B	B
67	Coast live oak	*Quercus agrifolia*	2, 2, 3, 4.5, 6		A	A	A
68	Coast live oak	*Quercus agrifolia*	3, 5, 5		A	A	A
69	Coast live oak	*Quercus agrifolia*	24, 27, 28	X	B+	C	B-
70	Coast live oak	*Quercus agrifolia*	10.5, 17, 17, 18, 20	X	C	B	C+
71	Coast live oak	*Quercus agrifolia*	2, 3, 4, 17, 19	X	C	C	C
72	Coast live oak	*Quercus agrifolia*	7, 23	X	C	D	C-
73	Coast live oak	*Quercus agrifolia*	3, 3 @ 2'		A	A	A
74	Coast live oak	*Quercus agrifolia*	7, 23, 24, 29	X	B	C	B-
75	Coast live oak	*Quercus agrifolia*	2, 3		A	A	A
76	Coast live oak	*Quercus agrifolia*	20		B+	B	B
77	Coast live oak	*Quercus agrifolia*	20, 24, 28	X	C	C	C
78	Coast live oak	*Quercus agrifolia*	7, 9, 14, 20	X	B	C	C+
79	Coast live oak	*Quercus agrifolia*	2, 3.5		A	A	A
80	Coast live oak	*Quercus agrifolia*	16, 18, 22	X	C	C	C

TAG NO.	COMMON NAME	BOTANICAL NAME	DBH	HERITAGE	HEALTH	STRUCTURE	OVERALL GRADE
81	Coast live oak	*Quercus agrifolia*	1, 3		B	B	B
82	Coast live oak	*Quercus agrifolia*	2		B	A	B+
83	Coast live oak	*Quercus agrifolia*	29 @ 3'	X	C	D	C-
84	Coast live oak	*Quercus agrifolia*	18, 20	X	B	C-	C
85	Coast live oak	*Quercus agrifolia*	1, 2, 3		A	A	A
86	Coast live oak	*Quercus agrifolia*	1, 3, 4		A	A	A
87	Coast live oak	*Quercus agrifolia*	4		A	A	A
88	Coast live oak	*Quercus agrifolia*	3 @ 2'		A	A	A
89	Coast live oak	*Quercus agrifolia*	10, 12		C	D	C-
90	Coast live oak	*Quercus agrifolia*	24 @ 4'	X	B	B	B
91	Coast live oak	*Quercus agrifolia*	1, 3		A	A	A
92	Coast live oak	*Quercus agrifolia*	18.5		B	C	C
93	Coast live oak	*Quercus agrifolia*	13		B	C	C
94	Coast live oak	*Quercus agrifolia*	4, 6		A	A	A
95	Coast live oak	*Quercus agrifolia*	13, 17	X	B	C-	C-
96	Coast live oak	*Quercus agrifolia*	18.5		B	B	B
97	Coast live oak	*Quercus agrifolia*	12.5		C	C	C
98	Coast live oak	*Quercus agrifolia*	19		C	B-	C
99	Coast live oak	*Quercus agrifolia*	12		C	C	C
100	Coast live oak	*Quercus agrifolia*	10, 12.5		B	B-	B-
101	Coast live oak	*Quercus agrifolia*	12 @ 4'		B	B-	B-
102	Coast live oak	*Quercus agrifolia*	17		C-	B	C-
103	Coast live oak	*Quercus agrifolia*	3.5		A	A	A
104	Coast live oak	*Quercus agrifolia*	11.5, 15, 17	X	C	C	C
105	Valley oak	*Quercus lobata*	17		B	B	B
106	Valley oak	*Quercus lobata*	33	X	B	B	B
107	Coast live oak	*Quercus agrifolia*	26	X	C	D	C-
108	Valley oak	*Quercus lobata*	36.5	X	B-	D	B-
109	Coast live oak	*Quercus agrifolia*	10		A-	B-	B
110	Coast live oak	*Quercus agrifolia*	7		C	C	C
111	Coast live oak	*Quercus agrifolia*	18		C	C	C
112	Coast live oak	*Quercus agrifolia*	11		C	C	C
113	Coast live oak	*Quercus agrifolia*	16 @ 2'		C-	C	C-
114	Coast live oak	*Quercus agrifolia*	18.5		C-	C	C-
115	Coast live oak	*Quercus agrifolia*	9, 14		C-	C	C-
116	Coast live oak	*Quercus agrifolia*	3		A	A	A
117	Coast live oak	*Quercus agrifolia*	18		B	B	C+
118	Coast live oak	*Quercus agrifolia*	22		C	C	C
119	Coast live oak	*Quercus agrifolia*	23		C-	C-	C-
120	Coast live oak	*Quercus agrifolia*	11		C	C	C
121	Coast live oak	*Quercus agrifolia*	11, 13, 13	X	C	C-	C

TAG NO.	COMMON NAME	BOTANICAL NAME	DBH	HERITAGE	HEALTH	STRUCTURE	OVERALL GRADE
122	Coast live oak	*Quercus agrifolia*	28 @ 3'	X	C	C	C
123	Coast live oak	*Quercus agrifolia*	1.5, 1.5, 2, 2		B+	A	B+
124	Coast live oak	*Quercus agrifolia*	16.5		C	C	C
125	Coast live oak	*Quercus agrifolia*	13, 15, 19	X	C	C	C
126	Coast live oak	*Quercus agrifolia*	9, 10, 12.5	X	B	B	B
127	Coast live oak	*Quercus agrifolia*	3.5, 16		C	C	C
128	Coast live oak	*Quercus agrifolia*	5, 10.5		C	B	B-
129	Coast live oak	*Quercus agrifolia*	7		D	D	D
130	Coast live oak	*Quercus agrifolia*	12, 16	X	C	C	C
131	Coast live oak	*Quercus agrifolia*	17		B	B	B
132	Coast live oak	*Quercus agrifolia*	1, 1, 8		D	D	D
133	Coast live oak	*Quercus agrifolia*	15, 17	X	C	C	C
134	Coast live oak	*Quercus agrifolia*	22.5 @ 3'		B	B	B
135	Coast live oak	*Quercus agrifolia*	10, 11		B	B	B
136	Coast live oak	*Quercus agrifolia*	18		C	C	C
137	Coast live oak	*Quercus agrifolia*	12.5, 13	X	C	B	B
138	Coast live oak	*Quercus agrifolia*	10.5, 11		B	C	C+
139	Coast live oak	*Quercus agrifolia*	16		C	D	D+
140	Coast live oak	*Quercus agrifolia*	16, 18	X	B	B	B-
141	Coast live oak	*Quercus agrifolia*	13, 15, 19	X	B	B	B
142	Coast live oak	*Quercus agrifolia*	8, 10, 14	X	C	C-	C-
143	Coast live oak	*Quercus agrifolia*	10.5, 12, 13	X	C	C	C
144	Coast live oak	*Quercus agrifolia*	8.5		C	D	D+
145	Coast live oak	*Quercus agrifolia*	20		B	B	B
146	Coast live oak	*Quercus agrifolia*	11, 13	X	C	C	C
147	Coast live oak	*Quercus agrifolia*	7.5, 9		C	C	C
148	Coast live oak	*Quercus agrifolia*	18		C	C	C-
149	Coast live oak	*Quercus agrifolia*	12.5		C	C	C-
150	Coast live oak	*Quercus agrifolia*	22.5		D	D	D
151	Coast live oak	*Quercus agrifolia*	25	X	C-	C	C-
152	Coast live oak	*Quercus agrifolia*	19.5		C-	C	C-
153	Coast live oak	*Quercus agrifolia*	20.5		D	C	C-
154	Coast live oak	*Quercus agrifolia*	13, 16, 22	X	A	B	B+
155	Coast live oak	*Quercus agrifolia*	3, 3, 3, 4, 4, 4		A	A	A
156	Coast live oak	*Quercus agrifolia*	3, 3, 3, 4, 5		A	A	A
157	Coast live oak	*Quercus agrifolia*	1, 2.5		A	A	A
158	Coast live oak	*Quercus agrifolia*	2, 3		A	A	A
159	Coast live oak	*Quercus agrifolia*	1, 2		A	A	A
160	Coast live oak	*Quercus agrifolia*	17		B	C	C
161	Coast live oak	*Quercus agrifolia*	26	X	B	B	B
162	Coast live oak	*Quercus agrifolia*	2, 5, 7		A	A	A

TAG NO.	COMMON NAME	BOTANICAL NAME	DBH	HERITAGE	HEALTH	STRUCTURE	OVERALL GRADE
163	Coast live oak	*Quercus agrifolia*	2, 6		B+	B	B+
164	Coast live oak	*Quercus agrifolia*	24 @ 2'	X	C	C	C
165	Coast live oak	*Quercus agrifolia*	9		B+	B	B
166	Coast live oak	*Quercus agrifolia*	7		A	A	A
167	Coast live oak	*Quercus agrifolia*	11.5		D	D	D
168	Coast live oak	*Quercus agrifolia*	4, 10		B	B	B
169	Coast live oak	*Quercus agrifolia*	7.5, 11		B	B	B
170	Coast live oak	*Quercus agrifolia*	4		B	C	B-
171	Coast live oak	*Quercus agrifolia*	20		B	D	C-
172	Coast live oak	*Quercus agrifolia*	14, 19	X	B	B	B
173	Coast live oak	*Quercus agrifolia*	19		C	B	C+
174	Coast live oak	*Quercus agrifolia*	17, 18	X	C	B	C+
175	Coast live oak	*Quercus agrifolia*	24 @ 2.5'	X	D	D	D
176	Coast live oak	*Quercus agrifolia*	14		C-	C-	C-
177	Coast live oak	*Quercus agrifolia*	12		B-	B	B
178	Coast live oak	*Quercus agrifolia*	18		B	B	B
179	Coast live oak	*Quercus agrifolia*	12, 12, 14	X	B	B	B
180	Coast live oak	*Quercus agrifolia*	2.5, 12		B	B	B
181	Coast live oak	*Quercus agrifolia*	3, 6		C	B	B-
182	Coast live oak	*Quercus agrifolia*	16		B	B	B
183	Coast live oak	*Quercus agrifolia*	20		B	C-	C
184	Coast live oak	*Quercus agrifolia*	20		B	B	B
185	Coast live oak	*Quercus agrifolia*	39	X	B	D	C
186	Coast live oak	*Quercus agrifolia*	65	X	B+	B+	B+
187	Coast live oak	*Quercus agrifolia*	49	X	A	B	B+
188	Valley oak	*Quercus lobata*	43 @3'	X	C	D	C-
189	Valley oak	*Quercus lobata*	23		B	B	B
190	Valley oak	*Quercus lobata*	27	X	B	A	B
191	Valley oak	*Quercus lobata*	16		U	U	U
192	Valley oak	*Quercus lobata*	5		B	A	B+
193	Valley oak	*Quercus lobata*	8		A	A	A
194	Valley oak	*Quercus lobata*	4.5		A	B	A-
195	Coast live oak	*Quercus agrifolia*	1, 1, 1 @base		A	A	A
196	Coast live oak	*Quercus agrifolia*	4		C	D	D
197	Valley oak	*Quercus lobata*	2.5		D	D	D
198	Coast live oak	*Quercus agrifolia*	3.5		B	D	C-

The majority of the inventoried oak trees were found to be in very good to excellent overall health. Close examination reveals that the majority of the oak trees have experienced at least one episode of wildfire and they are being impacted to some degree by current drought conditions. These are normal environmental occurrences in Southern California and native oaks are well-adapted to survive such conditions. Roughly 60% of the oaks were graded overall in the A or B range. The overall grade takes into account both physiological health and structural integrity. Exhibits 3 and 4 summarize the overall grade distribution and the degree of fire damage noted throughout the population, respectively.

The one "unknown" in Exhibit 3 relates to an oak tree that was inaccessible. Since the majority of the deciduous valley oaks were out of leaf at the time of our survey, we could not accurately gauge the overall health of the tree from a distance. That tree is well outside the potential area of impact and an update will be provided if deemed necessary.

Most of the oaks throughout the site have experienced some level of fire damage. Signs of past fire damage include burned-out cavities in trunks and branches, varying degrees of charring, bark checking where new bark tissue has formed underneath, callous seams along trunks and branches, dieback in the crown, and defoliation of twigs and branches. The majority of the oaks exhibit minor to moderate damage and are recovering well. Callous tissue generation and canopy regeneration is actively occurring on most trees. Root-crown regeneration (stump-sprouting) is common on smaller oaks that were severely burnt. Those trees are vigorously reestablishing as multi-trunk trees.

Roughly 24% of the oaks exhibit severe fire damage, such as collapse of trunks or major limbs and severe defoliation and dieback in the crown with limited recovery.

EXHIBIT 3 - SUMMARY OF OVERALL GRADE DISTRIBUTION

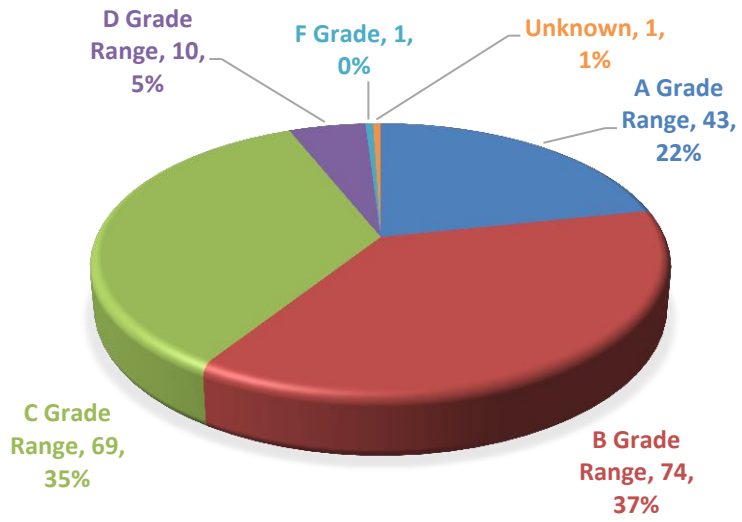
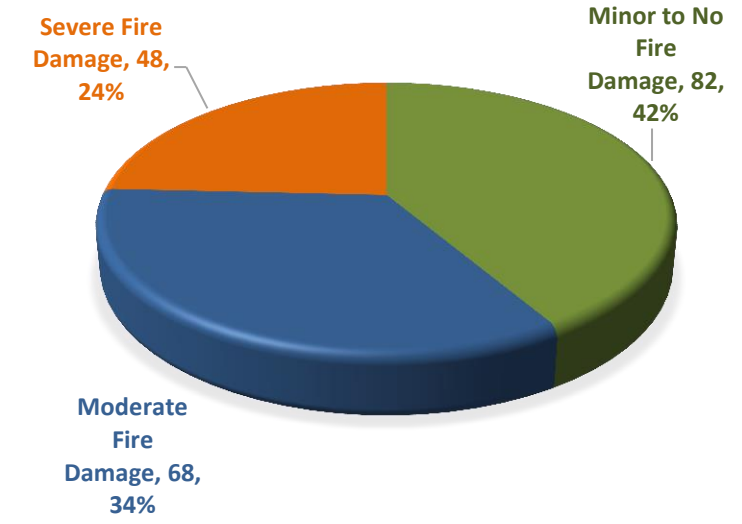


EXHIBIT 4 - SUMMARY OF FIRE DAMAGE

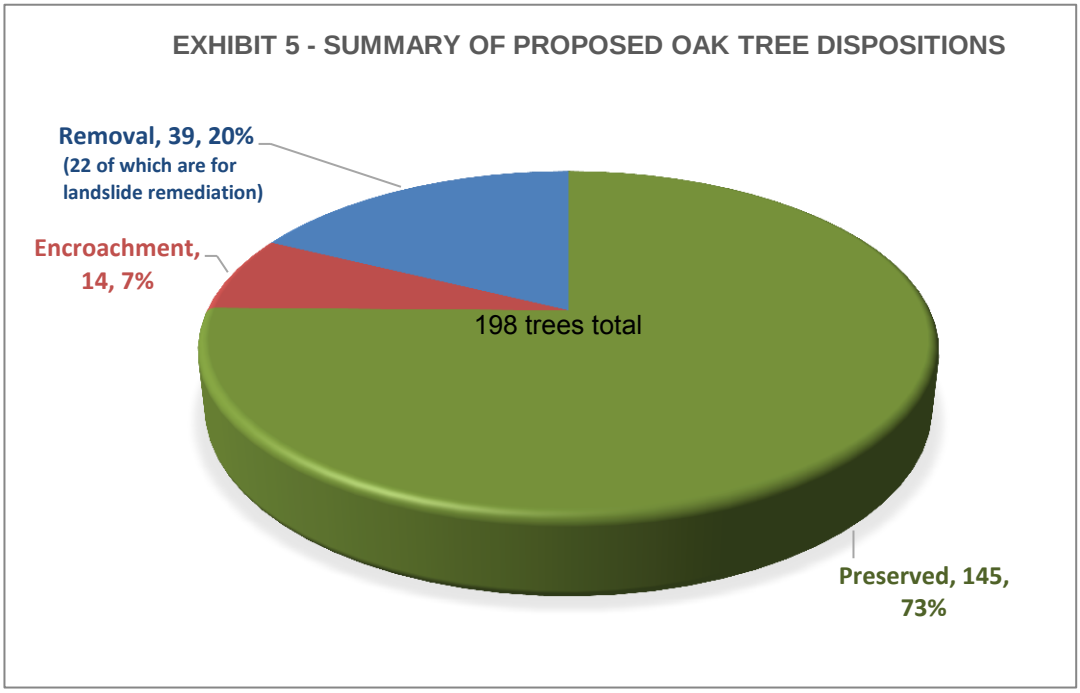


DISCUSSION

Canyon Oaks proposes a gated residential neighborhood of single-family detached homes and affordable condominiums, a community recreation area, a first-class hotel catering to leisure and business travelers, and preservation of open space. An ancient landslide is located onsite. It covers a large area in the south-central portion of the property. Remediation of the landslide will be required to stabilize that portion of the slope for the development proposed in the valley below.

A full-sized copy of the Oak Tree Location and Impact Map is enclosed in a back pocket of this report. A reduced version of that map is included on the next page as Exhibit 6. Table 2 summarizes the oak trees proposed to remain without impact. Table 3 summarizes the oaks proposed to remain with some encroachment into their protected zones. Table 4 summarizes the oak trees proposed for removal. Exhibit 5, below, summarizes the overall dispositions of the oak trees with implementation of the proposed project.

Value assessments for each ordinance-sized tree using the City-required PRC method are included in Appendix III. Cross-sections for the proposed encroachment trees have not been prepared at this early stage of the development process. Detailed cross-sections may be prepared once the conceptual grading plans and architectural drawings have been reviewed.



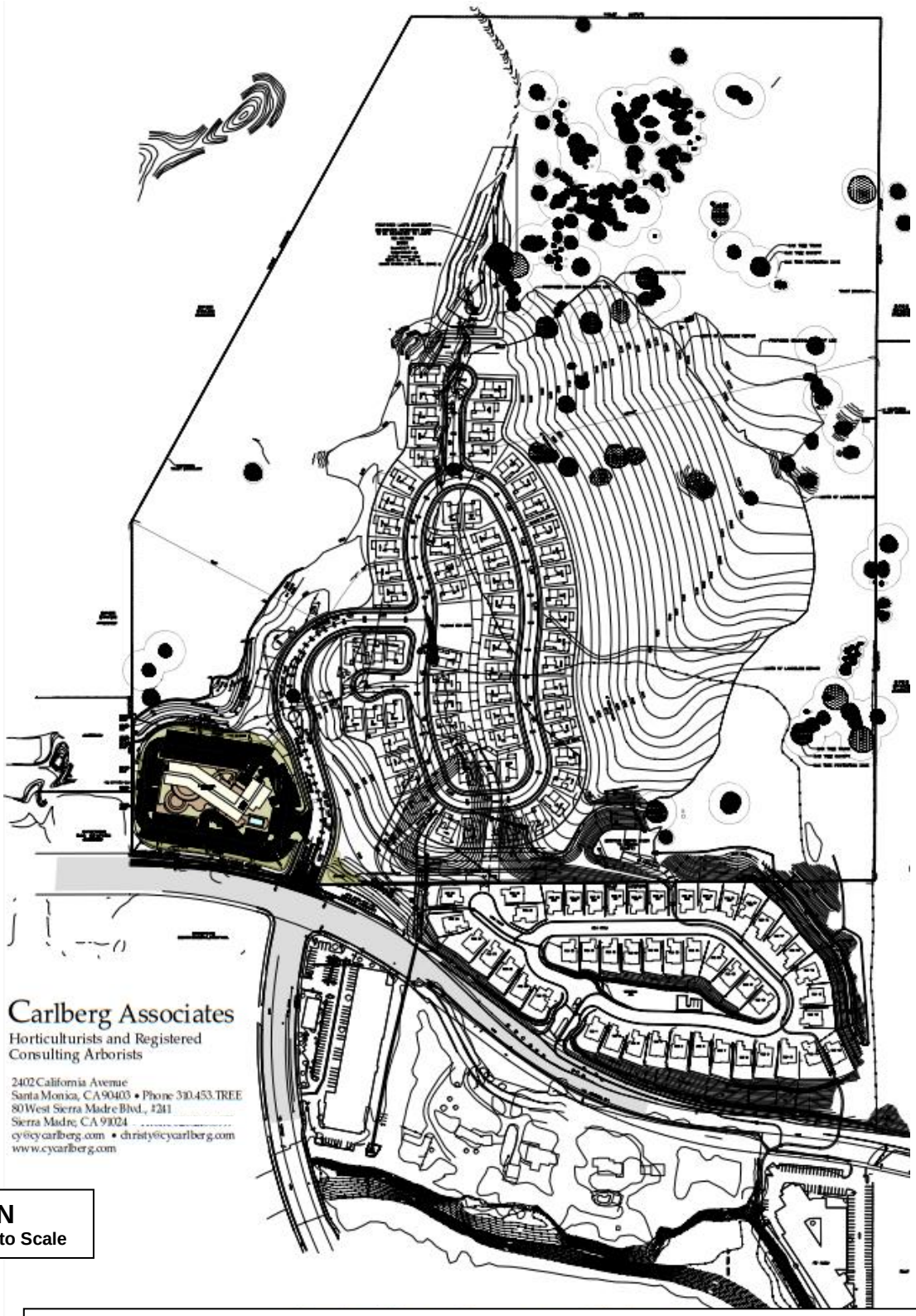


EXHIBIT 5 - CANYON OAKS PROJECT – REDUCED COPY OF THE OAK TREE IMPACT MAP

TABLE 2 – OAK TREES TO REMAIN WITHOUT IMPACT

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24" DBH)	OVERALL GRADE	DISPOSITION	CANOPY AREA (SQ. FT.)
2	*Quercus agrifolia*	16 @ 3'		B+	Not Impacted	900
3	*Quercus lobata*	46	X	B	Not Impacted	2021
4	*Quercus agrifolia*	36	X	B-	Not Impacted	2250
5	*Quercus agrifolia*	18		B	Not Impacted	1050
6	*Quercus agrifolia*	24	X	B+	Not Impacted	832
7	*Quercus agrifolia*	11		C+	Not Impacted	168
8	*Quercus agrifolia*	30	X	B	Not Impacted	3300
9	*Quercus agrifolia*	2, 3		A	Not Impacted	49
10	*Quercus agrifolia*	23		B-	Not Impacted	1800
11	*Quercus agrifolia*	5, 9, 12, 23	X	B	Not Impacted	1290
12	*Quercus agrifolia*	50	X	B	Not Impacted	4200
13	*Quercus agrifolia*	2		B+	Not Impacted	36
14	*Quercus agrifolia*	30	X	B-	Not Impacted	1400
15	*Quercus agrifolia*	6, 6.5, 7		A	Not Impacted	621
16	*Quercus agrifolia*	5, 6		A	Not Impacted	196
17	*Quercus agrifolia*	2, 3, 4, 5 @ 3'		A	Not Impacted	90
18	*Quercus agrifolia*	10		B+	Not Impacted	208
19	*Quercus agrifolia*	7, 7		B	Not Impacted	288
20	*Quercus agrifolia*	3, 3.5		B+	Not Impacted	50
21	*Quercus agrifolia*	3.5, 7		A	Not Impacted	224
22	*Quercus agrifolia*	4.5, 5.5		A	Not Impacted	90
23	*Quercus agrifolia*	2, 5.5		A	Not Impacted	36
24	*Quercus agrifolia*	3		A	Not Impacted	16
25	*Quercus agrifolia*	4, 5 @ 3'		A	Not Impacted	96
26	*Quercus agrifolia*	20		B+	Not Impacted	700
27	*Quercus agrifolia*	18		B+	Not Impacted	544
28	*Quercus agrifolia*	2.5		A	Not Impacted	16
29	*Quercus agrifolia*	2.5, 3.5 @ 3'		A	Not Impacted	64
30	*Quercus agrifolia*	5		A	Not Impacted	64
44	*Quercus lobata*	27.5	X	C+	Not Impacted	1312
46	*Quercus lobata*	32	X	F	Not Impacted	0
47	*Quercus agrifolia*	30	X	B	Not Impacted	1760
48	*Quercus agrifolia*	25	X	C	Not Impacted	1600
49	*Quercus agrifolia*	40	X	C-	Not Impacted	1312
75	*Quercus agrifolia*	2, 3		A	Not Impacted	36
76	*Quercus agrifolia*	20		B	Not Impacted	200
77	*Quercus agrifolia*	20, 24, 28	X	C	Not Impacted	2070
78	*Quercus agrifolia*	7, 9, 14, 20	X	C+	Not Impacted	957

TABLE 2 – OAK TREES TO REMAIN WITHOUT IMPACT

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24" DBH)	OVERALL GRADE	DISPOSITION	CANOPY AREA (SQ. FT.)
79	*Quercus agrifolia*	2, 3.5		A	Not Impacted	56
80	*Quercus agrifolia*	16, 18, 22	X	C	Not Impacted	1440
81	*Quercus agrifolia*	1, 3		B	Not Impacted	48
82	*Quercus agrifolia*	2		B+	Not Impacted	4
83	*Quercus agrifolia*	29 @ 3'	X	C-	Not Impacted	1088
84	*Quercus agrifolia*	18, 20	X	C	Not Impacted	1008
85	*Quercus agrifolia*	1, 2, 3		A	Not Impacted	36
86	*Quercus agrifolia*	1, 3, 4		A	Not Impacted	25
87	*Quercus agrifolia*	4		A	Not Impacted	20
88	*Quercus agrifolia*	3 @ 2'		A	Not Impacted	12
89	*Quercus agrifolia*	10, 12		C-	Not Impacted	110
90	*Quercus agrifolia*	24 @ 4'	X	B	Not Impacted	880
91	*Quercus agrifolia*	1, 3		A	Not Impacted	16
92	*Quercus agrifolia*	18.5		C	Not Impacted	704
93	*Quercus agrifolia*	13		C	Not Impacted	198
94	*Quercus agrifolia*	4, 6		A	Not Impacted	256
95	*Quercus agrifolia*	13, 17	X	C-	Not Impacted	486
96	*Quercus agrifolia*	18.5		B	Not Impacted	676
97	*Quercus agrifolia*	12.5		C	Not Impacted	256
98	*Quercus agrifolia*	19		C	Not Impacted	1044
99	*Quercus agrifolia*	12		C	Not Impacted	192
100	*Quercus agrifolia*	10, 12.5		B-	Not Impacted	540
101	*Quercus agrifolia*	12 @ 4'		B-	Not Impacted	420
102	*Quercus agrifolia*	17		C-	Not Impacted	900
103	*Quercus agrifolia*	3.5		A	Not Impacted	54
104	*Quercus agrifolia*	11.5, 15, 17	X	C	Not Impacted	1156
105	*Quercus lobata*	17		B	Not Impacted	1368
106	*Quercus lobata*	33	X	B	Not Impacted	990
107	*Quercus agrifolia*	26	X	C-	Not Impacted	1050
111	*Quercus agrifolia*	18		C	Not Impacted	320
112	*Quercus agrifolia*	11		C	Not Impacted	216
113	*Quercus agrifolia*	16 @ 2'		C-	Not Impacted	460
114	*Quercus agrifolia*	18.5		C-	Not Impacted	806
115	*Quercus agrifolia*	9, 14		C-	Not Impacted	528
116	*Quercus agrifolia*	3		A	Not Impacted	24
117	*Quercus agrifolia*	18		C+	Not Impacted	1292
118	*Quercus agrifolia*	22		C	Not Impacted	1368
119	*Quercus agrifolia*	23		C-	Not Impacted	1548

TABLE 2 – OAK TREES TO REMAIN WITHOUT IMPACT

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24" DBH)	OVERALL GRADE	DISPOSITION	CANOPY AREA (SQ. FT.)
120	*Quercus agrifolia*	11		C	Not Impacted	128
121	*Quercus agrifolia*	11, 13, 13	X	C	Not Impacted	1520
122	*Quercus agrifolia*	28 @ 3'	X	C	Not Impacted	960
123	*Quercus agrifolia*	1.5, 1.5, 2, 2		B+	Not Impacted	36
124	*Quercus agrifolia*	16.5		C	Not Impacted	744
125	*Quercus agrifolia*	13, 15, 19	X	C	Not Impacted	1190
126	*Quercus agrifolia*	9, 10, 12.5	X	B	Not Impacted	1204
127	*Quercus agrifolia*	3.5, 16		C	Not Impacted	660
128	*Quercus agrifolia*	5, 10.5		B-	Not Impacted	360
129	*Quercus agrifolia*	7		D	Not Impacted	70
130	*Quercus agrifolia*	12, 16	X	C	Not Impacted	1216
131	*Quercus agrifolia*	17		B	Not Impacted	1080
132	*Quercus agrifolia*	1, 1, 8		D	Not Impacted	280
133	*Quercus agrifolia*	15, 17	X	C	Not Impacted	1440
134	*Quercus agrifolia*	22.5 @ 3'		B	Not Impacted	1368
135	*Quercus agrifolia*	10, 11		B	Not Impacted	528
136	*Quercus agrifolia*	18		C	Not Impacted	560
137	*Quercus agrifolia*	12.5, 13	X	B	Not Impacted	638
138	*Quercus agrifolia*	10.5, 11		C+	Not Impacted	345
139	*Quercus agrifolia*	16		D+	Not Impacted	144
140	*Quercus agrifolia*	16, 18	X	B-	Not Impacted	748
141	*Quercus agrifolia*	13, 15, 19	X	B	Not Impacted	1476
142	*Quercus agrifolia*	8, 10, 14	X	C-	Not Impacted	396
143	*Quercus agrifolia*	10.5, 12, 13	X	C	Not Impacted	520
144	*Quercus agrifolia*	8.5		D+	Not Impacted	78
145	*Quercus agrifolia*	20		B	Not Impacted	1400
146	*Quercus agrifolia*	11, 13	X	C	Not Impacted	896
147	*Quercus agrifolia*	7.5, 9		C	Not Impacted	396
148	*Quercus agrifolia*	18		C-	Not Impacted	400
149	*Quercus agrifolia*	12.5		C-	Not Impacted	440
150	*Quercus agrifolia*	22.5		D	Not Impacted	520
151	*Quercus agrifolia*	25	X	C-	Not Impacted	874
152	*Quercus agrifolia*	19.5		C-	Not Impacted	864
153	*Quercus agrifolia*	20.5		C-	Not Impacted	756
155	*Quercus agrifolia*	3, 3, 3, 4, 4, 4		A	Not Impacted	256
156	*Quercus agrifolia*	3, 3, 3, 4, 5		A	Not Impacted	288
157	*Quercus agrifolia*	1, 2.5		A	Not Impacted	36
158	*Quercus agrifolia*	2, 3		A	Not Impacted	36

TABLE 2 – OAK TREES TO REMAIN WITHOUT IMPACT

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24" DBH)	OVERALL GRADE	DISPOSITION	CANOPY AREA (SQ. FT.)
159	*Quercus agrifolia*	1, 2		A	Not Impacted	30
160	*Quercus agrifolia*	17		C	Not Impacted	440
161	*Quercus agrifolia*	26	X	B	Not Impacted	540
162	*Quercus agrifolia*	2, 5, 7		A	Not Impacted	572
163	*Quercus agrifolia*	2, 6		B+	Not Impacted	256
164	*Quercus agrifolia*	24 @ 2'	X	C	Not Impacted	810
165	*Quercus agrifolia*	9		B	Not Impacted	306
166	*Quercus agrifolia*	7		A	Not Impacted	100
167	*Quercus agrifolia*	11.5		D	Not Impacted	280
168	*Quercus agrifolia*	4, 10		B	Not Impacted	360
169	*Quercus agrifolia*	7.5, 11		B	Not Impacted	480
170	*Quercus agrifolia*	4		B-	Not Impacted	16
171	*Quercus agrifolia*	20		C-	Not Impacted	598
172	*Quercus agrifolia*	14, 19	X	B	Not Impacted	1368
173	*Quercus agrifolia*	19		C+	Not Impacted	850
174	*Quercus agrifolia*	17, 18	X	C+	Not Impacted	891
175	*Quercus agrifolia*	24 @ 2.5'	X	D	Not Impacted	0
176	*Quercus agrifolia*	14		C-	Not Impacted	180
177	*Quercus agrifolia*	12		B	Not Impacted	312
178	*Quercus agrifolia*	18		B	Not Impacted	660
179	*Quercus agrifolia*	12, 12, 14	X	B	Not Impacted	1600
180	*Quercus agrifolia*	2.5, 12		B	Not Impacted	352
181	*Quercus agrifolia*	3, 6		B-	Not Impacted	84
182	*Quercus agrifolia*	16		B	Not Impacted	900
183	*Quercus agrifolia*	20		C	Not Impacted	836
184	*Quercus agrifolia*	20		B	Not Impacted	1224
188	*Quercus lobata*	43 @3'	X	C-	Not Impacted	2240
189	*Quercus lobata*	23		B	Not Impacted	1190
190	*Quercus lobata*	27	X	B	Not Impacted	1225
191	*Quercus lobata*	16		U	Not Impacted	750
195	*Quercus agrifolia*	1, 1, 1 @base		A	Not Impacted	16

1) coast live oak (*Quercus agrifolia*) or valley oak (*Quercus lobata*)

TABLE 3 – OAK TREES TO REMAIN WITH ENCROACHMENT

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24")	OVERALL GRADE	DISPOSITION	REASON FOR ENCROACHMENT	CANOPY AREA (SQ. FT.)
1	*Quercus agrifolia*	48	X	B	Encroachment	Grading for bldg. pad in eastern edge of PZ	3024
42	*Quercus agrifolia*	41	X	B+	Encroachment	landslide remediation	1240
45	*Quercus agrifolia*	18, 19, 22	X	B-	Encroachment	edge of grading above/outside landslide remediation	1575
50	*Quercus agrifolia*	13.5, 14, 14.5, 21	X	C-	Encroachment	edge of grading above/outside landslide remediation	1520
53	*Quercus agrifolia*	40	X	C-	Encroachment	edge of grading above/outside landslide remediation	840
62	*Quercus agrifolia*	14, 16	X	C-	Encroachment	eastern debris basin	216
63	*Quercus agrifolia*	23 @ 2'		B-	Encroachment	eastern debris basin	960
71	*Quercus agrifolia*	2, 3, 4, 17, 19	X	C	Encroachment	grading above/outside landslide remediation	1260
72	*Quercus agrifolia*	7, 23	X	C-	Encroachment	landslide remediation	868
73	*Quercus agrifolia*	3, 3 @ 2'		A	Encroachment	landslide remediation	16
74	*Quercus agrifolia*	7, 23, 24, 29	X	B-	Encroachment	landslide remediation	2150
154	*Quercus agrifolia*	13, 16, 22	X	B+	Encroachment	landslide remediation	1368
185	*Quercus agrifolia*	39	X	C	Encroachment	eastern debris basin	2040
194	*Quercus lobata*	4.5		A-	Encroachment	off-site grading up to west PL	182

1) coast live oak (*Quercus agrifolia*) or valley oak (*Quercus lobata*)

TABLE 4 – OAK TREES PROPOSED FOR REMOVAL

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24")	OVERALL	DISPOSITION	REASON FOR REMOVAL	CANOPY AREA (SQ. FT.)
31	*Quercus agrifolia*	13.5, 17.5	X	A	Removal	Grading for Bldg. pad	1080
32	*Quercus agrifolia*	24	X	B-	Removal	landslide remediation	1645
33	*Quercus agrifolia*	18, 18	X	C-	Removal	landslide remediation	1176
34	*Quercus agrifolia*	48	X	C	Removal	landslide remediation	1935
35	*Quercus agrifolia*	43 @ base	X	B-	Removal	landslide remediation	1800
36	*Quercus agrifolia*	33	X	B-	Removal	landslide remediation	2000
37	*Quercus agrifolia*	23		B-	Removal	landslide remediation	1596
38	*Quercus agrifolia*	8, 23, 25	X	C+	Removal	landslide remediation	2530
39	*Quercus agrifolia*	30 @ 3'	X	C+	Removal	landslide remediation	660
40	*Quercus agrifolia*	38	X	D	Removal	landslide remediation	825

TABLE 4 – OAK TREES PROPOSED FOR REMOVAL

TAG NUMBER	BOTANICAL NAME[1]	DBH	HERITAGE (24")	OVERALL	DISPOSITION	REASON FOR REMOVAL	CANOPY AREA (SQ. FT.)
41	*Quercus agrifolia*	42	X	B	Removal	grading above landslide remediation	1296
43	*Quercus agrifolia*	20		B	Removal	landslide remediation	1188
51	*Quercus agrifolia*	28	X	C-	Removal	edge of grading above/outside landslide remediation	1008
52	*Quercus agrifolia*	20		B-	Removal	edge of grading above/outside landslide remediation	672
54	*Quercus agrifolia*	3.5		A	Removal	landslide remediation	16
55	*Quercus agrifolia*	2, 3, 4.5 @3'		A	Removal	landslide remediation	64
56	*Quercus agrifolia*	2.5, 3.5, 4, 6		A	Removal	landslide remediation	132
57	*Quercus agrifolia*	23		B	Removal	landslide remediation	990
58	*Quercus agrifolia*	5, 6, 6, 6		A	Removal	landslide remediation	234
59	*Quercus agrifolia*	1, 1, 2, 2.5, 3, 4		A	Removal	landslide remediation	144
60	*Quercus agrifolia*	5 @ 3'		A	Removal	eastern debris basin	81
61	*Quercus agrifolia*	23 @3'		C	Removal	eastern debris basin	1140
64	*Quercus agrifolia*	24	X	B	Removal	grading above/outside landslide remediation	728
65	*Quercus agrifolia*	4.5		A	Removal	landslide remediation	144
66	*Quercus agrifolia*	38	X	B	Removal	landslide remediation	2250
67	*Quercus agrifolia*	2, 2, 3, 4.5, 6		A	Removal	landslide remediation	352
68	*Quercus agrifolia*	3, 5, 5		A	Removal	landslide remediation	135
69	*Quercus agrifolia*	24, 27, 28	X	B-	Removal	landslide remediation	2750
70	*Quercus agrifolia*	10.5, 17, 17, 18, 20	X	C+	Removal	landslide remediation	2240
108	*Quercus lobata*	36.5	X	B-	Removal	Overex. required for slope behind hotel pad	1560
109	*Quercus agrifolia*	10		B	Removal	grading for entry street & bldg. pad	841
110	*Quercus agrifolia*	7		C	Removal	grading for entry street & bldg. pad	65
186	*Quercus agrifolia*	65	X	B+	Removal	eastern debris basin	3600
187	*Quercus agrifolia*	49	X	B+	Removal	eastern debris basin	4875
192	*Quercus lobata*	5		B+	Removal	off-site grading up to west PL	80
193	*Quercus lobata*	8		A	Removal	off-site grading up to west PL	440
196	*Quercus agrifolia*	4		D	Removal	off-site drainage structure	36
197	*Quercus lobata*	2.5		D	Removal	off-site drainage structure	8
198	*Quercus agrifolia*	3.5		C-	Removal	off-site drainage structure	35

1) coast live oak (*Quercus agrifolia*) or valley oak (*Quercus lobata*)

CONCLUSION AND RECOMMENDATIONS

The proposed Canyon Oaks project will require cut and fill grading to accommodate the development of streets, building pads, and drainage devices on the 77-acre site. Remedial landslide repair will be required to stabilize a large portion of the hillside south of the proposed development areas. Overall, 145 of the 198 inventoried oak trees will be preserved with no impact based on the project design. Encroachments and removals are discussed below.

Proposed Canopy Retention and Removal

The City of Calabasas promotes oak woodland conservation through a set of Canopy Retention Standards (OTPPG pg. 21). No more than 25% of the total canopy cover for a given property may be removed without City Council approval. The total oak tree canopy cover associated with the 198 oak trees present on, or immediately adjacent to, the Canyon Oaks property is roughly 3.61 acres. Proposed removal of 39 oak trees as identified above would remove roughly 0.97 acres of oak canopy cover. This constitutes 27% of the overall canopy cover and will require consideration and approval by the City Council as part of the overall project application and oak tree permit.

Encroachments

Implementation of the project would result in the encroachment of 14 protected oak trees. Encroachments would occur at the edges of the manufactured slopes proposed around the building pads, debris basins, and for the landslide remediation. Encroachment would include grade changes within the protected zone of the tree and canopy and/or possible root pruning. Based on the degree of encroachment illustrated on the Oak Tree Impact Map, long-term, significant impacts to the encroachment trees are not anticipated. Since the grading design is preliminary at this stage of the development, the details of each encroachment may be revisited during final engineering and precise grading design.

Removals

Implementation of the project is expected to result in the removal of 39 protected oak trees. Twenty-two (22) of the 39 removals are the direct consequence of remedial grading for the landslide repair. The combined trunk diameters of the 39 removal oak trees equals 1,037.5 inches of additive[2] trunk diameter at breast height. The combined canopy cover of these oak trees equals roughly 42,351 square feet (0.97acres). This represents approximately 27% of the roughly 3.61 acres of oak tree canopy present on-site.

MITIGATION RECOMMENDATIONS

General mitigation recommendations for the loss of 39 oak trees onsite are outlined below under the subtitle "Removal Trees". Recommendations for management of the encroachment oak trees during construction are outlined under the subtitle "Encroachment Trees". Mitigation recommendations were developed through the application of conditions in the City's ordinance. General maintenance guidelines for preserved and mitigation trees follows under the heading "Oak Tree Management & Preservation Guidelines."

Removal Trees

In order to offset the loss of 39 oak trees, it is recommended that the applicant be responsible for the mitigation measures listed below. These measures are in accordance with the Calabasas Oak Tree Preservation and Protection Guidelines and Section 17.26.070 of the Calabasas Municipal Code (attached).

[2] The City of Calabasas uses the cumulative diameter of all trunks, not the cumulative trunk *area*, when calculating removal impacts.

1. Given the steep topography of the site, relocation is not recommended for any of the removal trees.

2. Plant replacement oak trees onsite to replace each inch of tree trunk diameter removed at a 1:1 ratio. The diameters of the 39 removal trees total 1,037.5 inches. The mitigation requirements include but are not limited to the following:

    a. Replacement trees shall consist of Coast Live Oak *(Q. agrifolia)* trees and Valley Oak (*Q. lobata*) trees that have been raised at a nursery which harvests acorns from local oak trees.
    b. The size and quality of the replacement trees shall be consistent with the specifications outlined in Section VIII.7.A-C of the Oak Tree Preservation and Protection Guidelines. Small (5 gallon) oak trees shall be utilized whenever possible. Every attempt shall be made to acquire trees grown from local acorns.
    c. Inch for inch replacement should correspond to the species removed.
    d. Replacement trees shall be planted in accordance with the procedures established in Section VIII.7.D of the Oak Tree Preservation and Protection Guidelines.

3. Every attempt should be made to complete the mitigation for loss of oaks onsite. However, if it is not feasible to replace trees at the required replacement ratio on-site, the applicant should enter into an agreement with the City of Calabasas to mitigate the approved removal oaks off-site. In this case, the City may require an in-lieu fee (to be determined), or the replacement cost of the mitigation trees may be required to equal the cost of the replacement value associated with the removal tree(s) as determined by the PRC Method in this report.

4. Replacement trees shall be planted onsite in the areas proposed for open space and/or in the restoration areas of the project that exhibit conditions favorable for oak growth. If this is not feasible, then the oaks may be planted on a city-approved off-site property, as detailed in a mitigation agreement.

5. Oak trees which are approved for relocation will be considered removals, and at the City's discretion may require replacement mitigation in addition to their relocation (Section VIII.9.A, Oak Tree Preservation and Protection Guidelines).

6. The applicant shall be responsible for the monitoring and maintenance of the mitigation oaks and relocated trees (if any) for a minimum of five years. If any replacement or relocated tree(s) die during the five-year period, the applicant shall plant new replacement trees and the five-year monitoring period shall begin again from the date of planting for the replacement oak.

7. Monitoring intervals will be determined by the project's Oak Tree Consultant (Consulting Arborist) based on site conditions, but will minimally occur on a bi-weekly basis.

8. Following construction, monitoring will be conducted at least at quarterly intervals for the first three years, and will continue bi-annually for the next two years, or more if warranted.

9. Monitoring of trees to be relocated (if any) will commence at least three months prior to any encroachment or grading activities so as to provide important baseline information used to assess the changes in the tree following transplantation.

10. Success criteria for replacement and relocation trees will be based on the success standards set forth in Section VIII.10 of the Oak Tree Preservation and Protection Guidelines.

11. Unless waived by the City, a refundable security deposit, in an equal amount to the PRC value of the removal trees, including the cost of planting and possible replacement, shall be deposited in trust (or through another instrument) with the City of Calabasas (prior to the issuance of the grading permit) to guarantee the implementation of successful replacement. The deposit shall be refunded upon satisfactory completion of the mitigation requirements at the conclusion of the 5-year monitoring period (refer to Section VIII.9.B).

12. A mitigation planting plan shall be prepared and submitted for approval City prior to project commencement (i.e., grading permit). If oaks are to be relocated, the plan shall include a relocation feasibility report prepared by an oak relocation specialist.

13. In accordance with the OTPPG (pg.33), the following applies to Tree Removals, as applicable: "*Unless otherwise expressly approved in writing, authorized removal of oak trees shall be accomplished using the following guidelines: a) all portions of the tree shall be completely chipped for mulch and/or removed for the site, and debris shall be relocated to a permitted refuse disposal site. Additionally, the stump must be completely removed and the hole or indentation filled with soil; b) All tree wells that were created to preserve the tree shall be completely filled with soil to the satisfaction of the City Engineer and Building Official.*"

Encroachment Trees

Special care must be taken during grading and construction to protect the encroachment trees and their immediate environment. Implementation of the following measures will ensure that the preserved trees will not be adversely affected by project development.

14. The applicant shall be responsible for notifying the City's Oak Tree Specialist and the project's Consulting Arborist of any changes in the scope of the work and shall insure that all work is performed in accordance with applicable ordinances, permits and procedures. Work performed within the protected zones of the trees shall be preceded by not less than 48-hours' notice of same to the City's Oak Tree Specialist and the project's Consulting Arborist.

15. Grading or trenching work in the protected zone of the trees approved for encroachment must be done using hand implements only; the use of mechanized tools or equipment is prohibited except where absolutely necessary AND pre-approved by the City and the project's Consulting Arborist.

16. All work conducted within the protected zone of the oak trees shall be performed in the presence of the project's Consulting Arborist[3]. The protected zone shall commence from a point five (5) feet outside of the dripline and extend inwards to the trunk of the tree. In no case shall the protected zone be less than fifteen (15) feet from the trunk of an oak tree. For trees with a DBH of 24 inches or greater, in no case shall the protected zone be less than fifty (50) feet from the trunk of the oak tree. Monitoring of

[3] The project's Consulting Arborist shall be an ISA Certified Arborist, ASCA Registered Consulting Arborist, or other City-approved oak tree monitor.

the work by a consulting arborist is subject to inspection and approval by the City's Oak Tree Specialist and shall not relieve the Contractor of the obligation to fulfill all of these conditions.

17. Where absolutely necessary and as approved by the City's Oak Tree Specialist, limited mechanized equipment may be used as follows: a rubber-tired excavator or larger mechanized equipment may be set up outside of the PZ of the trees and can reach in under the canopies to avoid damage to the overhanging limbs. When pre-approved, other equipment may be used within the PZ of trees that have been approved for such encroachment in the Oak Tree Permit. Placement of anti-compaction material prior to PZ access by equipment may be required.

18. All roots pruned shall consist of clean, 90º-angle cuts and shall not be sealed unless directed by the monitoring Consulting Arborist or the City's Oak Tree Specialist. Major roots (2" or greater in diameter) that must be removed should be cut back to the nearest lateral root where feasible.

19. Removal of the natural leaf mulch within the protected zone of the project oak trees is prohibited except where absolutely necessary for encroachment.

20. Upon completion of the work associated with each oak tree approved for encroachment, a four to six-inch layer of certified mulch shall be placed within the protected zone. Where feasible, the native leaf litter should be retained and used as the mulching material.

21. Any canopy pruning for structural or clearance purposes, including dead-wooding, shall be performed by, or under the direction of, a Certified Arborist in compliance with the latest ANSI pruning standards. Smaller limbs should be tied back out of the way to avoid unnecessary pruning for equipment clearance.

22. Equipment, materials, and vehicles shall not be stored, parked or operated within the protected zone of an oak tree, except on an already improved road base for work that is being performed with encroachment approval.

23. Prior to commencement of grading operations, the applicant or his representative shall provide the City with a copy of the protective fencing plan for the oak trees to be preserved onsite.

24. A minimum five (5) foot high chain link fence in concrete footings with posts installed every eight (8) feet and two (2) feet deep into the natural grade will be required to be installed at the outermost edge of the protected zone plus five (5) feet of each oak tree or group of trees. Fencing shall be no closer than 15 feet to the trunk of any protected tree. Exceptions to this policy may occur in cases where oak trees are located on slopes that will not be grubbed or graded, are located in areas where there is no activity planned, or when oaks are approved for encroachment.

25. When oaks are approved for encroachment, the chain link fencing should be placed in such a manner as to afford the tree the maximum amount of protection while allowing for the encroachment. As a visual barrier to contractors, orange snow-fencing or other temporary fencing should be used at the edge of the PZ while work is not being performed. Such temporary fencing shall be illustrated on the oak tree fencing plan, should be posted with signage that directs contractors to contact the project's Consulting Arborist when work is to be performed in the PZ, and should remain in place when work is not actively taking place in the PZ until the encroachment is completed.

26. All work conducted within the protected zone of the oak trees shall verified by the City's oak tree consultant at the conclusion of the project. A certification letter is required for all work conducted upon oak trees and shall be submitted within 10 working days after completion of work certifying that all of the work was conducted in accordance with the appropriate permits and the requirements of the Calabasas oak tree protection guidelines.

27. Where chain link fencing is required, signs (minimum 2'x2') must be installed on the fence in four equidistant locations around the tree and must contain the following statement:

    WARNING - THIS FENCE IS FOR THE PROTECTION OF THIS TREE AND SHALL NOT BE REMOVED OR RELOCATED WITHOUT WRITTEN AUTHORIZATION FROM THE CITY OF CALABASAS.

28. Fences shall remain in place throughout the entire demolition, grubbing, grading, and construction period and may not be removed without obtaining written authorization from the City.

29. Trees that have had their roots or limbs pruned for grading purposes will be monitored at least at quarterly intervals for the first three years following construction, and will continue bi-annually for the next two years, or more if warranted. If an encroached oak tree should fail as a result of the proposed project during the five-year monitoring period, then the tree shall be replaced according to the standards described in this report.

OAK TREE MANAGEMENT & PRESERVATION GUIDELINES

An important component of oak tree management and preservation relates to the management of the preserved and newly-planted mitigation trees during construction and after the development is in place. Oak trees are sensitive to changes in their environment and improper irrigation, soil compaction and/or disturbances to the roots can result in the decline in health and eventual loss of the tree. The following guidelines are recommended to successfully maintain preserved and mitigation trees during and after project implementation.

- Irrigation - Established oaks are adapted to xeric (dry) conditions and do not need summer water at all. However, turf areas associated with landscaping do require frequent irrigation. Excessive dry season irrigation within the drip line of existing trees will promote the growth of Oak Root Fungus (*Armillaria mellea*). This fungus occurs naturally and grows more rapidly under wet conditions, such as during the winter months. Under normal conditions, the subsequent dry season keeps the fungus under control. Moisture around the base of the tree in the warm summer season not only allows the fungus to survive, but the combination of warmth and extra moisture fosters fungus growth. Prolonged fungus attack promotes oak tree decline and eventual death. Supplemental irrigation should only be considered during periods of prolonged drought. Therefore, turf areas and associated irrigation systems should be planned so as not to encroach within the dripline of an existing oak tree. Water should never be allowed to spray onto, or pond around, the trunk of an oak tree. Oak leaf litter should be allowed to accumulate in the area directly under a protected tree.

- Establishment irrigation - Young oak trees often need initial irrigation to establish successfully after planting. Irrigation for replacement trees shall follow the schedule described in Section VIII.7.D of the Oak Tree Preservation and Protection Guidelines unless otherwise approved by the City's Oak Tree Specialist.

- Fencing - As previously indicated, the area surrounding the dripline of established trees shall be fenced for the duration of construction. Fencing shall be no closer than 5 feet to the outer drip line boundary or 15 feet to the trunk of any protected tree.

- Drainage - Natural drainage courses and natural grades around existing oak trees should not be altered. Surface runoff from adjacent areas shall be directed away from preservation areas and shall not increase runoff to those areas. Water shall not be allowed to pond or accumulate within the drip line of any oak tree.

- Pruning - Existing oak trees shall not be pruned, except as necessary for public health and safety. Pruning of live tissue over two inches (2") in diameter requires an Oak Tree Permit. Removal of dead wood is exempt from the requirement to obtain a permit.

- Fuel Modification - All fuel modification requirements such as selective clearing, pruning, and wet zones shall be limited within the drip line of any individual oak tree.

- Weed Control - Use of soil sterilizers shall be prohibited under and around existing oak trees. Sterilizers may leach into the root system and kill the tree. Use of pre-emergent weed killers shall be prohibited within 100 feet of any individual oak tree or within a natural drainage that seasonally irrigates oak trees.

- Revegetation Near Existing Oaks - All cut and fill slopes adjacent to the existing oak trees shall be vegetated with native species that require little water to become established and little or no irrigation once established.

- Other Considerations - Dust that accumulates on the foliage of the preserved oak tree due to nearby construction should be periodically hosed-off as recommended by the project's consulting arborist.

CERTIFICATION OF PERFORMANCE

I, Christine Cuba, certify:

- That I have personally inspected the tree(s) and/or the property referred to in this report, and have stated my findings accurately. The extent of the evaluation and appraisal is stated in the attached report and the Terms of Assignment;
- That I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved;
- That the analysis, opinions, and conclusions stated herein are my own;
- That my analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices;
- That no one provided significant professional assistance to the consultant, except as indicated within the report;
- That my compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party.

I further certify that I am a member of the American Society of Consulting Arborists, and that I acknowledge, accept, and adhere to the ASCA Standards of Professional Practice. I am an International Society of Arboriculture Certified Arborist, and have been involved in the practice of arboriculture and the study of trees for over twenty years.

Signed:

Christine Cuba

Date: October 30, 2014

Christy Cuba
Registered Consulting Arborist, #502
Certified Arborist, WE-1982A
Qualified Tree Risk Assessor

CHRISTINE CUBA

CARLBERG ASSOCIATES
Satellite Office – 80 W. Sierra Madre Blvd., #241 • Sierra Madre • California • 91024
2402 California Avenue • Santa Monica • California • 90403
christy@cycarlberg.com • o: 626.248.8977 m:626.428.5072

Education — B.A., Environmental Analysis & Design, University of California, Irvine, 1993
Graduate, International Society of Arboriculture Certification Study Program, April 1998
Graduate, Consulting Academy, American Society of Consulting Arborists, February 2008

Experience — Director of Environmental Services & Senior Arborist, Land Design Consultants, Inc. Pasadena, 1994 – 2011
Park Specialist/Naturalist, City of Monrovia, 1988-1996

Certificates — Certified Arborist, WE-1982A, International Society of Arboriculture, 1998
Registered Consulting Arborist, #502, American Society of Consulting Arborists, 2011
Certified Tree Risk Assessor, #1529

AREAS OF EXPERTISE

Ms. Cuba is experienced in the following areas of tree management and preservation:

- Tree health & risk assessments
- Inventories & reports for native and non-native trees
- Master planning
- Evaluation of trees for preservation, encroachment, relocation, restoration, and hazards
- Value assessments (appraisals) for native and non-native trees
- Post-fire inventories, assessments, and valuations for native and non-native trees
- Guidelines for tree preservation, planting, pruning and maintenance specifications
- Pest and disease identification
- Tree and landscape resource mapping – GPS, GIS, and AutoCAD
- Planning Commission, City Council, and community meetings representation
- Review of landscape plans for mitigation compliance & fire fuel modification planning
- Preparation of native habitat and woodland management plans
- Performance of long-term mitigation compliance monitoring & reporting
- Expert testimony

PREVIOUS CONSULTING EXPERIENCE

Ms. Cuba has performed hundreds of tree inventories, health evaluations, impact analyses, hazard, and value assessments for counties, cities, sanitation districts, and water districts, as well as private developers, architects, engineers, and homeowners. She has over 23 of experience in arboriculture and is trained in environmental planning, state and federal regulatory permitting, preparation of CEQA analyses, and habitat mitigation planning and implementation. Representative clients include:

City of Pasadena
City of Monrovia
City of Santa Clarita
City of Glendora
Los Angeles County Fire Department
Los Angeles County Sanitation Districts
Newhall County Water District
Pulte/Centex Homes
Newhall Land and Farming
San Diego Gas & Electric
Quinn, Emanuel, Urquhart and Sullivan (attorneys at law)
Figure 8 Group
City of South Gate
City of Sierra Madre
D2 Development
Burrtec, Inc.
City of West Hollywood
Corky McMillin Companies

AFFILIATIONS

Ms. Cuba serves with the following national and regional professional organizations:

- Member, American Society of Consulting Arborists
- Member, International Society of Arboriculture, Western Chapter
- Member, ASCA Education Task Force
- Member, Los Angeles Oak Woodland Habitat Conservation Strategic Alliance
- Vice President, Street Tree Seminar, Inc.

APPENDIX I

OAK TREE INVENTORY FIELD DATA

APPENDIX II

OAK TREE PHOTOGRAPHS

APPENDIX III

OAK TREE VALUATIONS – PCR METHOD

APPENDIX IV

CITY OF CALABASAS OAK TREE CODE, CALABASAS CODE CHAPTER 17.26.070, AND CITY OF CALABASAS OAK TREE PRESERVATION & PROTECTION GUIDELINES

PLACEHOLDER FOR 2 MAP POCKETS AND FULL-SIZE

'OAK TREE LOCATION MAP'

AND

'OAK TREE LOCATION & IMPACT MAP'

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
1	*QA*	48	X	35	28	0	28	0	26	0	28	0	80%	S		A	S			T					Mo	Mo		Mo	B	B	A	B	85	l/t; scale; magnificent tree
2	*QA*	16 @ 3'		25	15	2	15	10	15	2	15	0	80%	S		A	A												B	A	A	B+	85	nice tree
3	*QL*	46	X	40	18	25	25	20	25	3	22	2	80%	S		A	A			T					Mo	Mo		Mo	B	B	A	B	75	basal cavity; beetles; hrot
4	*QA*	36	X	35	25	0	24	0	20	0	26	0	90%	S		A	S		X	B					S	Mo	X	Mo	B-	B-	F	B-	70	l/t;beetles;hrot;good fire recovery
5	*QA*	18		30	22	5	25	5	20	2	0	0	75%	S	E	A	S		X	B					S	Mo	X	Mo	B	B	F	B	75	Lean east; l/t; hrot; good fire recovery
6	*QA*	24	X	25	12	10	16	5	20	0	10	5	80%	S		E	S		X	B					Mo	Mo		Mo	B	A-	A	B+	85	l/t;beetles;hrot;good fire recovery
7	*QA*	11		16	8	10	4	8	4	6	10	10	75%	S		E	A		X	T					S	Mi	X	Mo	B	C+	A	C+	65	good fire recovery; young enough to outgrow it; l/t
8	*QA*	30	X	35	25	12	30	0	35	5	25	12	70%	S		E	S		X	B					Mo	Mo		Mi	B	B	A	B	75	good fire recovery; l/t
9	*QA*	2, 3		12	3	3	1	3	4	3	6	3	90%	S		N/A	A										X		A	B	E	A	95	young & vigorous

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
10	*QA*	23		30	25	8	30	6	15	8	15	10	75%	S		E	A	X	X	T					Mo	Mi	X	Mi	B	B-	A	B-	70	Severe burn on trunk, but good recovery; l/t;hrot
11	*QA*	5, 9, 12, 23	X	35	12	25	18	15	18	0	25	12	80%	S	W	E	A	X	X	B					Mo	Mo	X	Mi	B	B	A	B	80	Lean west; l/t; woodpecker
12	*QA*	50	X	40	30	0	30	0	40	0	30	0	75%	S		A	S	X	X	T/ B					Mo	Mo		Mi	B	B	F	B	85	good fire recovery; scale and l/t; hrot; magificent tree
13	*QA*	2		8	6	4	6	4	0	0	0	0	90%	S		E	A								Mi	Mi	X		B+	B+	A	B+	85	
14	*QA*	30	X	25	15	8	20	10	20	4	20	6	80%	S		A	A	X	X	T					Mi	Mi			A	C+	E	B-	70	likely to fail at codoms
15	*QA*	6, 6.5, 7		20	8	15	12	15	15	5	15	5	80%	S		N/ A	A	X							Mo				A	A	E	A	95	root sprout from fire; vigorous multi
16	*QA*	5, 6		15	8	4	6	5	6	4	8	4	80%	S		N/ A	A	X							Mo			Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale
17	*QA*	2, 3, 4, 5 @ 3'		18	6	3	6	3	4	3	3	3	80%	S		N/ A	A								Mo			Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale
18	*QA*	10		18	8	3	6	3	5	15	10	3	80%	S		N/ A	A	X							Mi	Mi	X	Mi	B	A	A	B+	85	good recovery; scale

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
19	*QA*	7, 7		18	8	4	6	6	10	8	10	0	80%	S		N/A	A	X							Mo	Mo	X	Mo	B	B	F	B	80	good recovery; scale
20	*QA*	3, 3.5		15	0	0	5	2	10	2	0	0	70%	S	E	A	A	X							Mi	Mi	X		B+	B+	A	B+	85	Lean east
21	*QA*	3.5, 7		18	8	0	10	50	6	4	6	4	70%	S		N/A	A	X							Mo	Mi	X	Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale; l/t
22	*QA*	4.5, 5.5		18	6	3	6	3	4	3	3	3	75%	S		N/A	A	X							Mo	Mi	X	Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale; l/t
23	*QA*	2, 5.5		14	3	4	3	4	3	4	3	4	75%	S		N/A	A	X							Mo	Mi	X	Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale; l/t
24	*QA*	3		12	2	4	2	4	2	4	2	4	75%	S		N/A	A	X							Mo	Mi	X	Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale; l/t
25	*QA*	4, 5 @ 3'		14	8	7	4	3	4	3	4	5	75%	S		N/A	A	X							Mo	Mi	X	Mi	A	A	A	A	95	root sprout from fire; vigorous multi; scale; l/t
26	*QA*	20		25	10	12	5	10	18	5	20	5	80%	S		A	A	X	X	B					Mo	Mi	X	Mi	A	B	A	B+	85	scale; l/t; off-site tree
27	*QA*	18		25	12	10	12	10	20	5	5	10	75%	S	S	A	A	X	X	B					Mi	Mi	X	Mi	A-	B	A	B+	85	lean is south; scale; l/t; off-site tree

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28	*QA*	2.5		10	2	0	2	0	2	0	2	0	80%	S		A	A	X								Mi	X		A	A	A	A	95	young & vigorous; PL tree; not tagged
29	*QA*	2.5, 3.5 @ 3'		12	4	3	4	3	4	3	4	3	80%	S		N/A	A	X									X		A	A	A	A	95	young & vigorous; PL tree; not tagged
30	*QA*	5		12	4	8	4	3	4	4	4	6	80%	S		N/A	A									Mi		Mi	A	A	A	A	95	l/t
31	*QA*	13.5, 17.5	X	25	20	8	15	15	20	6	12	10	85%	S		E	A			B					Mi	Mi		Mi	A	A	E	A	95	l/t
32	*QA*	24	X	30	15	8	22	6	20	20	25	6	75%	S		A	A		X	T/B					Mo	Mo		Mi	B-	B	F	B-	70	l/t; scale; fire damage to outer branches
33	*QA*	18, 18	X	40	20	25	16	20	22	10	12	3	70%	S		P	S	X	X	T/B					S	Ex		Mo	C-	D	P	C-	50	large cavity; hrot; exposed roots
34	*QA*	48	X	25	25	0	25	8	18	5	20	3	80%	S		E	S	X	X	T/B					S	Mo		Mo	C-	C	F	C	60	outer canopy moderate/severe burn; hrot;beetles;fair reecovery
35	*QA*	43 @ base	X	25	25	10	18	18	25	0	18	4	80%	S		E	A	X	X	B					S	Mo		Mo	B-	B-	F	B-	70	outer canopy moderate/severe burn; hrot;beetles;good recovery

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36	*QA*	33	X	45	20	20	20	10	20	40	30	15	70%	S		N/A	A	X	X	B					Mo	Mo	X	Mo	B	B-	A	B-	70	outer canopy moderate/severe burn; hrot;beetles;good recovery
37	*QA*	23		35	18	40	20	4	20	8	22	10	60%	S		N/A	A	X	X	T/B					Mo	Mo	X	Mo	B+	B-	A	B-	70	outer canopy moderate/severe burn; hrot;beetles;good recovery
38	*QA*	8, 23, 25	X	30	30	10	16	18	25	2	30	0	75%	S		E	S	X	X	B					Mo	Mo	X	Mo	C+	B	F	C+	65	outer canopy moderate/severe burn; l/t; hrot;beetles;good recovery
39	*QA*	30 @ 3'	X	25	15	1	8	14	18	3	12	0	80%	S		A	D		X	T/B					S	Mi	X	Mo	B	C-	E	C+	65	collapsed T on west; Hrot; l/t
40	*QA*	38	X	22	18	18	10	18	15	6	15	6	65%	S		P	S	X	X	T/B	X				S	Ex		Mo	C-	D	P	D	30	Declining; lg cavity on west; collapsed T on west; Hrot; l/t
41	*QA*	42	X	30	18	1	18	4	18	2	18	0	75%	F		A	A	X	X	B					Mo	Mo		Mo	B	B	A	B	80	Moderate fire damage on lower limbs/canopy; l/t; encampment here
42	*QA*	41	X	30	18	7	15	3	22	4	16	7	80%	F		A	A		X	B					Mo	Mi		Mo	A-	B	E	B+	85	Fire damage to upper crown; l/t
43	*QA*	20		20	15	8	18	5	18	3	18	4	90%	F		E	D			B					Mi	Mi		Mi	A	B	A	B	80	Fire damage to upper crown; l/t

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44	*QL*	27.5	X	25	25	5	16	4	16	5	16	5	80%	S		A	A	X	X	T/B					Mo	Mo		Mo	B	C	A	C+	65	trunk has column of decay; good callous; fire damage mostly trunk; l/t
45	*QA*	18, 19, 22	X	30	20	8	15	4	25	1	20	12	75%	S		A	S	X	X	T/B					Mo	Mo		Mo	C+	B	F	B-	70	l/t;
46	*QL*	32	X	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a					n/a	n/a	n/a	n/a	n/a	n/a	n/a	F	0	COLLAPSED DEAD; not tagged
47	*QA*	30	X	30	20	8	22	0	20	0	22	15	80%	S		A	A		X	B					Mi	Mo		Mi	B	B	A	B	80	south PL tree; good fire recovery; l/t
48	*QA*	25	X	30	15	28	22	28	25	5	18	25	65%	S		A	S	X	X	B					Mi	Mo	X	Mi	C	B	P	C	65	south PL tree; good fire recovery; l/t
49	*QA*	40	X	25	20	6	25	14	12	20	16	20	60%	S		P	S		X	T/B					S	Ex	X	Mo	C	D	P	C-	50	south PL tree; poor fire recovery; l/t; large cavity
50	*QA*	13.5, 14, 14.5, 21	X	18	18	10	18	10	20	4	22	0	70%	S		P	S	X	X	T/B					S	Mo	X	Mo	C-	D	P	C-	50	severe basal fire damage; poor recovery
51	*QA*	28	X	25	10	18	16	5	18	8	20	10	60%	S		P	S		X	T/B					S	Mo /Ex	X	Mi	C-	C-	F	C-	50	Severe fire damage

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52	*QA*	20		20	14	4	10	10	14	14	14	14	60%	S		A	A		X	T/B					Mo	Mo	X	Mi	B	B-	F	B-	70	basal cavity due to fire; recovering
53	*QA*	40	X	30	12	16	16	5	16	3	14	18	70%	S		A	A	X	X	T/B					S	Mo	X	Mi	B-	C-	A	C-	50	severe fire damage on trunk; one collapsed trunk (south)
54	*QA*	3.5		10	2	3	2	5	2	5	2	5	75%	S		N/A	A												A	A	E	A	95	young tree; stump sprout
55	*QA*	2, 3, 4.5 @3'		12	5	4	5	4	3	4	3	4	80%	S		N/A	A	X											A	A	E	A	95	young tree; stump sprout
56	*QA*	2.5, 3.5, 4, 6		15	5	4	6	4	6	1	6	4	75%	S		N/A	A	X											A	A	E	A	95	young tree; stump sprout
57	*QA*	23		20	15	10	10	4	18	12	20	12	70%	S		A	S		X						Mi	Mi		Mi	B	B	A	B	80	recovering well
58	*QA*	5, 6, 6, 6		18	8	8	5	5	10	7	8	4	70%	S		N/A	A	X										Mi	A-	A	A	A	95	stump sprout from large collapsed tree
59	*QA*	1, 1, 2, 2.5, 3, 4		14	6	0	6	2	6	3	6	2	75%	S		N/A	A	X										Mi	A-	A	A	A	95	l/t; stump sprout

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60	*QA*	5 @ 3'		10	5	5	4	5	4	5	5	5	85%	S		A	A	X											A-	A	A	A	95	
61	*QA*	23 @3'		30	20	25	18	10	18	8	12	15	75%	S		A	S		X	T/ B					S	Mo	X	Mo	C	C	F	C	60	Hrot; fire damage to trunk and limbs
62	*QA*	14, 16	X	25	12	10	12	25	0	0	6	25	75%	S		A	A	X	X	T/ B					S	Ex	X	Mo	C-	D	F	C-	50	l/t; Hrot; severe fire damage, trunk collapsing
63	*QA*	23 @ 2'		25	10	5	18	15	22	3	12	2	80%	S		A	S	X	X	B					Mo	Mo	X	Mo	B-	B-	A	B-	70	l/t; good recovery
64	*QA*	24	X	25	12	15	14	14	16	2	12	5	80%	S		E	A		X	B					Mo	Mi	X	Mi	B+	B	A	B	80	fire damage, good recovery
65	*QA*	4.5		15	6	5	6	5	6	5	6	5	80%	S		A	A												A	A	A	A	95	young and vigorous
66	*QA*	38	X	25	25	10	20	3	25	3	25	10	75%	S		P	S		X	B					Mo	Mo		Mo	B-	B	A	B	75	l/t; heavy sapsucker
67	*QA*	2, 2, 3, 4.5, 6		16	8	3	12	3	8	3	10	3	80%	S		N/ A	A	X										Mi	A	A	A	A	95	l/t; scale; stump sprout; nice tree
68	*QA*	3, 5, 5		14	4	4	8	4	5	4	7	4	80%	S		N/ A	A	X										Mi	A	A	A	A	95	l/t; nice tree

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69	*QA*	24, 27, 28	X	35	25	8	25	10	30	4	25	4	75%	S		A	A	X	X	T/ B					Mo	Mo		Mo	B+	C	A	B-	70	l/t; pests
70	*QA*	10.5, 17, 17, 18, 20	X	25	20	20	28	3	20	10	28	2	70%	S		E	S	X	X	B	X				Mo	Mo		Mi	C	B	F	C+	65	fair recovery
71	*QA*	2, 3, 4, 17, 19	X	30	22	30	15	20	20	6	15	20	75%	S		A	S	X	X	T/ B	X				S	Mo		Mo	C	C	P	C	50	l/t; 3 failed trunks (west)
72	*QA*	7, 23	X	25	20	30	15	20	8	16	16	16	75%	S	S	A	S	X	X	T/ B					S	Mo		Mi	C	D	P	C-	50	trunk collapsed (south)
73	*QA*	3, 3 @ 2'		7	2	3	2	3	2	3	2	3	75%	S		N/ A	A	X											A	A	A	A	95	young and vigorous
74	*QA*	7, 23, 24, 29	X	30	22	15	15	1	28	2	28	2	80%	S		E	A	X	X	T/ B					Mo	Mo			B	C	A	B-	70	basal cavity; excellent recovery
75	*QA*	2, 3		12	3	1	3	1	3	1	3	1	90%	S		N/ A	A	X											A	A	A	A	95	nice tree; young and vigorous
76	*QA*	20		16	0	0	5	0	20	0	5	0	75%	S	SE	A	A		X							Mi		Mi	B+	B	A	B	70	2 collapsed trunks have significant vertical epicormic growth

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77	*QA*	20, 24, 28	X	25	20	20	20	1	26	1	25	1	75%	S		E	S	X	X	T/B					S	Mo		Mi	C	C	F	C	60	l/t; sapsucker
78	*QA*	7, 9, 14, 20	X	18	15	5	14	4	18	2	15	5	95%	S		N/A	D	X	X	T/B					Mi	Mo		Mi	B	C	A	C+	65	basal damage
79	*QA*	2, 3.5		7	3	3	3	3	4	3	5	4	90%	S		N/A	A	X											A	A	A	A	95	young and vigorous
80	*QA*	16, 18, 22	X	25	16	16	20	5	16	5	25	2	75%	S		N/A	A	X	X	T/B					Mi	Mo		Mi	C	C	F	C	60	l/t; ants
81	*QA*	1, 3		12	4	5	2	8	4	4	4	4	70%	S		E	S	X		T					Mi	Mi	X	Mi	B	B	A	B	80	l/t; ants
82	*QA*	2		10	1	4	1	4	1	4	1	4	80%	S		N/A	A										X		B	A	F	B+	80	young and vigorous
83	*QA*	29 @ 3'	X	25	12	30	10	8	20	6	24	3	75%	S		A	S		X	T/B					Mi	Mo	X	Mi	C	D	F	C-	50	l/t; ants
84	*QA*	18, 20	X	20	18	6	18	6	18	3	10	2	80%	S		E	A	X	X	T/B					Mi	Mo		Mi	B	C-	A	C	50	excellent woundwood response
85	*QA*	1, 2, 3		12	3	1	3	1	3	1	3	1	80%	S		N/A	A	X									X		A	A	A	A	95	stump sprout; young and vigorous

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
86	*QA*	1, 3, 4		15	5	4	5	5	0	0	0	0	80%	S		N/A	A	X									X		A	A	A	A	95	young and vigorous
87	*QA*	4		12	2	4	5	4	2	8	0	0	80%	S		N/A	A	X									X		A	A	A	A	95	young and vigorous
88	*QA*	3 @ 2'		7	3	5	1	5	3	4	1	4	80%	S		N/A	A	X									X		A	A	A	A	95	young and vigorous
89	*QA*	10, 12		20	10	16	0	0	12	10	5	10	75%	S		A	S	X	X	T/B					S	Mo	X	Mi	C	D	F	C-	50	l/t; one collapsed trunk
90	*QA*	24 @ 4'	X	20	18	12	18	20	22	4	4	8	80%	S		E	A	X	X						Mo	Mo	X	Mi	B	B	A	B	80	l/t; good recovery
91	*QA*	1, 3		8	2	3	2	3	2	3	2	3	80%	S		N/A	A	X											A	A	A	A	95	young and vigorous
92	*QA*	18.5		20	12	20	6	18	20	3	16	16	75%	S		E	S		X	T					S	Mi	X	Mi	B	C	A	C	60	vigorous; good recovery
93	*QA*	13		18	6	22	6	12	12	8	5	16	75%	S		E	S		X	T					S	Mi	X	Mi	B	C	A	C	60	vigorous; good recovery
94	*QA*	4, 6		14	8	5	8	10	8	3	8	5	90%	S		N/A	A	X											A	A	A	A	95	young and vigorous

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
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P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
95	*QA*	13, 17	X	20	12	12	10	4	15	4	8	5	75%	S		A	S	X	X	T					Mi	Mo		Mi	B	C-	A	C-	50	l/t; basal cavity
96	*QA*	18.5		20	12	6	12	6	14	2	14	3	75%	S		E	S		X	T/ B					Mi	Mo		Mi	B	B	A	B	80	l/t
97	*QA*	12.5		20	12	6	6	12	4	12	10	2	75%	S		A	S		X	T					Mi	Mo	X	Mi	C	C	F	C	55	l/t; trunk cavity
98	*QA*	19		20	18	6	15	8	18	2	14	2	70%	S		A	S		X	B					Mo	Mo	X	Mi	C	B-	F	C	55	laterals damaged
99	*QA*	12		18	8	12	0	0	8	10	12	0	50%	S		P	S		X	T/ B					S	Ex	X	Mi	C	C	F	C	55	root sprouts
100	*QA*	10, 12.5		20	18	15	10	8	12	4	8	15	70%	S		A	S	X	X	T					Mo	Mo	X	Mi	B	B-	A	B-	70	good vigor
101	*QA*	12 @ 4'		20	15	8	6	6	15	5	8	10	75%	S		A	A		X	T					Mi	Mi	X	Mi	B	B-	A	B-	70	basal cavity
102	*QA*	17		20	16	20	12	12	14	6	18	0	75%	S		N/ A	S		X	T/ B					S	Mo		Mi	C-	B	P	C-	50	severe fire damage in canopy
103	*QA*	3.5		8	6	10	2	4	3	5	4	6	80%	S		N/ A	D												A	A	E	A	95	young and vigorous

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
104	*QA*	11.5, 15, 17	X	30	16	14	20	2	18	2	14	14	50%	S		A	S	X	X	T					Mo	Mo		Mo	C	C	P	C	55	basal cavity
105	*QL*	17		20	18	4	16	15	20	8	20	4	50%	S		A	A							X		Mi			B	B	A	B	80	nice tree; on north side of property (out of sequence)
106	*QL*	33	X	30	15	15	18	15	15	5	15	12	50%	S		E	A	X	X						Mi	Mi		Mi	B	B	A	B	80	l/t; good recovery; on north side of property
107	*QA*	26	X	25	0	0	15	1	35	0	15	8	75%	S	S	A	S		X						S	Mo		Mi	C	D	A	C-	50	l/t; severe cavity in trunk; heavy lean (south) - failing?; on north side of property
108	*QL*	36.5	X	35	20	20	19	20	20	4	20	18	20%	S		A	S	X	X	T/ B					S	E		Mi	B-	D	P	B-	70	severe fire damage on trunk; on north side of property
109	*QA*	10		20	15	5	16	4	14	15	13	1	95%	F		A	D							X		Mi	X	Mi	A-	B-	A	B	70	l/t; plastic pot embedded at base; on north side of property
110	*QA*	7		15	0	0	5	6	5	3	8	8	80%	F		A	A	X						X		Mi	X	Mi	C	C	F	C	65	mechanical damage on trunk; plastic pot embedded at base; on north side of property
111	*QA*	18		25	12	12	8	8	8	0	8	12	50%	S		A	S		X	T/ B	X				Mo	Mo	X	Mo	C	C	P	C	50	low vigor, heart rot

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
112	*QA*	11		16	18	20	12	12	0	0	0	0	40%	S		A	S		X	T/B					S	Mo	X	Mo	C	C	P	C	50	fire damage in canopy
113	*QA*	16 @ 2'		20	18	10	15	20	5	18	5	5	40%	S		P	S		X	T/B					S	Ex	X	Mo	C-	C	P	C-	50	severe fire damage on underside of limbs
114	*QA*	18.5		25	8	20	16	8	18	5	15	20	60%	S		P	S		X	T/B					S	Ex	X	Mo	C-	C	P	C-	50	
115	*QA*	9, 14		20	20	20	4	10	4	8	18	6	50%	S		P	S		X	T/B					S	Ex	X	Mo	C-	C	P	C-	50	
116	*QA*	3		10	4	12	2	5	2	5	2	5	75%	S		A	A									Mi		Mi	A	A	A	A	95	young tree
117	*QA*	18		25	14	14	18	10	20	5	20	8	60%	S		A	S		X	B					Mo	Mo		Mo	B	B	F	C+	65	
118	*QA*	22		25	20	30	18	20	18	4	18	4	60%	S		A	S		X	T					Mo	Mo			C	C	A	C	60	basal cavity on west side
119	*QA*	23		20	18	25	16	15	25	4	20	20	70%	S		A	S		X	T/B					Mo	Mo	X	Mo	C-	C-	A	C-	55	basal cavity, fire damage, good recovery
120	*QA*	11		*16*	6	25	4	16	2	4	12	20	50%	S		A	S		X	T/B					S	Mo	X	Mo	C	C	F	C	60	loss of major trunk due to fire

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
121	*QA*	11, 13, 13	X	25	20	25	18	18	20	3	20	20	50%	S		A	S	X	X	T/B					Mo	Mo	X	Mo	C	C-	F	C	60	
122	*QA*	28 @ 3'	X	30	12	12	10	3	20	8	20	18	50%	S		A	S	X	X	B					Mo	Mo		Mo	C	C	F	C	60	
123	*QA*	1.5, 1.5, 2, 2		7	3	4	3	4	3	4	3	4	80%	S		N/A	D	X								MI		Mi	B+	A	A	B+	85	stump sprout
124	*QA*	16.5		22	15	30	8	20	16	4	16	16	40%	S		A	S		X	T/B					S	Ex	X	Mo	C	C	P	C	50	basal cavity and sever bark and branch damage due to fire
125	*QA*	13, 15, 19	X	25	18	30	15	15	16	4	20	20	60%	S		A	A		X	B					Mo	Mo		Mo	C	C	A	C	65	
126	*QA*	9, 10, 12.5	X	25	18	25	16	18	25	4	12	12	75%	S		A	A	X	X	B					Mo	Mo	X	Mo	B	B	A	B	75	good recovery
127	*QA*	3.5, 16		20	16	25	10	20	14	8	12	16	70%	S		A	A	X	X	T/B					S	Mo	X	Mo	C	C	F	C	60	basal cavity, good vigor
128	*QA*	5, 10.5		20	10	15	8	3	8	15	12	3	75%	S		A	A	X	X	B					Mo	Mo	X	Mo	C	B	A	B-	70	
129	*QA*	7		12	14	14	5	3	0	0	0	0	50%	S		P	S		X	T/B					S	Ex	X	Mo	D	D	P	D	30	cavity on north side

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
130	*QA*	12, 16	X	20	16	25	16	10	16	4	22	4	50%	S		A	A	X	X	B					Mo	Mo	X	Mo	C	C	F	C	60	fire damage at base, some recovery
131	*QA*	17		35	18	40	16	20	18	14	14	20	70%	S		E	A		X	T/ B					Mo	Mo		Mi	B	B	A	B	75	large cavity at base on west, good fire recovery
132	*QA*	1, 1, 8		14	4	16	6	14	16	4	8	5	30%	S		P	S	X	X	T/ B					S	Ex	X	Mo	D	D	P	D	30	2 trunk portions lost during fire
133	*QA*	15, 17	X	25	20	30	12	25	25	4	20	8	60%	S		A	A	X	X	T/ B					Mo	Mo	X	Mo	C	C	F	C	60	basal cavity
134	*QA*	22.5 @ 3'		25	20	20	18	0	16	16	20	4	80%	S		E	D		X	T/ B					Mo	Mi		Mi	B	B	E	B	75	basal cavity
135	*QA*	10, 11		18	12	8	10	12	12	3	12	8	75%	S		A	A		X	B					Mi	Mi		Mi	B	B	E	B	75	
136	*QA*	18		25	6	15	16	4	14	6	12	15	60%	S		A	A	X	X	T/ B					S	Mo	X	Mo	C	C	A	C	55	l/t; severe cavity in trunk, west side
137	*QA*	12.5, 13	X	18	8	10	14	10	14	8	15	3	50%	S		N/ A	A	X	X	B					Mo	Mo	X	Mo	C	B	A	B	75	severe fire damage on underside of limbs
138	*QA*	10.5, 11		20	5	8	0	0	18	0	15	8	75%	S	S	A	A	X	X	T/ B					S	Mo	X	Mo	B	C	E	C+	60	sever burn at base, cavity present

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
139	*QA*	16		18	8	12	6	14	4	14	6	12	50%	S		A	S		X	T/ B					S	Mo	X	Mo	C	D	P	D +	40	sever burn at base, cavity present, one trunk lost
140	*QA*	16, 18	X	20	18	18	12	10	16	5	10	8	75%	S		A	A	X	X	B					Mo	Mi	X	Mi	B	B	A	B-	70	bark damage from fire, good recovery
141	*QA*	13, 15, 19	X	25	16	25	25	6	20	8	16	14	75%	S		A	A	X	X	T/ B					Mo	Mi	X	Mi	B	B	A	B	75	basal cavity
142	*QA*	8, 10, 14	X	25	6	25	10	20	12	8	12	18	75%	S		P	S	X	X	T/ B					Mo	Mo	X	Mo	C	C-	F	C-	50	l/t; basal cavity, heart rot, beetles
143	*QA*	10.5, 12, 13	X	20	12	20	4	10	14	14	16	12	75%	S		A	A	X	X						Mo	Mo	X	Mo	C	C	F	C	55	l/t; basal cavity, heart rot
144	*QA*	8.5		16	3	8	3	10	10	12	3	6	75%	S		A	A		X	T					S	Ex		Mi	C	D	A	D +	40	heart rot, column of decay entire trunk
145	*QA*	20		30	20	20	15	25	20	6	20	3	85%	S		E	A	X	X						Mi	Mi		Mi	B	B	A	B	75	upper trunk codominant stems
146	*QA*	11, 13	X	20	20	12	14	8	12	3	14	8	75%	S		A	A	X	X								X	Mi	C	C	F	C	55	
147	*QA*	7.5, 9		18	6	10	14	8	16	5	4	8	75%	S		A	A		X								X	Mi	C	C	F	C	55	

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
148	*QA*	18		20	6	10	12	18	14	14	8	14	70%	S		A	S	X	X	B					Mo	Mo	X	Mo	C	C	P	C-	50	upper canopy fire damage
149	*QA*	12.5		20	12	4	10	18	8	16	12	2	50%	S		A	S		X	B					Mo	Mo	X	Mo	C	C	P	C-	50	upper canopy fire damage
150	*QA*	22.5		20	20	20	14	14	0	0	12	18	20%	S		P	S		X	T/ B					S	Ex	X	Mo	D	D	P	D	30	basal cavity and sever bark and branch damage; major decline
151	*QA*	25	X	20	16	14	8	12	22	4	15	8	40%	S		P	S		X	B					S	Ex	X	Mo	C-	C	P	C-	50	severe canopy and trunk fire damage; recovering
152	*QA*	19.5		20	12	15	15	8	20	10	12	8	40%	S		A	S		X	B					S	Ex		Mo	C-	C	F	C-	55	basal cavity and sever bark and branch damage; major decline
153	*QA*	20.5		25	15	15	12	4	12	4	16	4	40%	S		A	S		X	T/ B					S	Ex		Mo	D	C	P	C-	50	upper canopy fire damage; in decline
154	*QA*	13, 16, 22	X	25	20	8	18	4	18	0	18	0	85%	S		E	D	X	X	B					Mo	Mi		Mi	A	B	E	B+	85	nice tree
155	*QA*	3, 3, 3, 4, 4, 4		12	8	0	8	0	8	0	8	0	100 %	S		N/ A	D	X										Mi	A	A	E	A	95	stump sprout, vigorous
156	*QA*	3, 3, 3, 4, 5		12	8	0	8	0	8	0	10	0	100 %	S		N/ A	D	X										Mi	A	A	E	A	95	stump sprout, vigorous

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

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Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
157	*QA*	1, 2.5		9	3	4	3	4	3	4	3	4	90%	S		N/A	A	X										Mi	A	A	E	A	95	stump sprout, vigorous
158	*QA*	2, 3		9	3	2	3	2	3	2	3	2	90%	S		N/A	A	X										Mi	A	A	E	A	95	stump sprout, vigorous
159	*QA*	1, 2		9	3	2	2	5	3	2	3	2	90%	S		N/A	A	X										Mi	A	A	E	A	95	stump sprout, vigorous
160	*QA*	17		18	0	0	8	0	20	0	14	0	80%	S	S	A	A		X	T					S	Mo	X	Mi	B	C	A	C	55	trunk failure (south)
161	*QA*	26	X	25	12	20	15	8	8	8	12	0	75%	S		A	A		X	T					Mi	Mi		Mi	B	B	A	B	80	basal cavity
162	*QA*	2, 5, 7		20	12	15	12	5	10	4	14	4	85%	S		N/A	D	X								Mi		Mi	A	A	E	A	95	young and vigorous
163	*QA*	2, 6		12	8	2	8	4	8	2	8	2	75%	S		A	A								Mi	Mi		Mi	B+	B	A	B+	85	
164	*QA*	24 @ 2'	X	25	12	14	10	10	15	10	20	15	50%	S		A	S	X	X	T/B					Mo	Mo		Mo	C	C	P	C	50	l/t; basal cavity, heart rot, canopy fire damage
165	*QA*	9		18	14	12	14	5	4	4	3	5	75%	S		A	S		X						Mi	Mi	X		B+	B	A	B	80	

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
166	*QA*	7		12	5	3	5	3	5	3	5	3	80%	S		N/A	A								Mi	Mi			A	A	A	A	95	
167	*QA*	11.5		18	10	10	14	8	4	1	6	10	40%	S		A	S	X		T/B					S	Ex		Mo	D	D	P	D	25	trunk cavity, column of decay entire trunk
168	*QA*	4, 10		22	8	12	10	10	10	3	10	3	75%	S		A	A	X	X	B					Mo	Mi	X	Mi	B	B	A	B	80	
169	*QA*	7.5, 11		25	12	15	14	10	8	12	10	8	75%	S		A	A	X	X	T/B					Mo	Mo	X	Mi	B	B	A	B	80	
170	*QA*	4		8	2	2	2	2	2	2	2	2	70%	S		N/A	A		X						Mo				B	C	A	B-	70	large dead trunk, epicormic growth
171	*QA*	20		18	15	20	12	2	8	6	14	8	50%	S		A	S		X	T/B					S	Mo	X	Mo	B	D	F	C-	50	basal cavity
172	*QA*	14, 19	X	30	22	20	18	7	14	15	20	20		S		A	S	X	X	T/B					Mo	Mo	X	Mi	B	B	F	B	80	exposed roots, fire damage to canopy
173	*QA*	19		20	16	30	10	10	18	3	15	10		S		A	S		X						Mo	Mo	X	Mi	C	B	F	C+	65	
174	*QA*	17, 18	X	30	15	35	12	20	18	5	15	3		S		A	S		X	T/B					Mo	Mo	X	Mi	C	B	F	C+	65	basal cavity (south)

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
175	*QA*	24 @ 2.5'	X	18	8	20	0	0	0	0	0	0	20%	S	E	P	S	X		T					S	Ex		S	D	D	P	D	25	severe basal fire damage; poor recovery; estimated dbh
176	*QA*	14		15	15	6	12	6	0	0	0	0	50%	S		P	S		X	T					S	Ex	X	S	C-	C-	P	C-	50	estimated dbh; trunk cavity
177	*QA*	12		18	10	4	5	10	14	10	8	4	70%	S		A	S		X	T					Mo	Mo	X	Mo	B-	B	A	B	75	estimated dbh; trunk cavity
178	*QA*	18		25	12	20	15	1	8	10	18	16	80%	S		A	A		X	T					Mi	Mi		Mi	B	B	A	B	80	estimated dbh due to limited access; fire damage on trunk
179	*QA*	12, 12, 14	X	30	20	10	20	6	20	6	20	6	80%	S		A	A	X	X	T					Mo	Mi		Mi	B	B	A	B	80	estimated dbh due to limited access; fire damage on trunk; canopy - good recovery
180	*QA*	2.5, 12		18	6	3	14	4	10	0	8	12	75%	S	E	A	S								Mi	Mi	X	Mi	B	B	A	B	80	Exposed roots
181	*QA*	3, 6		8	4	4	12	4	3	3	0	0	40%	S	E	A	S	X							Mo	Mo	X	Mi	C	B	F	B-	70	exposed roots; shaded out
182	*QA*	16		25	15	20	15	10	15	4	15	10	70%	S		A	A								Mi	Mi		Mi	B	B	A	B	80	exposed roots; fire damage to canopy; recovering

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
183	*QA*	20		30	6	20	16	12	16	4	22	2	75%	S		E	S		X	T/ B						Mo		Mo	B	C-	A	C	55	heart rot, one trunk collapsed and dead
184	*QA*	20		25	18	15	18	2	16	2	18	2	70%	S		A	A		X	B					Mo	Mi		Mi	B	B	A	B	80	
185	*QA*	39	X	40	25	40	20	30	35	10	14	25	80%	S		A	A			T/ B					S			Mi	B	D	A	C	50	two collapsed trunks, sever fire damage
186	*QA*	65	X	35	30	0	30	0	30	0	30	0	80%	S		A	A	X	X						Mi	Mi		Mi	B+	B+	A	B+	85	nice tree
187	*QA*	49	X	40	40	20	40	10	25	5	35	5	85%	S		A	A	X	X						Mi	Mi		Mi	A	B	A	B+	85	nice tree
188	*QL*	43 @3'	X	28	5	28	28	5	35	5	28	5	60%	S	S	A	S	X	X	T/ B					S	Ex		Mo	C	D	F	C-	50	deciduous, but lots of twig & branch dieback, severe trunk cavity will impact structure; >50% cavity
189	*QL*	23		25	20	4	14	6	15	4	20	4	75%	S		A	A	X	X	B					Mi	Mi		Mi	B	B	A	B	80	offsite (south); esposed roots W side; less fire damage - canopy only; deciduous, included bark
190	*QL*	27	X	28	15	10	20	10	20	5	15	15	75%	S		A	A		X						Mi	Mo		Mi	B	A	F	B	80	deciduous; minor canopy fire damage

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
191	*QL*	16		25	10	18	15	15	15	10	15	10		S		U	U			U					U	U		U	U	U	U	U	U	Deciduous; No tag; no access; near east property line on steep escarpment
192	*QL*	5		15	5		3		5		5		80%	F		A	A		X							Mi		Mi	B	A	E	B+	85	Landscape tree in offsite slope along Las Virgenes
193	*QL*	8		18	12		10		10		10		90%	S		A	A		X							Mi		Mi	A	A	E	A	95	Landscape tree in offsite slope along Las Virgenes
194	*QL*	4.5		18	5		8		8		6		80%	S		A	A	X								None		None	A	B	E	A-	95	Landscape tree in offsite slope along Las Virgenes; codom stems at top
195	*QA*	1, 1, 1 @base		5	2		2		2		2		100 %	S		A	A	X								None		None	A	A	A	A	95	Landscape tree in offsite slope along Las Virgenes
196	*QA*	4		12	3		3		3		3		80%	S	S	P	A		X	T				X		Mo		Mo	C	D	F	D	25	Landscape tree in offsite slope along Las Virgenes' large column of decay along entire trunk
197	*QL*	2.5		12	2		1		2		1		50%	S		P	S		X	T				X		Ex		S	D	D	P	D	25	Landscape tree in offsite slope along Las Virgenes; extensive decay along trunk

CANYON OAKS - OAK TREE INVENTORY FIELD WORKSHEET

QA = Quercus agrifolia (coast live oak)
QL = Quercus lobata (valley oak)

P=poor F=fair A=average E=excellent S=sparse D=dense Mi=minor Mo=moderate S=severe Ex=extreme

Tag Number	Species	DBH	Heritage (24")	Height	N	N c/g	E	E c/g	S	S c/g	W	W c/g	% Canopy Cover	Terrain - Flat / Slope	Lean	Wound Wood Dev. (P,A,E)	Foliage Density (S,A,D)	Codominant Trunks	Epicormic Growth	Cavities - Trunk / Branch	Fungus	Cankers	Exudations	Mechanical Damage	Fire Damage (Mi,Mo,S)	Dieback (Mi,Mo,Ex)	Shaded Out	Pest / Disease (Mi,Mo,S)	Health Grade	Structure Grade	Vigor (E,A,F,P)	Overall Grade	Condition Rating (%)	Comments L/T = leaf/twig Hrot = heart rot/decay
198	*QA*	3.5		10	3		4		2		3		80%	S		P	S		X	T				X		Mi		S	B	D	P	C-	50	Landscape tree in offsite slope along Las Virgenes; extensive decay along trunk

#1 - Coast live oak

#2 - Coast live oak

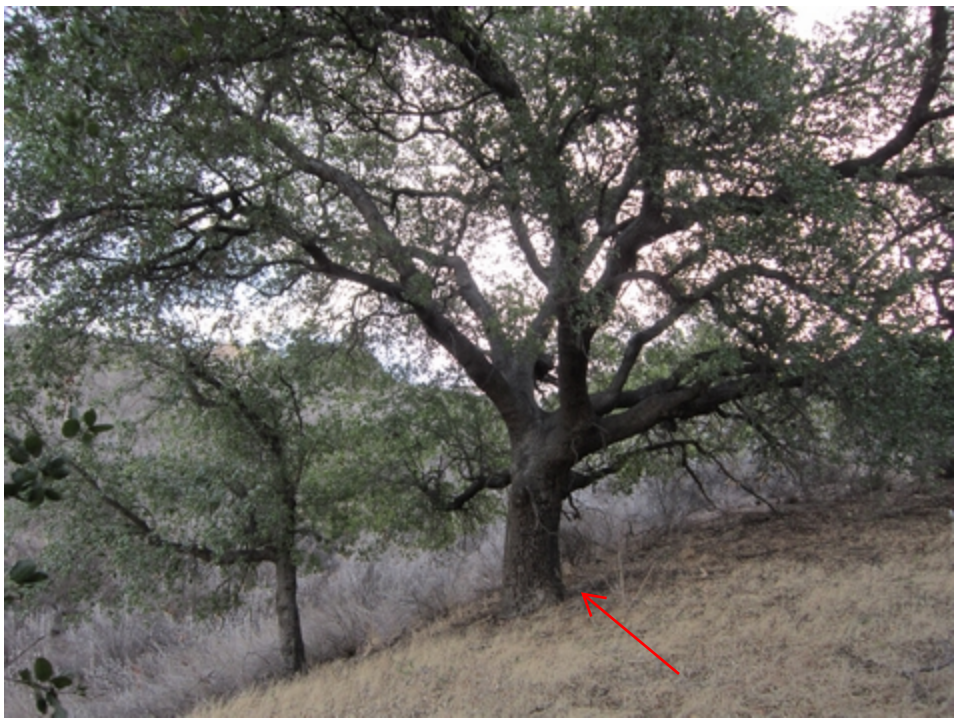
#3 - Valley oak

#4 - Coast live oak

#5 - Coast live oak

#6 - Coast live oak

#7 - Coast live oak



#8 - Coast live oak

#9 - Coast live oak

#10 - Coast live oak

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#15 - Coast live oak

#16 - Coast live oak

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#35 - Coast live oak

#36 - Coast live oak

#37 - Coast live oak

#38 - Coast live oak

#39 - Coast live oak

#40 - Coast live oak

#41 - Coast live oak

#42 - Coast live oak

#43 - Coast live oak

#44 - Valley oak

#45 - Coast live oak

#46 - Collapsed dead Valley oak

#47 - Coast live oak

#48 - Coast live oak

#49 - Coast live oak

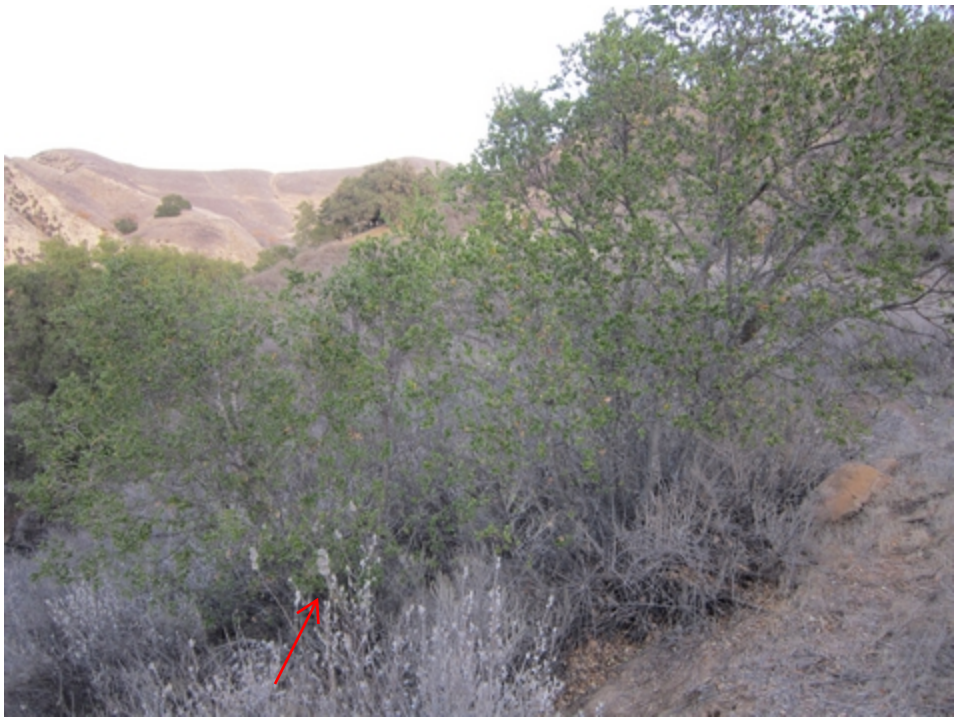
#50 - Coast live oak

#51 - Coast live oak

#52 - Coast live oak

#53 - Coast live oak

#54 - Coast live oak



#55 - Coast live oak

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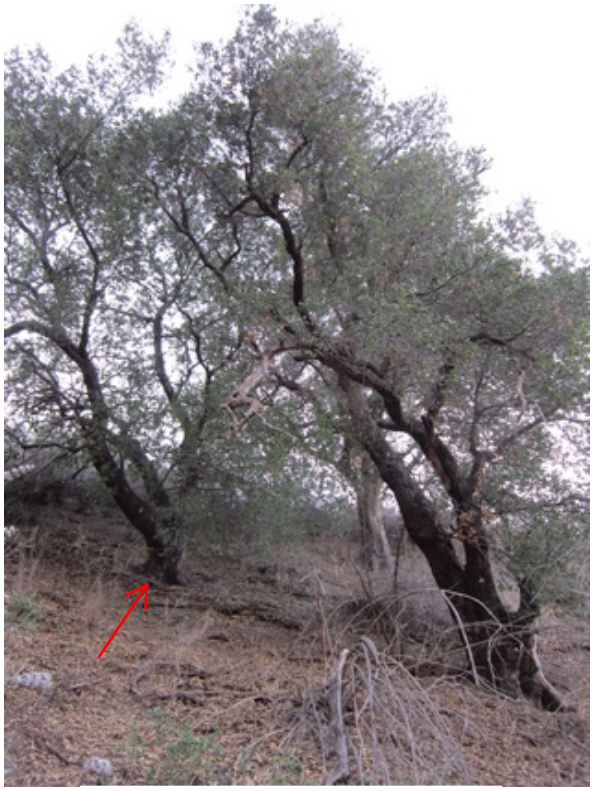
#61 - Coast live oak



#62 - Coast live oak

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#100 - Coast live oak

#101 - Coast live oak

#102 - Coast live oak

#103 - Coast live oak

#104 - Coast live oak

#105 - Valley oak

#106 - Valley oak

#107 - Coast live oak

#108 - Valley oak

#109 - Coast live oak

#110 - Coast live oak

#111 - Coast live oak

#112 - Coast live oak

#113 - Coast live oak

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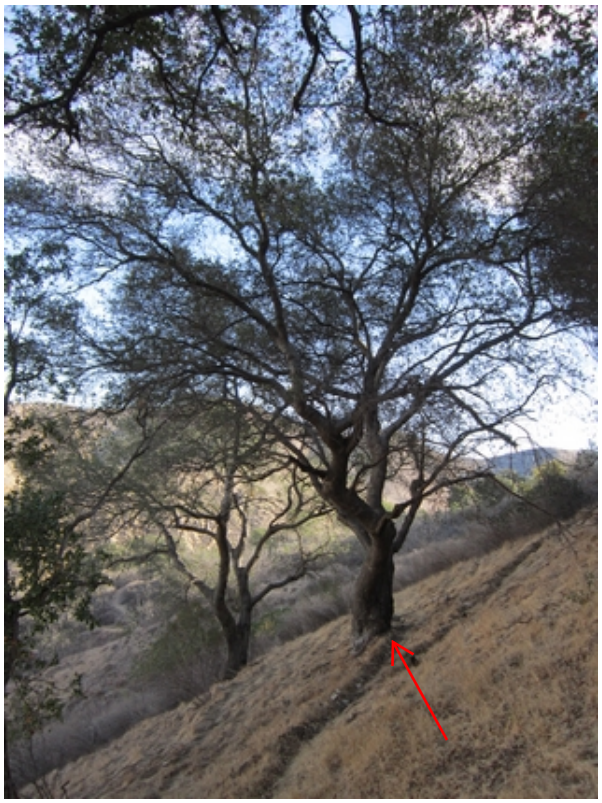
#118 - Coast live oak

#119 - Coast live oak

#120 - Coast live oak



#121 - Coast live oak

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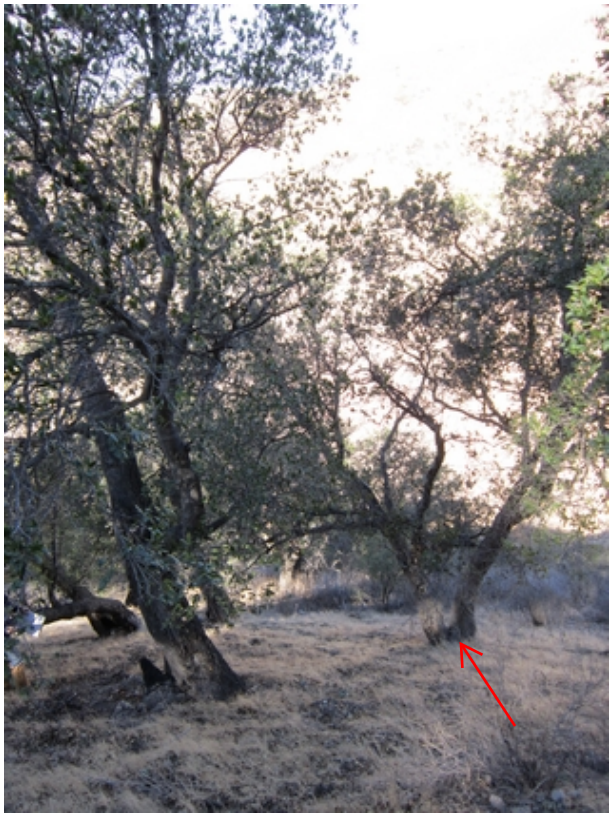
#134 - Coast live oak

#135 - Coast live oak

#136 - Coast live oak



#137 - Coast live oak

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#190 - Coast live oak

#191 - Coast live oak

#192 - Coast live oak

#193 - Coast live oak

#194 - Coast live oak

#195 - Coast live oak

#196 - Coast live oak

#197 - Coast live oak

#198 - Coast live oak

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
1	48	n/a	0.85	115,400	98,090	From the City of Calabasas OTP&PG: For trees under 7" in diameter 4 1/2' above grade :
2	16 @ 3'	n/a	0.85	29,000	24,650	
3	46	n/a	0.75	110,000	82,500	
4	36	n/a	0.70	83,000	58,100	
5	18	n/a	0.75	34,400	25,800	
6	24	n/a	0.85	50,600	43,010	
7	11	n/a	0.65	15,500	10,075	
8	30	n/a	0.75	66,800	50,100	
9	2, 3	3.6	0.95	1,950	1,853	
10	23	n/a	0.70	47,900	33,530	
11	5, 9, 12, 23	27.9	0.80	61,130	48,904	
12	50	n/a	0.85	120,800	102,680	
13	2	n/a	0.85	910	774	
14	30	n/a	0.70	66,800	46,760	
15	6, 6.5, 7	11.2	0.95	16,040	15,238	
16	5, 6	7.8	0.95	6,860	6,517	
17	2, 3, 4, 5 @ 3'	7.4	0.95	5,780	5,491	
18	10	n/a	0.85	12,800	10,880	
19	7, 7	9.8	0.80	12,260	9,808	
20	3, 3.5	4.7	0.85	3,000	2,550	
21	3.5, 7	7.8	0.95	6,860	6,517	
22	4.5, 5.5	6.6	0.95	7,600	7,220	
23	2, 5.5	5.9	0.95	4,700	4,465	
24	3	n/a	0.95	1,600	1,520	

Size (inches)	Box/ Ball Size (inches)	Value (Dollars)
less than 0.73	5 gal.	175
0.75	15 gal.	525
1-1.5	20	700
2	24	910
2.75	30	1,275
3.25	36	1,600
4	42	1,950
4.5	48	2,300
5	54	3,000
6	60	4,700
7	72	7,600

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
25	4, 5 @ 3'	6.5	0.95	7,600	7,220	
26	20	n/a	0.85	39,800	33,830	
27	18	n/a	0.85	31,100	26,435	
28	2.5	n/a	0.95	1,275	1,211	
29	2.5, 3.5 @ 3'	4.4	0.95	2,300	2,185	
30	5	n/a	0.95	3,000	2,850	
31	13.5, 17.5	21.3	0.95	43,310	41,145	
32	24	n/a	0.70	50,600	35,420	
33	18, 18	25.4	0.50	54,380	27,190	
34	48	n/a	0.60	115,400	69,240	
35	43 @ base	n/a	0.70	101,900	71,330	
36	33	n/a	0.70	74,900	52,430	
37	23	n/a	0.70	47,900	33,530	
38	8, 23, 25	34.9	0.65	80,030	52,020	
39	30 @ 3'	n/a	0.65	66,800	43,420	
40	38	n/a	0.30	88,400	26,520	
41	42	n/a	0.80	99,200	79,360	
42	41	n/a	0.85	96,500	82,025	
43	20	n/a	0.80	39,800	31,840	
44	27.5	n/a	0.65	60,050	39,033	
45	18, 19, 22	34.2	0.70	78,140	54,698	
46	32	n/a	0.00	72,200	0	Collapsed dead
47	30	n/a	0.80	66,800	53,440	
48	25	n/a	0.65	53,300	34,645	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
49	40	n/a	0.50	93,800	46,900	
50	13.5, 14, 14.5, 21	24.3	0.50	51,410	25,705	
51	28	n/a	0.50	61,400	30,700	
52	20	n/a	0.70	39,800	27,860	
53	40	n/a	0.50	93,800	46,900	
54	3.5	n/a	0.95	1,950	1,853	
55	2, 3, 4.5 @3'	5	0.95	3,000	2,850	
56	2.5, 3.5, 4, 6	8.4	0.95	8,480	8,056	
57	23	n/a	0.80	47,900	38,320	
58	5, 6, 6, 6	11.5	0.95	16,850	16,008	
59	1, 1, 2, 2.5, 3, 4	6.2	0.95	4,700	4,465	
60	5 @ 3'	n/a	0.95	3,000	2,850	
61	23 @3'	n/a	0.60	47,900	28,740	
62	14, 16	21.3	0.50	43,310	21,655	
63	23 @ 2'	n/a	0.70	47,900	33,530	
64	24	n/a	0.80	50,600	40,480	
65	4.5	n/a	0.95	2,300	2,185	
66	38	n/a	0.75	88,400	66,300	
67	2, 2, 3, 4.5, 6	8.6	0.95	6,320	6,004	
68	3, 5, 5	7.7	0.95	6,590	6,261	
69	24, 27, 28	45.7	0.70	109,190	76,433	
70	10.5, 17, 17, 18, 20	37.6	0.65	87,320	56,758	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
71	2, 3, 4, 17, 19	26.1	0.50	56,270	28,135	
72	7, 23	24	0.50	68,500	34,250	
73	3, 3 @ 2'	4.2	0.95	1,950	1,853	
74	7, 23, 24, 29	44.7	0.70	106,490	74,543	
75	2, 3	3.6	0.95	1,950	1,853	
76	20	n/a	0.70	39,800	27,860	
77	20, 24, 28	41.9	0.60	98,930	59,358	
78	7, 9, 14, 20	26.9	0.65	58,430	37,980	
79	2, 3.5	4.1	0.95	1,950	1,853	
80	16, 18, 22	32.6	0.60	73,820	44,292	
81	1, 3	3.2	0.80	1,650	1,320	
82	2	n/a	0.80	910	728	
83	29 @ 3'	n/a	0.50	64,100	32,050	
84	18, 20	26.9	0.50	58,430	29,215	
85	1, 2, 3	3.7	0.95	1,950	1,853	
86	1, 3, 4	5.2	0.95	3,000	2,850	
87	4	n/a	0.95	1,950	1,853	
88	3 @ 2'	n/a	0.95	1,600	1,520	
89	10, 12	15.6	0.50	27,920	13,960	
90	24 @ 4'	n/a	0.80	50,600	40,480	
91	1, 3	3.2	0.95	1,650	1,568	
92	18.5	n/a	0.60	35,750	21,450	
93	13	n/a	0.60	20,900	12,540	
94	4, 6	7.2	0.95	7,600	7,220	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
95	13, 17	21.4	0.50	43,580	21,790	
96	18.5	n/a	0.80	35,750	28,600	
97	12.5	n/a	0.55	19,550	10,753	
98	19	n/a	0.55	37,100	20,405	
99	12	n/a	0.55	18,200	10,010	
100	10, 12.5	16	0.70	29,000	20,300	
101	12 @ 4'	n/a	0.70	18,200	12,740	
102	17	n/a	0.50	31,700	15,850	
103	3.5	n/a	0.95	1,950	1,853	
104	11.5, 15, 17	25.4	0.55	54,380	29,909	
105	17	n/a	0.80	31,700	25,360	
106	33	n/a	0.80	74,900	59,920	
107	26	n/a	0.50	56,000	28,000	
108	36.5	n/a	0.70	84,350	59,045	
109	10	n/a	0.70	12,800	8,960	
110	7	n/a	0.65	7,600	4,940	
111	18	n/a	0.50	34,400	17,200	
112	11	n/a	0.50	15,500	7,750	
113	16 @ 2'	n/a	0.50	29,000	14,500	
114	18.5	n/a	0.50	35,750	17,875	
115	9, 14	16.7	0.50	30,890	15,445	
116	3	n/a	0.95	1,600	1,520	
117	18	n/a	0.65	34,400	22,360	
118	22	n/a	0.60	45,200	27,120	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
119	23	n/a	0.55	47,900	26,345	
120	11	n/a	0.60	15,500	9,300	
121	11, 13, 13	21.4	0.60	43,580	26,148	
122	28 @ 3'	n/a	0.60	61,400	36,840	
123	1.5, 1.5, 2, 2	3.6	0.85	1,950	1,658	
124	16.5	n/a	0.50	30,350	15,175	
125	13, 15, 19	27.5	0.65	60,050	39,033	
126	9, 10, 12.5	18.4	0.75	35,480	26,610	
127	3.5, 16	14.4	0.60	24,680	14,808	
128	5, 10.5	11.7	0.70	17,390	12,173	
129	7	n/a	0.30	1,600	480	
130	12, 16	20	0.60	39,800	23,880	
131	17	n/a	0.75	31,700	23,775	
132	1, 1, 8	8.1	0.30	7,670	2,301	
133	15, 17	22.7	0.60	47,090	28,254	
134	22.5 @ 3'	n/a	0.75	46,550	34,913	
135	10, 11	14.9	0.75	23,660	17,745	
136	18	n/a	0.55	34,400	18,920	
137	12.5, 13	18.1	0.75	34,670	26,003	
138	10.5, 11	15.2	0.60	26,840	16,104	
139	16	n/a	0.40	29,000	11,600	
140	16, 18	24.1	0.70	50,870	35,609	
141	13, 15, 19	27.5	0.75	60,050	45,038	
142	8, 10, 14	19	0.50	37,100	18,550	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
143	10.5, 12, 13	20.6	0.55	41,420	22,781	
144	8.5	n/a	0.40	8,750	3,500	
145	20	n/a	0.75	39,800	29,850	
146	11, 13	17	0.55	31,700	17,435	
147	7.5, 9	11.7	0.55	17,390	9,565	
148	18	n/a	0.50	34,400	17,200	
149	12.5	n/a	0.50	19,550	9,775	
150	22.5	n/a	0.30	46,550	13,965	
151	25	n/a	0.50	53,300	26,650	
152	19.5	n/a	0.55	38,450	21,148	
153	20.5	n/a	0.50	41,150	20,575	
154	13, 16, 22	30.2	0.85	67,340	57,239	
155	3, 3, 3, 4, 4, 4	8.7	0.95	9,290	8,826	
156	3, 3, 3, 4, 5	8.3	0.95	8,210	7,800	
157	1, 2.5	2.8	0.95	1,275	1,211	
158	2, 3	3.6	0.95	1,950	1,853	
159	1, 2	2.3	0.95	910	865	
160	17	n/a	0.55	31,700	17,435	
161	26	n/a	0.80	56,000	44,800	
162	2, 5, 7	8.8	0.95	9,560	9,082	
163	2, 6	6.3	0.85	4,700	3,995	
164	24 @ 2'	n/a	0.50	50,600	25,300	
165	9	n/a	0.80	10,100	8,080	
166	7	n/a	0.95	7,600	7,220	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
167	11.5	n/a	0.25	16,850	4,213	
168	4, 10	10.8	0.80	14,960	11,968	
169	7.5, 11	13.3	0.80	21,710	17,368	
170	4	n/a	0.70	1,950	1,365	
171	20	n/a	0.50	39,800	19,900	
172	14, 19	23.6	0.80	49,520	39,616	
173	19	n/a	0.65	37,100	24,115	
174	17, 18	24.8	0.65	52,760	34,294	
175	24	n/a	0.25	50,600	12,650	
176	14	n/a	0.50	23,600	11,800	
177	12	n/a	0.75	18,200	13,650	
178	18	n/a	0.80	34,400	27,520	
179	12, 12, 14	22	0.80	45,200	36,160	
180	12	n/a	0.80	18,200	14,560	
181	6, 4	7.2	0.70	5,240	3,668	
182	16	n/a	0.80	29,000	23,200	
183	20	n/a	0.55	39,800	21,890	
184	20	n/a	0.80	39,800	31,840	
185	39	n/a	0.50	91,100	45,550	
186	65	n/a	0.85	161,300	137,105	
187	49	n/a	0.85	118,100	100,385	
188	43 @3'	n/a	0.50	120,800	60,400	
189	23	n/a	0.80	47,900	38,320	
190	27	n/a	0.80	58,700	46,960	

PCR VALUES Canyon Oaks Project – Calculated February 2014						
Tree No.	**DBH (s)**	**Adjusted Diameter** (based on additive trunk area for multi-trunk trees)	**Condition Rating**	**Basic Value $** ($4,700 for 1st 7" dbh + $2,700 x balance of dbh)	**PRC Value $** (rounded to nearest dollar) (Basic value x Condition Rating)	**Notes**
191	16	n/a	0.50	29,000	14,500	may need adjustment - no leaves - no access - assumed 50%
192	5	n/a	0.85	3,000	2,550	
193	8	n/a	0.95	7,400	7,030	
194	4.5	n/a	0.95	2,300	2,185	
195	1, 1, 1 @base	2	0.95	910	865	
196	4	n/a	0.25	1,950	488	
197	2.5	n/a	0.25	1,275	319	
198	3.5	n/a	0.50	1,950	975	
198 Oaks					**$4,856,457**	

17.26.070 Oak trees; oak tree permit.

A. Purpose.
1. The city of Calabasas lies within a unique area of Los Angeles County, the beauty and welfare of which is greatly enhanced by the presence of large numbers of oak trees and scrub oak habitat areas. Past development of the area resulted in removal of a great number of these trees and diminished resource habitat areas. Further destruction of these finite resources would detrimentally affect the ecosystem and aesthetics of the city.
2. It is the policy of the city to preserve and enhance its ecosystem, one element being its inventory of oak trees and scrub oak habitat, due in part to their contribution to the hardwood canopy and wildlife habitat. Other identified benefits of oak trees and scrub oak habitat to the health, safety and welfare of the citizens of Calabasas include, but are not limited to, erosion control, solar benefits, dust control, visual enjoyment, energy reduction, property values and the sense of community and place created by the surrounding vistas.
3. The preservation program outlined in this section contributes to the historical and environmental value of these trees to the community. Accordingly, the spirit and intent of this section are meant to have an equal parity to its articulated contents.
B. Oak Tree and Scrub Oak Habitat Preservation.
1. Any person or entity that owns, controls or has custody or possession of any real property within the city shall maintain all oak trees and scrub oak habitat located thereon in a state of good health pursuant to the most current “Oak Tree Preservation and Protection Guidelines” (Guidelines) adopted by council Resolution 91-36, which can be found on file in the office of the city clerk.
2. In an effort to further the goals and intent of this section, the city shall establish an oak tree preservation program. The objectives of this program shall include, but not be limited to, the following:
a. Reforestation of sites inside or outside of a project area that will not be subject to future development;
b. Replacement of existing oak woodlands and scrub oak habitat previously removed for development;
c. Public acquisition of or establishment of permanent conservation easements on otherwise developable lands;
d. Public environmental education regarding reforestation and habitat preservation;
e. Support for nonprofit organizations and other governmental agencies for the acquisition, preservation and reforestation of oak woodlands and other suitable wildlife habitat areas.
3. All cash fees, fines, forfeitures and mitigations, apart from permit processing fees, shall be placed within a fund for the oak tree and scrub oak habitat preservation program.
C. Oak Tree Permit Requirements and Exemptions.
1. Requirements.
a. No person shall alter any oak tree or scrub oak habitat on any real property within the city, unless a valid oak tree permit is issued pursuant to the provisions of this section and the guidelines.
b. Any other permit issued for the purpose of development of any public or private property shall also comply with this section.
2. Exemptions. A permit is not required to cut or remove an oak tree or alter scrub oak habitat under the following circumstances:
a. If the oak tree is less than two inches in diameter, unless the tree is within a scrub oak habitat or was planted as mitigation for a prior removal;
b. If an oak tree or scrub oak habitat is damaged by thunderstorms, windstorms, floods, earthquakes, fires, or other natural disaster or incident and verified by city staff;
c. Replacement or repair of existing utility lines or structures, while performing emergency or routine maintenance activities that may impact oak trees or scrub oak habitat, and which are necessary to maintain the facilities or other property of a public utility. The utility shall notify the city of any action taken that impacts oak trees or scrub oak habitat as soon as reasonably possible.
3. Minor Oak Tree Permit. A minor oak tree permit shall be required to remove or alter oak

trees, under the following circumstances:
a. When an oak tree is less than six inches in diameter, as confirmed by city staff, and has any portion of its trunk located within forty (40) feet of an existing primary structure, unless the tree was planted as mitigation for a prior removal. Oak trees located within a public right-of-way, however, are not exempted by this subsection;
b. Pruning of oak trees or vegetation on scrub oak habitat for fuel modification to meet city requirements. Official agency documentation must be provided to the city and verified by city staff prior to commencing work;
c. Routine maintenance action needed to maintain the continued good health of an oak tree, limited to removal of deadwood, insect control spraying, fertilization, cabling, mulching and watering;
d. Routine maintenance actions needed to assure safe clearance for pedestrians, vehicles or structures;
e. Replacement, modification or repair of existing improvements within the protected zone of an oak tree, as long as the tree is not impacted by the action.
4. Utility Projects. New construction, modification or replacement of existing facilities, excluding the replacement or repair of utility lines and structures as discussed in subsection (C)(2)(c) of this section, shall be governed by the provisions of this section. Utilities shall be responsible for damage to oak trees. Utilities shall be required to notify the city five working days prior to any maintenance activity that might affect an oak tree or scrub oak habitat. As an alternative to individual prior notifications for each maintenance activity, the utility may submit an annual notification of maintenance activities to the city. This notification shall include, but is not limited to, the following:
a. List of facilities;
b. Schedule of work;
c. Extent of maintenance activities;
d. List of oak trees and/or scrub oak habitat that might be affected.
Utilities may take emergency action with respect to oak trees without giving advance notice when immediate action is required in order to protect the public or the utility's employees, prevent damage or destruction of facilities and property, or to effect expeditious reinstatement of service following an interruption. The utility shall notify the city of such action taken as soon as reasonably possible.
D. Permit Processing. The applicant shall furnish all necessary information required by the guidelines and pay the appropriate filing fee to the city.
1. An application shall be completed and submitted to city staff for review and approval.
2. The comments from the city staff shall be forwarded to the community development director for review and approval. The director may approve permits for the following types of activity:
a. Removal of up to three living oak trees, less than six inches in diameter each, and not greater than twelve (12) inches in diameter aggregate. This limit shall be on a cumulative basis for the parcel. Following such removals, a notice shall be recorded regarding the subject property, requiring that any subsequent removal of oak trees from the subject site be approved by the planning commission, as appropriate;
b. Removal of any number of dead and/or hazardous oak trees or portions of oak trees or scrub oak habitat of any size, which is required due to health and safety concerns, or a public emergency, as determined by the director and the city arborist;
c. Pruning for clearance from existing structures or above roadways, sidewalks, trails or other transportation corridors, comprising not more than twenty-five (25) percent of the live foliage for each oak tree;
d. Minor encroachments into a protected zone of an oak tree including, but not limited to, fence installations or minor improvements that may impact up to ten (10) percent of the total area included within the protected zone;
e. Replacement or repair of existing improvements located within the protected zone of an oak tree, as long as the impacts to the tree do not increase.
3. The recommendation of the director shall be forwarded to the planning commission for consideration and disposition for the following types of activity:

a. Removal of any number of oak trees (beyond that allowed by subsection (D)(2)(a) or (D)(2)(b) of this section) or any amount of scrub oak habitat, excluding any living heritage oak;
b. Pruning comprising more than twenty-five (25) percent of the live foliage for an individual oak tree;
c. Encroachments impacting more than ten (10) percent of the total area included within the protected zone of an oak tree;
d. Impacts to any oak tree of special or significant community interest or exceptional, aesthetic, environmental or historical value. Such tree shall have been previously designated as having special or significant value by a specific action of the planning commission or council.
4. The recommendation of the planning commission shall be forwarded to the council for consideration and disposition for the following levels of activity:
a. Any oak tree permit for a project that involves the removal of any living heritage oak;
b. Any oak tree permit for a project that requires a separate development project approval from the council.
E. Permit Findings. An oak tree permit may be approved by the city based upon at least one of the following findings:
1. The request to remove an oak tree or scrub oak habitat is warranted to enable reasonable and conforming use of the subject property, which would otherwise be prevented by the presence of the oak tree or scrub oak habitat. Reasonable use of the property shall be determined in accordance with the guidelines.
2. The request to alter or encroach within the protected zone of an oak tree or scrub oak habitat is warranted to enable reasonable and conforming use of the property, which would otherwise be prevented by the presence of the oak tree or scrub oak habitat. In addition, such alterations and encroachments can be performed without significant long-term adverse impacts to the oak tree or scrub oak habitat. Reasonable use of the property shall be determined in accordance with the guidelines.
3. The condition or location of the oak tree or scrub oak habitat requires altering to maintain or aid its health, balance or structure.
4. The condition of the oak tree or scrub oak habitat warrants its removal due to disease, dangerous condition, proximity to existing structures, high pedestrian traffic areas, such as parking lots and pedestrian walkways when such conditions may be unsafe or cannot be controlled or remedied through reasonable preservation and/or prevention procedures and practices.
5. Removal or altering of the oak tree(s) will have minimal impact on the total hardwood canopy with special emphasis on associated tree growth and their natural regeneration, wildlife habitat and heritage oak trees.
F. Required Oak Tree Report. The applicant shall submit an oak tree report, prepared by a city-qualified arborist. The exact information and format of the information required is described in the guidelines. An oak tree report may include, but is not limited to, the following information:
1. An inventory of the individual oak trees and scrub oak habitat areas associated with the project;
2. An oak tree location map indicating the current topography and proposed grading plan, the tag number, exact trunk location, dripline, and protected zone of each oak tree within the project area, as well as the outline of proximate scrub oak habitat areas;
3. All proposed site development activities including, but not limited to, excavation for foundations, utility corridors and construction access routes;
4. Analysis of the potential impacts of the proposed development activities upon the oak trees and scrub oak habitat;
5. A mitigation program for the proposed impacts.
G. Permit Conditions. A gain or loss in oak tree inventory on the site shall be described in terms of species, total inches of diameter aggregate gain or loss, and the magnitude of the impacts. A gain or loss of scrub oak habitat shall be described in terms of acres of habitat coverage and the magnitude of the impacts. Conditions may be imposed on an oak tree

permit by the city, including but not limited to any combination of the following:
1. A cash fee paid to the oak tree mitigation fund, which shall include maintenance and monitoring costs. The determination of the dollar value, cost or loss shall be calculated in accordance with the most current mitigation schedule established by the council. The council shall review and approve such fees at least once every three years. The city may accept appropriate dedication of land in lieu of cash;
2. One inch of oak tree diameter shall be planted for each inch of tree removed. Scrub oak habitat shall be replaced on a land area basis. Locations appropriate for new replacement plantings may be proposed by the applicant and approved by the city arborist prior to the granting of a permit based upon the potential for long-term viability;
3. Replacement or placement of additional oak trees, scrub oak habitat, associated hardwood canopy, land or wildlife habitat to proportionally offset the impacts associated with the loss of oak trees, scrub oak habitat, limbs, roots or potential long-term adverse impacts due to alterations or encroachment within the protected zone. Locations appropriate to such new plantings may be proposed by the applicant and must be approved by city staff prior to the granting of a permit based upon the potential for long-term viability;
4. Relocation of oak trees over ten (10) inches in diameter shall not be considered as mitigation;
5. Restrictions on construction activities within the protected zone of oak trees or within scrub oak habitat areas;
6. Remedial maintenance programs to improve the health of existing oak trees and scrub oak habitat areas;
7. Monitoring. Monitoring shall be conducted during all grading and construction activities at intervals warranted by the site conditions and level of activity. The monitoring program shall consist of quantitative and qualitative observations useful in identifying stress-related responses of oak trees and scrub oak habitat. Monitoring activities shall be performed in accordance with the procedures adopted in the guidelines.
a. Duration of and Responsibility for Monitoring. As noted above, monitoring shall be maintained during grading and construction activities; furthermore, following construction, annual monitoring shall be performed for a minimum of five years as warranted by site conditions, to ensure continued health of the trees and habitat areas. A city-qualified arborist shall conduct all monitoring. Costs shall be borne by the applicant. Restitution or remediation shall be required, should a project fail to comply with the desired establishment goals.
b. Use of Monitoring Information. Information provided by monitoring shall be used in establishing realistic mitigation measures and to ensure the future of oak resources throughout the city.
c. Establishment Goals. Criteria for evaluating the success of oak tree and scrub oak habitat preservation and establishing associated vegetation shall be specified in the permit conditions. Remediation shall be required as necessary to enable a site to meet the establishment criteria;
8. Registration. All replacement oak trees and scrub oak habitat areas shall be registered with the city in accordance with the guidelines;
9. Maintenance. All oak trees and scrub oak habitat areas shall be maintained in accordance with the guidelines;
10. Bond. The city may require adequate security to ensure performance, correct construction procedures, reforestation, monitoring and maintenance, in an amount to be determined by the city;
11. Recordation. As deemed necessary by the city or as set forth in this section, conditions of approval for an oak tree permit shall be recorded. The specific wording of the recorded permit shall be subject to the approval of the director.
H. Nonliability of City. Nothing in this section or within the guidelines shall be deemed to impose any liability for damages or a duty of care and maintenance upon the city or upon any of its officers or employees.
I. Other Laws and Authorities. The granting of an oak tree permit by the city shall not be

construed as a permit to ignore any other law or authority. Among the laws that should be considered are the following at the California state level:
1. California Department of Fish and Game Code laws prohibit the destruction of a tree that contains a nest of certain birds.
2. State law includes the California Environmental Quality Act, which addresses tree removals.
3. The California Department of Forestry published the Integrated Hardwood Range Management Program which has specific guidelines for oak rangeland.
J. Violation—Penalty.
1. Any person or entity that violates this section is guilty of a misdemeanor and upon conviction, may be punished as set forth in this code.
2. Any person or entity that violates this section shall be required to obtain a retroactive oak tree permit and to comply with any mitigation measures specified therein.
3. Violation of this section and the guidelines during any construction shall result in an immediate stop-work order issued by the city, and work may not continue until permits are obtained and proper mitigation is completed.
4. Removal of an oak tree or scrub oak habitat may also result in a building or improvement moratorium being placed on the property for a period not to exceed ten (10) years and will apply to any subsequent owner of the property until the term is completed. A notice of noncompliance may also be recorded on the property. (Ord. 2006-222 § 2, 2006; Ord. 2005-210 § 1, 2005; Ord. 2001-166 § 3, 2001)

CITY OF CALABASAS

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LDC INC.

OAK TREE PRESERVATION AND PROTECTION GUIDELINES

REVISED DRAFT 29 April 1993

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INTRODUCTION

Oak trees within the City of Calabasas are a valuable resource and are protected by the Oak Tree Ordinance. These guidelines describe methods, procedures and application materials required by the City to ensure that proper consideration is given to oak trees and their habitat in connection with development and other requests. An oak tree permit is required for the removal, encroachment or moving by development of an oak tree with certain exceptions as described below.

Certain work on an oak tree may be performed without a permit and therefore, the provisions of these guidelines do not apply. Please refer to the Oak Tree Ordinance and these guidelines for details if in doubt.

It is generally advisable to contact the City prior to beginning any construction or earthwork on property that has any oak trees within 200 feet. The City will be happy to answer your questions and assist you with your oak trees.

OAK TREE PRESERVATION AND PROTECTION GUIDELINES

I. PURPOSE

The City lies in a unique portion of Los Angeles County, the beauty and natural setting of which is greatly enhanced by the presence of large numbers of majestic oak trees. These indigenous oak trees are recognized for their significant historical, aesthetic and environmental value. They are indicator species for the natural communities in which they exist, supporting a broad spectrum of other native plant and animal species. As one of the most picturesque trees in the Southern California area, they lend beauty and charm to the natural and man-made landscape, provide over $5,000 per year in environmental enhancement by controlling soil erosion and water run-off, moderating air pollution and cutting heating and cooling costs, enhance the value of property and preserve the character of the communities in which they exist.

Development within the Calabasas area has resulted in the removal of a great number of oak trees. Further uncontrolled and indiscriminate destruction of this diminishing plant heritage would have a detrimental affect the general health, safety and welfare of the citizens of Calabasas. The preservation program and procedures outlined in these guidelines contribute to the welfare and aesthetics of the community and retain the great historical and environmental value of these trees.

No person, partnership, firm, corporation, government agency, or other legal entity shall cut, prune, remove, relocate, endanger or damage any tree protected by the City Oak Tree Ordinance on any public or private land located within the incorporated areas of the City of Calabasas except in accordance with the conditions of a valid oak tree permit issued by the City.

II. OAK TREE POLICY

It shall be the policy of the City of Calabasas to require the preservation of all healthy oak trees unless compelling reasons justify the removal of such trees. This policy shall apply to the removal, pruning, cutting and/or encroachment into the protected zone of oak trees. The Planning Commission, in conjunction with an oak tree preservation consultant as necessary, shall have the primary

and overall responsibility to administer, evaluate and monitor this policy to assure strict compliance.

III. DEFINITIONS

For the purposes of these guidelines, unless otherwise apparent from the context, certain words and phrases used are defined in this section.

"**Alter**" - Any action undertaken which may cause damage or cause injury, death or disfigurement to a tree. This includes, but is not limited to, removing, transplanting, detaching, cutting or pruning, poisoning, over watering, excavating, or paving within the protected zone of an oak tree.

"**Canopy Cover**" - The percentage of a site covered by oak canopy based on the sum of all oak crown canopies within the property boundaries .

"**Canopy Retention Standard**" - The amount of canopy that is to remain on any property following improvement. The City policy is to retain 75% of the baseline canopy within its jurisdiction, as of August 1992.

"**Certification Letter**" - A letter certifying that the work was performed under the general or direct supervision of an oak tree preservation consultant and that said work fully complies with the conditions of the development permit, the oak tree report and/or these Oak Tree Preservation Guidelines, as appropriate.

"**Crown Canopy**" - The leafy portion of the tree outlined using dripline measurements.

"**Cutting**" - The detaching or separating either in whole or in part, from a protected tree, any part of the tree including, but not limited to, any limb, branch, root, or leaves. Cutting shall include pruning and trimming.

"**Damage**" - Any action which causes or tends to cause injury, death or disfigurement to a tree. This includes, but is not limited to, cutting, poisoning, burning, over watering, relocating or transplanting a protected tree, changing or compacting the natural grade within the protected zone of a protected tree, changing groundwater levels or drainage patterns, or trenching, excavating or paving within the protected zone of an oak tree.

"**Dead Tree**" - A tree that does not contain any live tissue; i.e. green leaves or live limbs. Since Valley Oak (Quercus

lobata) are deciduous trees and are dormant in the winter, their status must be confirmed by the City's Oak Tree Consultant in the spring before being declared dead.

"**Deadwood**" - Limbs or branches that contain no green leaves or live tissues. A tree or limb may be considered dead if it does not show evidence of any green leaves or live branches over the span of 1 year, inclusive of prime growing weather.

"**Deadwooding**" - The process of trimming an oak tree of its deadwood.

"**DBH**" - Diameter at breast height is to be measured at 4 1/2 feet above grade on the high side of the tree.

"**Dripline**" - The outermost edge of the tree's canopy. When depicted on a map or on the ground, the dripline will appear as an irregular shape that follows the outline of the trees branches as seen from overhead.

"**Encroachment**" - Any intrusion into the protected zone of an oak tree which includes, but is not limited to, altering, pruning, grading, excavating, trenching, dumping of materials, animal corrals, storage of materials or equipment, or the construction of structures, paving or other improvements. For purposes of this section, encroachment shall not include the action of a person physically entering the protected zone of an oak tree.

"**Fencing Plan**" - A detailed design showing placement of protective structures around trees. Fences will be located outside the protected zone of a tree or group of trees, be a minimum of 5 feet high, with warning signs located on 4 sides.

"**Fine Grading Permit**" - An entitlement from the City authorizing certain grading work that must be conducted within the protected zone of an oak tree, designed to ensure proper drainage as required by the City of Calabasas Municipal Code.

"**Ground Plane Improvements**" - Improvements that do not disturb the soil within the protected zone of an oak tree.

"**Heritage Oak**" - Any tree in the oak genus with a diameter of 24 inches at 4 1/2 feet above natural grade. In addition, the Planning Commission and/or the City Council may classify an oak tree, regardless of size, as a heritage oak tree if it is determined by a majority vote thereof that such tree has exceptional historic, aesthetic and/or environmental qualities of major significance or prominence to the community.

"**Monitoring**" - The process of physically measuring various aspects of tree health and vigor to determine how the tree changes over time. This can include photographs, soil analysis, and measurements of water stem potential and flushing growth as well as visual assessment.

"**Multiple trunks**" - Refers to more than one trunk growing from one root system, with the aggregate diameters totaled, deemed to equal one tree.

"**Oak Tree**" - Any oak tree of the genus Quercus, including, but not limited to, Valley Oak (Quercus lobata), California Live Oak (Quercus agrifolia), Interior Live Oak (Quercus wislizenii), and Scrub Oak (Quercus dumosa), having a diameter greater than 1 inch when measured 12 inches above grade.

"**Oak Tree Consultant**" - An individual or firm with a degree of acceptable and relevant experience in landscape architecture and/or horticulture, including extensive experience in monitoring and maintaining the health of oak trees. A list of such individuals/firms will be available from the City.

"**Oak Tree Information Packet**" - A packet containing certain handouts concerning the care and maintenance of oak trees which will be distributed to property owners whose lots contain oak trees.

"**Oak Tree Permit**" - An entitlement from the City authorizing specific work to be performed within the protected zone of an oak tree pursuant to the provisions of the Oak Tree Ordinance.

"**Oak Tree Preservation and Protection Guidelines**" or "**Guidelines**" - The policy established by the City Council and the dministrative procedures and rules established by the Planning Commission for the implementation of the Oak Tree Ordinance.

"**Oak Tree Report**" - A report prepared by an oak tree consultant containing specific information on the location, condition, potential impacts of development, recommended actions and mitigation measures regarding one or more oak trees on an individual lot or project site.

"**Person**" - Any natural person, partnership, firm, corporation, governmental agency, or other legal entity; does not include the City of Calabasas.

"**Pre-Application Conference**" - A meeting between the applicant and appropriate City representatives, including the City oak tree consultant for the purposes of discussing the

requirements for submitting an application for an oak tree permit.

"**Pre-Construction Conference**" - A meeting with the applicant, his/her contractors, superintendent, engineers, oak tree consultants, and City representatives, including the City oak tree consultant, to delineate special procedures, limits of work, lines of authority and special conditions or procedures.

"**Protected Tree**" - The same as oak tree.

"**Protected Zone**" - A specifically defined area totally encompassing an oak tree within which work activities are strictly controlled. Using the dripline as a point of reference, the protected zone shall commence at a point 5' outside of the dripline, and no less than 15' from the trunk of an oak tree, or 50' from the trunk of a heritage tree. The perimeter of the protected zone shall be fenced during construction according to the specifications contained in these guidelines.

"**Pruning**" - Any and all cutting performed upon any portion of an oak tree. Requires a permit and must be conducted in strict compliance to ISA Pruning Standards.

"**Registered Oak**" - Any tree registered by the City or a City recognized entity.

"**Removal**" - Physically removing, or causing the death of a tree through damaging, poisoning, or other direct or indirect action.

"**Routine Maintenance**" - Actions taken for the continued health of an oak tree such as deadwooding. In special cases fertilization, insect control, limited watering and ground aeration may also be warranted. For purposes of the ordinance, routine maintenance shall not include pruning.

"**Stress**" - Any indication that the tree is suffering from changes in its environment. Stress can include, but is not limited to, change in leaf color, crown thinning, curling of leaves, early leaf drop, and reduced shoot growth.

IV. OAK TREE PERMIT APPLICATION PROCESS

Any person who owns, controls, or has custody or possession of any real property within the City of Calabasas shall make a reasonable effort to maintain all oak tree(s) located thereon in a state of good health. Failure to do so will constitute a violation of the ordinance.

Oak Tree Permit Required - No person shall cut, remove, encroach into, or remove brush from the protected zone or remove or transplant any oak tree on any public or private property within the City of Calabasas, unless a valid Oak Tree Permit has been issued pursuant to the provisions of the Oak Tree Ordinance. The applicant shall be required to furnish all necessary information as determined by the Planning Commission together with a fee as established by Council Resolution.

There are two classes of permits:

1. Permit to Alter
   (prune, change grade, encroach, fuel modification;

2. Permit to Remove
   (which also includes relocations)

If the situation calls for both removal and encroachment, only the Permit for Removal is necessary.

No grading permits for properties containing oak trees will be issued without prior approval of an Oak Tree Permit.

STEP ONE: Pre-Application Conference

The purpose of this meeting is to familiarize the applicant with the City's permit process, review pertinent environmental constraints, identify the Canopy Retention Standard, discuss City guidelines on reasonable use of the property and identify the information and materials necessary to file an application for an oak tree permit or request to prune. Criteria for design constraints will be identified at this time and can include: locations of walkways, driveways, cut and fill, fencing individual or clusters of trees, staking surveyed corners of buildings.

A pre-application conference may be arranged by calling the City. Attending the meeting will be the appropriate City planning staff and the City oak tree consultant. For Permits to Alter, this step may be accomplished by phone.

STEP TWO: Formal Application

Once the applicant has completed all application forms and prepared all of the information identified during the pre-application conference, the applicant may formally submit the project application together with the applicable fee.

STEP THREE: Application Review

On receipt of an application for an oak tree permit or request to prune, the City shall review the application for accuracy and completeness and make an inspection of the project site.

The application will be reviewed by the City's oak tree consultant. Those situations requiring consultant review include, but are not limited to, projects involving significant numbers of protected trees, projects involving development activities in the immediate vicinity of protected trees, and/or projects where physical protective measures may be required for the continued health of the remaining trees.

Upon completion of application review and on-site inspections, the City's oak tree consultant shall submit a written report to the City outlining the findings and recommendations. Normally, this will occur within ten (10) working days of receipt of the application materials from the City.

STEP FOUR: Environmental Review

Pursuant to the requirements of the California Environmental Quality Act, the City staff shall determine the appropriate level of environmental review for the project. If an initial study is required, an Environmental Questionnaire and associated filing fee shall be needed.

STEP FIVE: Findings for Approval

After receiving all of the required information, the City may approve the request when one of the following findings can be made:

A. The condition of the protected tree(s) requires pruning to preserve health or maintain balance.

B. The condition of the protected tree(s) general health with respect to the perceived danger of falling over or dropping limbs and proximity to existing structures, high pedestrian areas such as roadways, pedestrian walkways, parking lots or interference with public utility lines cannot be controlled or remedied

through reasonable preservation and/or preventative measures.

C. The approval of this request will not be contrary or in conflict with the general purpose and intent of the Oak Tree Ordinance.

In evaluating requests for removal or encroachments based on the reasonable and conforming use section, the City shall take into consideration: comparison of proposed building(s) gross floor area and other on-site design features with other conforming developments in the same vicinity and zone, and any other factors that are unique to the property such as topographic constraints and other physical limitations. The applicant shall be responsible for submitting adequate information to demonstrate that reasonable and conforming use cannot be made of the subject property without removal(s) or encroachment(s) into the protected zone of an oak tree.

STEP SIX: Approval Procedure

A. The Planning Commission may approve, deny, or conditionally approve a request for the removal of three (3) or fewer oak trees comprising less than 25% of the total canopy cover on a single parcel except for Heritage Oak Trees as provided herein. The Planning Commission may also approve, deny, or conditionally approve a request for pruning or encroachment involving an unlimited number of oak trees.

B. The Planning Commission may refer any request for an oak tree permit directly to the City Council if the Planning Commission determines that special circumstances may exist with regard to the status of the tree(s), special community interest, or exceptional aesthetic, environmental or historical value.

C. The decision of the Planning Commission may be appealed to the City Council pursuant to the provisions of the Municipal Code.

D. Any request for removal of one (1) or more Heritage Oak Trees or greater than 25% of the canopy cover on a single parcel shall require a public hearing and three-fifths approval of the City Council.

E. Notwithstanding the Planning Commission's authority under the preceding paragraphs to act on requests relating to oak trees, whenever the request involves another entitlement requiring a recommendation or approval by the City Council, the Planning Commission shall refer the request to the City Council.

V. CONDITIONS OF PERMIT APPROVAL

Conditions may be imposed on the permit at the discretion of the City including, but not limited to, any of the following mitigations:

A. It is the policy of the City to preserve and enhance its ecosystem, one element being the contribution of oaks to the total hardwood canopy and wildlife habitat. Therefore, the loss or gain of total oak tree canopy as reflected in a baseline inventory of these resources shall be described in terms of species, total inches of diameter of any tree, and/or aggregate inches of diameter for more than one tree, and the magnitude of impact.

B. Requiring the replacement or placement of additional trees on the subject property to offset the impacts associated with the loss of a tree, limbs or encroachment into the protected zone of an oak. For every inch of tree, limb or root removed, a minimum of one inch must be replaced.

C. Canopy Retention Standards recognize the need to protect and retain stands of trees, as well as individual trees which will be impacted by proposed development. It is the policy of the City of Calabasas to retain 75% or more of the baseline canopy of each subject property.

Canopy cover will be determined by using dripline measurements to determine crown canopy and by comparing the amount of the subject property covered by canopy to that without canopy.

D. Unless waived by the City Council, a refundable security deposit in an amount equal to the cost of the replacement trees and canopy shall be deposited in trust with the City of Calabasas to guarantee the implementation and success of this replacement. The deposit will be refunded upon satisfactory completion of all conditions, including successful establishment of replacement plantings according to the criteria outlined in section V.4. The dollar deposit shall be determined using the PRC method of determination as outlined in Appendix B.

E. A signed acceptance of the conditions of the oak tree permit for removal shall be executed by the applicant or his/her representative, and the refundable security deposit shall be made prior to the issuance of the oak tree permit.

F. The planting of new trees on-site or off-site will be required to offset the loss of a tree. The applicant shall be responsible for periodic submission of affidavits by a certified oak tree consultant according to the permit specifications. This will include, but not be limited to, reports at the conclusion of grading and construction, and annually for the next 5 years based on quarterly or bi-annual site visits and including monitoring observations. Such affidavit shall certify compliance with all conditions of the permit, establishment goals and the health of all replaced, remaining or relocated trees.

This requirement shall be supplemented by random inspections by the City of Calabasas. The applicant's acceptance of an approved permit and the exercise of the rights thereunder shall be deemed consistent with allowing City officials reasonable access to the property for the purpose of conducting such inspections.

A written proposal from a qualified transplantation company must be submitted stating the validity of transplanting any tree.

A written proposal from a qualified monitoring agency/ company must be submitted outlining the specific monitoring required for the site/project according to the protocol in Appendix D.

G. The timing of any pruning, removals or relocations will avoid disturbing nesting birds.

H. The monitoring schedule, and the maintenance and care program outlined in the Oak Tree Report be carried out by qualified professionals. This program is to insure the continued health and care of oak trees on the property. The cost of the report, monitoring and the City review shall be paid by the applicant.

I. Payment of a fee to the City based on the following criteria:

Class I: To alter.

The cost for the loss of more than 25% canopy impact to any one tree, or limbs or roots over 2 inches in diameter based upon PRC value of the tree before and after alteration.

Class II: To transplant.

The cost for monitoring, maintenance and replacement in accordance with the Guidelines, by a City approved agency or firm, in addition to the cost related to the PRC value of the tree.

Class III: To remove.

The cost for the loss related to total inches of diameter of the tree(s) removed, associated hardwood canopy cover loss, wildlife habitat loss, and reforestation.

All such funds will be used to provide for reforestation of equivalent sites within or outside the project area that will remain as open space, replace woodlands removed for development, provide for public acquisition of title to and permanent conservation easement on developable lands and provide for public environmental education regarding reforestation and habitat preservation.

As an alternative to the payment of all or part of the fees described above, donation of land suitable for oak reforestation to the City may also be acceptable at the discretion of the City Council. Fees imposed under this section may be reduced as mitigated by specific circumstances and corrective measures undertaken by the property owner.

J. All oak trees included in an Oak Tree Report shall be considered registered with the City. Persons wishing to register other oak trees are encouraged to do so with either the City or a City-approved entity such as the Topanga-Las Virgenes Resource Conservation District.

K. If applicable, a bonded assurance of performance for reforestation, monitoring or maintenance may be required, in an amount to be determined by the City.

VI. PERMIT REQUIREMENTS: REQUEST TO ALTER

CONDITIONS REQUIRING A PERMIT TO ALTER

Pruning Request

Branches and roots under 2 inches in diameter and deadwood may be pruned without a permit.

The removal of live growth exceeding 2 inches in diameter requires application for an oak tree permit and approval of the Planning Commission. However, a property owner may remove limited live roots and branches under 2 inches in diameter considered to be unsafe because of decay, rot, cavities, cracks or splitting, based on the written description of the problem and recommendation for remediation by the property owner's oak tree consultant.

IT IS THE POLICY OF THE CITY OF CALABASAS NOT TO ALLOW THE REMOVAL OF LIVE TISSUE FOR THE PURPOSE OF ALTERING THE APPEARANCE OF AN OAK TREE. THEREFORE, ORNAMENTAL PRUNING, THINNING OUT, HEADING UP, OR ANY OTHER SIMILAR PRUNING WHICH INVOLVES THE REMOVAL OF LIVE TISSUE IS DISCOURAGED. THESE PROCESSES CONTRIBUTE TO THE ONSET OF INSECTS AND DISEASES.

Exceptions to this requirement are cases where clearance is required for utilities or public rights-of-way which are made known to the City in advance. All such pruning work shall follow proper arboriculture practices as outlined in the ISA Pruning Standards (Appendix A) and as approved by the City's oak tree consultant. Sealer should not be applied to cut ends. Research indicates that this aids the pathogens and not the tree.

Encroachment within the Protected Zone

Intrusion of any kind within the protected zone of an oak tree (15 feet from the trunk or 5 feet outside the dripline of trees under 24 inch DBH; 50 feetfrom all trees 24 inch DBH or greater) is to be avoided whenever possible. However, permits will be granted in those situations where such encroachment is unavoidable. Use of trenches for more than one utility service, proper trench design which minimizes root impacts, proper cutting and treatment of roots should all be detailed in the application.

Change of Grade

Any changes to the natural grade within or adjacent to the protected zone of an oak tree require a permit. Included in the application should be clearly detailed drawings indicating intended cut and fill, tree protection devices and other strategies as needed to meet or exceed City standards.

Fuel Modification

In accordance with Public Resources Code 4291 (Minimum Statewide Clearance of Brush) and recognizing the importance of the natural scrub oak communities within the City, the following standards shall be used to provide adequate clearance and protection from wildland fires.

1. Existing or Previously Approved Construction

When deemed necessary by the County of Los Angeles Fire Department, communities of scrub oaks are to be cleared of all deadwood, be limbed up a minimum of 48 inches above natural grade, and be thinned to allow at least 18 feet between groups of plants, for a distance of at least 100 feet from any structure, and not to exceed 200 feet. from any structure. Planting of low growing (below 18 inch) native groundcovers will be allowed within the cleared area to prevent erosion.

All work must have prior approval from the City and be supervised by a City approved arborist/landscaper.

2. New Construction

All new structures shall be sited 100 to 200 feet from scrub oak communities, or from the boundaries of any State or National Park lands. If the parcel size precludes this setback, the siting of structures will then be set back from the slope/pad intercept by at least 50 feet. Additional clearance of native vegetation may be required to provide adequate fire protection.

All work must have prior approval of the City and be supervised by a City approved arborist/landscaper.

In order to receive a permit for any of these activities, the following information must be submitted to the City, along with the necessary fee.

Application Form

Application shall be made on the standard application form supplied by the City. The signature of the property owner will be required in all cases.

Data Sheet

Data sheets are supplied by the City and must be completed for each tree involved.

Justification Statement

This is a written statement indicating the need for taking proposed actions involving oak trees. It should establish that the trees in the vicinity will be protected by meeting or exceeding the standards set by the City; that any encroachment, grade change or fuel modification will be done using approved preservation methods; and that one or more of the following findings can be made:

1. that the condition of the oak tree(s) with respect to disease, danger of falling, proximity to existing or proposed buildings and/or structures and parking lots, or interference with utility services cannot be controlled or remedied through redesign of the site elements or reasonable preservation procedures and practices;

2. that the retention or failure to allow some encroachment of the trees as described in the application prohibits the reasonable and conforming use of the property.

Description of work

Site plan showing tree locations and how proposed actions will impact the tree(s). In the case of fuel modification include a copy of the request from the Fire Department.

VII. PERMIT REQUIREMENTS: REQUEST TO REMOVE

The materials required to complete an application are described below. The City may waive the filing of one or more of the items listed when deemed necessary to process the application. However, additional information may be required when deemed necessary for permit processing. The accuracy of all information, maps, and lists submitted shall be the responsibility of the applicant.

Application Form

Application shall be made on the standard application form supplied by the City. The signature of the property owner will be required in all cases.

Justification Statement

An application requirement which may not be waived is a written statement by the applicant or his/her oak tree consultant stating the justification for planned actions involving oak trees.

Statements should establish that the oak trees in the vicinity of the project or construction site will be protected by meeting or exceeding the standards set by the City; that any construction or use will be done with approved preservation methods; and that one or more of the following findings can be made:

1. That due to the condition of the oak tree(s), certain actions are required to maintain its health, balance, or structure.

2. That the retention of or failure to allow some encroachment as described in the application prohibits the reasonable and conforming use of the property.

3. That the condition of the oak tree(s) with respect to disease, danger of falling, proximity to existing or proposed buildings and/or structures, parking lots or interference with utility services cannot be controlled or remedied through redesign of the site elements, reasonable preservation procedures and practices.

Site Plan and Oak Tree Map

In those cases determined to require a site plan, the following information should be included.

NOTE: Existing site plans may be used provided the information is both current and accurate.

1. Size: Maps should not exceed 30" x 42" in size.

2. Scale: The scale should not be smaller than 1" = 20'.
   Note: Map size and scale may be decreased with prior approval.

3. Property address and legal description.

4. Title Block: In one corner of the map, indicate the name of the property owners, applicant, appropriate consultants, (such as surveyor and oak tree specialist), address(s) and phone number(s) of those involved in preparing the plans and application.

5. Physical characteristics: the body of the map should accurately portray the following existing and proposed features:

   a. property lines;
   b. streets, access easements and/or public or private driveways and any other paved areas;
   c. buildings or structures;
   d. setbacks of all buildings and structures from the property lines;
   e. parking and other paved areas;
   f. land uses on parcel (existing and proposed as applicable);
   g. proposed grading and construction, including utilities and subdrains.

6. Oak Tree Locations: The map shall indicate the exact location of all oak tree(s) proposed to be encroached upon, removed and/or relocated, and those trees within 200 feet of the project or construction area, even if this extends beyond the property boundaries. Surveying the exact location(s) of the tree(s) both horizontally and vertically is very important and must be accomplished by obtaining the services of a professional engineer or a licensed land surveyor whose signature shall be affixed to the site plan and oak tree location map as appropriate.

   Symbols shall be used to indicate the proposed status of the tree(s).
   - X - tree to remain
   - O - tree to be removed
   - * - tree to be relocated

7. Dripline(s) of the Tree(s): The exact location of the dripline of an oak tree is crucial in order to evaluate any impacts resulting from construction. Consequently, aerial photographs and rough approximations will not be acceptable. The dripline must be plotted in the following manner:

   a. Obtain and record four compass readings: N, E, S, W, plus any directions which have greater dripline dimensions.

   b. Perform a measurement of the dripline in the field at each compass point.

   c. Sketch in any variations as observed in the field.

Tagging

In anticipation of a field inspection, each tree having a caliper measure of 1 inch at 12 inches above grade shall be assigned a number on the plan and be physically tagged in the field. In order to standardize the system so that everyone may easily locate the tree number the following procedure is established:

1. A permanent tag, a minimum of 1 1/4" to 2" is to be used. The tag must be made from a non-corrosive, all-weather material and be permanently attached to the tree. For small trees that would be damaged by affixing the tag directly to the trunk, the tag may be tied with non-corrosive wire to a lower branch on the north side. It may need to be retagged more permanently at a later date.

2. The tag shall be affixed to the north side of the tree at 4 1/2 feet above natural grade.

3. Except for trees whose number has become obliterated, trees that were previously tagged properly need not be retagged.

4. Trees whose numbers have become obliterated shall be retagged using the required method.

Canopy Retention Standards

To promote woodland conservation, proposed development designs should make every effort to maintain groups of trees in contiguous areas that function as a cohesive habitat. No more than 25% of the total oak canopy cover for a given property as of August 1992 may be removed without City Council approval.

Total canopy cover will be determined by taking the sum of the individual tree crown canopies and comparing the percentage covered with the total area of the site.

Since preservation and reforestation are the long-term goals, special consideration should be given for protecting those areas having obvious natural regeneration and mixed age stands of oaks. The mitigations for loss of these resources will be determined by the City Council.

Short-term impacts due to construction can be mitigated by, but not limited to, the following;

1. Reserving some acres or percentage of property from development until reforested areas attain habitat value of oak woodlands lost, or

2. Specify open space deed restriction or donation of some property with equivalent oak resources on developable lands located outside the project area. Total area, canopy cover, woodland type and habitat value, in addition to any other pertinent resources shall be considered in determining equivalence of property.

Oak Tree Report

1. General

a. No Report Necessary

The determination of the requirement for an oak tree report will be made during the pre-application conference and will be predicated on the scope of the project and the nature of its impact on the surrounding trees. In general, the requirements for an oak tree report may be waived only in situations involving the removal of hazardous trees, subject to verification by the City's oak tree consultant. A modified oak tree report may be recommended by the City's oak

tree consultant should all of the trees on the property be a sufficient distance from the construction (no less than 200 feet), so as not to be impacted by construction or grading. Photographs, completed data sheets and protective fencing according to the standards outlined in the guidelines shall be required for those trees. Requests for pruning may also be subject to a modified report, subject to verification by the City's oak tree consultant.

b. New Report Necessary

In situations requiring the submission of an oak tree report, the document shall be certified by the applicant's oak tree preservation consultant to be true and correct and must be acceptable to the Planning Commission. Questions concerning the extent of the report's content or the acceptability of the report's preparer should be cleared with the City staff in advance.

c. Use of Existing Report

In cases where there is an existing oak tree report over two years old, on an earlier project that was not approved and/or constructed, the applicant may be required to provide a supplementary report rather than a new report. In addition to any design changes, the report will retain the original numbering system and include the current health and dripline of each oak tree on the project.

2. Format for the Report

A standard data sheet provided by the City will be completed for each tree. Additionally, the report shall discuss all grading and structures, required cutting, paving or trenching in and around the trees on the project and shall evaluate, to the extent possible, the impact of such activity on the tree, the impact on the overall canopy cover, as well as any mitigating measures proposed, including drainage modifications, and the anticipated effectiveness thereof.

In addition, the oak tree report shall be based on information requested on the data sheet, which includes the following information:

a. Location of tree
b. Tree tag number
c. Species
d. Diameter at 4 1/2 feet above natural grade
e. Height
f. Canopy cover information:
   - condition of crown canopy (% shade)
   - diameter based on actual ground measurements taken at 4 or more compass points
   - distance from natural grade to the first branch at 8 compass points
   - percentage of canopy cover

g. Health and Vigor Rating

Use the following criteria to describe the condition of the tree. Percentage (%) of canopy, trunk, branches and roots should be determined by visual inspection.

"A" = Outstanding

A healthy and vigorous tree characteristic of its species and reasonably free of any visible signs of stress, disease or pest infestation.

"B" = Above Average

A healthy and vigorous tree with less than 25% of the tree affected by visible signs of stress, disease and/or pest infestation.

"C" = Average

Although healthy in overall appearance, 25% - 75 % of the tree shows evidence of stress, disease and/or pest infestation.

"D" = Below Average/Poor

Greater than 75% of this tree shows evidence of stress, disease and/or pest infestation and appears to be in a state of rapid decline. The degree of decline may vary greatly.

"F" = Dead

This tree exhibits no signs of life at all.

h. PRC value of the tree

This value shall be calculated for each tree and will be used to determine the necessary mitigations. Refer to Appendix B for complete discussion.

TREE VALUE = (basic value) (0.1) (condition rating)

Basic value = $4,700 + $2,700 (d-7) when
(d = diameter in inches of trunk at 4 1/2' above natural grade)

Condition rating = based on visual evaluation

"A"	Outstanding	90-100%
"B"	Above Average	70-89%
"C"	Average	50-69%
"D"	Below Average	25-49%

"F" Dead 0-24%

Note: Dead trees have important wildlife value and therefore receive extra valuation in certain circumstances).

EXAMPLE: Coast Live Oak (Quercus agrifolia) in good condition having a diameter of 25"

($4,700 + $2,700(25-7)) (0.1) (0.80) = **$42,640**

i. Existing tree environment:slope grade and aspect, soil description, list of surrounding vegetation

j. Physical Structure: broken branches, unbalanced crown, water traps, etc.

k. Horticultural evaluation: disease, pest identification and extent of damage

l. Tree vigor: new shoots, leaf color, bark characteristics, deadwood, crown thinning, dieback, etc.

m. Photograph of tree taken from stated distance and direction. Must be clear enough to discern important features of the crown and trunk. Additional photos may be needed to show health problems, unusual features, extent of fire damage, etc.

n. Recommendations: Suggestions made by the applicant's oak tree consultant regarding any need for stabilizing physical structure (cabling, bracing), drainage/irrigation changes, disease and/or pest control, monitoring schedule, intended action (remain, remove, relocate).

Drawn sections shall be submitted showing the tree and all impacts to the protected zone above and below natural grade.

Each identified disease symptom shall be accompanied by a statement as to the probable effect of the disease upon the life or structure of the tree.

VIII. STANDARDS FOR PERFORMANCE OF PERMITTED WORK

1. Scope of Work

All work shall be performed as specified in the approved oak tree report and monitoring plan, oak tree permit and the requirements contained in these guidelines. Additional work such as spraying, watering, fertilization, cabling, bracing, etc. may be required as determined by the City's oak tree consultant. It must be remembered that these trees are living organisms and that the necessity for such additional work may be required due to any change in their condition after the original oak tree report is prepared.

2. Oak Tree Preservation Consultants

Generally, the services of an oak tree consultant are made necessary by the conditions of approval of various permits issued by the City of Calabasas. The importance of the consultant to the applicant/property owner is clear from the various requirements listed in this resolution.

From the City's perspective it is both necessary and critical that the applicant/property owner identify the consultant of record and allow him/her to act independently so as to be able to certify that all work was conducted according to the permit and these guidelines. Where encroachment and/or removal has been approved, the applicant/property owner must notify the City and the consultant in writing 48 hours before commencing any authorized work within the protected zone of oak trees. Moreover, it is mandatory that the applicant/property owner notify the City in writing within 5 days of any changes of their oak tree consultant of record. Monitoring of specific trees may need to begin at least 3 months prior to any encroachment or action within the protected zone.

A list of qualified oak tree consultants can be obtained by contacting the City.

3. Monitoring

A monitoring schedule for each site will be determined by the City's oak tree consultant based on the monitoring protocol (Appendix D). Monitoring will be conducted at quarterly intervals or more, during all grading and construction activities as warranted by the site conditions, for the first 3 years. Following construction, bi-annual monitoring is required for the next 5 years, or more if warranted. The specific monitoring protocol for each project will be determined based on the following:

- the number of trees to remain and their proximity to construction activities;
- the number of trees to be transplanted;
- the location and number of replacement trees required;

- the potential extent of impact to the overall canopy.

Annual reports will be submitted according to the schedule indicated in the permit.

Monitoring of relocated trees will commence at least 3 months prior to any encroachment or grading activities so as to provide important baseline information used to assess the changes in the tree following transplantation.

All monitoring will be done by a City approved agency/firm and the cost will be born by the applicant. Information provided by such monitoring will be used to establish realistic mitigation measures and to ensure the long term future of oak resources in the City.

4. Inspections

All work shall be conducted in accordance with applicable ordinances and procedures detailed in the guidelines. It is the applicant's responsibility to call for and secure all inspections required to approve such work in accordance with the schedule outlined in the permit.

5. Work within the protected zone

Because of the high sensitivity of oak trees, great care must be taken when work is being conducted within the protected zone. For this reason, the City has established specific procedures to ensure that the trees receive maximum protection. The procedures are as follows:

a. On-site Supervision

All work conducted within the protected zone of an oak tree shall be performed in the presence of the applicant's oak tree consultant, and be verified by the City's oak tree consultant.

b. Forty-eight Hour Notice

Except for deadwooding and pruning of limbs or roots under 2 inches in diameter, the applicant shall provide a 48 hour notice to the City and the appropriate oak tree consultant before beginning any work within the protected zone.

c. Hand Tools

Unless otherwise approved, all work conducted within the protected zone shall be accomplished using hand tools only. Use of tractors and other vehicles is prohibited. Roots will be severed cleanly with a saw, avoiding torn ragged or shattered ends.

d. Certification Letter

Certification letters are required for all work conducted upon oak trees. The applicant's oak tree consultant shall submit a certification letter within 10 working days after completion of such work certifying that all of the work was conducted in accordance with the appropriate permits and the requirements of these guidelines.

6. New Plants around Oak Trees

Planting is not recommended within the protected zones of oak trees. There should be nothing but a 3 inch layer of organic mulch (preferably oak leaves) within 6 feet of the trunk. Any planting within the dripline shall consist of oak associated natives of the Santa Monica Mountains. See Appendix E for the list prepared by the California Native Plant Society. These plants will not be irrigated.

Plants located at the perimeter of the protected zone shall consist only of drought tolerant species which are not susceptible to either Avocado Root Rot (Phytophthora cinnamomi) or Oak Root Fungus (Armillaria mellea). Irrigation should be limited. Spray emitters are prohibited.

7. Replacement Trees

A. Types:

In all cases, replacement trees of the following species (Quercus agrifolia, Quercus lobata, and Quercus dumosa) must be approved in advance by the City's oak tree consultant. Every attempt should be made to acquire trees grown from local acorns.

Top pruning and removal of branches on the lower two thirds of the trunk (lollypopping) destroys the natural structure of the tree and attracts boring beetle infestations. No specimens having been treated in this manner will be deemed acceptable. As the trees mature, removal of side branches may be permitted as outlined in the maintenance and care program.

Note: In some cases, where it is not possible to obtain appropriate nursery grown trees in the sizes required, an equivalent number of smaller container trees shall be planted in an amount equal to the cost of the larger unavailable trees.

B. Sizes

It is most advantageous to plant acorns and small oak trees (5 gallon), allowing them to develop in place. When larger container specimens are required, they must meet the following specifications:

Size Container"	Height'	Spread'	Caliper"
5 gallon	6-8'	12-24"	1/2"
15 gallon	6-8'	3-5'	1 1/2"
24" box	8-10'	5-6'	2"
30" box	10-12'	6-8'	2 1/2"
36" box	12-14'	8-10'	3"

C. Quality of Stock and Inspection Criteria

Nursery stock should be inspected by the applicant's oak tree consultant at the site before acceptance. The City requires that all trees be handled by their containers or root balls and not by the trunks.

At least 2% of the trees purchased should be removed from their containers and all other trees should be checked for the following:

1. Vigor: good shoot growth, large leaves and dense foliage, smooth, shiny bark, proper trunk taper, no evidence of extensive pruning.

2. Well-formed root systems: white root tips visible on perimeter of root ball, no kinked or girdling roots, firm, healthy older roots.

3. No serious disease or insect damage.

4. Well formed crown: strong central leader, no evidence of topping or lollypopping, side branches left intact.

5. No evidence of shipping damage or other injury.

6. Delivery of the exact species from the locale specified.

D. Planting Requirements

1. All holes will be no deeper than the container and at least 2 times wider than the container, with edges scarified. Check for and correct soil and drainage problems.

2. Unless otherwise directed by the oak tree consultant, backfill soil will not be amended.

3. The root crown will be level with or slightly higher than the surrounding grade.

4. Staking is not recommended. Under certain circumstances staking may be used at the direction of the City's oak tree consultant. In such cases, 2 stakes will be a minimum of 24" from the trunk and secured by the use of non-abrasive ties in a figure 8 pattern for the first 6 months. Be sure to remove the stack used for transporting the tree.

5. Watering should be by drip irrigation according to the following schedule:

WATER SHOULD NEVER BE SPRAYED ON THE TRUNK.

Year 1 - water weekly in the rainy season if needed to keep the soil moist. Slow, deep application is best. Summer watering should be spread out to every other week or more if the tree is well enough established.

Year 2 - extend the normal rainy season by supplemental watering through June, none in July or August, resuming as needed in September.

Year 3 - water only during the rainy season if necessary due to low natural rainfall.

6. Three to six inches of mulch should be applied under the dripline, but not touching the trunk.

8. Location of Replacement Trees

In determining the location for replacement tree planting, the Planning Commission shall consider, but is not limited to, the following factors:

A. The vegetative character of the surrounding area near the project site. These concerns are outlined in the California Native Plant Society guidelines for tree planting (Appendix C).

B. The number of oak trees subject to this ordinance which are proposed to be removed in relation to the total canopy existing on the site.

C. The anticipated effectiveness of the replacement oak trees in replacing lost canopy cover.

D. The development plans submitted by the applicant for the proposed construction or use of the project site.

E. The time frame of large scale, phased projects may necessitate planting over several years using oaks of

various sizes in order to promote development of a mixed age stand.

In cases where it is not possible to use the project site for planting replacement trees, the Planning Commission may consider the following options:

- providing for reforestation of equivalent sites that will not be subject to future development, or

- requiring donation of developable land for preservation.

9. Relocation of Oak Trees

In certain limited cases the City may consider the relocation of oak trees from one area of the project to another. The guidelines and limitations of this program are as follows:

A. Oak trees which are approved for relocation will be considered removals by the City and require appropriate replacement mitigation.

B. A refundable cash security deposit shall be made with the City. The amount shall be determined by the PRC value of the tree (Appendix B), plus the cost of planting and possible replacement. The deposit will be refunded upon the conclusion of the 5 year monitoring period, if in the opinion of the monitoring reports and the City's oak tree consultant, the relocated tree has survived and is in good health. If the health of the tree is unchanged or has declined, the applicant will remove the relocated tree and replace it with equivalent nursery grown tree(s) as specified.

C. The tree(s) being recommended for relocation must be approved by the City's oak tree consultant whose decision will be based upon factors including health, type, size, time of year and proposed location.

D. Inspections will occur during grading and construction according to the schedule established by the City's oak tree consultant.

E. Monitoring by an approved agency/firm will commence at least 3 months prior to any impact on the tree(s) and continue quarterly for the first 3 years, bi-annually for the next 2 years or longer as deemed necessary by the City's oak tree consultant.

Procedures for monitoring are outlined in Appendix D and may be modified to fit the needs of specific sites. However, quantitative measurements of tree health including, but not limited to, water potential and flushing growth are deemed necessary for accurate assessment and may not be deleted.

Yearly reports will be submitted to the City regarding the status of the tree(s). Cost of monitoring and inspections will be born by the applicant.

10. Establishment Criteria

In order to clarify the level of revegetation deemed satisfactory, the following criteria will be used to evaluate the success of oak tree preservation and replacement plantings:

Year 1 — 50-100% living cover on slopes, at least 80% of trees surviving.

Year 2 — 80-100% living cover on slopes, at least 90% of trees surviving on reduced irrigation as outlined in section V.1.5.

Year 3 — 100% living cover on slopes, at least 95% of trees surviving with limited watering and maintenance.

Year 4 and after — Continued growth of ground cover and trees with no supplemental water and little maintenance.

NOTE: Transplanted trees will always require more maintenance than replacement plantings. Special consideration for these trees will be given.

IX. TREE MAINTENANCE

Oak trees require little active maintenance and limited removal of deadwood. They thrive on benign neglect. The tree is growing on a given site because the necessary environmental conditions are already present. For this reason, preserving existing grade and drainage is crucial to the future of the tree.

1. Deadwooding

This activity is exempt from the requirement to obtain a permit. See definition of deadwood. If uncertain as to whether it is deadwood or not, contact the City's oak tree consultant.

2. Pruning Living Tissue

All pruning of limbs or roots over 2 inches in diameter will be done according to the Western Chapter of the International Society for Arboriculture Standards (Appendix A) after receiving a permit to alter. Sealers will not be used. All cuts will be made with sharp tools leaving no ragged or torn ends. Natural Target Pruning techniques protecting the branch bark ridge is required.

3. Unbalanced Trees

Trees that are suspected of being physically unbalanced because of broken limbs or that may become unbalanced as a result of deadwooding will require an oak tree report and an oak tree permit before any work can be performed. The report will contain an analysis of the problem and a recommendation for whatever remedial work may be necessary to correct the situation.

4. Roots

Impact to roots 2 inches in diameter or larger shall require an oak tree permit. Where structural footings are required and roots will be impacted, the footings shall be bridged and the roots protected. All roots will be cleanly cut with a saw. Shattered or ragged root ends shall be cut cleanly. Cover all roots with wet burlap for the time that they are exposed. Do not use root seals, as these have proven to aid pathogens and not the tree.

5. Fire Damaged Trees

Although fire is considered a serious threat to oak trees, many trees can survive several damaging fires. During their life span they can continue to provide wildlife enhancement, watershed protection, and physical and aesthetic value to the community. Some trees may begin to exhibit visible signs of rejuvenation within a few weeks after a fire. It is desirable to postpone the cutting of a heavily charred oak trees for at least 2 to 3 years. Most trees will recuperate. Since there are many factors that will determine the survival of fire damaged trees, a careful assessment of each individual tree must be undertaken. Burned trees shall be assessed and rated according to the standard in section VII.2.g immediately after the fire and again 1 year later. Subsequent inspections may also be required before deciding on a specific course of action.

IT IS THE POLICY OF THE CITY OF CALABASAS TO REQUIRE A COMPLETE OAK TREE REPORT ON ANY AND ALL OAK TREES THAT HAVE BEEN FIRE-DAMAGED BEFORE ANY WORK CAN BE PERMITTED.

In preparing such a report, oak tree consultants may assess the extent of the damage using visual or other techniques as necessary. If the removal of any live tissue is indicated, an exception may be made to prune the tree in such a manner so as to permit the regeneration process to proceed unhindered by dead or unhealthy tissue.

6. Diseased Trees - Pests and Insects

Generally our native oak trees are a very hardy species. However, there are a variety of diseases and pests that can severely affect trees that are in a state of general decline. Since the entire subject of diseases, pests and insects is a highly technical matter, no diseased tissue may be removed, unless it is unsafe, without submitting an oak tree report and obtaining an oak tree permit.

7. Cavities

Trees have well developed defense mechanisms which can be disrupted when natural barriers around the perimeter of a cavity is broken. Other than removing loose debris and providing a screen cover to prevent further debris build up, no action should be taken. Concrete or other similar materials shall not be used to seal or fill cavities. No holes shall be drilled to provide drainage.

8. Tree Removals

Unless otherwise expressly approved in writing, authorized removal of oak trees shall be accomplished using the following guidelines:

a. All portions of the tree shall be completely chipped for mulch and/or removed from the site, and debris shall be relocated to a permitted refuse disposal site. Additionally, the stump must be completely removed and the hole or indentation filled with soil.

b. All tree wells that were created to preserve the tree shall be completely filled with soil to the satisfaction of the City Engineer and Building Official.

X. PHASES OF CONSTRUCTION

The information contained in this section is divided into the four phases normally associated with new construction. Apart from the normal activities conducted during each phase, there are certain conditions associated with work around oak trees that are required to be completed during each of these phases. These requirements are expected to be completed for all residential, commercial and industrial projects.

PRE-CONSTRUCTION PHASE

This period is defined as the time between the approval of a development permit and the issuance of a grading permit. No work of any kind may occur on an approved project unless a stage grading permit, a grading permit or an oak tree permit has been obtained from the City of Calabasas. A grading plan for parcels with oak trees on the property will be reviewed and approved by the City's oak tree consultant before final approval. Generally, the following activities will occur before the commencement of grading operations.

A. Pre-Construction Conference

During this meeting City staff, including the City oak tree consultant will address various issues relating to the oak trees on the site. These issues shall include but not be limited to:

1. Fencing Plan

The applicant or his representative shall bring a copy of the fencing plan to the pre-construction meeting. Using the approved grading plan or the site plan, the fencing plan should be designed along the following guidelines:

a. A minimum 5 feet high chain link fence in concrete footings with posts installed every 8 feet and 2 feet deep into natural grade will be installed at the outermost edge of the protected zone of each oak tree or group of trees. Exceptions to this policy may occur in cases where oak trees are located on slopes that will not be grubbed or graded, or are located in areas where there is no activity planned or no currently approved grading plan.

The fences must be installed in accordance with the approved fencing plan and approved by City inspection prior to the commencement of any grading operations. The applicant's superintendent will be responsible for calling the City to arrange the inspection.

b. Signs must be installed on the fence at 4 cardinal points around each tree. For groups of trees signs will be placed at approximately 50 foot intervals around the grove. The signs must be a minimum of 2 feet by 2 feet square and must contain the following statement:

WARNING
THIS FENCE IS FOR THE PROTECTION OF THIS TREE AND SHALL NOT BE REMOVED OR RELOCATED WITHOUT WRITTEN AUTHORIZATION FROM THE CITY OF CALABASAS.

2. Monitoring Plan
In some cases it will be necessary to begin monitoring 3 months prior to any encroachment or grading activities. The appropriate contract must be in place to ensure that this is done in compliance with the standards of these guidelines and the plan outlined in the permit.

3. Parking Lots and Pedestrian Walkways
Since it is City policy to preserve all healthy oak trees unless removal, pruning or relocation is absolutely unavoidable, architects should design their projects with these requirements in mind. Therefore, for public safety reasons, parking lots and pedestrian walkways must be designed so that only healthy oak trees are proposed to remain in a high vehicular and pedestrian place. Trees whose rating are confirmed to be a "D" or less should be avoided in pre-design or proposed for removal unless it is possible to restore the tree to a safe and vigorous condition.

To the extent possible, parking spaces should not be located directly under the canopy of oak trees. When this is not possible, pervious paving material shall be used to the satisfaction of the City. The applicant's licensed engineer and oak tree consultant will be required to certify that such work was accomplished under their personal supervision and in accordance with approved plans and permits. These issues will be discussed in the pre-application conference.

4. Cut and Fill Slopes
In general, every effort should be made to avoid cut and/or fill slopes within the protected zone of any oak tree. The oak tree report should delineate any remedial measures necessary to retain positive drainage away from the tree and preserve the root system. Where fill slopes are proposed, the oak tree report must include a soils report indicating whether or not it will be necessary to cut and recompact the area prior to

moving the fill material into position. These issues will be discussed in the pre-application conference.

6. Oak Tree Removals, Deadwooding, Pruning
Unless otherwise approved, the applicant is required to complete oak tree removals as approved by the oak tree permit for the entire project phase that is currently being graded. Deadwooding and pruning is to be accomplished prior to grading phase unless otherwise approved.

GRADING OPERATIONS PHASE

This period is defined as the time between the commencement of grading operations and the commencement of construction of the building improvements. It is understood that the construction phase may begin while grading operations are continuing and that grading may begin on a subsequent phase while construction is still in progress on a previous phase.

For purposes of this section, each phase is considered separate and the conditions and monitoring associated with each phase will be required to be completed at the start or during the operations of each phase. The City inspector will make that determination in the field.

In addition to the normal grading operations conducted during this phase, the applicant will be required to comply with the following:

A. On-Site Documentation

The following information must be located and permanently retained on the construction site from the start of grading operations. The superintendent will be required to call the City to request an inspection to verify compliance with this requirement.

1. Oak tree permit - with all proposed modifications
2. Oak Tree Report
3. Oak tree location map
4. Oak tree fencing plan
5. Oak tree monitoring plan
6. Stamped set of grading plans approved by the City Engineer and City Oak tree consultant
7. Permit and Tract Conditions:

A copy of the approved permit and tract conditions, and all current and future modifications approved by the City.

8. Oak tree inspection card

9. Oak tree ordinance

10. Oak tree preservation guidelines

11. Approved planting and irrigation drawings

B. Retaining Walls Within the Protected Zone

In cases where an oak tree permit has been approved for the construction of retaining walls within the protected zone of the oak tree, the applicant will be required to complete these improvements using hand tools before completion of grading operations and before commencement of the construction phase.

C. Oak Tree Preservation Devices

If required by the oak tree report and the oak tree permit, preservation devices such as air ventilation systems, oak tree wells, drains, special paving and cabling systems will be required to be installed before the completion of the grading phase and commencement of the construction phase.

These devices must be installed under the direct supervision of the applicant's oak tree consultant who will write a letter certifying all such work and submit it to the City within 10 working days. Advance notification (48 hours) of such work shall be given to the oak tree consultant and the City.

D. Utility Trenching-Pathway Plan

In order to avoid unnecessary damage to the root system, prior to the completion of the grading operations and the commencement of the construction phase, the applicant will be required to submit a utility trenching-pathway plan to the City for review and approval. The plan shall use the best alternative to trenching within the tree's protected zone. The plan will depict all of the following systems: storm drains, sub-drains, sewers, easements, area drains, gas lines, electrical service, cable TV, water mains, irrigation mainlines, and any other underground installations.

IT IS THE POLICY OF THE CITY TO COORDINATE SUCH SERVICES TO AVOID DUPLICATE TRENCHING AND TO ENCOURAGE TUNNELING UNDER ROOTS OR AROUND THE DRIPLINE. ALL WORK WITHIN THE PROTECTED ZONE SHALL BE DONE USING HAND TOOLS.

Additionally, the plan must show all lateral lines serving the residences. The plan must also show the surveyed

locations of all oak trees and an accurate plotting of the protected zone.

The plan should be developed considering the following guidelines:

A. All systems in this subsection shall avoid the protected zone of any oak tree.

B. Where it is not possible to avoid some encroachment, the design shall minimize the extent of encroachment by coordinating services using the trench, tunneling under roots wherever feasible and conducting all work using hand tools. A report of these encroachments will be made in a supplemental oak tree report.

CONSTRUCTION PHASE

This period is defined as the time during which building improvements are under construction.

A. Ground Plane Improvements

The following improvements may be installed within the protected zone of an oak tree subject to the approval of an oak tree permit issued by the City and the limitations and guidelines contained in this section: pervious patio covers, wood decks, garden walls, fences, gazebos, and other similar improvements. The guidelines and limitations are as follows:

1. An oak tree permit shall be approved by the City.

2. Any work conducted within the dripline of the tree will be done with hand tools only.

3. Tunneling under roots or using caissons or posts is preferred.

4. No soil will be stockpiled under the dripline.

5. All work shall be conducted in the presence of an oak tree consultant, subject to verification by the City's oak tree consultant. Both will receive 48 hour notice of impending actions.

6. Pruning of limbs and roots will be done in strict accordance with ISA Pruning Standards (Appendix A) and the standards outlined in these guidelines.

7. Monitoring quarterly for the first 2 years and bi-annually for the following 3 years will be required to verify the continued health of the tree.

B. Fine Grading Permit (Oak Tree Lots Only)

On most tracts, the drainage patterns for the lots will have been designed into the original grading plan. However, this is not the case with custom lots and custom lot tracts. Therefore, in an effort to avoid establishing drainage patterns that intrude into the protected zone of oak trees, the following procedures have been established.

1. Custom Lots and Custom Lot Tracts

   A fine grading permit will be obtained from the City in accordance with the oak tree permit. The landscape architect or the engineer shall design a pattern utilizing surface and/or subsurface drainage devices to avoid completely the protected zone. Additionally, the oak tree consultant will be required to submit an supplemental oak tree report to the City for review and approval prior to fine grading the lot. Supplemental monitoring may be required at that time.

   Following approval of the plan and the completion of the work, the oak tree consultant will submit a letter of certification within 10 working days. Additional reports may be required as per the monitoring schedule.

2. Other Lots and Projects

   On all other projects, grading plans will be designed at the outset to avoid the protected zone of the oak trees. The procedure for these lots will be as described in custom lots, above.

3. Inspections and Monitoring

   The City reserves the right to inspect the project at appropriate intervals and require further monitoring if deemed necessary.

POST CONSTRUCTION PHASE

This period is defined as the time following the completion of all building improvements. In residential projects, the construction phase and the post-construction phase will overlap as houses are completed and new houses are still being constructed. For purposes of this section, certain conditions will be required to be completed prior to receiving Certificates of Occupancy.

A. Certification of Oak Tree Work

On all lots containing oak trees, the City inspector will require that all of the oak tree work required by the conditions of the development permit, the oak tree report and the oak tree permit, as applicable, have been completed and certified by the applicant's oak tree consultant prior to City approval.

B. Monitoring

The continued monitoring of oak trees according to the oak tree report and the oak tree permit shall proceed until 5 years are passed, or longer as required by the oak tree permit.

C. Oak Tree Information Packet

In cooperation with the sales agent, the applicant will be required to provide and certify that an oak tree information packet, as approved by the Planning Commission, has been provided to the buyer of the property and the homeowner's association. The information to be included in this packet is as follows:

1. Oak Trees - Care and Maintenance
2. Compatible Native Plants for Around Your Oaks
3. Oak Tree Ordinance
4. Oak Tree Preservation Guidelines
5. Development Permit: Copy of the City-approved conditions of approval of the oak tree permit.

D. Certification of Receipt

Applicant/sales agent shall prepare a letter introducing the packet. The letter and packet shall then be sent by certified mail to the property owner. The applicant shall forward a copy of the letter and the signed return receipt card to the City where it will be recorded and stored.

XI. ENFORCEMENT

A. General

The City, through its Code Enforcement Officers, shall vigorously enforce the provisions of the Oak Tree Ordinance and the Oak Tree Preservation Guidelines. Additionally, inspectors from Building and Safety and Public Works, in the course of their regular duties will monitor activities on-site on a daily basis. Any irregularities or suspected violations will be immediately reported to the Code Enforcement Section and the City's oak tree consultant for follow-up action.

B. Stop Work Orders

Whenever any construction or work is being performed contrary to the provision of the Oak Tree Ordinance, Oak Tree Preservation Guidelines, Oak Tree Permit or conditions of the appropriate development permit, the City's oak t
ree consultant or a City inspector may issue a written notice to the responsible party to "stop work" on the project on which the violation occurred or upon which the danger exists. The notice shall state the nature of the violation and no work shall be allowed until the violation has been rectified

and approved by the Code Enforcement Officer or the City's Oak Tree Consultant.

C. Additional Remedies

Any person who cuts, damages, moves or removes any oak tree within the City or encroaches into the drip line of an oak tree in violation of the City's oak tree ordinance shall be subject to the following mitigations in addition to any penalties provided by the Municipal Code:

1. A suspension of any building permits until all mitigation measures specified by the City are satisfactorily completed.

2. Completion of all mitigation measures as established by the City.

3. For removal of a non-exempt oak tree a building or improvement moratorium on the property for a period not to exceed 10 years and applying to any subsequent owner of the property until the term is completed.

4. A Notice of Non-Compliance may also be recorded on the property.

D. Restitution

It has been determined that the oak trees within the City are valuable assets to the citizens of this community and to the citizens of the State of California, and as a result of the loss or damage to any of these trees, the public should be recompensed.

Any person violating the provisions of this ordinance shall be responsible for proper restitution and may be required to replace the oak tree(s) removed or damaged. Replacement shall be made based on the PRC value (see Appendix B) or the actual replacement cost, whichever is higher, plus the cost of planting and maintaining the replacement trees. The number, size and location of said equivalent replacement oak trees shall be determined by the Planning Commission.

APPENDIX B
DETERMINING TREE VALUES - PRC METHOD

The City of Calabasas wishes to more realistically replace the value of oak woodlands and individual trees lost in the development process. Recognizing that the long-term goal of reforestation and preservation can only be accomplished with the implementation of short-term initiatives fostering tree conservation, the values of individual trees will follow the PRODUCTION REPLACEMENT COST (PRC) METHOD devised by arborist Alden Kelley. The more widely applied International Society of Arboriculture (ISA) method is biased towards undervaluing oak trees, and is therefore not applicable.

The PRC method addresses tree value in terms of universally recognized criteria, the cost of replacement. Tree value is specified as the cost of providing and establishing an equivalent specimen to that being lost. The replacement tree would be of the same species, size, condition and installed in an equivalent location to the tree being removed.

Both the PRC method and the ISA method rely on several variables in determining the value of a given tree. First, the Basic Value is based upon the size (diameter at breast height at 4 1/2 feet above grade). Second, the condition of the tree, and thirdly the species value.

Basic value will be defined as $4,600 for the first 7 inches of diameter, and $2,700 for each additional inch of size. Those trees smaller than 8 inches in diameter are valued according to local nursery prices, including installation costs. These prices will be adjusted to remain consistent with industry standards.

The condition of the tree will be evaluated according to ISA standards. The data sheet for making these determinations is included. Value will be noted as a percentage.

The City has determined that all oaks have a species value of 100%.

Since the oaks under consideration are now growing in a location having all the essential elements for survival, location will not be considered a factor in determining value.

The formula for determining value is:

PRC VALUE = Basic value x condition rating

Basic Value = $4,600 + $2,700(diameter - 7)

Condition rating = percentage based on ISA evaluation standards

DETERMINING PRC VALUES FOR OAK TREES
April 1993

When determining conditions of approval for impacting or removing oak trees, the City will use the following values. This document will be revised to reflect changes in **PRODUCTION REPLACEMENT COST** according to local nursery prices, including installation costs.

For trees under 7" in diameter 4 1/2' above grade

:

Size (inches)	Box/ Ball Size (inches)	Value (Dollars)
less than 0.73	5 gal.	175
0.75	15 gal.	525
1-1.5	20	700
2	24	910
2.75	30	1,275
3.25	36	1,600
4	42	1,950
4.5	48	2,300
5	54	3,000
6	60	4,700
7	72	7,600

For trees over 7" in DBH, use the following equation to determine PRC Value:

1. Determine Condition Rating for the tree using the standard ISA form.
2. Fill in values and use the formula to determine value.

A = $4,600 + $2,700 (DBH - 7)

B = Condition rating (percentage: example 95%= 0.95)

A x B = PRC Value

EXAMPLE 1: 25" diameter Coast Live Oak in good condition

A = $4,600 + $2,700 (25-7) = 53,200
B = 0.80

53,200 x 0.80 = $42,640

Value of branches and roots impacted due to alteration can be determined by calculating the PRC value, estimating how much of the tree is impacted (percentage) and using that to determine mitigation.

EXAMPLE 2: 15% of the tree in Example 1 will be lost due to construction of a driveway

$42,640 x 0.15 = $6,396

HEALTH AND VIGOR RATING

A = Outstanding: Healthy, vigorous tree, free of signs of stress, disease, pest infestation

B= Above Average: Less than 25% of the tree affected by signs of stress, disease /pest infestation

C= Average: Overall appearance healthy, 25-75% of tree shows evidence of stress, disease/pest infestation

D= Below Average/Poor: Greater than 75% of tree shows signs of stress, disease/pest infestation, appears to be in state of rapid decline. Degree of decline may vary.

F= Dead: Exhibits no sign of life at all.

GUIDE FOR JUDGING THE CONDITION OF LANDSCAPE TREES

FACTOR	VARIATION IN CONDITION FACTOR	POINTS	POINTS AWARDED
CROWN DEVELOPMENT	Characteristic of species - well balanced	(5)	
	Lacking natural or desired symmetry	(3)	
	Lacking full crown	(1)	_____
TRUNK CONDITION	Sound and solid	(5)	
	Section of bark missing:		
	less than 1/4 of circumference	(4)	
	1/4 to 1/2 missing	(3)	
	1/2 or more missing	(1)	
	Extensive decay or hollow	(0)	_____
MAJOR BRANCH STRUCTURE	No defects	(5)	
	Die back limited	(4)	
	Few structurally important dead or broken branches	(3)	
	Several structurally important dead or broken branches	(1)	_____
TWIG GROWTH RATE	Typical for species and age - usually 4-6 inches	(5)	
	Less than 1/2 normal growth rate	(3)	
	Growth rate greatly reduced - yearly decline	(1)	_____
FOLIAGE	Normal size and color for species	(5)	
	Minor deficiency/pollution symptoms	(3)	
	Major deficiency/pollution symptoms	(1)	_____
INSECTS & DISEASES	No insects or diseases apparent	(5)	
	Few controllable insects or diseases present	(3)	
	Severe infestation	(1)	_____
ROOTS	No root problems apparent	(5)	
	Minor root problems	(3)	
	Severe root problems	(1)	_____

Total Points	Condition Class	Formula % for Condition
30 - 35	Excellent	90 - 100%
24 - 29	Good	70 - 89
17 - 23	Fair	50 - 69
11 - 16	Poor	25 - 49
6 - 10	Very Poor	0 - 24

APPENDIX E

STANDARD DESIGNS FOR ENCROACHMENTS WITHIN THE PROTECTED ZONE

Understanding the basics of how oak roots work helps to prevent unnecessary damage. There are two kinds of roots. The woody roots support the tree and can extend down as much as 50 feet, in the case of Valley Oaks (Q. lobata). The non-woody roots absorb water and nutrients from the soil. They are concentrated in the upper 18 inches of soil and are potentially the most easily damaged. They require both air and water, thriving in soil that is not compacted. If damage is done to the absorbing non-woody roots, the tree will become stressed. If the woody roots are damaged, the tree could remain green and still be in danger of falling over.

Some general rules to keep in mind:

1. All work done within the protected zone of the tree shall be done with hand tools.

2. If a root is split during work, they should be cut cleanly above the injury if possible.

3. Any roots exposed during excavation should be covered with wet burlap to protect them from drying.

4. Do not pile dirt or change the soil grade around the tree trunk or dripline. This causes oxygen deprivation and the tree can suffocate.

5. Do not change the drainage systems around the trees.

6. Do not compact the soil within the dripline.

7. Do not fertilize the tree until at least one full growing season following impacts. This prevents the tree from expending energy in response to the fertilizer. A 3-6 inch layer of oak leaf mulch is the best fertilizer for the tree and should be applied immediately following completion of work.

8. Avoid any grade change within 6 feet of the trunk.

9. Irrigation and landscaping around the tree should be compatible with the standards established in the guidelines.

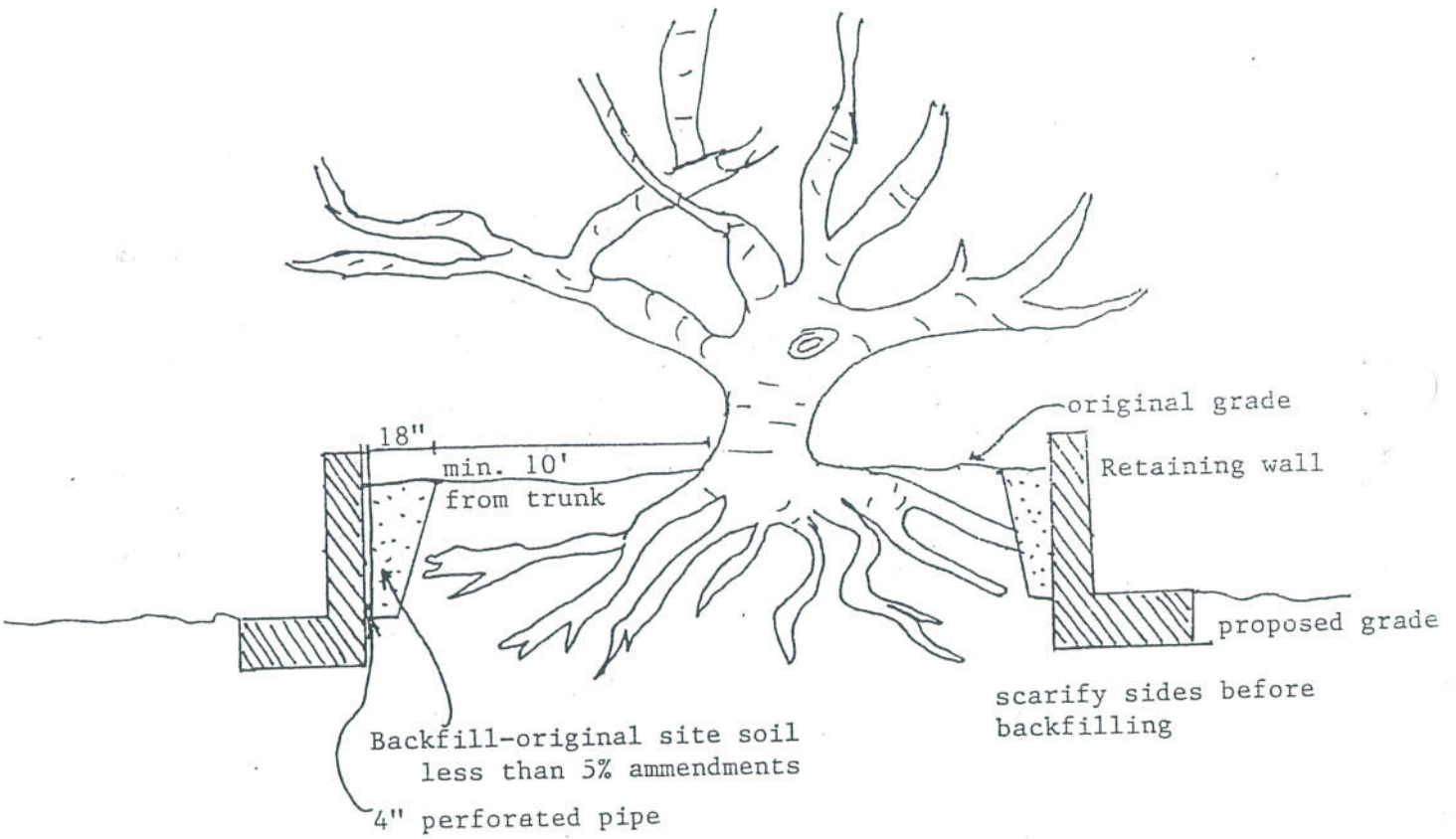
10. All work should be supervised by an Oak Tree Consultant.

CUTS DEEPER THAN 6 INCHES

1. All work in the protected zone is to be done using hand tools only.

2. All roots are to be cleanly cut. No sealer should be used.

3. Permit approval for encroachment is necessary and applies only in special circumstances.



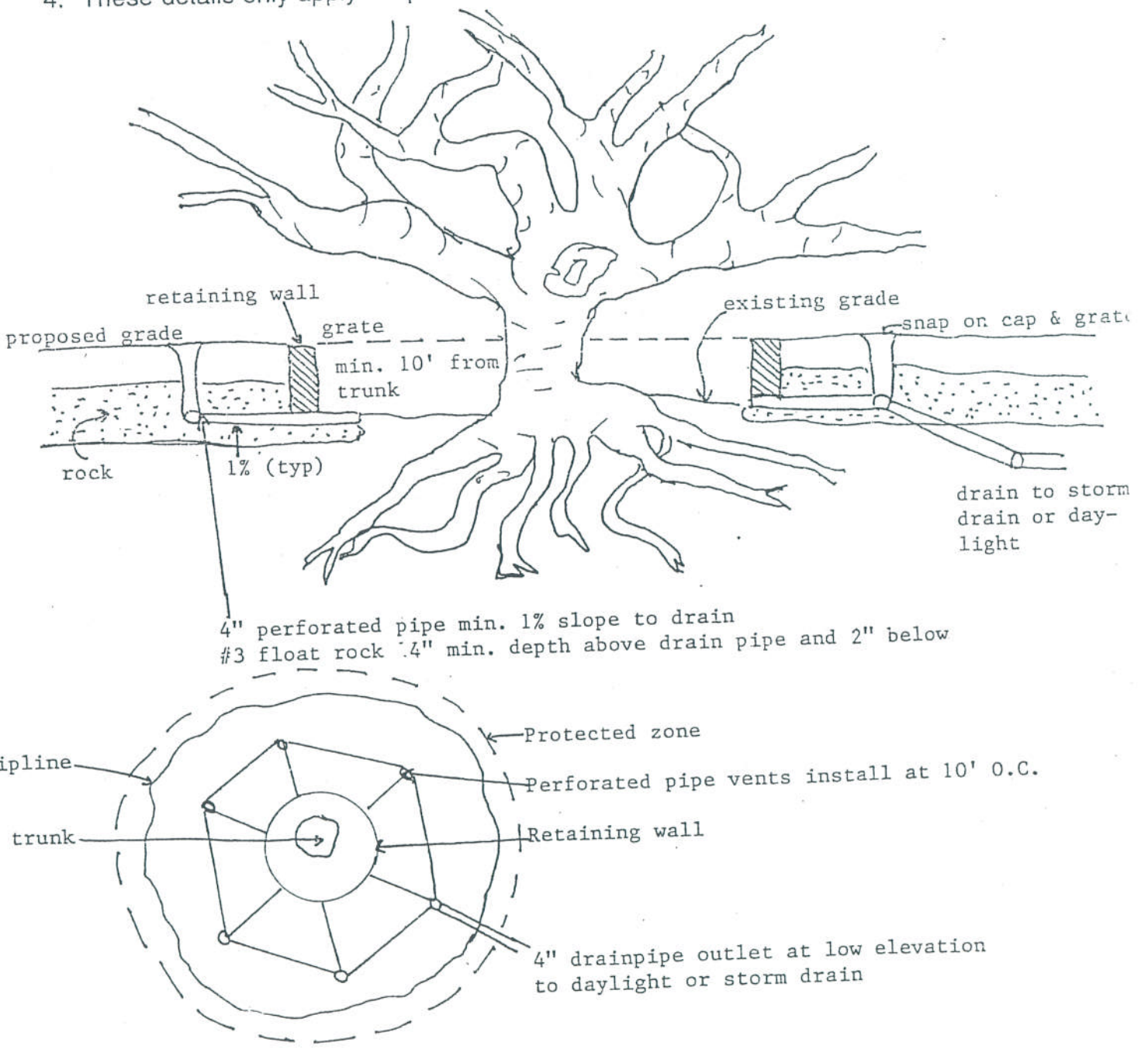
FILLS GREATER THAN 6 INCHES

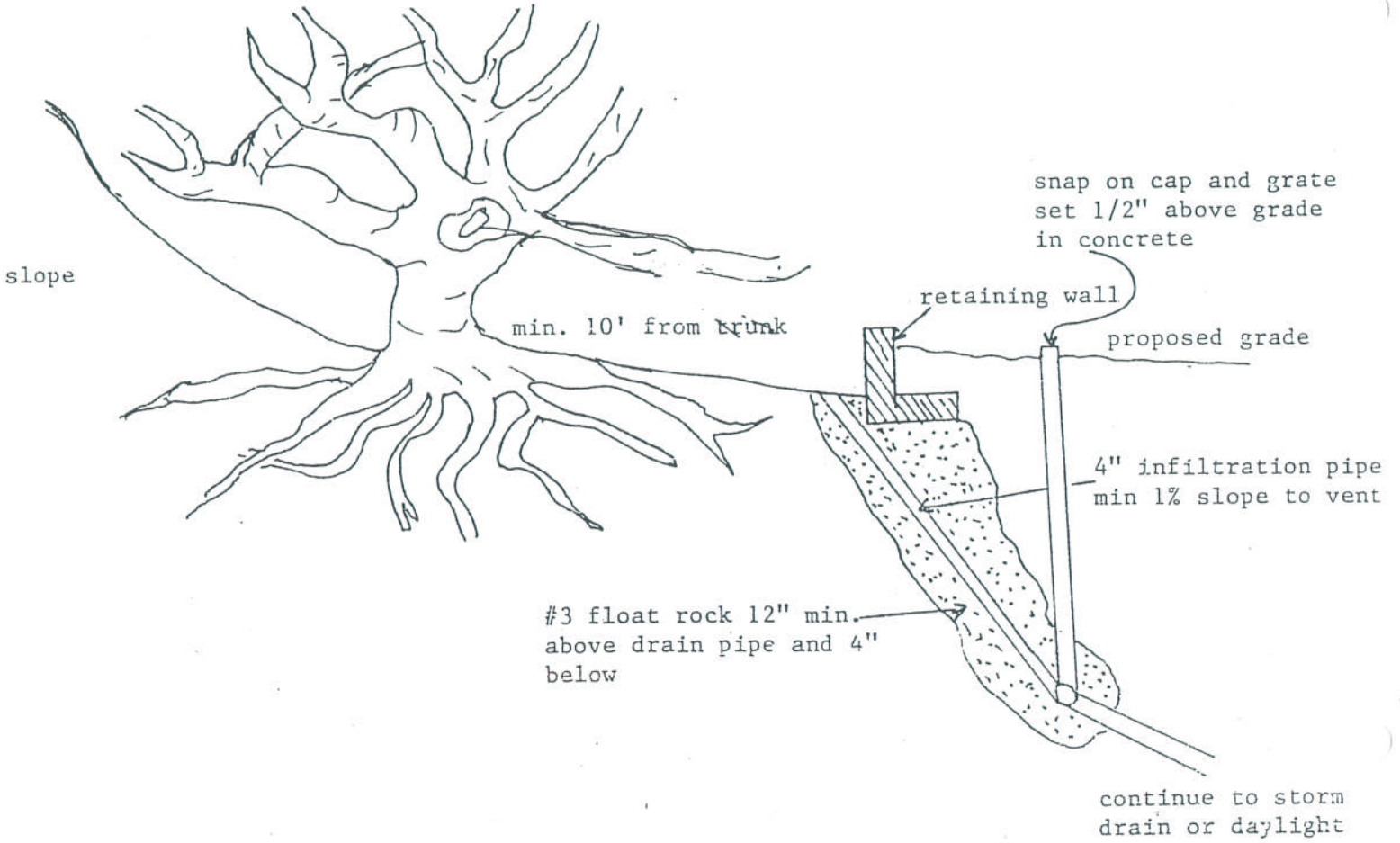
1. These diagrams apply only to fills greater than 6 inches. All other fills as directed.

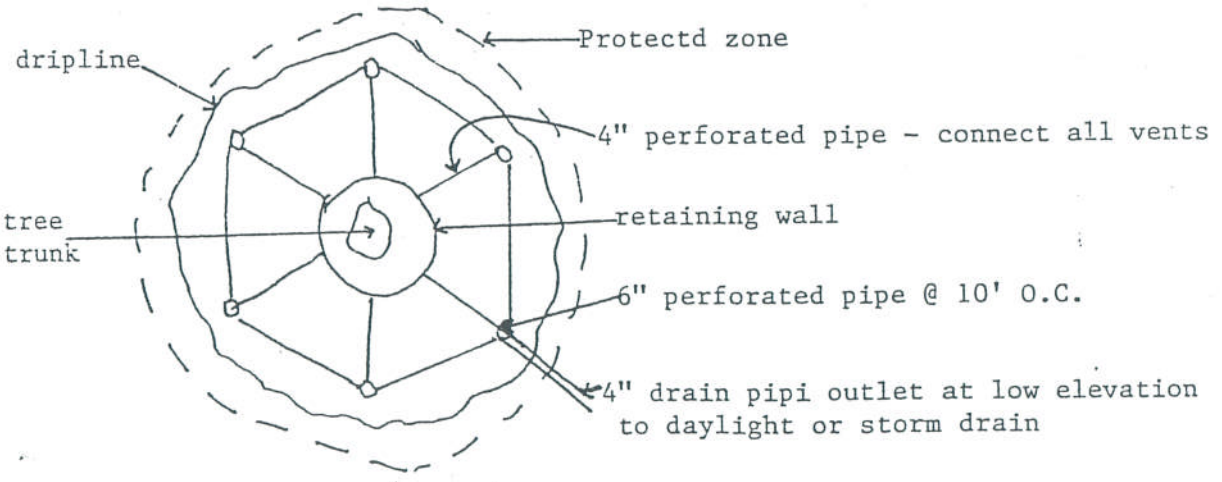
2. Clean away soil using only hand labor under the direction of an Oak Tree Consultant.

3. Do not damage roots when placing rocks.

4. These details only apply in special circumstances following permit approval.




slope
min. 10' from trunk
snap on cap and grate
set 1/2" above grade
in concrete
retaining wall
proposed grade
4" infiltration pipe
min 1% slope to vent
#3 float rock 12" min.
above drain pipe and 4"
below
continue to storm
drain or daylight


dripline
Protectd zone
4" perforated pipe - connect all vents
tree
trunk
retaining wall
6" perforated pipe @ 10' O.C.
4" drain pipi outlet at low elevation
to daylight or storm drain

GUIDE FOR JUDGING THE CONDITION OF LANDSCAPE TREES

FACTOR	VARIATION IN CONDITION FACTOR	POINTS	POINTS AWARDED
CROWN DEVELOPMENT	Characteristic of species - well balanced	(5)	
	Lacking natural or desired symmetry	(3)	
	Lacking full crown	(1)	_____
TRUNK CONDITION	Sound and solid	(5)	
	Section of bark missing:		
	less than 1/4 of circumference	(4)	
	1/4 to 1/2 missing	(3)	
	1/2 or more missing	(1)	
	Extensive decay or hollow	(0)	_____
MAJOR BRANCH STRUCTURE	No defects	(5)	
	Die back limited	(4)	
	Few structurally important dead or broken branches	(3)	
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TWIG GROWTH RATE	Typical for species and age - usually 4-6 inches	(5)	
	Less than 1/2 normal growth rate	(3)	
	Growth rate greatly reduced - yearly decline	(1)	_____
FOLIAGE	Normal size and color for species	(5)	
	Minor deficiency/pollution symptoms	(3)	
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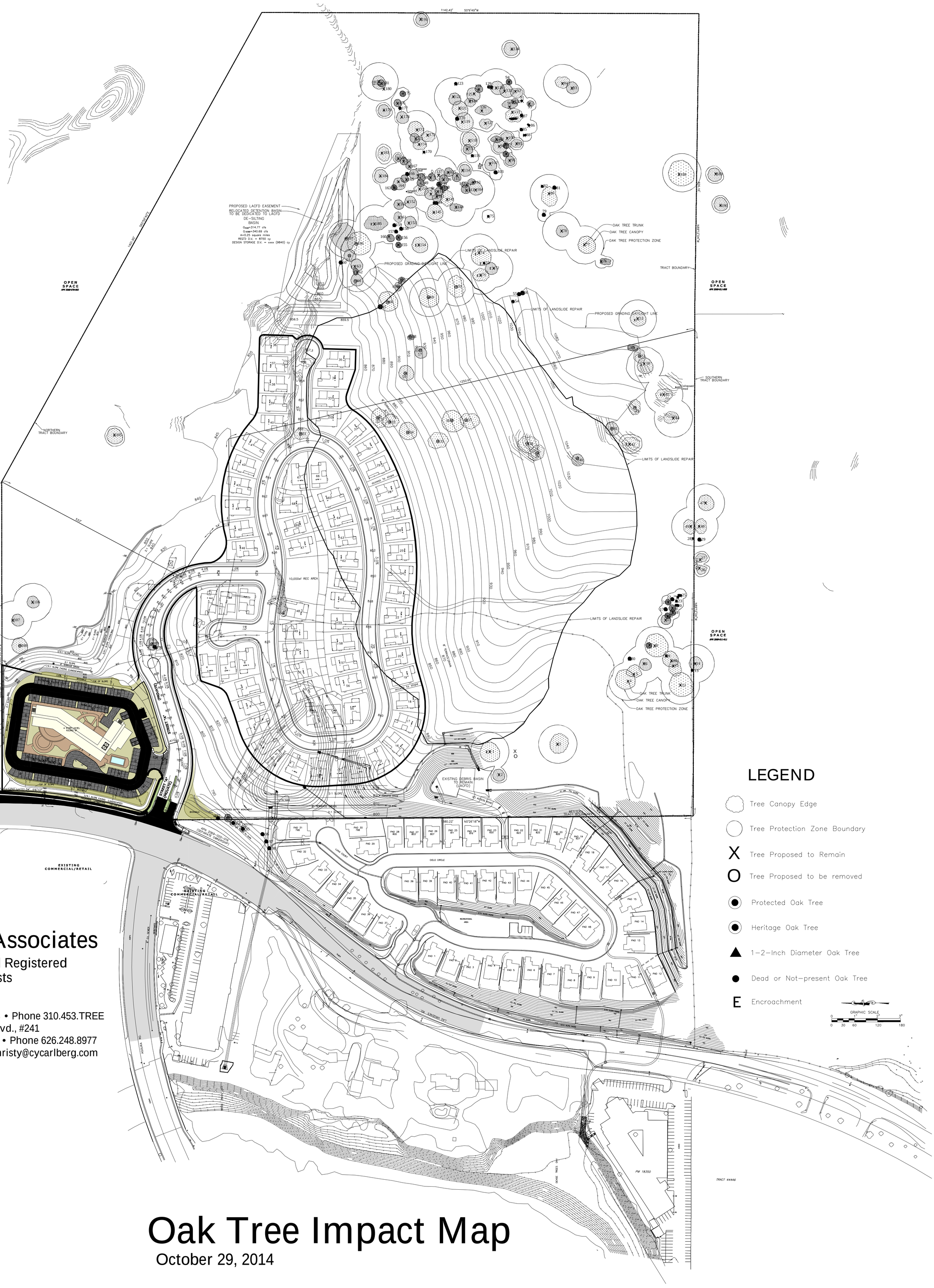


Carlberg Associates

Horticulturists and Registered
Consulting Arborists

2402 California Avenue
Santa Monica, CA 90403 • Phone 310.453.TREE
80 West Sierra Madre Blvd., #241
Sierra Madre, CA 91024 • Phone 626.248.8977
cy@cycarlberg.com • christy@cycarlberg.com
www.cycarlberg.com

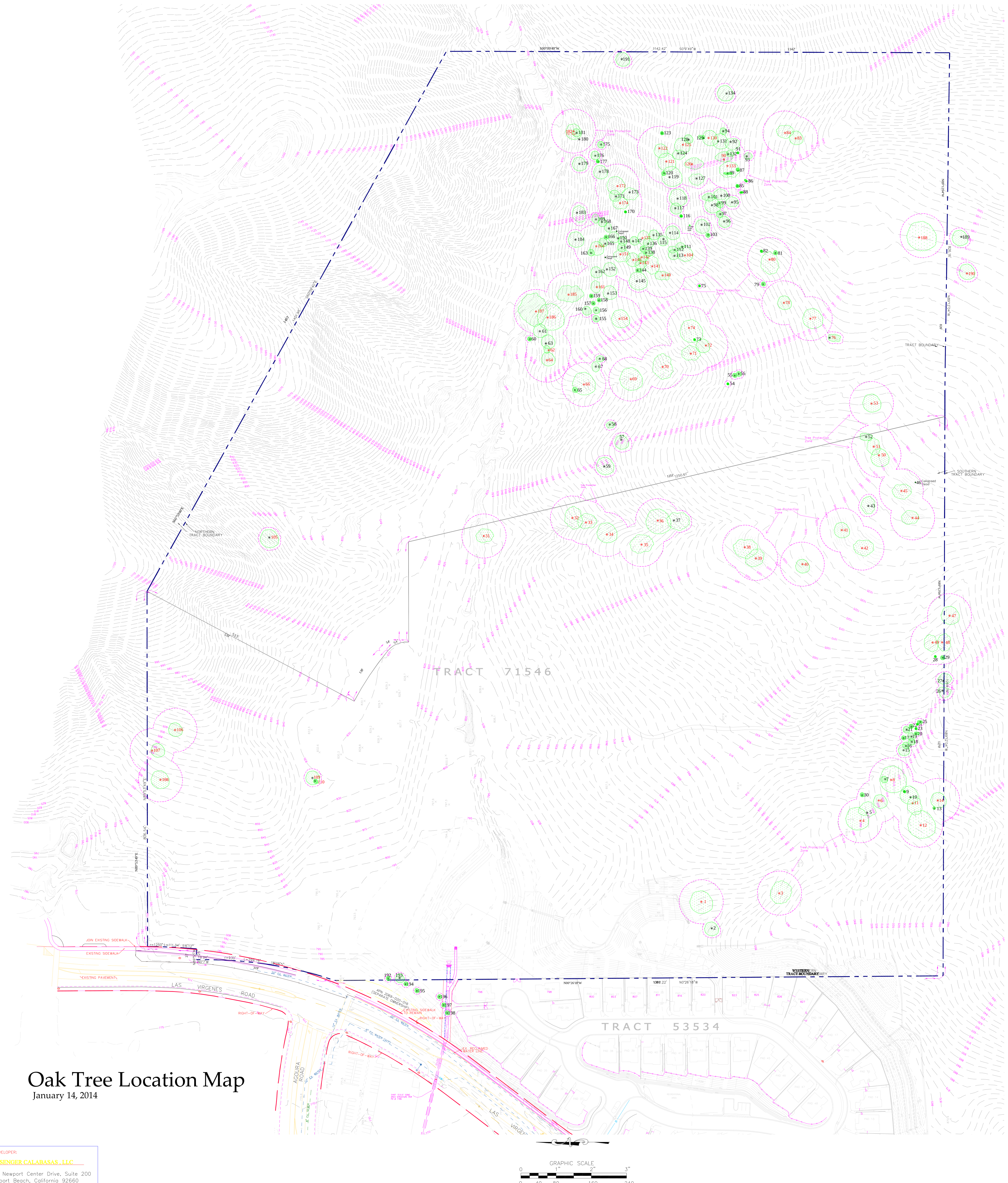
LEGEND

- Tree Canopy Edge
- Tree Protection Zone Boundary
- X — Tree Proposed to Remain
- O — Tree Proposed to be removed
- Protected Oak Tree
- Heritage Oak Tree
- 1–2–Inch Diameter Oak Tree
- Dead or Not–present Oak Tree
- E — Encroachment

GRAPHIC SCALE
1" 2" 3"
0 30 60 120 180

Oak Tree Impact Map

October 29, 2014



LEGEND

- Tree Canopy Edge
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www.cycarlberg.com

Oak Tree Location Map

January 14, 2014

PREPARED BY:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Environmental
3500 Camino Ave, Suite 200, Oxnard CA. 93030
(805) 485-3935 (805) 485-6496 FAX
E-mail: rjreng@rjreng.com

OWNER/DEVELOPER:
MESSENGER CALABASAS , LLC
250 Newport Center Drive, Suite 200
Newport Beach, California 92660
(949) 721-0013
(949) 644-4890 FAX

TENTATIVE TRACT MAP 71546
EXISTING SITE SURVEY
MESSENGER CALABASAS , LLC
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Oak Tree Location Map

January 14, 2014

GRAPHIC SCALE
0 40 80 160 240
1" = 80'

LEGEND

- Tree Canopy Edge
- Tree Protection Zone Boundary
- Protected Oak Tree
- Heritage Oak Tree
- 1-2-Inch Diameter Oak Tree
- Dead or Not-present Oak Tree

TENTATIVE TRACT MAP 71546
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3500 Camino Ave, Suite 200, Oxnard CA. 93030
(805) 485-3915 (805) 485-6496 FAX
E-mail: rjreng@rjreng.com

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Newport Beach, California 92660
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(949) 644-4890 FAX

City of Calabasas

Canyon Oaks Project

Rare Plant Survey Report
2015 Update

August 2015

rincon

Environmental Scientists Planners Engineers

RARE PLANT SURVEY REPORT

CANYON OAKS PROJECT
CITY OF CALABASAS
LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

City of Calabasas
26135 Mureau Road
Calabasas, California 91302-3172

Prepared by:

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

August 2015

This report prepared on 50 percent recycled paper with 50 percent post-consumer content.

Rincon Consultants, Inc.

2015 *Focused Rare Plant Survey Report, 2015 Update – Canyon Oaks Project, Los Angeles County, California.* Rincon Project No. 10-66150. August.

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Appendix

Appendix A: Plant Species Observed On-Site

INTRODUCTION

Rincon Consultants, Inc. (Rincon) herein presents the results of the 2015 focused rare plant survey. This survey was conducted to determine the presence or absence of any rare, threatened, or endangered plant species (rare plants) within the Canyon Oaks Project site as an update to the focused rare plant surveys completed in June of 2010 and 2013. The project site (survey area) encompasses approximately 77 acres located at 4790 Las Virgenes Road (Assessor's Parcel Numbers 2069-078-009 and 2069-078-011; "Parcel Boundary") in the City of Calabasas, County of Los Angeles, California (Figure 1). The project site is located immediately east of the intersection of Las Virgenes Road and Agoura Road; U.S Highway 101 is located approximately one-quarter mile northwest of the project site. A residential development and Las Virgenes Road are along the western boundary, with the eastern boundary containing open space and undeveloped lands.

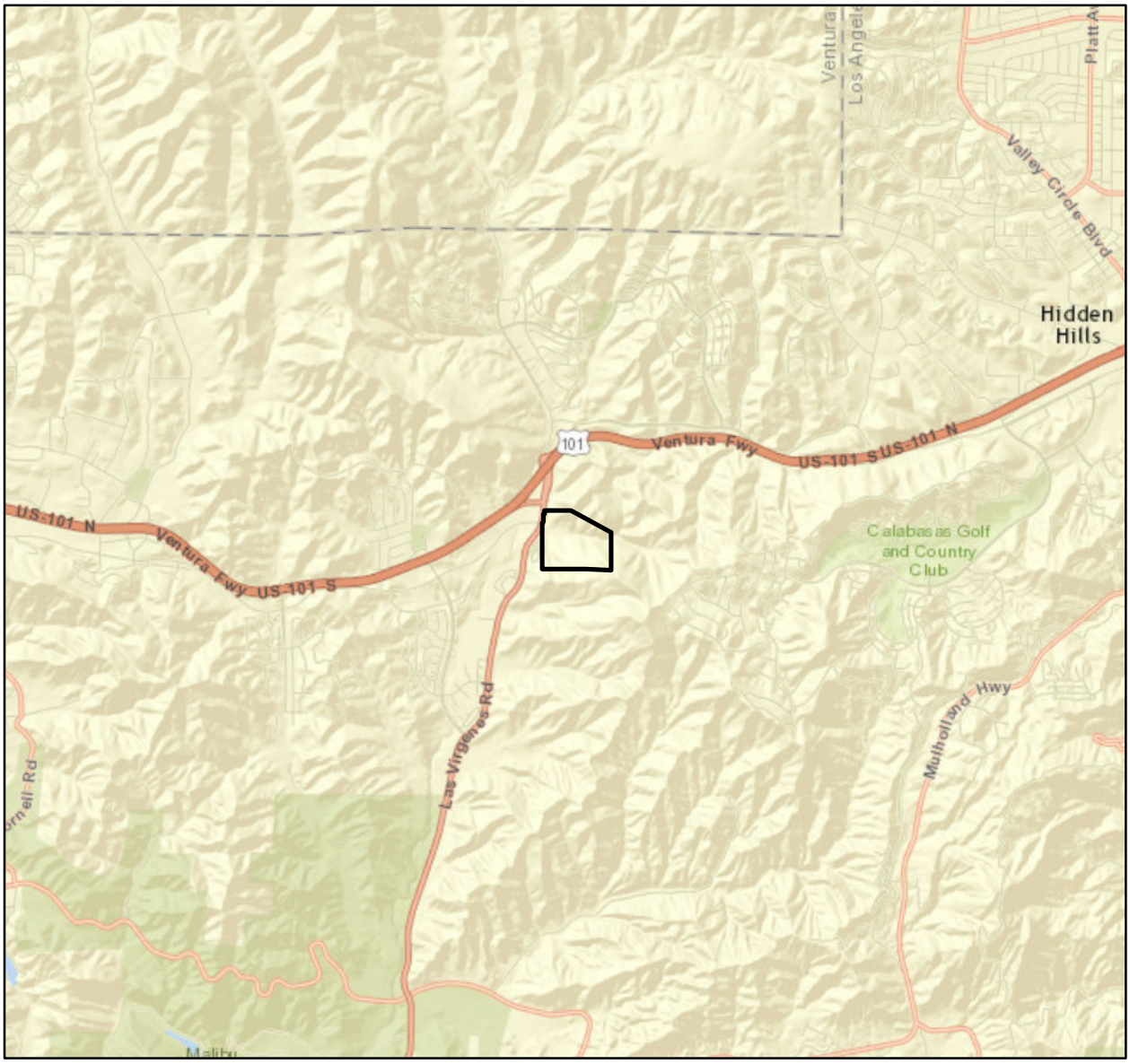
EXISTING CONDITIONS

The project site, ranging in elevation from approximately 800 to 1,280 feet above mean sea level (amsl), contains a canyon of undeveloped lands. The northern and western portions have been subject to a high level of disturbance resulting from fire clearance, grading, and grazing, now dominated by non-native grasslands, with patches of native scrub on the steeper slopes. The northern portion of the project site includes abandoned structures from a former sheep husbandry operation. The southern portion of the project site remains relatively intact, dominated by native coastal scrub and oak woodland vegetation. An ephemeral riparian stream course conveys flows east to west through the property to a detention basin at the western end. The canyon bottom includes three seep/spring (water seepage) features; two adjacent to the main ephemeral stream, and one within the canyon to the north of the stream. The entire project site is mapped as Linne-Los Osos-Haploxerepts association, 30 to 75 percent slopes, according to the Web Soil Survey (USDA, NRCS 2015) interactive soil mapping.

METHODOLOGY

Prior to conducting field surveys of the project site, Rincon reviewed the 2010 and 2013 Focused Rare Plant Survey Reports, recent aerial photography of the project area, and consulted the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB; CDFW 2015a), California Native Plant Society's (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2015), and U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal (USFWS 2015) for information on general biological resources, special-status species occurrences, and critical habitat designations within a five-mile radius of the project site.

For the purpose of this report, special-status species are those plants listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS under the Federal Endangered Species Act (FESA); those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); and those recognized by the CDFW under the California Rare Plant Rank (CRPR) system (Ranks 1 through 4, Table 1; Rank Threat Code Extensions, Table 2). Nomenclature follows *The Jepson*



Map images copyright © 2015 ESRI and its licensors.

Site Boundary

N

0 0.5 1

Miles

Regional Location of Project Site

Figure 1

Manual (Baldwin et al. 2012), with status updates provided in the CDFW *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2015b), the CDFW *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFW 2015c), and the CNPS online Inventory of Rare and Endangered Vascular Plants of California (CNPS, Rare Plant Program 2015).

Table 1. California Rare Plant Rank Definitions

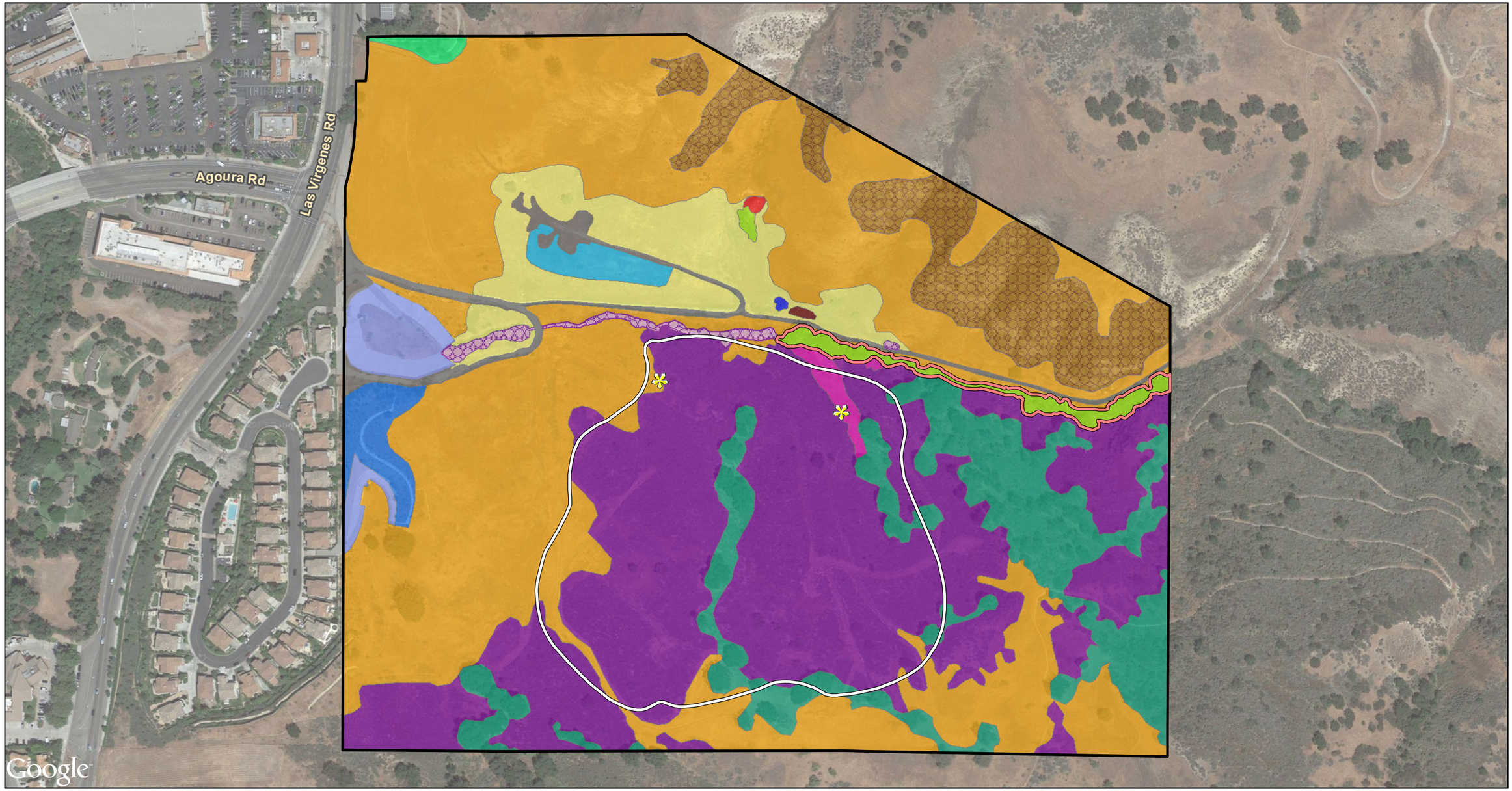
Rank	Definition
1A	Presumed Extinct in California
1B	Rare, Threatened, or Endangered in California and elsewhere
2	Rare, Threatened, or Endangered in California, but more common elsewhere
3	Need more information (a Review List)
4	Plants of Limited Distribution (a Watch List)

Table 2. California Rare Plant Rank Threat Code Extensions

Threat Rank	Definitions
.1	Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2	Fairly endangered in California (20-80% occurrences threatened)
.3	Not very endangered in California (<20% of occurrences threatened)

The rare plant surveys were floristic in nature (i.e., all plants encountered were identified to the highest taxonomic level necessary to determine rarity) and generally followed the *CNPS Botanical Survey Guidelines* (CNPS 2001) and the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2009). The 2015 Rare Plant Survey was performed by Rincon botanists Dan Rosie and Jon True on April 10 and by Mr. True on July 7. The survey was conducted to update the existing Focused Rare Plant Survey, to identify areas that could potentially contain special-status biological resources, and to determine presence or absence of any special-status plants with the potential to occur on-site. During the survey, plant species observed on-site were noted, recorded, and added to the 2010/2013 list (see Appendix A).

The assessment was conducted using systematic field techniques by walking transects through the entire property to ensure thorough coverage of proposed impact areas to characterize the existing biological resources on-site. Special attention was given to on-site vegetation communities with a high potential to support special-status plant species. Vegetation communities identified and mapped in 2010 were confirmed in 2013 and 2015 (Figure 2). Definitions of plant communities follow the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and *A Manual of California Vegetation* (Sawyer et al. 2009). The results of the rare plant surveys and the probability of special-status species to otherwise occur on-site based on the current biological conditions found on-site are discussed below.



Imagery provided by Google and its licensors © 2015.

Catalina mariposa-lily (2013)
Catalina mariposa-lily (2015; area occupied with scattered individuals)
Southern California black walnut (area occupied with scattered individuals)
Parcel Boundary

Road/Disturbed
Detention Basin
Ornamental
Annual Brome Grassland

Cattail-Saltgrass Marsh
Bulrush-Saltgrass Marsh
Dwarf Nettle Herbaceous Stand
Stinging Nettle Herbaceous Stand

Summer Mustard Herbaceous Stand
Coyote Brush Scrub
Coastal Buckwheat Scrub
Purple Sage Scrub

Mulefat Thickets
Coast Live Oak Woodland
Arroyo Willow Thickets
Yerba Mansa Meadow

N

0 125 250 Feet

Biological Resources Map

Figure 2

SPECIAL-STATUS SPECIES

A list of special-status species targeted in this survey was developed based on our review of the CNDDB RareFind 5 as well as our own knowledge of the area. Table 3 details an updated list of those plants with a low potential to occur within the Parcel Boundary. Special-status species targeted for the 2010 and 2013 surveys that are not expected to occur on-site due to lack of habitat or lack of preferred soils were omitted from the 2015 table.

Table 3. Special-Status Species with Potential to Occur On-Site

Common Name	*Scientific Name*	Status* Fed / State Listing CRPR State-Rank	Habitat Requirements and *Potential for Occurrence*
Catalina mariposa-lily	*Calochortus catalinae*	-- / -- 4.2 S4	Coastal scrub, chaparral, grassland and woodland. Rocky and sandy sites between 100 to 2,295 feet amsl. Blooms February through June. ***Present.*** *A few individuals were found on-site in 2010, none in 2013, and several in 2015 on south-facing slopes in the southern portion of the site.*
Slender mariposa-lily	*Calochortus clavatus* var. *gracilis*	-- / -- 1B.2 S2S3	Chaparral, coastal scrub and grasslands between 1,050 and 3,280 feet amsl. Blooms March through November. ***Low*** *potential for occurrence.*
Plummer's mariposa-lily	*Calochortus plummerae*	-- / -- 4.2 S4	Chaparral, cismontane woodland, coastal scrub, lower coniferous forest, and grassland. Prefers granitic, rocky soils. Found at elevations between 325 and 5,570 feet amsl. Blooms May through July. ***Low*** *potential for occurrence.*
Santa Susana tarplant	*Deinandra minthornii*	-- / -- 1B.2 S2	Chaparral and coastal scrub between 980 and 1,600 feet amsl. Blooms July through November. Perennial shrub, if present, would have been seen during survey. ***Low*** *potential for occurrence.*
Southern California black walnut	*Juglans californica*	-- / -- 4.2 S3	Chaparral, cismontane woodland, coastal scrub, and riparian woodland in alluvium between 165 and 2,950 feet amsl. Blooms March through August. ***Present.*** *Several individuals are located on-site within upper reached of the main drainage feature.*

Source: CDFW CNDDB Special Vascular Plants, Bryophytes, and Lichens List, July 2015; CNDDB 5-mile search radius, August 2015.

**Special Status Codes*

SR = State Rare;
S1 = <6 Eos (viable element occurrences) or <1,000 individuals or <2,000 acres
S2 = 6-20 Eos or 1,000-3,000 individuals or 2,000-10,000 acres
S3 = 21-80 Eos or 3,000-10,000 individuals or 10,000-50,000 acres

No USFWS-designated Critical Habitat for listed threatened or endangered plants occurs within the Parcel Boundary. The following discusses the above listed plants with the potential to occur on-site, including their regulatory status, habitat preferences, and known ecological requirements.

- **Catalina mariposa-lily** (*Calochortus catalinae*). Catalina mariposa-lily is ranked S4 by CDFW, has a CRPR of 4.2, and currently has no State or Federal listing status. Catalina mariposa lily is a perennial bulbiferous herb in the lily family (Liliaceae) that occurs in a variety of habitat types throughout southern California ranging from grasslands to woodlands. This species generally blooms from February through June, and is known to occur from the Los Angeles area northward to San Luis Obispo County. In those locations where this plant is common, the bulbs are abundant and number in the hundreds. Approximately five (5) individuals were observed on-site in two separate locations during the 2010 survey. None were observed during the 2013 survey. During the April 2015 survey, 15-30 individuals were observed scattered throughout the middle and southern portion of the survey area.

- **Slender mariposa-lily** (*Calochortus clavatus* var. *gracilis*). Slender mariposa-lily, a bulbiferous perennial herbaceous plant species in the lily family, is listed with a State Rank S2S3 and CRPR 1B.2. It occurs in chaparral, coastal scrub, and grasslands between 1,050 and 3,280 feet amsl. This species typically blooms March through November. The project site (approximately 800 to 1,280 feet amsl) is at the lower elevation limits described for this species. All potentially suitable habitats for this species on-site were thoroughly searched during the 2010, 2013, and 2015 rare plant surveys yielding no specimens of slender mariposa-lily, either of blooms or seed pods. This plant is not expected to occur in the project area.

- **Plummer's mariposa-lily** (*Calochortus plummerae*). Plummer's mariposa-lily is a bulbiferous perennial herbaceous plant species in the lily family. Plummer's mariposa-lily is listed as a State Rank S4 and CRPR 4.2. Plummer's mariposa-lily is known from Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties where it has been found growing on rocky soils in chaparral, coastal scrub, woodland, and grassland habitat types. This species typically flowers from May to July. All potentially suitable habitats for this species on-site were thoroughly searched during the rare plant surveys. Surveys conducted in 2010, 2013, and 2015 yielded no specimens of Plummer's mariposa-lily, either of blooms or seed pods. This plant is not expected to occur in the project area.

- **Santa Susana tarplant** (*Deinandra minthornii*). Santa Susana tarplant, a perennial deciduous shrub in the sunflower family (Asteraceae), is listed as California Rare, State Rank S2, and CRPR 1B.2. It occurs in chaparral and rocky, coastal scrub areas in southern Western Transverse Ranges (Santa Susana and Santa Monica Mountains) commonly associated with Santa Susana sandstone outcrops. It has also been found on rocky outcrops of Conejo volcanics. The blooming period is July through November. This plant is a perennial shrub that if present would have been visible even without inflorescence present. Santa Susana tarplant was not observed during the 2010, 2013,

and 2015 rare plant surveys, nor is suitable soils present on-site. This plant is not expected to occur in the project area.

- **Southern California black walnut** (*Juglans californica*). Southern California black walnut, a perennial deciduous tree in the walnut family (Juglandaceae), is listed as State Rank S3 and CRPR 4.2. It occurs in chaparral, cismontane woodland, coastal scrub, and riparian woodland areas in southern California Coast, Transverse, and Peninsular Ranges, and the Central Valley, commonly associated with alluvium. The blooming period is March through August. Southern California black walnut was observed scattered throughout eastern portion of the main drainage riparian corridor on-site.

RESULTS AND DISCUSSION

The survey area contains two special-status species: Catalina mariposa-lily and southern California black walnut. Catalina mariposa-lily and Southern California black walnut are listed as a CRPR 4.2. CRPR 4 includes plants of limited distribution or those that occur infrequently throughout a broader area in California. Their vulnerability or susceptibility to threat appears relatively low at this time. While plants falling under this category are not "rare" from a State-wide perspective, they are uncommon enough that in the CDFW's opinion their status should be monitored regularly. The CDFW will transfer them to other lists or eliminate them at such time that their status changes.

Within the Parcel Boundary, five (5) individuals of Catalina mariposa-lily were observed during the 2010 survey, none during the 2013 survey, and approximately 15-30 individuals were observed scattered throughout and along the peripheries of the purple sage scrub (*Salvia leucophylla*) habitat during the 2015 survey. Figure 2 depicts the locations where Catalina mariposa-lily was observed on-site in 2010 and the extent of Catalina mariposa-lily observed on-site in 2015.

Within the Parcel Boundary, approximately 10-15 individuals of Southern California black walnut were observed scattered throughout the area identified as Arroyo Willow Thickets, as seen and indicated on Figure 2.

No other special-status plant species were observed on-site during the focused rare plant surveys.

CONCLUSION

The intent of this survey was to determine the presence or absence of any rare, threatened, or endangered plant species within the Parcel Boundary. During the 2010 and 2015 spring surveys, Catalina mariposa lily was found scattered throughout the southern portion of the project area. In addition, southern California black walnut was observed scattered throughout eastern portion of the main drainage riparian corridor on-site.

This is the third rare plant survey in five years conducted by Rincon for this project area. Seasonal conditions varied between the survey years with 2015 being the most optimal year to detect rare plants (based on the number of Catalina mariposa-lilies detected and the number of

new species added to the list of plants observed on-site [Appendix A]). Based on the survey data collected since 2010, the number of Catalina mariposa-lilies observed on-site, and the disturbed nature of the site, the polygon shown on Figure 2 likely represents the extent of the Catalina mariposa-lily population within the Parcel Boundary; however dormant bulbs may be present within and along the periphery of purple sage scrub habitat in other areas on-site. Further, because of the favorable environmental conditions during this 2015 survey season, the disturbed nature of the site, and the number of new (not special-status) species detected, no other special-status are expected to occur on-site.

It should be noted that locally protected individuals of coast live oak (*Quercus agrifolia*) and valley oak (*Quercus lobata*) occur within the Parcel Boundary. An analysis of potential project effects to oak trees, oak woodlands, and recommendations for avoidance and/or minimization of potential project effects are addressed in the Oak Tree Report prepared by Carlberg Associates (Carlberg 2014).

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Appendix A

Plant Species Observed On-Site

Appendix A: Plant Species Observed On-Site

Scientific Name	Common Name	Family	2010 Survey	2013 Survey	2015 Survey
Acmispon americanus	bird's foot trefoil	Fabaceae			x
Acmispon glaber	deer weed	Fabaceae	x	x	x
Acourtia microcephala	sacapellote	Asteraceae			x
Adiantum jordanii	California maidenhair fern	Pteridaceae			x
Agrostis pallens	leafy bent grass	Poaceae			x
Amsinckia menziesii	small flowered fiddleneck	Boraginaceae	x		x
Anemopsis californica	yerba mansa	Saururaceae	x	x	x
Antirrhinum nuttallianum	Nuttall's snapdragon	Plantaginaceae			x
Artemisia californica	California sagebrush	Asteraceae	x	x	x
Artemisia douglasiana	mugwort	Asteraceae	x	x	x
Asclepias fascicularis	narrow-leaf milkweed	Apocynaceae	x	x	x
*Atriplex semibaccata**	Australian saltbush	Chenopodiaceae	x	x	x
*Avena barbata**	slender wild oats	Poaceae			x
*Avena fatua**	wild oats	Poaceae	x	x	x
Baccharis pilularis	coyote brush	Asteraceae	x	x	x
Baccharis salicifolia	mule fat	Asteraceae	x	x	x
*Bassia hyssopifolia**	fivehook bassia	Chenopodiaceae			x
Bloomeria crocea	common goldenstar	Themidaceae	x	x	x
*Brassica nigra**	black mustard	Brassicaceae	x	x	x
*Brassica rapa**	field mustard	Brassicaceae	x		
*Bromus diandrus**	common ripgut grass	Poaceae		x	x
*Bromus hordeaceus**	soft chess	Poaceae	x	x	x
*Bromus rubens**	red brome	Poaceae	x	x	x
*Bromus tectorum**	cheat grass	Poaceae			x
Calandrinia menziesii	red maids	Montiaceae	x	x	
Calochortus catalinae	Catalina mariposa lily	Liliaceae	x		x
Calystegia macrostegia	island morning glory	Convolvulaceae	x		x
*Capsella bursa-pastoris**	shepherd's purse	Brassicaceae			x
*Carduus pycnocephalus**	Italian thistle	Asteraceae	x		x
Carex sp.	sedge	Cyperaceae	x		
Castilleja affinis	Indian paintbrush	Orobanchaceae	x	x	x
Castilleja exserta	purple owl's clover	Orobanchaceae	x		x
*Centaurea calcitrapa**	purple star thistle	Asteraceae	x	x	
*Centaurea melitensis**	tocalote	Asteraceae	x	x	x
Chenopodium californicum	California goosefoot	Chenopodiaceae			x
*Chenopodium murale**	nettle leaf goosefoot	Chenopodiaceae			x
Chlorogalum pomeridianum	wavyleaf soap plant	Agavaceae	x		
Cirsium occidentale	western thistle	Asteraceae	x		
*Cirsium vulgare**	bull thistle	Asteraceae	x	x	x
Clarkia bottae	punch bowl godetia	Onagraceae		x	x
Clarkia purpurea	purple clarkia	Onagraceae			x
Clarkia unguiculata	elegant clarkia	Onagraceae		x	x
Corethrogyne filaginifolia var. *filaginifolia*	common sandaster	Asteraceae			x
Crassula connata	pygmy weed	Crassulaceae			x
Croton setigerus	dove weed	Euphorbiaceae	x		x
Cucurbita foetidissima	calabazilla	Cucurbitaceae	x	x	x

Appendix A: Plant Species Observed On-Site

Scientific Name	Common Name	Family	2010 Survey	2013 Survey	2015 Survey
Cyperus sp.	Flatsedge	Cyperaceae	x	x	
Datura wrightii	jimsomweed	Solanaceae		x	x
Deinandra fasciculata	clustered tarweed	Asteraceae			x
Descurainia pinnata	western tansy mustard	Brassicaceae			x
Dichelostemma capitatum	blue dicks	Themidaceae			x
Distichlis spicata	saltgrass	Poaceae	x	x	x
Dudleya lanceolata	lanceleaf liveforever	Crassulaceae		x	x
Elymus condensatus	giant wild rye	Poaceae	x	x	x
Elymus trachycaulus	slender wheatgrass	Poaceae	x		
Elymus triticoides	beardless wild rye	Poaceae			x
Encelia californica	California encelia	Asteraceae		x	x
Ericameria palmeri var. *pachylepis*	Palmer's goldenbush	Asteraceae			x
Eriogonum cinereum	ashyleaf buckwheat	Polygonaceae			x
Eriogonum fasciculatum	California buckwheat	Polygonaceae	x	x	x
Eriophyllum confertiflorum	golden yarrow	Asteraceae			x
*Erodium cicutarium**	redstem filaree	Geraniaceae	x	x	x
*Erodium moschatum**	whitestem filaree	Geraniaceae			x
Eschscholzia californica	California poppy	Papaveraceae	x	x	x
Eucrypta chrysanthemifolia	spotted hideseed	Boraginaceae			x
*Festuca myuros**	rattail fescue	Poaceae	x		x
Galium aparine	common bedstraw	Rubiaceae			x
*Gazania linearis**	Gazania	Asteraceae		x	x
Gilia angelensis	chaparral gilia	Polemoniaceae			x
Hazardia squarrosa	sawtooth goldenbush	Asteraceae	x	x	x
Heliotropium curassavicum	salt heliotrope	Boraginaceae		x	x
*Helminthotheca echioides**	bristly ox-tongue	Asteraceae		x	x
Hesperoyucca whipplei	chaparral yucca	Agavaceae	x	x	x
Heterotheca grandiflora	telegraph weed	Asteraceae			x
*Hirschfeldia incana**	short-pod mustard	Brassicaceae			x
*Hordeum murinum**	foxtail barley	Poaceae	x	x	x
*Hypochaeris glabra**	smooth cat's ear	Asteraceae			x
Isocoma menziesii var. *vernonioides*	coastal goldenbush	Asteraceae			x
Juglans californica	California black walnut	Juglandaceae	x	x	x
Juncus mexicanus	Mexican rush	Juncaceae	x		x
Keckiella cordifolia	heartleaf keckiella	Plantaginaceae	x		x
*Lactuca serriola**	prickly lettuce	Asteraceae			x
*Lamarckia aurea**	goldentop	Poaceae			x
Lasthenia gracilis	needle goldfields	Asteraceae			x
Layia platyglossa	coastal tidytips	Asteraceae		x	
*Logfia gallica**	narrowleaf cottonrose	Asteraceae			x
Lupinus nanus	sky lupine	Fabaceae	x		
Lupinus succulentus	arroyo lupine	Fabaceae	x		x
Lysimachia arvensis *	scarlet pimpernel	Myrsinaceae	x		x
Malacothamnus fasciculatus var. *fasciculatus*	chaparral mallow	Malvaceae	x		x
Malacothrix saxatilis var. *commutata*	cliff desert dandelion	Asteraceae	x	x	x
*Malva parviflora**	cheeseweed	Malvaceae		x	x

Appendix A: Plant Species Observed On-Site

Scientific Name	Common Name	Family	2010 Survey	2013 Survey	2015 Survey
Marah macrocarpa	Chilicothe	Cucurbitaceae	x	x	x
*Marrubium vulgare**	horehound	Lamiaceae	x	x	x
*Medicago polymorpha**	burclover	Fabaceae	x	x	x
Melica imperfecta	coast range melic	Poaceae			x
*Melilotus indicus**	yellow sweetclover	Fabaceae	x	x	x
*Mentha spicata**	spearmint	Lamiaceae	x		x
Mimulus aurantiacus	sticky monkeyflower	Phrymaceae	x	x	x
*Nicotiana glauca**	tree tobacco	Solanaceae	x	x	x
Phacelia cicutaria	caterpillar phacelia	Boraginaceae	x		
Phacelia distans	common phacelia	Boraginaceae			x
*Phalaris paradoxa**	hood canarygrass	Poaceae			x
Pholistoma auritum	fiesta flower	Boraginaceae			x
Plantago erecta	California plantain	Plantaginaceae	x		x
*Plantago lanceolata**	English plantain	Plantaginaceae	x		x
*Polypogon interruptus**	ditch beard grass	Poaceae		x	
*Polypogon monspeliensis**	annual beard grass	Poaceae	x		x
Pseudognaphalium californicum	ladies' tobacco	Asteraceae	x		x
Quercus agrifolia	coast live oak	Fagaceae	x	x	x
Quercus lobata	valley oak	Fagaceae	x	x	x
Rafinesquia californica	California chicory	Asteraceae			x
Rhus ovata	sugar bush	Anacardiaceae			x
Ribes sp.	gooseberry	Grossulariaceae			x
*Rumex crispus**	curly dock	Polygonaceae	x		x
Salix laevigata	red willow	Salicaceae			x
Salix lasiolepis	arroyo willow	Salicaceae	x	x	x
*Salsola tragus**	Russian thistle	Chenopodiaceae	x	x	x
Salvia apiana	white sage	Lamiaceae	x	x	x
Salvia columbariae	chia sage	Lamiaceae			x
Salvia leucophylla	purple sage	Lamiaceae	x	x	x
Sambucus nigra ssp. *caerulea*	blue elderberry	Adoxaceae	x	x	x
Sanicula crassicaulis	Pacific sanicle	Apiaceae			x
*Schinus molle**	Peruvian pepper tree	Anacardiaceae	x		x
*Schismus barbatus**	Mediterranean grass	Poaceae			x
Schoenoplectus americanus	chairmaker's bulrush	Cyperaceae			x
Scrophularia californica	California bee plant	Scrophulariaceae	x		x
Selaginella bigelovii	Bigelow's spike moss	Selaginellaceae	x	x	x
*Silybum marianum**	milk thistle	Asteraceae			x
*Sisymbrium irio**	London rocket	Brassicaceae			x
*Sonchus asper**	prickly sow thistle	Asteraceae	x		x
*Sonchus oleraceus**	common sow thistle	Asteraceae			x
*Stellaria media**	common chickweed	Caryophyllaceae			x
Stephanomeria pauciflora	wire lettuce	Asteraceae			x
Stephanomeria virgata	virgate wreath plant	Asteraceae			x
Stipa lepida	foothill needle grass	Poaceae			x
Stipa miliacea var. *miliacea**	Smilo grass	Poaceae			x
Stipa pulchra	purple needle grass	Poaceae			x
*Tamarix ramosissima**	smallflower tamarisk	Tamaricaceae	x		x

Appendix A: Plant Species Observed On-Site

Scientific Name	Common Name	Family	2010 Survey	2013 Survey	2015 Survey
Trichostema lanatum	woolly bluecurls	Lamiaceae			x
Typha latifolia	broadleaf cattail	Typhaceae	x	x	x
Uropappus lindleyi	silver puffs	Asteraceae			x
Urtica dioica	stinging nettle	Urticaceae	x	x	x
*Urtica urens**	dwarf nettle	Urticaceae			x
Verbena lasiostachys	western vervain	Verbenaceae	x	x	x
*Washingtonia robusta**	Washington fan palm	Arecaceae			x
Xanthium strumarium	cocklebur	Asteraceae			x

** Non-native plant species*

City of Calabasas

Calabasas Canyon Oaks Development Project

Least Bell's Vireo Focused Survey Report

August 2015

rincon

Environmental Scientists Planners Engineers

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Appendix A – Avian Species Compendium

INTRODUCTION

This report presents the results of focused protocol surveys for the federally endangered least Bell's vireo (*Vireo bellii pusillus*). Rincon Consultants, Inc. (Rincon) conducted the surveys to determine the presence/absence of least Bell's vireo on the Messenger Development Project site, located in the city of Calabasas, Los Angeles County, California.

The 77.55-acre site is located at 4790 Las Virgenes Road (Assessor's Parcel Numbers [APN] 2069-078-009 and 2069-078-011) in the city of Calabasas, County of Los Angeles. The project site is located adjacent to and east of the intersection of Las Virgenes Road and Agoura Road, and approximately 0.25 mile southeast of U.S. Highway 101 (U.S. 101). The site is bordered by a residential subdivision and Las Virgenes Road to the west, a gas station and undeveloped open space to the north, and open space to the east and south. It is depicted on the Calabasas 7.5-minute United States Geological Survey (USGS) topographic map (Figure 1). The site does not occur within federally designated Critical Habitat for the least Bell's vireo.

METHODOLOGY

All surveys for the federally endangered least Bell's vireo were conducted by Rincon avian ecologists Steven Hongola, Jillian Moore, and Ethan Ripperger. The surveys were conducted in accordance with the U.S. Fish and Wildlife Service (USFWS) *Least Bell's Vireo Survey Guidelines*, issued January 19, 2001. Eight (8) surveys were conducted at least 10 days apart between April 10 and July 31. The surveys occurred between dawn and 1100 hours each day within all portions of the project site containing potentially suitable riparian habitat. Surveys were not conducted during inclement weather conditions (e.g. excessive or abnormal heat, cold, wind, rain, or fog).

The surveyor slowly walked the survey area, stopping at approximately 50 to 100-foot intervals to listen for least Bell's vireo songs and calls, and observe habitat with the aid of binoculars (10x40) for adults and fledglings. If vireos were observed, age, sex, breeding status, and behavioral characteristics were recorded, if possible.

A list of avian species observed/detected during the surveys is in Appendix A. Survey dates, times, and weather conditions are listed in Table 1.

Least Bell's Vireo Survey Conditions and Results

Date	Surveyor(s)	Beginning Conditions	Ending Conditions	LBVI Observed
4/10/15	Jillian Moore	07:45 A.M.; 45°F; winds 0 mph; 0% cc	11:00 A.M.; 70°F; winds 2-3 mph; 0% cc	none
4/20/15	Jillian Moore	07:30 A.M.; 55°F; winds 6-10 mph; 20% cc	11:00 A.M.; 66°F; winds 8-10 mph; 30% cc	none
4/30/15	Steven Hongola	07:50 A.M.; 64°F; winds 0-1 mph; 40% cc	10:55 A .M.; 87°F; winds 2-3 mph; 30% cc	none
5/12/15	Jillian Moore	08:30 A.M.; 68°F; winds 1-3 mph; 10% cc	11:00 A.M.; 74°F; winds 1-3 mph; 10% cc	none
5/22/15	Jillian Moore	07:30 A.M.; 57°F; winds 2-4 mph; 80% cc	11:00 A.M.; 66°F; winds 4-6 mph; 80% cc	none
6/3/15	Jillian Moore	06:30 A.M.; 62°F; winds 0-3 mph; 80% cc	9:30 A.M.; 65°F; winds 0-3 mph; 80% cc	none
7/7/15	Ethan Ripperger	07:00 A.M.; 62°F; winds 1-3 mph; 100% cc, light drizzle	9:40 A.M.; 64°F; winds 1-3 mph; 80% cc	none
7/17/15	Ethan Ripperger	07:45 A.M.; 65°F; winds 1-3 mph; 0% cc	10:00 A.M.; 75°F; winds 1-3 mph; 0% cc	none

ENVIRONMENTAL SETTING

The 77.55-acre project site (Figure 2) consists of two adjoining properties (APNs 2069-078-009 and 2069-078-011). The site is largely undeveloped with existing disturbance caused by fire clearance, grading, and grazing. The western half of the project site is primarily undeveloped; however, some grading and dirt roadways exist and a debris basin is also located at the western site boundary. The northern portion of the site also includes some grading and dirt roads, as well as abandoned structures from a former sheep husbandry operation. The remaining portions of the site are in a relatively natural, undisturbed condition.

Vegetation on the site is highly variable and includes primarily upland communities such as annual brome grasslands, coastal scrub (comprised of purple sage, coyote brush and coastal buckwheat scrub communities) and coast live oak woodland, as well as small areas of wetland and riparian communities such as arroyo willow thicket, rush-saltgrass meadow and a yerba mansa meadow.

The wetland and riparian communities are dominated by arroyo willow (*Salix lasiolepis*), yerba mansa (*Anemopsis californica*), and saltgrass (*Distichlis spicata*) with associate species Mexican rush (*Juncus mexicanus*), and flatsedges (*Cyperus* spp.) observed. The coast live oak woodland is dominated by coast live oak (*Quercus agrifolia* var. *agrifolia*) with greenbark ceanothus (*Ceanothus spinosus*), toyon (*Heteromeles arbutifolia*), California sagebrush (*Artemisia californica*), bigpod ceanothus (*Ceanothus megacarpus*), mountain mahogany (*Cercocarpus betuloides*), and lemonadeberry (*Rhus integrifolia*) growing below the oak canopy.

Dominant species within the annual brome grassland habitat include ripgut (*Bromus diandrus*) and/or soft chess (*Bromus hordeaceus*) with other non-natives in the herbaceous layer such as tocalote (*Centaurea melitensis*), wild oats (*Avena fatua*), mustards (*Brassica nigra, Brassica campestris, Hirschfeldia incana*) and star thistle (*Centaurea melitensis)*. The coastal scrub habitat and associated communities are dominated by purple sage (*Salvia leucophylla)*, coyote brush (*Baccharis pilularis*), coastal buckwheat (*Eriogonum cinereum*), deerweed (*Lotus scoparius*), California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), and California buckwheat (*Eriogonum fasciculatum*) with an herbaceous understory.

RESULTS AND DISCUSSION

No least Bell's vireo were detected during any of the eight surveys and the site is considered unoccupied. The California Natural Diversity Data Base (CNDDB) contained a total of four tracked occurrences for the least Bell's vireo within approximately 15 miles of the project site, including three to the northwest and one to the northeast (in 1985, 2004, and two occurrences in 2008). In addition, a search of eBird (Sullivan et al. 2009) revealed no recorded observations within or adjacent to the project site. The nearest observations recorded in eBird are located approximately 14.5 miles to the west adjacent to Hill Canyon Road in Camarillo. A total of 11 sightings were observed in 2006 (4), 2009 (1), 2010 (3), and 2011 (3) at this location. The USFWS has no additional records of least Bell's vireo occurrences within the five miles of the project (per email conversation with Senior Biologist Chris Dellith on July 28, 2015).

The riparian habitat suitable for least Bell's vireo within the project site is located along a drainage at the base of a narrow canyon containing steep hillsides. The vegetation surrounding the drainage consists of a mix of upland habitat, brome grasslands, coastal scrub, and coast live oak woodland. The riparian habitat within the drainage is intermixed with wetland communities and contains small, scattered stands of willows and mule fat (*Baccharis salicifolia*). However, the stands are relatively narrow, limited in size, and lack significant density typically preferred by the species. These characteristics may reduce the suitability of the habitat for the species and could be factors contributing to the absence of least Bell's vireo at this location.

Avian activity and diversity was generally moderate to high during the surveys, with common species expected to occur within coastal sage scrub and riparian habitat detected on a regular basis. Brown-headed cowbirds (*Molothrus ater*), which are considered to be a nest parasite to least Bell's vireo and other avian species, were not observed on or in the vicinity of the site over the course of the surveys. Several species listed by the California Department of Fish and Game as Special Animals were observed or detected onsite, including Cooper's hawk (*Accipiter cooperi*), Nuttall's woodpecker (*Picoides nuttallii*), Allen's hummingbird (*Selasphorus sasin*), oak titmouse (*Baeolophus inornatus*), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*).

CERTIFICATION

I hereby certify that the facts, statements, and information furnished in this report and in the attached figures are true and correct to the best of my knowledge and belief.

Signed: _____ Date: 8/14/15

Ethan Ripperger
Associate Biologist

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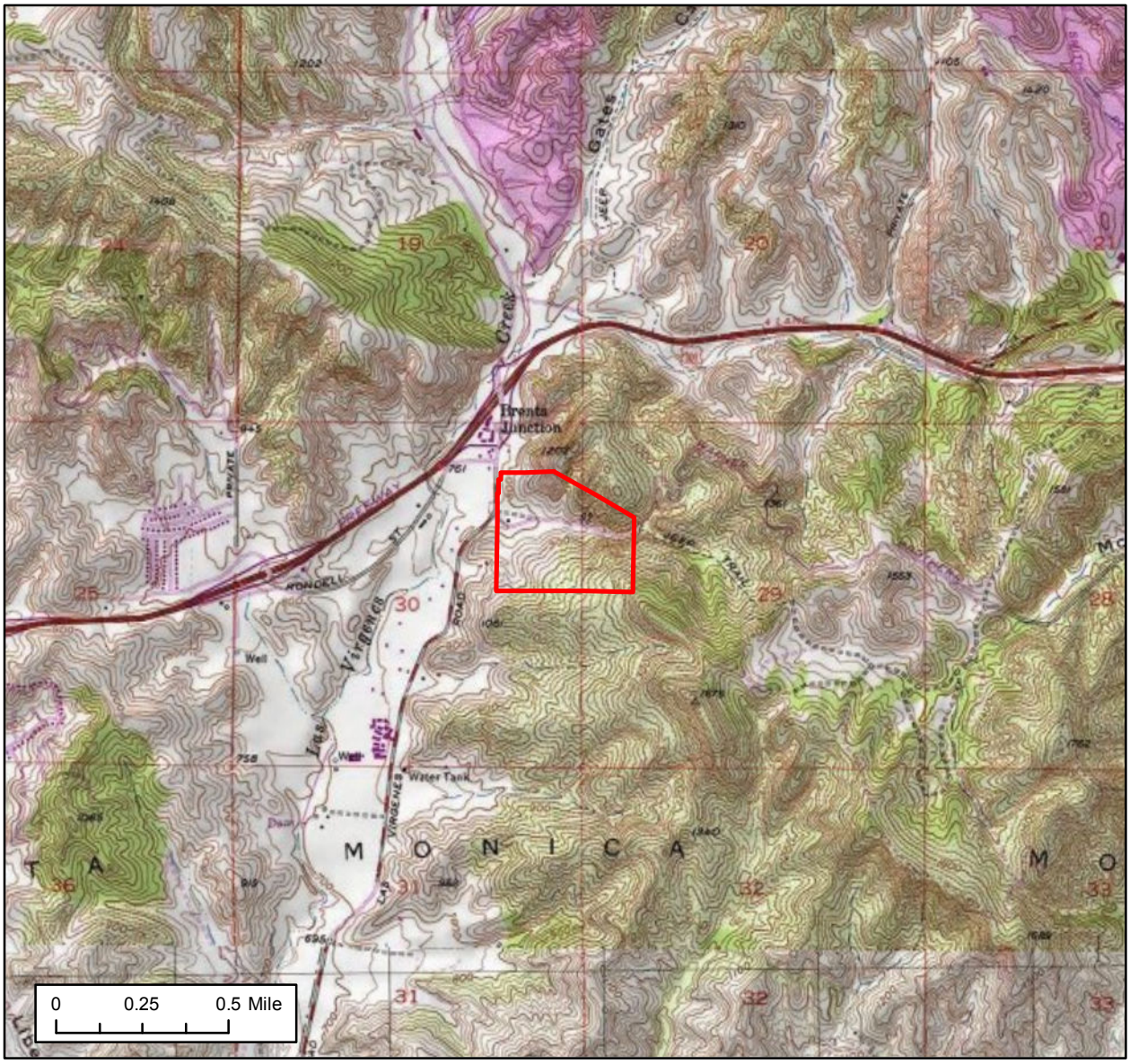

Imagery provided by National Geographic Society, ESRI and its licensors, 2012.

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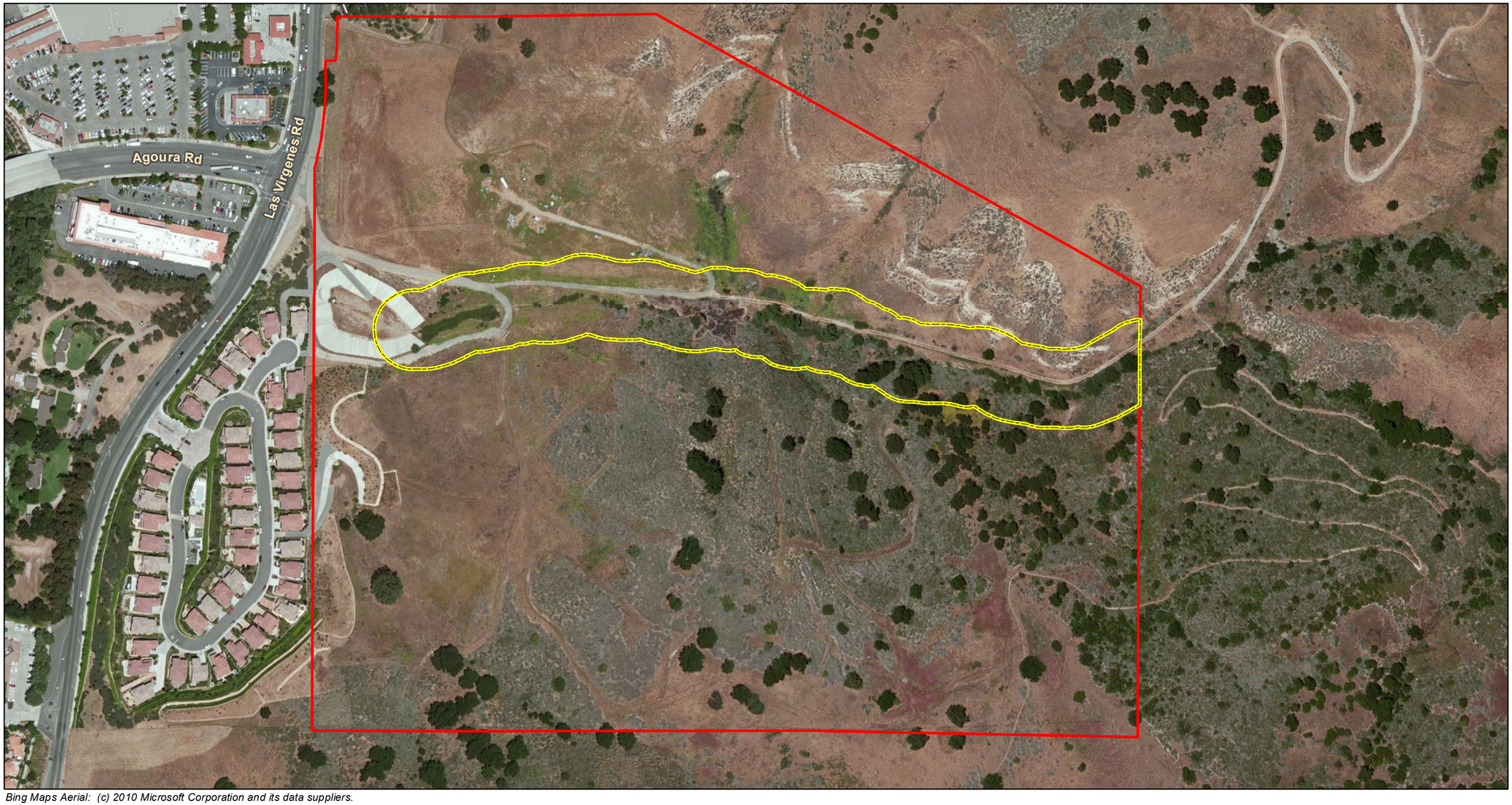
Site Boundary

Project Location

Figure 1



Bing Maps Aerial: (c) 2010 Microsoft Corporation and its data suppliers.

Parcel Boundary
Survey Area

0 125 250 Feet

N

Survey Area

Figure 2

City of Calabasas

Appendix A

Avian Species Compendium

AVIAN SPECIES COMPENDIUM

Avian Species Observed/Detected On Site

Scientific Name	Common Name
ANATIDAE	***DUCKS, GEESE, & SWANS***
Branta canadensis	Canada goose
Anas platyrhynchos	mallard duck
ODONTOPHORIDAE	***NEW WORLD QUAIL***
Callipepla californica californica	California quail
CATHARTIDAE	***NEW WORLD VULTURES***
Cathartes aura	turkey vulture
ACCIPITRIDAE	***HAWKS, KITES, & EAGLES***
Accipiter cooperii	Cooper's hawk
COLUMBIDAE	***PIGEONS & DOVES***
Zenaida macroura marginella	mourning dove
TROCHILIDAE	***HUMMINGBIRDS***
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
PICIDAE	***WOODPECKERS & SAPSUCKERS***
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens turati	downy woodpecker
TYRANNIDAE	***TYRANT FLYCATCHERS***
Myiarchus cinerascens cinerascens	ash-throated flycatcher
Sayornis nigricans semiatra	black phoebe
Sayornis saya	Say's phoebe
Tyrannus verticalis	western kingbird
VIREONIDAE	***VIREOS***
Vireo huttoni huttoni	Hutton's vireo
CORVIDAE	***CROWS, JAYS, & MAGPIES***
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos hesperis	American crow
Corvus corax clarionensis	common raven
HIRUNDINIDAE	***SWALLOWS***
Hirundo rustica erythrogaster	barn swallow
PARIDAE	***CHICKADEES & TITMICE***
Baeolophus inornatus transpositus	oak titmouse
AEGITHALIDAE	***BUSHTIT***
Psaltriparus minimus minimus	bushtit
TROGLODYTIDAE	***WRENS***
Thryomanes bewickii	Bewick's wren

Avian Species Observed/Detected On Site

Scientific Name	Common Name
Troglodytes aedon	house wren
Salpinctes obsoletus	rock wren
TIMALIIDAE	***BABBLERS***
Chamaea fasciata henshawi	wrentit
POLIOPTILIDAE	***GNATCATCHERS***
Polioptila caerulea	blue-gray gnatcatcher
MIMIDAE	***MOCKINGBIRDS & THRASHERS***
Mimus polyglottos polyglottos	northern mockingbird
Toxostoma redivivum redivivum	California thrasher
STURNIDAE	***STARLINGS & MYNAS***
Sturnus vulgaris	European starling (*)
PTILOGONATIDAE	***SILKY-FLYCATCHERS***
Phainopepla nitens	phainopepla
PARULIDAE	***WOOD WARBLERS***
Geothlypis trichas	common yellowthroat
EMBERIZIDAE	***EMBERIZIDS***
Aimophila ruficeps canescens	southern California rufous-crowned sparrow
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Pipilo maculatus	spotted towhee
CARDINALIDAE	***CARDINALS & GROSBEAKS***
Pheucticus melanocephalus maculatus	black-headed grosbeak
Passerina caerulea	blue grosbeak
ICTERIDAE	***BLACKBIRDS & NEW WORLD ORIOLES***
Icterus cucullatus nelsoni	hooded oriole
FRINGILLIDAE	***FINCHES***
Carduelis psaltria hesperophilus	lesser goldfinch
Carpodacus mexicanus frontalis	house finch
PASSERIDAE	***OLD WORLD SPARROWS***
Passer domesticus	house sparrow (*)
**Non-native*	

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

805 644 4455
FAX 644 4240

info@rinconconsultants.com
www.rinconconsultants.com

July 17, 2015
Rincon Project No. 10-66150

Talyn Mirzakhanian,
Planner
City of Calabasas
100 Civic Center Way
Calabasas, California 91302

Mr. Chris Kofron,
Recovery Permit Coordinator
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003

Subject: **45-day Summary Report of Focused Presence/Absence Surveys for the Calabasas Canyon Oaks Development Project (APN 2069-078-009 and 2069-078-011), Calabasas, Los Angeles County, California**

Dear Mr. Mirzakhanian and Mr. Kofron:

In compliance with the Special Terms and Conditions for Endangered and Threatened Wildlife Species Permit TE-19226A-1.1, Rincon Consultants, Inc. (Rincon) is submitting this letter report summarizing the results of focused surveys for the federally listed threatened coastal California gnatcatcher (*Polioptila californica californica*; CAGN), on behalf of City of Calabasas for the Calabasas Canyon Oaks Development Project. The proposed project is located in the City of Calabasas (City), California (Figure 1). Rincon biologist, Jillian Moore, currently holds an Endangered and Threatened Species Permit issued by the U.S. Fish and Wildlife Service (USFWS) under Section 10(a) of the Federal Endangered Species Act. This permit, TE-19226A-1.1, authorizes Mrs. Moore to conduct presence/absence surveys for CAGN. Additional authorized individuals under this permit include Steven Hongola and Jennifer Turner. Any potential harassment or take of CAGN resulting from the responsible application of survey methods following the approved USFWS protocol, such as using taped vocalizations, would be allowable under this permit.

PROJECT LOCATION AND ENVIRONMENTAL SETTING

The approximate 78-acre Calabasas Oaks property (APN 2069-078-009 and 2069-078-011) is located immediately north of the intersection of Agoura Road and Las Virgenes Road, approximately 0.25 mile southeast of U.S. Highway 101, in the city of Calabasas, Los Angeles County, California. The site is bordered by a residential subdivision and Las Virgenes Road to

the west, a gas station and undeveloped open space to the north, and open space to the east and south. The parcel is depicted in Township 1 North, Range 17 West, Sections 29 and 30 of the U.S. Geological Survey (USGS) *Calabasas, California* 7.5-minute topographic quadrangle (Figure 2). The site does not occur within federally designated Critical Habitat for the CAGN.

The site is largely undeveloped with existing disturbance caused by fire clearance, grading, and grazing. The western half of the project site is primarily undeveloped; however, some grading and dirt roadways exist and a debris basin is also located at the western site boundary. The northern portion of the site also includes some grading and dirt roads, as well as abandoned structures from a former sheep husbandry operation. The remaining portions of the site are in a relatively natural, undisturbed condition.

Vegetation on the site is highly variable and includes primarily upland communities such as annual brome grasslands, coastal scrub (comprised of purple sage, coyote brush and coastal buckwheat scrub communities) and coast live oak woodland, as well as small areas of wetland and riparian communities such as arroyo willow thicket, rush-saltgrass meadow, and a yerba mansa meadow. Dominant species within the annual brome grassland habitat include ripgut (*Bromus diandrus*) and/or soft chess (*Bromus hordeaceus*), with other non-natives in the herbaceous layer such as tocalote (*Centaurea melitensis*), wild oats (*Avena fatua*), mustards (*Brassica nigra, B. campestris, Hirschfeldia incana*), and star thistle (*Centaurea melitensis*). The coastal scrub habitat and associated communities are dominated by purple sage (*Salvia leucophylla*), coyote brush (*Baccharis pilularis*), coastal buckwheat (*Eriogonum cinereum*), deerweed (*Lotus scoparius*), California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), and California buckwheat (*Eriogonum fasciculatum*), with an herbaceous understory.

The coast live oak woodland is dominated by coast live oak (*Quercus agrifolia* var. *agrifolia*), with greenbark ceanothus (*Ceanothus spinosus*), toyon (*Heteromeles arbutifolia*), California sagebrush,bigpod ceanothus (*Ceanothus megacarpus*), mountain mahogany (*Cercocarpus betuloides*), and lemonadeberry (*Rhus integrifolia*) growing below the oak canopy. The wetland and riparian communities are dominated by arroyo willow (*Salix lasiolepis*), yerba mansa (*Anemopsis californica*), and saltgrass (*Distichlis spicata*), with associate species Mexican rush (*Juncus mexicanus*), and flatsedges (*Cyperus* spp.) observed.

SPECIES BACKGROUND

The CAGN belongs to the old-world warbler and gnatcatcher family, Sylviidae. It is a small blue-gray songbird which measures only 4.5 inches (11 cm) and weighs 0.2 ounces (6 grams). It has dark blue-gray feathers on its back and grayish-white feathers on its underside. The wings have a brownish wash to them. Its long tail is mostly black with white outer tail feathers. They have a thin, small bill. The males have a black cap during the summer which is absent during the winter. Both males and females have a white ring around their eyes.

The breeding season of the CAGN extends from late February through August with the peak of nesting occurring from mid-March through mid-May. The breeding territory size of the CAGN ranges from 2 to 22 acres (1 to 9 hectares), with home ranges expanding up to 39 acres (16 hectares), during the non-breeding season (Bontrager 1991; USFWS 1993). Nest parasitism by

brown-headed cowbirds (*Molothrus ater*) has been documented (Unitt 1984). Typically, there is a high rate of nest failure each breeding season. This is offset by rapid and persistent re-nesting efforts; a breeding pair may attempt to nest as many as ten times in a year, producing up to three successful broods in a season (Atwood and Bontrager 2001). There is evidence that this species is also susceptible to nest predation by various animals such as snakes, coyotes (*Canis latrans*), fox, rodents, and other birds, such as western scrub-jays (*Aphelocoma californica*) (Atwood et al. 1999).

The CAGN is a non-migratory songbird found on the coastal slopes of southern California. It ranges from Ventura County south to northwest Baja California, Mexico (Atwood et al. 1999; Jones and Ramirez 1995). It is strongly associated with coastal sage scrub habitats below 820 feet in coastal areas and between 820 and 1,640 feet in inland areas (Atwood and Bolsinger 1992); however, not all types of coastal sage scrub communities are used or preferred. This species appears to be most abundant in areas dominated by California sagebrush and California buckwheat. CAGN numbers are generally low in coastal habitats dominated by black sage (*Salvia mellifera*), white sage (*Salvia apiana*), or lemonade berry; in inland areas, habitats dominated by black sage may be used more regularly (Atwood and Bontrager 2001).

Population estimates for the coastal California gnatcatcher vary. Atwood (1992) estimated that 1,811 to 2,291 pairs of coastal California gnatcatchers existed in 1992 throughout its range in southern California. In 1996, the USFWS estimated the population in San Diego County at 3,000 pairs, excluding pairs located on sites where habitat loss had already been approved (Atwood and Bontrager 2001). According to a 1999 population estimate in San Diego and other southern California counties, the USFWS estimated the population in San Diego at 1,917 pairs, Orange County at 643 pairs, Los Angeles County at 144 pairs, San Bernardino County at 27 pairs, and Ventura County at 4 pairs (Atwood and Bontrager 2001).

The CAGN is federally listed as threatened, is a California Department of Fish and Wildlife (CDFW) Species of Special Concern, and is a County of San Diego Multi-Species Conservation Plan covered species. Specifically, the USFWS listed the CAGN as threatened (USFWS 1993) pursuant to the federal Endangered Species Act of 1973 as amended on March 30, 1993. Critical habitat was designated for CAGN on October 24, 2000 (USFWS 2007).

The primary cause of this species' decline is the cumulative loss of coastal sage scrub vegetation to urban and agricultural development. Little of this species habitat is formally protected or managed. The USFWS has estimated that coastal sage scrub habitat has been reduced by 70 to 90 percent of its historical extent (USFWS 1991) and little of what remains is protected in natural open space.

SURVEY METHODOLOGY

Notification to commence protocol surveys was provided via email correspondence to the USFWS on April 1, 2015. Approval was provided by Deputy Assistant Field Supervisor, Jeff Phillips on April 6, 2015. All surveys for the CAGN were conducted by either Rincon biologist Jillian Moore or Steven Hongola under permit number TE-

19226A-1.1. The survey window was within the CAGN breeding season; therefore, surveys were conducted pursuant to Section IV of the USFWS *Coastal California Gnatcatcher Presence/Absence Survey Protocol*, issued February 28, 1997, and revised July 28, 1997. Specifically, six (6) surveys were completed at least one week apart between March 15 and June 30. The surveys occurred between 0600 and 1200 hours each day, within all portions of the project site, and a 100-foot buffer, containing potentially suitable coastal sage scrub habitat. A total of approximately 28 acres (11 hectares) were surveyed (Figure 3). Surveys were not conducted during inclement weather conditions (e.g. excessive or abnormal heat, wind, rain, fog).

The surveyor slowly walked meandering transects through the survey area, stopping at approximate 50-foot intervals and playing an audio recording of CAGN vocalizations. The recording was played for several seconds at each interval, followed by a brief pause to listen for a response. If any gnatcatchers were observed, age, sex, breeding status, and behavioral characteristics were recorded, if possible.

SURVEY RESULTS

All protocol-level surveys were conducted on foot. Weather conditions during the surveys were primarily warm, with cloudy skies and low wind. Details on the date, time, conditions, and surveyors are provided in Table 1, below.

Table 1: Coastal California Gnatcatcher Survey Conditions and Results

Date	Surveyor(s)	Beginning Conditions	Ending Conditions	CAGN Observed
4/10/15	Jillian Moore	07:45 A.M.; 45°F; winds 0 mph; clear	12:00 P.M.; 72°F; winds 2-3 mph; clear	none
4/20/15	Jillian Moore	07:30 A.M.; 55°F; winds 6-10 mph; 20% cc	11:30 P.M.; 66°F; winds 8-10 mph; 30% cc	none
4/30/15	Steven Hongola	07:50 A.M.; 64°F; winds 0-1 mph; 40% cc	10:55 P.M.; 87°F; winds 2-3 mph; 30% cc	none
5/12/15	Jillian Moore	08:30 A.M.; 68°F; winds 1-3 mph; 10% cc	11:30 A.M.; 74°F; winds 1-3 mph; 10% cc	none
5/22/15	Jillian Moore	07:30 A.M.; 57°F; winds 2-4 mph; 80% cc	11:00 A.M.; 66°F; winds 4-6 mph; 80% cc	none
6/3/15	Jillian Moore	6:30 A.M.; 62°F; winds 0-3 mph; 80% cc	9:30 A.M.; 65°F; winds 0-3 mph; 80% cc	none

No CAGNs were observed on the site during the focused surveys. The coastal scrub habitat onsite is dominated by purple sage, a species that has been characterized as less preferred by gnatcatchers when it is a dominant constituent (Mock 1998). Large portions of the community onsite intergrade with chaparral and oak woodland habitats. These characteristics may reduce the suitability of the habitat for the species and could be factors contributing to the absence of gnatcatchers. CAGN are known to be absent from large portions of the Santa Monica Mountains, with sparsely distributed occurrences limited to the lower elevation fringes of this region. Furthermore, while incidental observations of this species has been recorded by bird watchers as close as 3 miles south of the project site as recently as April 2015 (eBird 2012), CNDDB has no record of occurrences for CAGN within 20 miles of the project

site. Therefore, given the existing site conditions; the lack of species observance/detection during 2015 breeding season surveys, as well as 2012 and 2013 breeding season surveys (Rincon 2012 and Rincon 2013); and known information of the region, the site is considered unoccupied.

Avian activity and diversity was generally moderate to high during the surveys and common species expected to occur within coastal sage scrub were observed on a regular basis. Several species listed by the CDFW as Special Animals were observed or detected onsite, including Cooper's hawk (*Accipiter cooperi*), Allen's hummingbird (*Selasphorus sasin*), Nuttall's woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). A complete list of avian species detected or observed during the survey(s) are included in Table 2. Brown- headed cowbirds were not observed on or in the vicinity of the site over the course of the surveys.

Table 2: Avian Species Observed/Detected On Site

Scientific Name	Common Name
ANATIDAE	***DUCKS, GEESE, & SWANS***
Branta canadensis	Canada goose
ODONTOPHORIDAE	***NEW WORLD QUAIL***
Callipepla californica californica	California quail
CATHARTIDAE	***NEW WORLD VULTURES***
Cathartes aura	turkey vulture
ACCIPITRIDAE	***HAWKS, KITES, & EAGLES***
Accipiter cooperii	Cooper's hawk
COLUMBIDAE	***PIGEONS & DOVES***
Zenaida macroura marginella	mourning dove
TROCHILIDAE	***HUMMINGBIRDS***
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
PICIDAE	***WOODPECKERS & SAPSUCKERS***
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens turati	downy woodpecker
TYRANNIDAE	***TYRANT FLYCATCHERS***
Myiarchus cinerascens cinerascens	ash-throated flycatcher
Sayornis nigricans semiatra	black phoebe
Sayornis saya	Say's phoebe
Tyrannus verticalis	western kingbird
VIREONIDAE	***VIREOS***
Vireo huttoni huttoni	Hutton's vireo
CORVIDAE	***CROWS, JAYS, & MAGPIES***
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos hesperis	American crow
Corvus corax clarionensis	common raven
HIRUNDINIDAE	***SWALLOWS***
Hirundo rustica erythrogaster	barn swallow

Table 2: Avian Species Observed/Detected On Site

Scientific Name	Common Name
PARIDAE	***CHICKADEES & TITMICE***
Baeolophus inornatus transpositus	oak titmouse
AEGITHALIDAE	***BUSHTIT***
Psaltriparus minimus minimus	bushtit
TROGLODYTIDAE	***WRENS***
Thryomanes bewickii	Bewick's wren
TIMALIIDAE	***BABBLERS***
Chamaea fasciata henshawi	wrentit
MIMIDAE	***MOCKINGBIRDS & THRASHERS***
Mimus polyglottos polyglottos	northern mockingbird
Toxostoma redivivum redivivum	California thrasher
STURNIDAE	***STARLINGS & MYNAS***
Sturnus vulgaris	European starling
PARULIDAE	***WOOD WARBLERS***
Geothlypis trichas	common yellowthroat
EMBERIZIDAE	***EMBERIZIDS***
Aimophila ruficeps canescens	southern California rufous-crowned sparrow
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Pipilo maculatus	spotted towhee
CARDINALIDAE	***CARDINALS & GROSBEAKS***
Pheucticus melanocephalus maculatus	black-headed grosbeak
ICTERIDAE	***BLACKBIRDS & NEW WORLD ORIOLES***
Icterus cucullatus nelsoni	hooded oriole
FRINGILLIDAE	***FINCHES***
Carduelis psaltria hesperophilus	lesser goldfinch
Carpodacus mexicanus frontalis	house finch
PASSERIDAE	***OLD WORLD SPARROWS***
Passer domesticus	house sparrow (I)

CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signed: _____ Date: July 17, 2015

Jillian S. Moore, MS, CISEC, QSP
Biologist / Project Manager
10(a)(1)(A) TE-19226A-1.1

Attachments: Figure 1: Regional Location of Project Site; Figure 2: Location of Project Site on USGS Topographical Map; Figure 3: Survey area on biological resource map.

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Rincon. 2013. 45-day Summary Report of Focused Presence/Absence Surveys for the Calabasas Canyon Oaks Development Project (APN 2069-078-009 and 2069-078-011), Calabasas, Los Angeles County, California. July.

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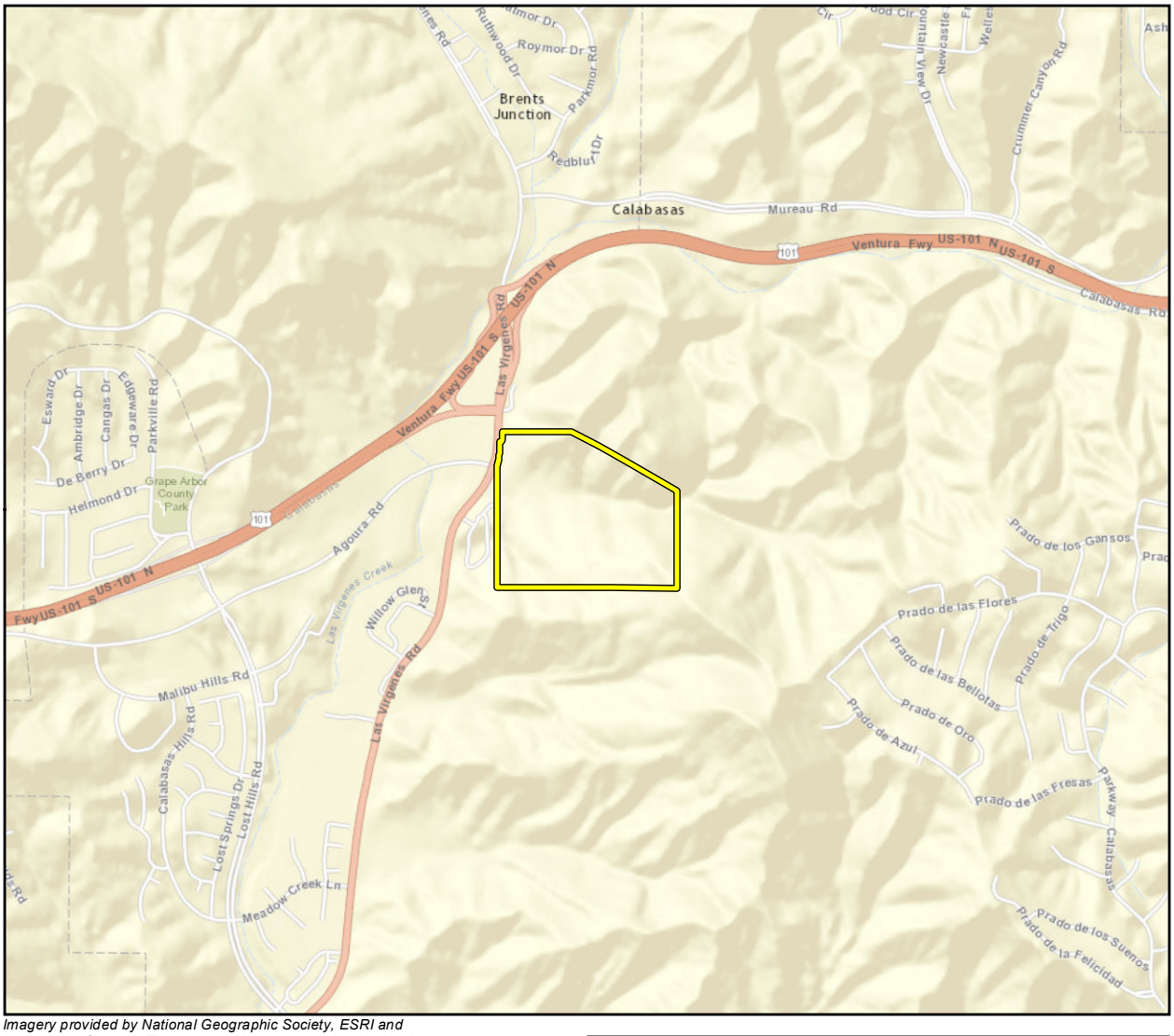

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Project Site

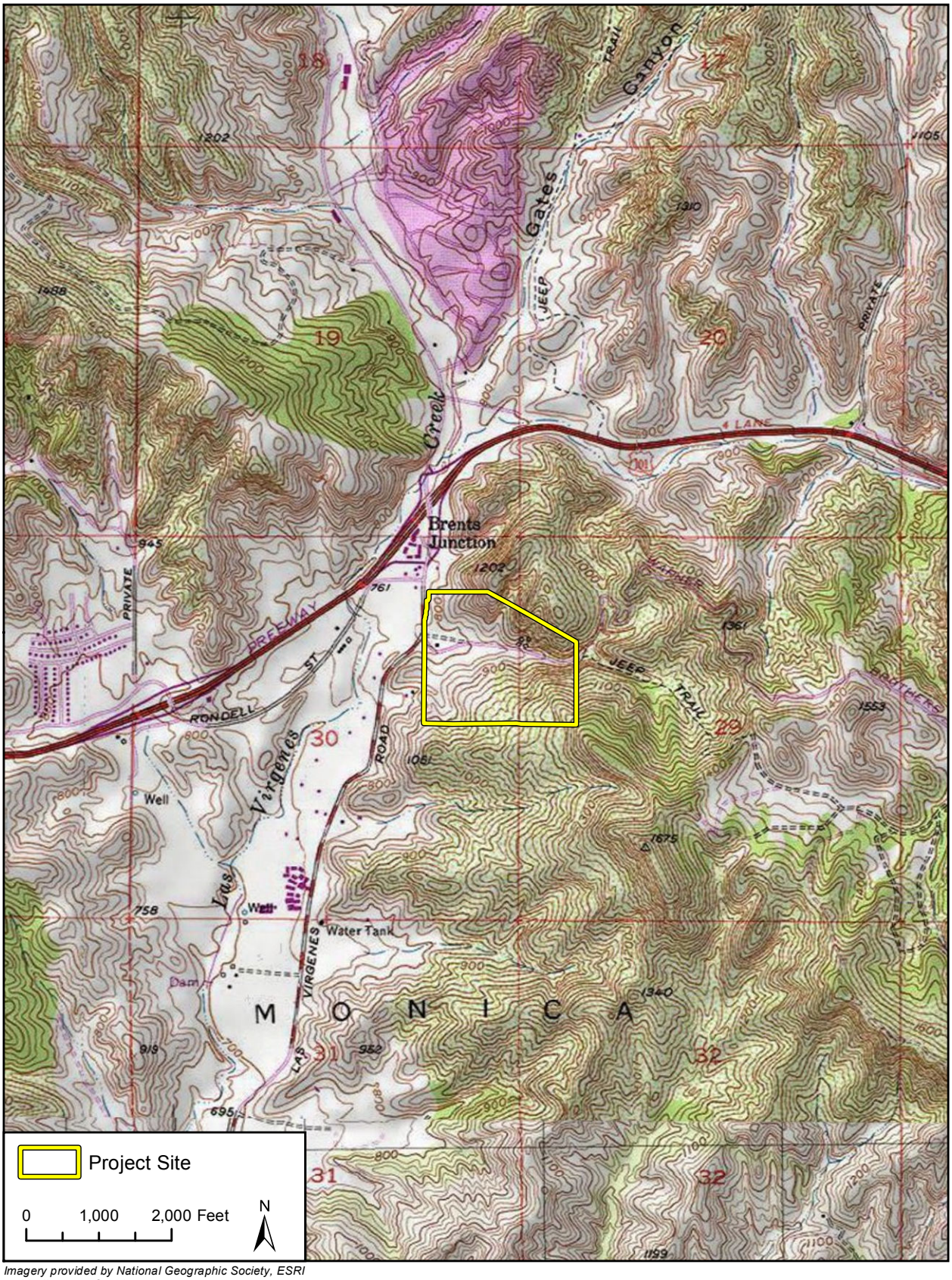
N

0 1,250 2,500

Feet

Regional Location of Project Site

Figure 1



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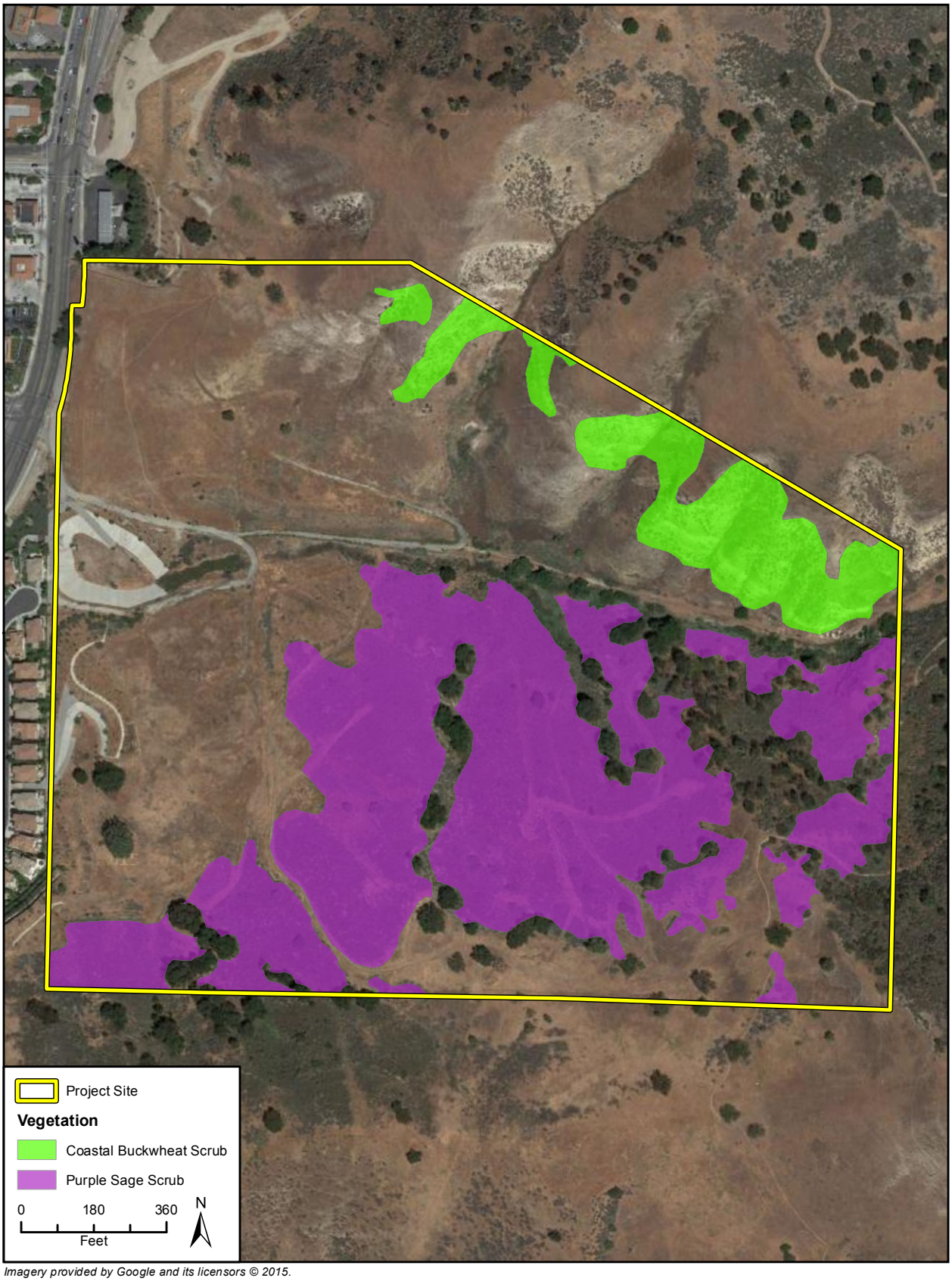
Project Location on USGS Topographic Map

Figure 2



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Potential Coastal California Gnatcatcher Habitat

Figure 3

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

805 644 4455
FAX 644 4240

info@rinconconsultants.com
www.rinconconsultants.com

September 2, 2015
Rincon Job No. 10-66150

Talyn Mirzakhanian, Senior Planner
City of Calabasas
100 Civic Center Way
Calabasas, California 91302

Subject: **Bat Survey Results for the Canyon Oaks Project, City of Calabasas, California**

Dear Ms. Mirzakhanian,

This report presents the results of the bat surveys conducted for the Canyon Oaks Project, pursuant to the California Department of Fish and Wildlife (CDFW) Comment Letter dated August 13, 2015. Rincon Consultants, Inc. (Rincon) conducted the surveys to determine the presence/absence of bats that may utilize the Canyon Oaks Project site as roosting habitat. The bat surveys consisted of one daytime visual inspection survey and one evening bat emergence and acoustic survey. The proposed project involves the construction of a 120-room, 66,516 square foot hotel, 67 small-lot single-family residences and 2 duplexes (4 units), 61 acres of dedicated open space, a de-silting/detention basin, and ancient landslide remediation on the southern portion of the Project site.

The proposed project is located at 4790 Las Virgenes Road (Assessor's Parcel Numbers 2069-078-009 and 2069-078-011) in the City of Calabasas, County of Los Angeles. The project site is located immediately east of the intersection of Las Virgenes Road and Agoura Road; the Ventura Freeway (U.S. 101) is located approximately one-quarter mile north of the project site.

EXISTING SITE CONDITIONS

The 77.22-acre project site consists of two adjoining properties. The site is largely undeveloped. The predominant landform within the western portion of the site is a relatively flat plateau located approximately 20-30 feet above the Las Virgenes Road elevation. Two concrete-lined detention basins that were constructed as part of the adjacent single-family residential tract are present within the west-central portion of the site. The eastern portions of the site are predominately hillside landforms, rising up to 1,280 feet above mean sea level (approximately 500 feet above Las Virgenes Road). A canyon feature traverses the central portion of the site from east to west.

METHODOLOGY

The daytime inspection and evening emergence and acoustic surveys for bats were conducted on August 26th, 2015 by Rincon biologists Leslie Yen and Amy Plesetz between 1800 and 2200 hours (sunset at 1927 hours). The daytime inspection survey consisted of a visual inspection of the proposed work area for potential roosting habitat. Additionally, the foliage, crevices, hollows, and peeling bark of trees suitable for roosting bats within 100 feet of the proposed work area were also inspected for urine staining, and individual scat or guano accumulations stuck to or piled below a roosting location. The surrounding habitat was inspected on foot from the ground. All accessible surfaces of trees were inspected, as feasible. LED flashlights and 10x42 binoculars were used during the inspections. In addition to recording all visual observations of bats during the evening emergence and acoustic survey, Pettersson D240X Ultrasound detectors with a Zoom recorder or a Wildlife Acoustics Echo Meter 2 recorder were used to detect the inaudible ultrasonic calls of bats active within the area. To increase the airspace around the detectors, the detector microphones were placed on extension poles and extended approximately 30 vertical feet and 7 vertical feet in the air. Detectors were focused on high potential habitat, at the western end of the central canyon. Acoustic recordings were subsequently downloaded to a computer and analyzed in Sonobat 3.1.3 to determine species.

RESULTS

Temperatures during the surveys ranged from 95° F at 1730 hours, to 84° F at 2200 hours. Wind speed during the daytime survey was 5-10 mph and 1-3 mph during the evening survey. Relative humidity ranged from 22% to 45% throughout the evening. No cloud cover or fog was present during the surveys.

No bats were observed during the exterior daytime survey and no accumulations of guano were found. During the evening emergence and acoustic survey, biologists recorded approximately 50 visual observations of flying bats over the canyon area, with 6 individuals observed emerging directly from nearby oaks. Bats were observed emerging from a south to north direction, foraging overhead, before departing the site in a southwest direction. Fifty individual bat calls were detected and recorded by the acoustical detectors.

The photos indicate as assessment of very low to very high suitable habitat. Photo 1 and 4 show the highest potential roosting habitat on the project site. The habitat is located in the central portion where the previously described canyon exists. Photo 2 shows the northern portion of the site contains dispersed individual trees. These trees are low potential habitat. Photo 3 shows the grassland and adjacent urban development of the southern portion. Grasslands and urban development are also low potential habitat. No bats were observed in low potential areas.

CONCLUSIONS

Approximately 50 bats were observed and detected by acoustic detectors. All individuals recorded by the acoustic detectors and/or visually observed were canyon bats (*Parastrellus*

hesperus), which is not a listed species by the CDFW or the U.S. Fish and Wildlife Service. No evidence of maternity colonies was observed onsite. This determination is based on the lack of guano accumulations and that only individual bats (not groups) were observed emerging from the trees onsite. Instead it is likely that the oak trees within the proposed project site are currently used as overnight roosts by individual bats and not by maternity colonies.

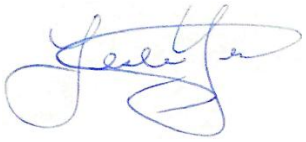
Although the site does not currently support a maternity colony, based on the number and structure of the trees onsite, there is the potential that an active maternity roost(s) may be established in future maternity seasons. As per the CDFW Comment Letter dated August 13, 2015:

> *"To avoid the direct loss of bats that could result from removal of trees and/or structures that may provide maternity roost habitat (e.g., in cavities or under loose bark), the Department recommends tree removal or relocation be scheduled between October 1 and February 28, outside of the maternity roosting season. If trees and/or structures must be removed during the maternity season (March 1 to September 30), a qualified bat specialist should conduct a pre-construction survey to identify those trees and/or structures proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.*
>
> *Each tree and/or structure identified as potentially supporting an active maternity roost should be closely inspected by the bat specialist no greater than 7 days prior to tree disturbance to more precisely determine the presence or absence of roosting bats.*
>
> *If bats are not detected, but the bat specialist determines that roosting bats may be present at any time of year, it is preferable to push any tree down using heavy machinery rather than felling it with a chainsaw. In order to ensure the optimum warning for any roosting bats that may still be present, the tree should be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist. Trees that are known to be bat roosts should not be sawn up or mulched immediately. A period of at least 24 hours, and preferably 48 hours, should elapse prior to such operations to allow bats to escape."*

Based on the evidence that individual bats are currently roosting onsite, that suitable habitat exists that may support a maternity colony in the future, and the conditions within the CDFW Comment Letter, Rincon recommends that tree disturbance (e.g., trimming, removal) activities occur October 1st to February 28th. Should project activities require tree disturbances outside the preferred time of year, a qualified biologist should conduct a pre-construction survey no more than seven days prior to the tree disturbance activities. Trees should be removed in accordance to the above CDFW guidelines and applicable local guidelines, and in the presences of a biologist with bat expertise.

Thank you for selecting Rincon Consultants for this important project. If you have any questions about the surveys or report, please contact Leslie Yen at 760/918-9444 ext. 204.

Sincerely,
RINCON CONSULTANTS, INC.



Leslie Yen
Biologist

John F. Dreher
Vice President

Photo 1. Location of high potential bat habitat. Central canyon, view from west looking east.

Photo 2. Northern side of site, view from central portion looking north. Very low potential habitat.

Photo 3. Southern portion, view from central portion looking south. Very low potential habitat.

Photo 4. Mouth of central canyon, view from west, facing east. Highest potential habitat onsite.

Appendix D

Geotechnical Studies

Civil Engineering

Land Planning

Hydrology/Flood Control

Geotechnical Engineering

Geology/Seismic Hazards

Public Works Services

Storm Water Management

RJR ENGINEERING

3500 Camino Avenue, Suite 200
Oxnard, California 93030
p: 805.485.3935
f: 805.485.6496

Malibu p: 310.456.9085
San Luis Obispo p: 805.596.0216
Sacramento p: 530.888.7356

www.rjreng.com

ADDENDUM 8 – EASTERN RETAINING WALL AT COMMERCIAL SITE GEOTECHNICAL STUDIES – ENVIRONMENTAL IMPACT REPORT TECHNICAL ASSESSMETN AND TENTATIVE MAP SUBMITTAL VESTING TENTATIVE TRACT 71546 – CANYON OAKS DEVELOPMENT 69 LOT RESIDENTIAL DEVELOPMENT AND COMMERICAL SITE EAST OF THE INTERSECTION OF AGOURA ROAD AND LAS VIRGENES ROAD CITY OF CALABASAS, CALIFORNIA

Prepared For:

THE NEW HOME COMPANY
29219 Canwood St., Suite 107
Agoura Hills, CA 91301

Attention: *Mr. Rick Bianchi, Vice President and Regional Manager*

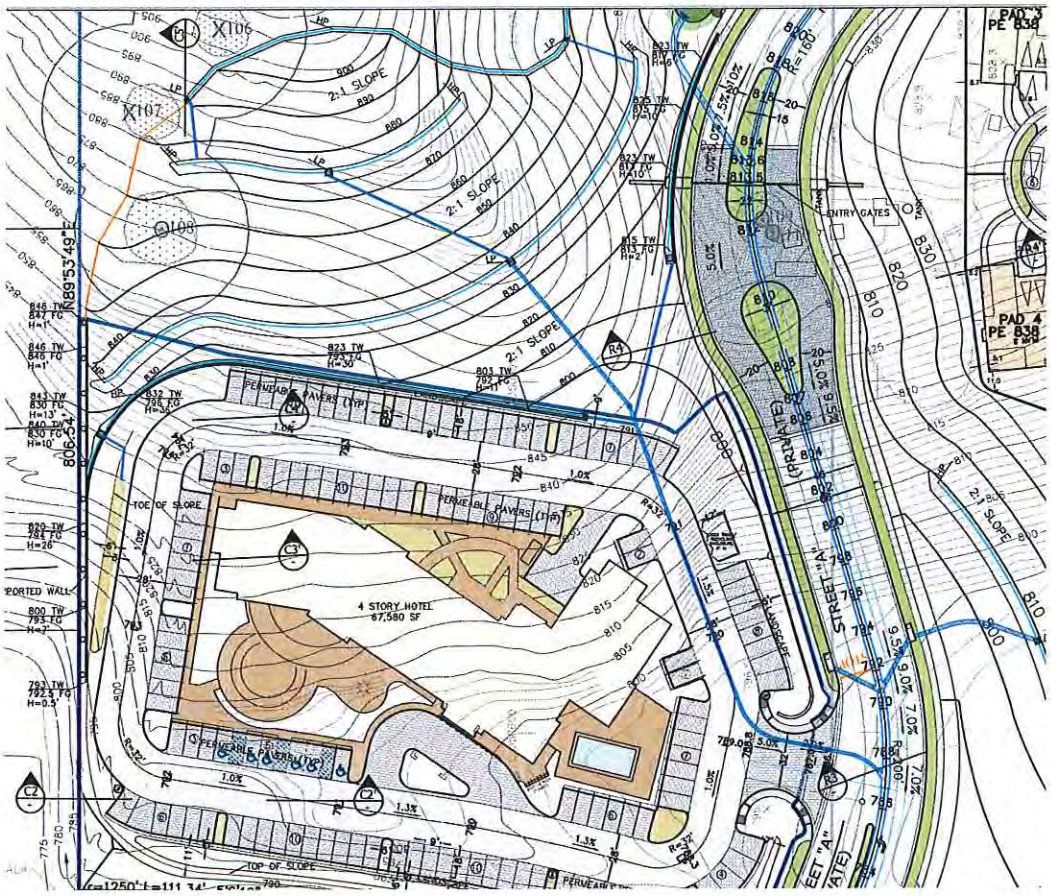
THE NEW HOME COMPANY

Submittal: March 26, 2015

Proposal: 1344TNHC.14-14

The proposed rear slope now considers the use of a vertical wall that ranges in height that typically is on the order of 10 to 15 feet and ranges up to 30 feet, with a 2:1 (horizontal to vertical) maximum, cut slope as illustrated in Figure 1.

Figure 1: Conceptual Site Plan at Rear Commercial Site



The proposed vertical cantilever retaining wall is a different system, but will be designed and constructed to provide the same lateral adjacent support as the previous segmented retaining wall.

The proposed vertical wall will be designed to withstand the necessary active earth pressure for the proposed slope, as well as, any creep forces, additional slope surcharges, and seismic loading. It is anticipated that the wall system will be a shallow (since the piles are into bedrock) pile system that will be required to provide the necessary global stability. Given the global analysis performed (Stability 21 and 22 in the RJR January 2015 report, larger scale failure surfaces will not be encountered, especially with the slope being reduced in inclination to a 2:1. However, a detailed analysis will be required.

The proposed cut slope will encounter bedrock. As recommended in the geotechnical report, if local conditions are encountered that are deemed unfavorable during

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construction, a stability fill will be constructed. The use of geogrid could also be implemented as necessary to assist with local stability.

The proposed retaining wall will be constructed with an additional freeboard and a drainage v-ditch of sufficient capacity to intercept excess debris, for a localized event.

The detailed analysis for this system will be performed during construction plan (CD) phase where geotechnical and structural calculations will be performed.

Based on the above design criteria, and based on the studies performed by RJR to date, the proposed vertical cantilever retaining wall and eastern slope design is feasible from civil and geotechnical engineering standpoint. The proposed improvements will not adversely affect the site or surrounding areas, and in fact will improve the overall condition.

Detailed 40-scale plans will be prepared at Rough Grade / Construction Document stage. Once these plans are prepared and reviewed, any necessary additional geologic and geotechnical study will be performed and results submitted with the 40-scale plans for that phase.

Should you have questions regarding this project or if we may be of any further assistance, please contact our office. We look forward to providing continued service.

Sincerely:

RJR ENGINEERING GROUP

Robert W. Anderson, N.S.P.E., R.C.E., Juris Doctorate
Principal Civil Engineer - RCE 58383 (CA)

Arizona RCE 51923
Hawaii RCE 14230
Nevada RCE 22968
Washington PE 47559
Oregon RCE 84690
South Dakota PE11546
North Dakota PE 8252
Colorado PE 44734
New York PE 92272

Certified CPESC #6840
California Certified QSP/QSD #21902 &
Trainer of Record (ToR)
Certified CISEC #1137

Certified CESSWI #3270
Certified CPSWQ #0920
Certified CMS4S #0223

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Attachments:

Appendix A: Updated Site Plan
Appendix B: 80-Scale Site Plan of Commercial Site
Cross Section thru Eastern Slope

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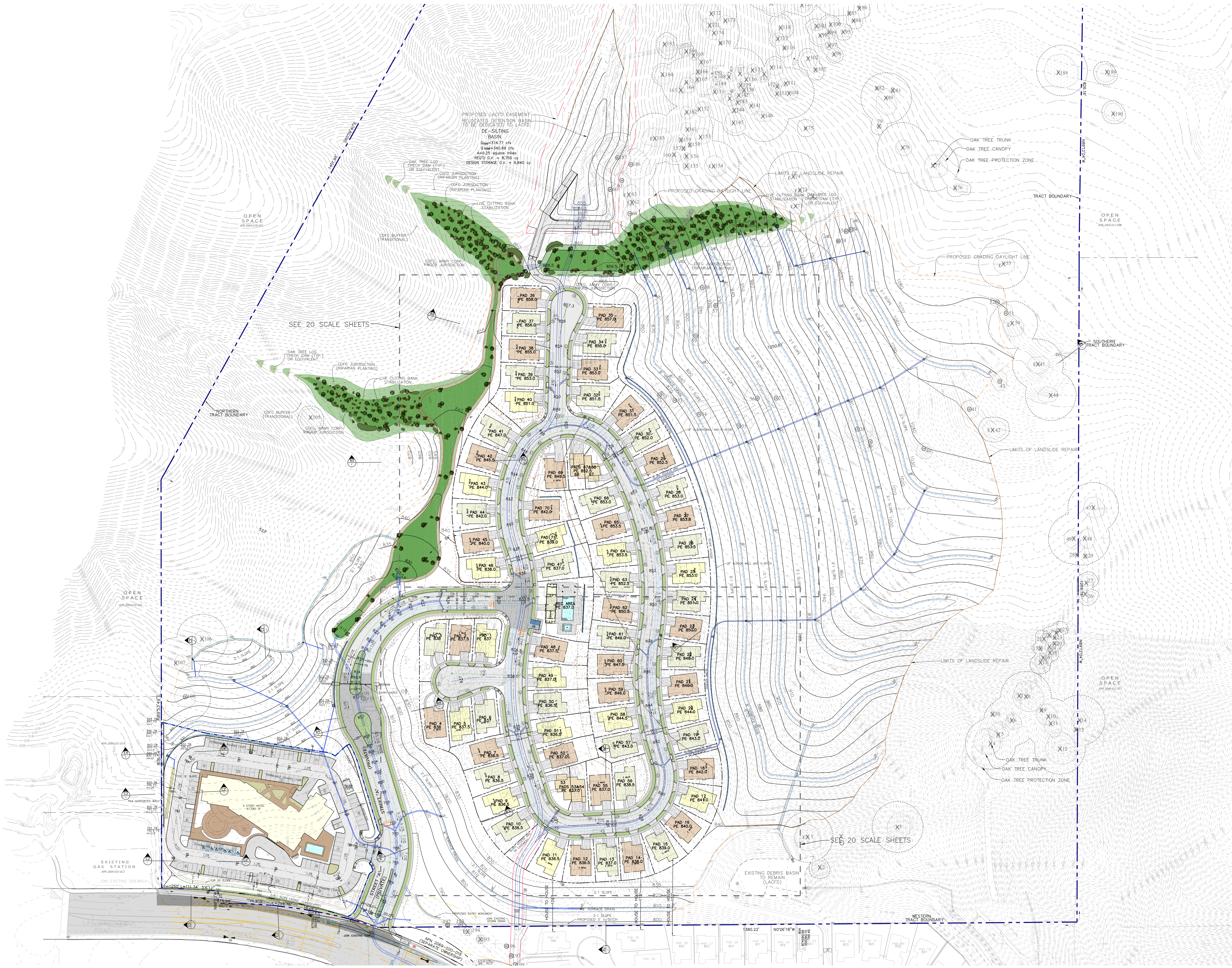
APPENDIX A
Updated Site Plan



LEGEND

- TRACT BOUNDARY
- UNIT BOUNDARY
- STORM DRAIN EASEMENT
- EXISTING WATER LINE
- EXISTING SEWER LINE
- PROPOSED WATER LINE
- PROPOSED RECLAIMED WATER LINE
- PROPOSED SEWER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED LANE STRIPPING
- PROPOSED TOP AND TOE OF SLOPE
- PROPOSED DRY UTILITY TRENCH
- PROPOSED LANE STRIPPING
- PROPOSED 3/4:1 SLOPE FACING
- PROPOSED TERRACE DRAIN FLOW LINE
- PROPOSED PRIVACY WALL
- PROPOSED COMBO WALL BLOCK/WROUGHT IRON
- PROPOSED RETAINING WALL

GRAPHIC SCALE

0 30 60 120 180

1" = 60'

VESTING TENTATIVE SITE PLAN

TENT. TRACT 71546

PARCELS 2069-078-009 & 2069-078-011

4790 LAS VIRGENES ROAD

COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology

Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030

(805) 485-3935 (805) 485-6496 FAX

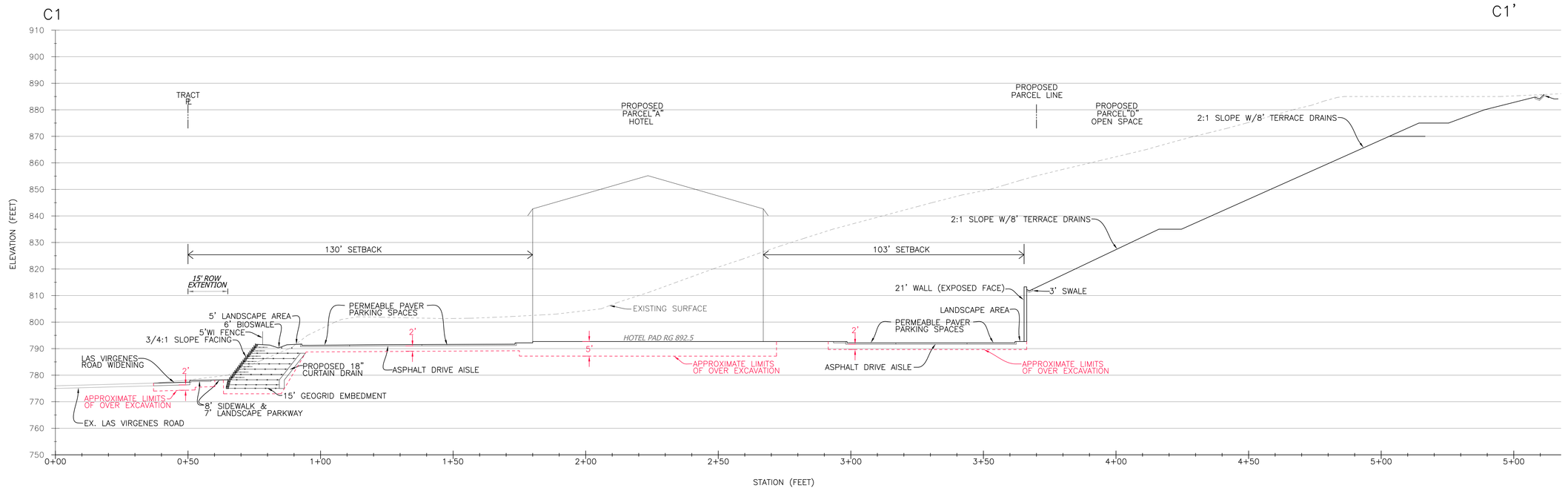
890 Osos Street, Suite A. San Luis Obispo, CA 93401

(805) 596-0216 (805) 596-0256 FAX

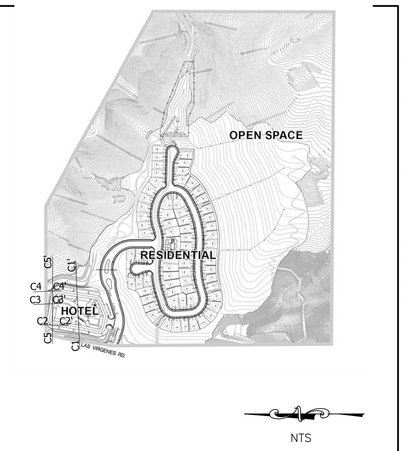
E-mail: rjr@rjreng.com

APPENDIX B

Commercial Site Cross Section thru Eastern Slope



SECTION C1–C1'
SCALE: 1" = 20'



NTS

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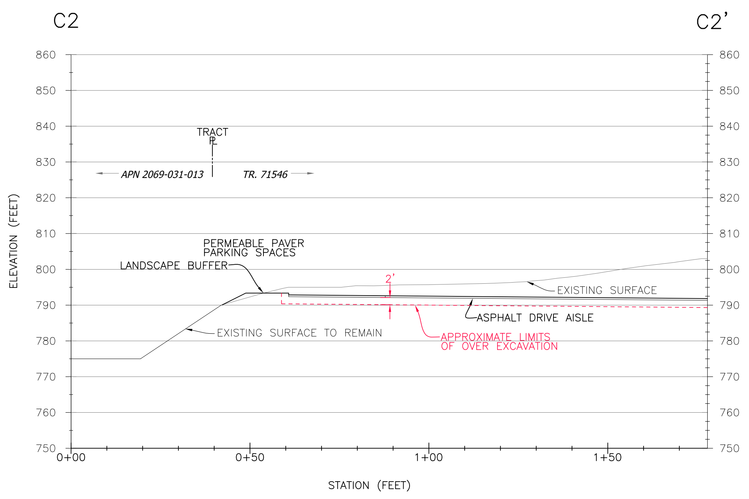
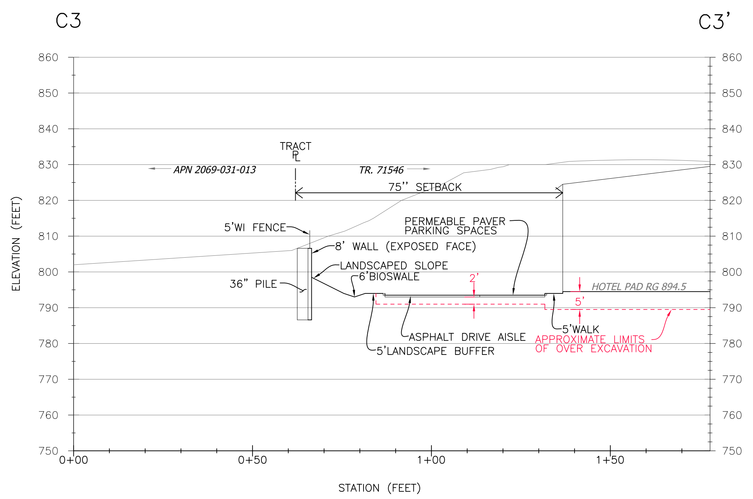
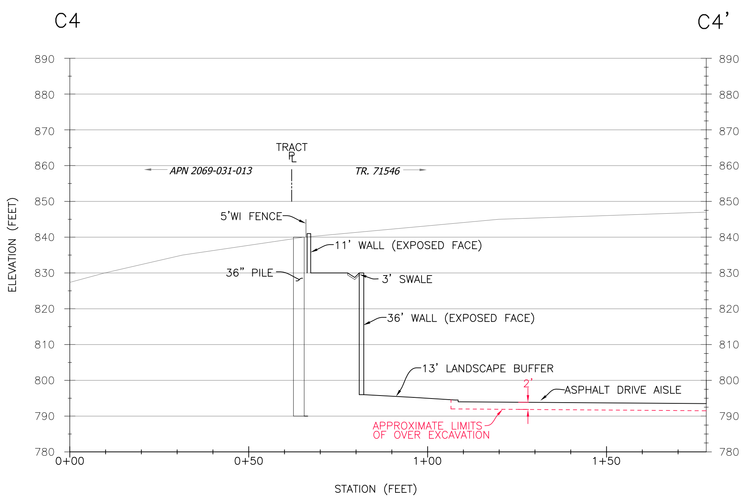


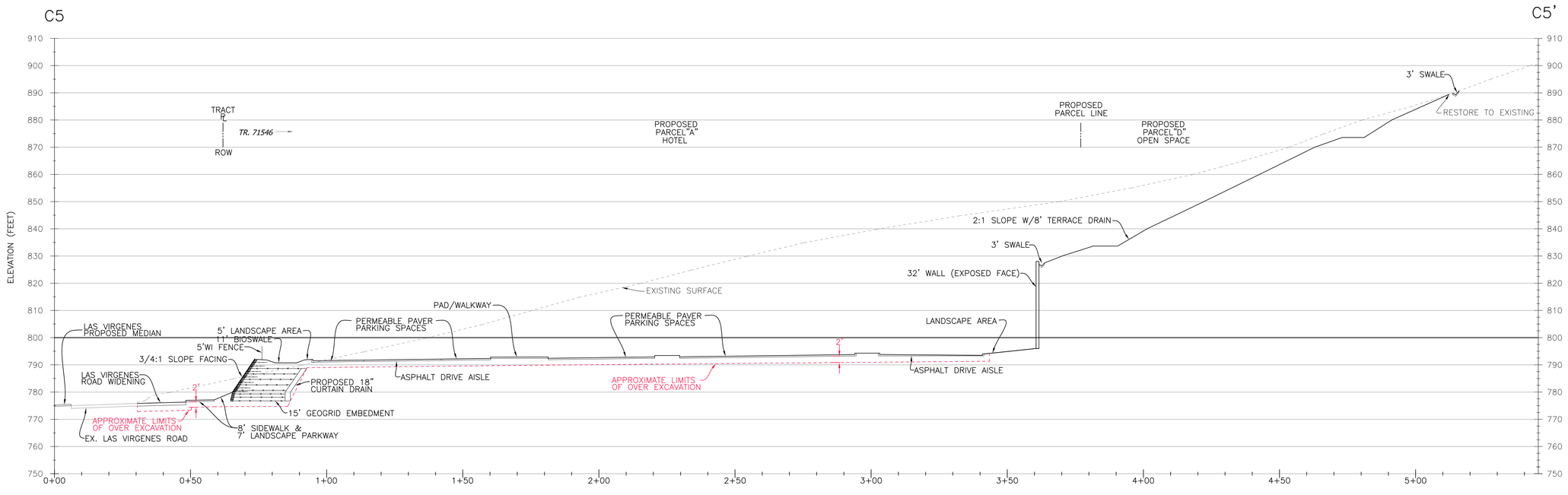
SECTION C2–C2'
SCALE: 1" = 20'



SECTION C3–C3'
SCALE: 1" = 20'



SECTION C4–C4'
SCALE: 1" = 20'



SECTION C5–C5'
SCALE: 1" = 20'

STATUS PLOT 7-15-13

TENTATIVE TRACT MAP 71546
COMMERCIAL LOT CROSS SECTIONS
CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

PREPARED BY:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6486 FAX
Los Angeles (Diagonal) 485-3935
(805) 596-0213 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7356 (310) 456-9085
E-mail: rjr@rjreng.com

Civil Engineering

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Geology/Seismic Hazards

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Storm Water Management

RJR ENGINEERING

3500 Camino Avenue, Suite 200
Oxnard, California 93030
p: 805.485.3935
f: 805.485.6496

Malibu p: 310.456.9085
San Luis Obispo p: 805.596.0216
Sacramento p: 530.888.7356

www.rjreng.com

ADDENDUM 7 & UPDATED GEOTECHNICAL FEASIBILITY STUDIES ENVIRONMENTAL IMPACT GEOTECHNICAL ASSESSMENT AND TENTATIVE TRACT SUBMITTAL VESTING TENTATIVE TRACT 71546 – CANYON OAKS DEVELOPMENT 69 LOT RESIDENTIAL DEVELOPMENT AND COMMERCIAL SITE EAST OF THE INTERSECTION OF AGOURA ROAD AND LAS VIRGENES ROAD CITY OF CALABASAS, CALIFORNIA

Prepared For:

THE NEW HOME COMPANY
29219 Canwood St., Suite 107
Agoura Hills, CA 91301

Attention: Mr. Rick Bianchi, Vice President and Regional Manager

THE NEW HOME COMPANY

Submittal: January 15, 2015

Proposal: 1344TNHC.14-14

Land Development & Planning
Storm Water Management & Engineering
Hydrology/ Flood Control
Soil BioEngineering & Stream Restoration
Airport Engineering Design & Support
Public Agency/ Municipality Consultant

January 15, 2015
Project No. 1344.12

THE NEW HOME COMPANY
29219 Canwood St., Suite 107
Agoura Hills, CA 91301

Attention: Mr. Rick Bianchi, Vice President & Regional Manager

Subject: **ADDENDUM LETTER #7**
GEOTECHNICAL STUDIES - ENVIRONMENTAL IMPACT REPORT TECHNICAL ASSESSMENT AND TENTATIVE MAP SUBMITTAL

Project: **TRACT 71546 - CANYON OAKS DEVELOPMENT**
LAS VIRGENES ROAD & AGOURA ROAD
CITY OF CALABASAS, CALIFORNIA

Dear Mr. Bianchi:

RJR Engineering Group (RJR) is pleased to submit this addendum letter for the geotechnical studies for Tract 71546. This letter addresses the City of Calabasas comments, presented in Willdan's Review Letter, dated December 12, 2014. These comments are based on Willdan's review of the report entitled: "Addendum Letter #6 and Update Geotechnical Studies- Environmental Impact Report Technical Assessment and Tentative Map Submittal, Tract 71546- Canyon Oaks Development, 69 Lot Residential Development and Commercial Development, Las Virgenes Road & Agoura Road, City of Calabasas, California, Volumes 1 and 2", Prepared by RJR Engineering, Dated November 10, 2014, Project No. 1344.12

A copy of the City review letter is included in Appendix A. RJR has also made text and other edits in the geotechnical report, and resubmitted a new copy.

We would like to thanks the Reviewers for their comments and this letter should provide the additional information requested, or presents a response that the information will be provided in a subsequent Rough Grade report.

Comment 1. Appendix A, Satellite Image, please identify the site area.

Response 1: The Plate has been revised.

Comment 2. Appendix A -Geologic & Geotechnical Plan. The map shows numerals within a symbol adjacent to some borings. Please clarify the numbers and add to the Legend.

Response 2: The depth to bedrock symbol was added.

Comment 3. Appendix A –Geologic & Geotechnical Plan, two apparent cross section lines (1-1' and 2-2') are marked on the geologic map but no cross sections matching those locations are included in the report. Please clarify.

Response 3: The Reviewer is correct, the section was updated and added in the Geotechnical Stability Appendix. The Cross Sections have been included in Appendix B of the updated report, dated January 15, 2015.

Comment 4. Appendix A - Geologic & Geotechnical Plan, Please show any buried landslide contact at the eastern toe of the landslide mass.

Response 4: The contact has been estimated and added. It should be noted again, that the contact more likely than not does not exist where shown because the landslide debris was eroded away by intermittent streams flows.

Comment 5. Appendix A- Geologic & Geotechnical Plan and Cross Sections, please add the orientation to each cross section and/or identify the "prime" end of the sections on the map.

Response 5: The existing map and sections do have a "prime" at the designated end to provide orientation for the reader.

Comment 6. The following borings and trench logs are included in Appendix B but are not apparent on the Geologic & Geotechnical Plan; B-2, B-7, B-8, CH-1, B-107, B-109, GT-1 through GT-7. Please clarify.

Response 6: We have attached an exhibit that was included in the submittal for review, but is not a part of this addendum letter. All of these were located on the map on the previous submittal. We have revise some of the labels in an effort to improve clarity.

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Comment 7. The following borings were identified on the Geologic & Geotechnical Plan but the logs were not located in the report; HD-1 through HD-4 and DB-1. Please clarify.

Response 7: The borings logs have been added to Appendix B.

Comment 8. Page 20, Section 3.4.2, the text refers to B-2 and B-8 having depth to groundwater at 38 feet. These borings could not be identified on the Geologic & Geotechnical Plan. Appendix B contains a log for boring B-8 indicating groundwater at a depth of 42 feet. Please clarify.

Response 8: The Reviewers comment appears to be an old comment. The text on Page 20 thru 21 reads as follows:

> *Groundwater seeps and groundwater should be anticipated to be associated with the bedrock surface (platform) at the bottom of the tributary canyons. Groundwater was encountered in the southern canyon at an approximate depth of 40 feet (Boring B-2 @ 38 Ft., B-8 @ 42 Ft.). Groundwater was encountered at a depth of 35 feet in the north side of the main east-west canyon during 1993 (Boring PSE-12).*
>
> *Groundwater was encountered during rough grading of Tract 53534 in July 2003 at a depth of 38 feet below ground surface; however, this was in the sixth (6th) consecutive year of below average rainfall.*
>
> *Recent borings and test pits performed in summer, 2011 encountered seeps in at depths between 48 and 75 while no seeps or groundwater was encountered in other borings to depths of 90 feet. The location of the seep is illustrated on the revised Geologic Map (Appendix B).*

The reference Borings and depth to groundwater are indicated on Borings and the right hand corner of the Geology and Geotechnical Map (Appendix B).

Comment 9. Provide a statement that the proposed development will not be adversely impacted by hazards associated with landslide, settlement, or slippage, and based on the study and evaluation conducted, the proposed development and grading will not adversely impact the area outside of the proposed development.

Response 9: This statement was added in a prior addendum. The following statement was located at the bottom of Page 73 of the report:

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Based upon the available data, from our review, investigation and analysis, the subject residential tract and associated improvements are feasible from a geologic and geotechnical engineering standpoint. The site will be free of landslides, minor slippage and settlement within the guidelines and limitations described in this report. In addition, the proposed development and grading will not adversely impact the stability of the surrounding areas outside of the proposed development.

If additional statements or wording is required, we will revise accordingly.

Comment 10. Slope stability analyses provided in the appendices are very confusing and unorganized. Need dividers, explanations, and a table summarizing all the results.

Response 10: Appendix D provided sequential runs that were labeled and separated with colored dividers. As requested, RJR has added dividers. RJR has also compiled the following table that is in the report on Page 62 and 63:

Table 1: Slope Stability Analysis (Table 9 in the report)

Analysis No.	Section	Condition	Analysis	Limits (Uncorrected) Initiation		Termination		Factor of Safety	Comments
Appendix D									
1	1b-1b'	Circular	Static	0	200	300	670	1.391	Detention Basin Northern Slope
2	1b-1b'	Circular	Pseudo	0	200	300	670	1.078	Detention Basin Northern Slope
3	1b-1b'	Specific Surface	Newmark's	-	-	-	-	-	0.352 Permanent Displacement; Yield = 0.1532 (%g)
4	1a'-1a'	Circular	Static	0	200	300	982	1.513	Detention Basin Southern Slope
5	1a'-1a'	Circular	Pseudo	0	200	300	982	1.155	Detention Basin Southern Slope
6	2'-2'	Circular	Static	140	200	400	1000	1.758	Northside Natural Slope
7	2'-2	Circular	Pseudo	140	200	400	1000	1.310	Northside Natural Slope
8	3-3'	Circular	Static	120	200	300	920	1.623	Northside Western Most Natural Slope
9	3-3'	Circular	Pseudo	120	200	300	920	1.231	Northside Western Most Natural Slope
10	G1-G1'	Circular	Static	1100	1600	1800	2300	1.844	Global – Southern Buttress Slope
11	G1-G1'	Circular	Pseudo	1100	1600	1800	2300	1.181	Global – Southern Buttress Slope
12	G1-G1'	Circular	Static	1300	1766	1800	2300	1.913	Upper Slope – Southern Buttress Slope
13	G1-G1'	Circular	Pseudo	1300	1766	1800	2300	1.163	Upper Slope – Southern Buttress Slope
14	G2-G2'	Circular	Static	579	900	1251	2145	2.546	Global – Southern Buttress Slope

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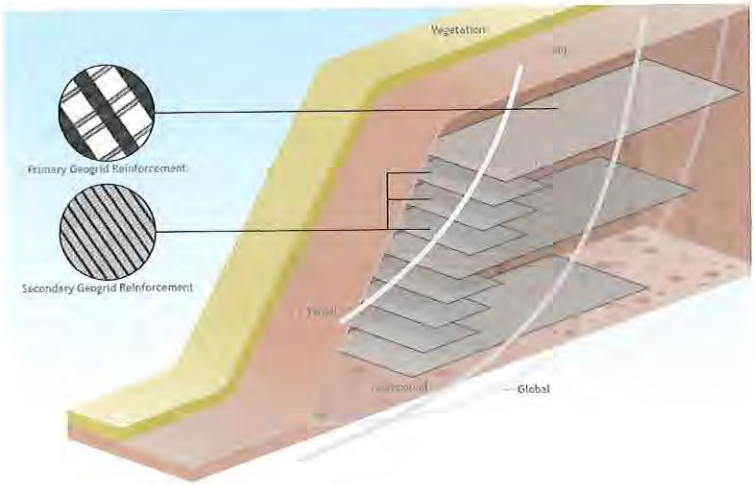
15	G2-G2'	Circular	Pseudo	579	900		1251	2145	1.620	Global – Southern Buttress Slope
16	G2-G2'	Circular	Static	969	1247		1541	2040	3.582	Upper Slope – Southern Buttress Slope
17	G2-G2'	Circular	Pseudo	969	1247		1541	2040	1.851	Upper Slope – Southern Buttress Slope
18	GAA-GAA'	Circular	Static	744	775		850	1100	1.261	Lower Local Slope - Static
19	GAA-GAA'	Circular	Static	Spec. Surface			Spec. Surface		2.037	Upper Local Slope – Landslide - Static
Appendix I										
20	SS-SS'	Circular	Pseudo	65	67		90	120	2.298	Front Commercial Slope Seg Facing - Adj to Las Virgenes Road
21	SS-SS'	Circular	Static	383	420		445	545	1.748	Rear Commercial Seg Facing – Behind
22	SS-SS'	Circular	Pseudo	383	420		445	545	1.362	Rear Commercial Slope Seg Facing – Behind Building

Comment 11. Very steep and relatively high segmental walls are proposed. In addition to global stability, an internal and external stability analysis should be provided on a typical high wall to demonstrate its feasibility.

Response 11. The current design is a reinforced slope that uses a modified version of the classic limit equilibrium slope stability. A circular potential failure surface is analyzed to assess factors of safety. Reinforcement layers intersecting the potential failure surface are assumed to increase the resisting moment or force.

These systems use recognized technology that has been evaluated and accepted by major agencies, including the Federal Highway Administration, US Army Corps of Engineers, and other state and government agencies as well as international acceptance. MSE systems are simply defined as soil structures comprised of multiple layers of inclusions (geogrid) that act as reinforcement in soil placed fill.

Figure 1: Segmented Slope Facing System



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The technical analysis and methodologies are well established in the literature. The analysis generally consists of three distinct analysis, Global, Compound, and Surficial. RJR has presented the Global and initial Compound analysis to assess the geogrid embedment. Internal stability, which addresses grids, connections, etc., are typically performed during the design phases.

The second question we understand the Reviewer is about the conventionality of the proposed design. The proposed design is a 37 foot high 1/4 :1 slope facing, with an ascending 10 foot high 2:1 (horizontal to vertical) slope with a 30 foot high, ¾:1 slope facing, as demonstrated below.

Figure 2: Conceptual Site Plan at Rear Commercial Site

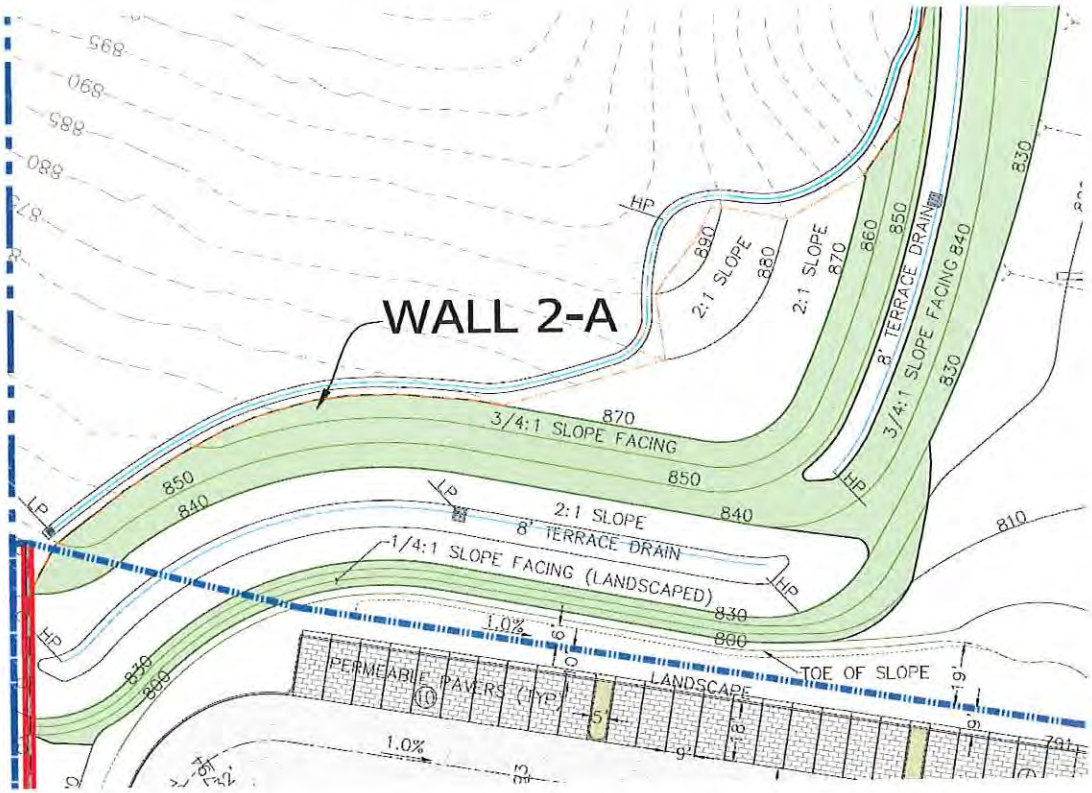

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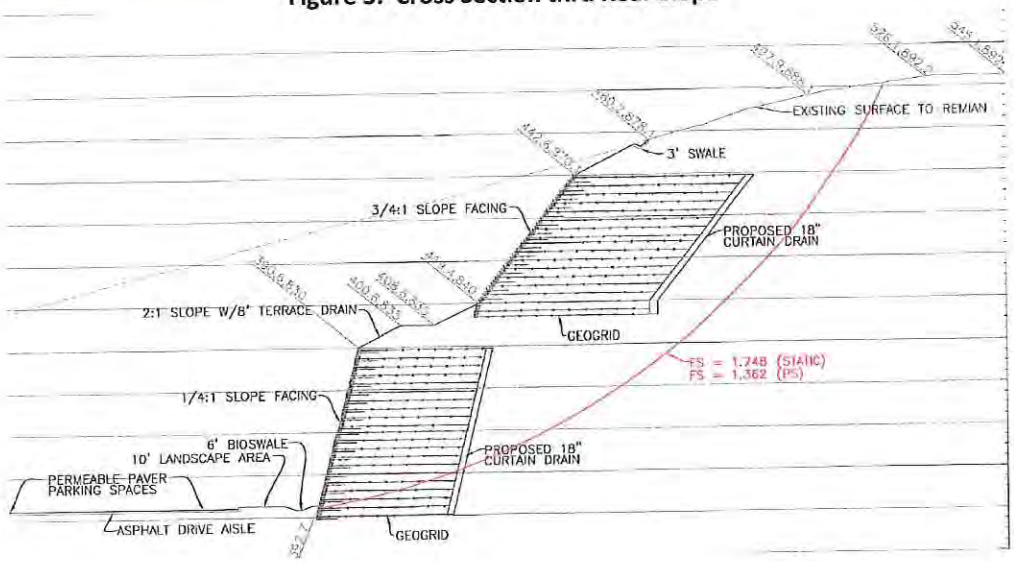
Figure 3: Cross Section thru Rear Slope



Such systems can be designed at heights that are well over 100 feet. The vertical retaining walls can exceed 50 feet. Slope facing, since the segments and geogrid reinforce the slope can be several hundred feet in height.

RJR has designed an integrated system where the lower 37 foot high wall is inclined at 75 degrees (approx.) with an upper 30 foot high slope facing system. While complicated and sophisticated, the system has a certain elegance and is well within the standard of construction practice. RJR has designed and constructed dozens of these systems throughout Southern California, including 100 foot high walls in Los Angeles. Several of the wall and block manufacturers provide ready examples on their websites.

RJR solicited a review from Dean Sandri, PE. Mr. Sandri has previously worked for Mirafi and Soil Retention/Vedura Block, and is an established and recognized expert in the geogrid and segmented wall field. A copy of his letter and corresponding information is included in Appendix B of this report.

Note from Reviewers: It is our understanding and per the report reviewed additional detail geologic and geotechnical study will be performed for future phases of the project as 100-scale and 40-scale plans are prepared.

Response: Detailed 40-scale plans will be prepared at Rough Grade / Construction Document stage. Once these plans are prepared and reviewed, any necessary additional geologic and geotechnical study will be performed and results submitted with the 40-scale plans for that phase.

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Should you have questions regarding this project or if we may be of any further assistance, please contact our office. We look forward to providing continued service.

Sincerely:

RJR ENGINEERING GROUP

Robert W. Anderson, N.S.P.E., R.C.E., Juris Doctorate
Principal Civil Engineer - RCE 58383 (CA)

Arizona RCE 51923
Hawaii RCE 14230
Nevada RCE 22968

Washington PE 47559
Oregon RCE 84690

South Dakota PE11546
North Dakota PE 8252

Colorado PE 44734
New York PE 92272

Certified CPESC #6840
California Certified QSP/QSD #21902 &
Trainer of Record (ToR)
Certified CISEC #1137

Certified CESSWI #3270
Certified CPSWQ #0920
Certified CMS4S #0223

James O'Tousa, MS, PG, CEG, CPESC
Principal - CEG 1393, QSP/QSD 00490, CPESC 7927

Attachments:

Appendix A: Willdan Review letter
Appendix B: Anchor Wall Assessment Letter

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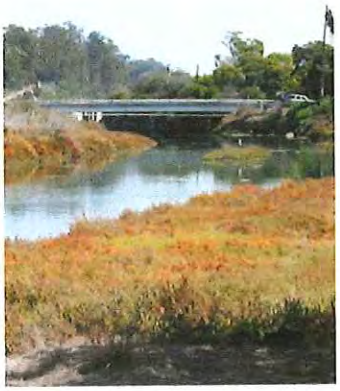

Section A

Willdan Review Letter

WILLDAN Geotechnical | extending your reach

December 12, 2014
Willdan Geotechnical Project No. 100498-1039

CITY OF CALABASAS -DEPARTMENT OF COMMUNITY DEVELOPMENT
ENGINEERING GEOLOGY AND GEOTECHNICAL ENGINEERING REVIEW

Submitted to: Mrs. Tatiana Holden, City of Calabasas

Project Location: Tract 71546 (Canyon Oaks Development)
4790 Las Vigenes Road
Calabasas, Califomia

Geotechnical Reports;

1) "Addendum Letter #6 and Update Geotechnical Studies- Environmental Impact Report Technical Assessment and Tentative Map Submittal, Tract 71546-Canyon Oaks Development, 69 Lot Residential Development and Commercial Development, Las Virgenes Road & Agoura Road, City of Calabasas, California, Volumes 1 and 2", Prepared by RJR Engineering, Dated November 10, 2014, Project No. 1344.12 *(Received by Willdan Geotechnical via e-mail on December 11, 2014)*

2) "Addendum Letter #4 and Updated Geotechnical Feasibility Studies, Environmental Impact Geotechnical Assessment and Tentative Tract Submittal, Vesting Tentative Tract 71546 – Canyon Oaks Development, East of the Intersection of Agoura Road and Las Virgenes Road, City of Calabasas, California, Volumes 1 and 2", Prepared by RJR Engineering, Dated February 14, 2014, Project No. 1344.12

Review Status: The Geotechnical Feasibility Report is not approved. The approval of the report is subject to addressing following comments:

COMMENTS

Our review of the above references/Reports indicates that the proposed development is in general considered to be feasible from geotechnical view point provided satisfact01y responses are provided to following comments:

1. Appendix A, Satellite Image, please identify the site area.

2. Appendix A -Geologic & Geotechnical Plan. The map shows numerals within a symbol adjacent to some borings. Please clarify the numbers and add to the Legend.

3. Appendix A –Geologic & Geotechnical Plan, two apparent cross section lines (1-1' and 2-2') are marked on the geologic map but no cross sections matching those locations are included in the report. Please clarify.

4. Appendix A-Geologic & Geotechnical Plan, Please show any buried landslide contact at the eastern toe of the landslide mass.

5. Appendix A-Geologic & Geotechnical Plan and Cross Sections, please add the orientation to each cross section and/or identify the "prime" end of the sections on the map.

6. The following borings and trench logs are included in Appendix B but are not apparent on the Geologic & Geotechnical Plan; B-2, B-7, B-8, CH-1, B-107, B-109, GT-1 through GT-7. Please clarify.

7. The following borings were identified on the Geologic & Geotechnical Plan but the logs were not located in the report; HD-1 through HD-4 and DB-1. Please clarify.

8. Page 20, Section 3.4.2, the text refers to B-2 and B-8 having depth to groundwater at 38 feet. These borings could not be identified on the Geologic & Geotechnical Plan. Appendix B contains a log for boring B-8 indicating groundwater at a depth of 42 feet. Please clarify

9. Provide a statement that the proposed development will not be adversely impacted by hazards associated with landslide, settlement, or slippage, and based on the study and evaluation conducted, the proposed development and grading will not adversely impact the area outside of the proposed development.

10. Slope stability analyses provided in the appendices are very confusing and unorganized. Need dividers, explanations, and a table summarizing all the results.

11. Very steep and relatively high segmental walls are proposed. In addition to global stability, an internal and external stability analysis should be provided on a typical high wall to demonstrate its feasibility.

It is our understanding and per the report reviewed additional detail geologic and geotechnical study will be performed for future phases of the project as 100-scale and 40-scale plans are prepared.

This review was performed in accordance with generally accepted professional geotechnical engineering principles and practice in Southern California at this time. We make no other warranty, either express or implied. Conclusions presented herein are based on review of work by others. No field exploration or laboratory testing was performed.

Please contact us if you have questions.

Respectfully submitted,
WILLDAN GEOTECHNICAL

Ross Khiabani, PE, GE
Director of Geotechnical Services
C 37156, GE 2202

Distribution: Addressee
Roxanne Hughes, Willdan engineering

Section B

Dean Sandri, Anchor Walls Letter

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Wednesday, January 14, 2015

Rob Anderson
RJR Engineering Group
3500 Camino Ave - Ste 200
Oxnard, CA 93030
Ph: 805-485-3935
randerson@rjreng.com

Subject: Review proposed slope system, Canyon Oaks, Calabasas, CA

Dear Rob:

The purpose of this letter is to comment on the proposed slopes for the above referenced project. In review of the slopes and walls that are being proposed at the Canyon Oaks Site in the City of Calabasas, several examples of tall walls have been provided for your review. While no scenarios have been presented that are EXACTLY like what is being proposed at the Canyon Oaks site (35 ft tall 1/4:1 structure with a set back and then a 30 ft tall 3/4:1 slope above), several references are provided where 45 - 50+ ft high walls and 100 – 242 ft high reinforced soil slopes have been used to manage grade transitions. While the proposed slope configuration is a bit complicated relative to design and construction, the proposed system is feasible and not uncommon or problematic relative to the state of the practice for geotechnical or geosynthetics engineering.

The design procedure employed would most appropriately be conducted as a limit equilibrium (LE) analysis method. Practitioners often utilize LE methods to analyze terraced systems having several walls or slope/wall systems having complex geometries. In the case at hand, there is actually one tall, highly battered wall (1/4:1) with a slope above. This procedure is a very appropriate analytical tool for analyzing the global structure for stability. It should be noted that both the FHWA and NCMA have contracts currently out for development of such limit equilibrium analysis procedures for structures having face batters steeper than 70 degrees.

In an effort to provide some 'case histories' on similar projects, a few examples of tall walls and slopes have been included in the following table and attached herein. The attached is NOT a comprehensive list.

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Project	Location	Reference
Prado Dam – 110 ft high reinforced soil slope	71 Fwy, just north of 91 at Orange County/Riverside County line	No case history available. Reinforced slope constructed as part of realignment of 71 fwy along the backwaters of the Prado Dam
SEA TAC Airport Runway Extension using 120 ft high terraced MSE walls	SEA TAC Airport	120 ft high terrace MSE wall constructed as part of the SEA TAC runway expansion
Subgrade Stress Relief Wall, Minneapolis Convention Center using 13m high SRW	Minneapolis, MN	See attached case history and Geosynthetics paper.
Hogback Parking Area using 47 ft high SRW's	Denver Co	See attached articles (2)
49 ft high plantable wall system using marginal soil along Antonio Parkway in Ladera CA	Ladera CA	See attached reference paper from ASCE GeoDenver 2000.
Lowes Store, Massachusetts – 72 ft high SRW	Massachusetts	Reference available upon request
Lexington SC Project uses 48 ft tall walls	Lexington SC	See attached case history
Korea Cultural Center – 13.4 m high segmental block faced steepened slope	Tae Back City, Korea	See attached case history
Word of Faith Ministries 61 ft tall Landmark faced Land Bridge	Powder Springs, GA	See attached case history
Thurgood Middle School, San Diego, CA – 45 ft tall wall	San Diego, CA	See attached case history
242 ft high 1:1 reinforced soil slope – Yeager Airport	Charleston, WV	See paper from GeoFlorida 2010

I trust that the above review and comments/case histories have demonstrated that the proposed sloping system is very doable and not new or unique to the geosynthetics industry. If you have any question on any of the above, please feel free to give me a call.

Sincerely,

Dean Sandri, P.E.
Engineer

Anchor Wall Systems, Inc.
2525 Costero Magestuoso
San Clemente, CA 92673

main 949-363-6663
fax 949-363-6668
cell 949-303-8215

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Landmark
RETAINING WALL SYSTEM

PROJECT PROFILE

PRODUCT
Landmark
retaining wall system

MANUFACTURER
Anchor Block Company
St. Paul, Minnesota

EARTHWORK CONTRACTOR
Veit and Company
Rogers, Minnesota

INSTALLER
Sunram Construction, Inc.
Corcoran, Minnesota

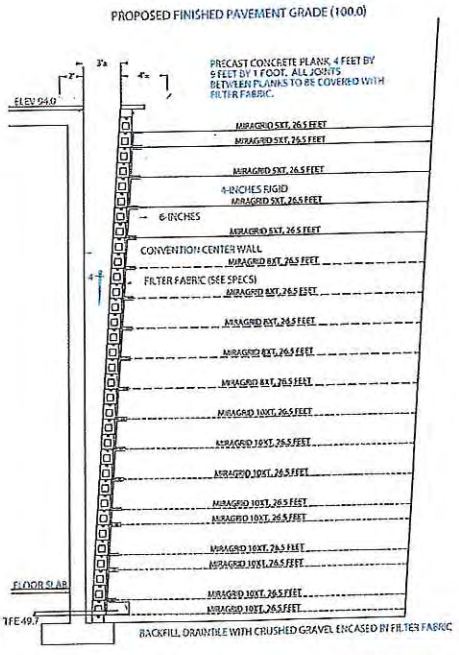
Project site prior to wall construction.

Minneapolis Convention Center MINNEAPOLIS, MINNESOTA

THE CHALLENGE
Find a cost-effective retaining wall that could sufficiently bear the lateral pressure of over 40 feet of soil surrounding the Minneapolis Convention Center's new, below-grade addition.

THE SOLUTION
Design and install a below-ground stress-relief wall featuring the Landmark retaining wall system that would be sturdy enough to support significant earth pressure and surcharge loads.

THE FULL STORY
The Minneapolis Convention Center hosts thousands of visitors each year for a variety of trade shows and events. To meet demand for its facilities, the Convention Center recently added 670,000 square feet of exhibit halls, including a below-grade equipment storage area. A portion of the addition extended 50 feet below the ground, creating a challenging construction predicament. How could the engineers prevent lateral fill loads from being imposed on the new, below-grade structure? A traditional solution would require very thick, labor- and equipment-intensive cast-in-place reinforced concrete walls with large, expensive buttresses. A team consisting of the project manager/estimator of Veit and Company, a TC Mirafi sales representative, an Anchor Wall Systems engineer



EVALUATED BY HITEC IN THE UNITED STATES, RTA IN AUSTRALIA AND BBA IN THE UNITED KINGDOM.

EVALUATED BY HITEC IN THE UNITED STATES, RTA IN AUSTRALIA AND BBA IN THE UNITED KINGDOM.

and an Anchor Block Company architectural representative proposed a far more economical solution: the Landmark retaining wall system. The performance characteristics of the Landmark system made it ideally suited for this type of application. The Landmark system's efficient mechanical connection reduced the required strengths and number of layers of reinforcement.

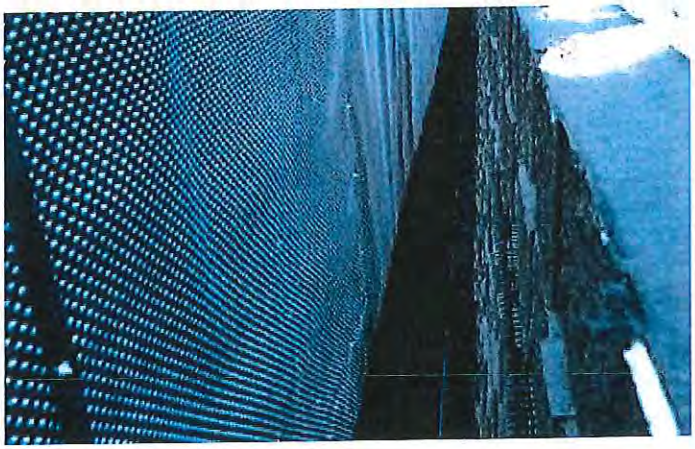
HOW THE LANDMARK RETAINING WALL SYSTEM MADE A DIFFERENCE

First, knowing that the Landmark system would bear the lateral pressure of surrounding loads, the new Convention Center structure featured conventional 1½-foot reinforced concrete walls. The Landmark system, ranging in height from 41 to 44 feet, was built adjacent to the basement walls, extending approximately 175 feet in length. Mirafi geogrid was used to reinforce the soil mass behind the Landmark block face. To ensure that the below-grade building foundation wall was free from lateral soil pressures, an air space was left between the Convention Center wall and the Landmark system. The Landmark system was buried. A precast plank was placed to span the void between the Landmark system and Convention Center walls. Approximately 5 feet of fill and pavement were placed to create a truck loading area and a 100-car parking lot.

This project demonstrates sound engineering principles, making use of current technology in ways that provide more economical solutions.

HITEC-EVALUATED

For high performance under extreme loading conditions, the Landmark retaining wall system is a cost-effective option evaluated by HITEC. The Landmark system features a unique mechanical connection, which allows the system to generate extremely high connection values, independent of blocks above the connection. Developed specifically to meet the high standards of the transportation industry, the performance features of the Landmark system make cost-effective design solutions possible using either the American Association of State Highway and Transportation Officials (AASHTO) or the National Concrete Masonry Association (NCMA) design methodology.



Project site mid-wall construction.

Project site near wall completion.

The mechanical connection of the Landmark retaining wall system.

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Anchor Wall Systems, Inc., 5959 Baker Road, Suite 390, Minnetonka, MN 55345.
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Geosynthetics - 7th ICG - Delmas, Gourc & Girard (eds) © 2002 Swets & Zeitlinger, Lisse ISBN 90 5809 523 1

13 m Stress Relief Modular Wall

J TURGEON-SCHRAMM & J PAULSON, Anchor Wall Systems, Minnetonka, Minnesota, USA

ABSTRACT: A 13.4 m high modular block wall was built facing a 13.4 m below grade structural building wall. An air gap is present between the walls. The below grade wall was part of a 5 story underground building expansion project at the Minneapolis, Minnesota, USA, Convention Center. The purpose of the modular wall was to prevent the soil lateral earth pressure and surcharge loads from being imposed on the below grade building wall. The modular wall was designed using the National Concrete Masonry Association, USA, design method. Slope inclinometers were installed and measured during and after construction as an aid to evaluate the modular wall facing deflection and performance. This paper describes the alternative wall choices evaluated by the general contractor, the unique project constraints, the wall design, construction and instrumentation.

1 INTRODUCTION

Modular retaining walls using geosynthetic reinforcement have been successfully used in numerous structures over the last fifteen years. These structures are generally in areas where a grade separation problem exists on a site with sloping ground. The acceptance of these structures in North America has led to a wider use of geosynthetic reinforced modular retaining walls in applications previously reserved for more traditional soil retaining technologies. The subject of this paper is one such application.

2 SITE DESCRIPTION

The Minneapolis, Minnesota Convention Center recently added 62,200 square meters of exhibit hall and a 5 story below grade building expansion. The below grade building has an access tunnel and is used for cleaning and processing equipment and machinery prior to display. The below grade expansion is located outside the perimeter walls of the above grade portion of the Convention Center. The roof of the below grade building is located from 1 to 1.8 m below the proposed finished grade. Above the below grade building is a paved loading dock and parking area.

The geomorphology of this area generally consists of 8 to 20 m of fine and course alluvial deposits over limestone and sandstone bedrock. The subsurface investigation performed for the structures generally encountered about 1 to 2.5 m of fill overlying alluvial deposits. Most of the alluvium was course grained clean sand. Limestone bedrock was encountered below the alluvium at a depth of 18 to 19.5 m. An exception was encountered in the center portion of the excavation for the modular wall where alluvial deposited lean clay was encountered from about 10 to 14 m below grade. Perched groundwater conditions were present in the area of the clayey soils.

The below grade building addition was in-place at the time of modular wall construction. The below grade building consisted of a 13.4 m high reinforced concrete wall, exposed for a length of 86 m. Perpendicular to one end of the concrete building wall was a driven H-pile wall with grouted tie backs and wood lagging. Perpendicular to the other end of the below grade wall was a reinforced concrete tunnel access wall that extended to about 11 m in height.

3 RETAINING WALL OPTIONS

On-grade paved loading dock and parking areas were proposed above the building addition. Thus, it was necessary to completely bury the below grade building addition. Originally, a reinforced concrete counterfort below grade wall was proposed to accommodate the loads imposed by the lateral earth pressure, overburden fill and traffic surcharge. Preliminary analysis indicated that the wall would have been excessively thick and would have required reinforced concrete buttresses on about 2.5 m centers, extending about 10 m in height. The material and labor cost to construct this option were considered excessive. A second option considered was to construct a geosynthetic reinforced wall with a modified wrap fascia. This wall would be constructed facing the below grade wall with a small air gap between the walls. The facing of this system consisted of the primary reinforcement wrapped up the wall face and then back into the reinforced structure about 2 m. An L shape welded wire cage was proposed to be used to assist in the location and forming of the reinforced wrapped face during construction.

A value engineering proposal was submitted to the project general contractor for a third alternative. This alternative consisted of constructing a geosynthetic reinforced modular block retaining wall. The modular wall would face the below grade wall, with an air gap between the structures. The purpose of the modular wall is to retain the soil and prevent the lateral earth pressure and traffic loads from being imposed on the below grade building wall. To cover the gap between the walls, pre-cast concrete planks were designed to span between the modular wall and the below grade building wall. For many reasons the modular wall option was selected. Factors influencing the selection were relationships, the mechanical connection of the reinforcement products to the modular facing units, the rigidity of the face during and after construction compared to alternative solutions, the wall deflection instrumentation package offered and of course price.

4 MODULAR WALL DESIGN

The modular wall design was performed in accordance with the National Concrete Masonry Association, Design Manual for Segmental Retaining Walls, 1997. The design is based on the site soil and bedrock conditions revealed by the subsurface in-

vestigation. The granular retained soils left in-place were assigned a peak effective stress friction angle of 30 degrees and a moist unit weight of 20.4 kN/m^3. The fine grained alluvial soils were assigned a friction angle of 24 degrees and a moist unit weight of 19.6 kN/m^3. Direct shear tests were performed on the imported fill to be used in the geosynthetic reinforced zone and in the retained soil zone at higher elevations. The friction angle obtained from this testing and used in design for the granular soil, with not more than 12% fines was 35 degrees, with a moist unit weight of 19. 6 kN/m^3.

The geometry of the wall face was obtained from the Convention Center addition foundation plans. The modular wall is founded on a gravel leveling pad place on top of the exterior foundation wall spread footing. Six foundation elevation changes are present along the 54 m length of wall. The modular wall height ranges from 12.4 to 13.4 m. The top of the modular wall and the building wall are at the same elevation. Pre-cast concrete plank were designed to span the 1 m gap between the walls at the top. From 1 to1.8 m of fill was required above the walls and concrete plank to achieve proposed pavement grade. The dead load of the planks, overburden fill and the live load from traffic were taken into account in the wall design. The overall height of the modular wall and overburden fill ranged from 14 to 15.3 m.

The concrete modular wall units are the Anchor Landmark System. The units are 380 mm in height by 200 mm in length by 300 mm in depth. The geosynthetic reinforcement products consisted of various strength TC Mirafi Miragrid, coated polyester geogrids. The index strength of the geogrids ranged from 52 to 121 kN/m. The reinforcement products are mechanically attached to the modular units by an extruded polymer lock bar that is placed into a recessed into the top of the units.

The referenced modular wall design methodology is a working stress method, based on limit equilibrium methods of analysis, with factors of safety applied to the component materials. The design method focuses on stability analysis for external, internal, facing and global modes of failure. Coulomb active earth pressure theory is used to calculate the internal and external forces acting on the system. The minimum reinforcement length required to satisfy bearing capacity and external sliding was the default design minimum of 60% of the wall height or 8.1 m. Global stability analysis was performed. The global stability analysis also uses limit equilibrium methods of analysis to solve for the factor of safety for circular or specified irregular failure surfaces, given the wall geometry, soil conditions, reinforcement layout and strength. The minimum reinforcement length of 8.1 m provided a factor of safety against global stability failure of 1.4. Nineteen layers of geogrid were required to satisfy internal strength, sliding, pullout and facing connection and bulging modes of failure. The maximum vertical spacing of the reinforcement ranged from 380 to 760 mm. A total cumulative reinforcement index strength of 1,806 kN/m was required to satisfy all aspects of design.

One end of the modular wall abuts to the H-pile and wood lagging wall at a 90 degree angle. To prevent migration of soil into the air gap between the modular and building walls, assuming the wood lagging fails, a pre-cast concrete plank was designed to be placed, parallel to, and in front of, the lagging. The plank was restrained from moving laterally at the building wall and the modular wall was abutted to the plank. The opposite end of the modular wall abutted the concrete tunnel wall to about the 11 m elevation and then extended onto the tunnel roof, turned a 90 degree inside corner and abutted the building foundation wall.

Geotextile filter fabric was designed for placement behind the modular units and the drainage aggregate and drain tile system constructed at the toe of the wall. Filter fabric was also placed completely over and down the sides of the pre-cast concrete planks spanning the two walls prior to placing the 1 to 1.8 m of overburden fill.

Project specific construction plans, details and specifications were prepared and certified by a registered professional engineer.

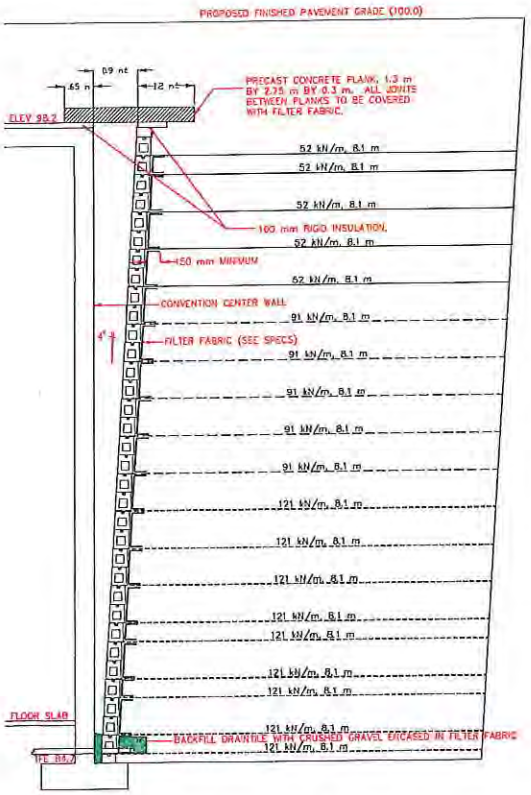

Figure 1. Profile View of Building and Modular Wall

5 MODULAR WALL INSTRUMENTATION

The consequence of failure of this modular wall is significant. Since the building and modular wall are completely buried during construction, access to the walls for visual inspection post construction is not possible. The modular wall, being designed with active earth pressure theory, must move or rotate during construction. To aid in determining the magnitude of this or any future movement, it was proposed to install two slope inclinometers directly behind the modular facing units during construction. The slope inclinometers were measured during construction after about 3 m of wall was constructed and about every 1 to 1.5 m vertically thereafter. The inclinometers were also measured about 4 months after completion of modular wall construction, pavement placement and inclinometer surface casing and access construction.

6 WALL CONSTRUCTION

The modular wall was constructed in May of 2001. About 3 to 4 weeks was required to construct the wall.

The site access conditions at the beginning of construction were restricted. An excavation about 15 m in depth across a horizontal span of approximately 50 m was present. An earthen embankment was constructed down into the bottom of the excavation. The construction materials, including the modular concrete facing units, geogrid reinforcement, geotextile filter fabric and backfill soils, were transported down into the excavation on the fairly steep embankment. A portion of the embankment can be seen on the left side of the photograph of Figure 2.

Figure 2. Start of Modular Wall Construction

The sequence of wall construction began with placement, compaction and leveling of the aggregate pad placed below the lowest course of modular foundation units. The foundation units were then placed, aligned horizontally and leveled in both directions. A drain tile encased in drainage aggregate and a geotextile filter fabric was installed behind the lower course of units. The drain tile was connected to the drainage system located below the floor slab of the adjacent building addition at two locations.

During construction perched water conditions were observed in the exposed cut bank, behind the reinforced soil zone. A second drain tile system, enclosed in drainage aggregate and filter fabric, was placed at the interface of the clay soil cut bank and the granular fill placed within and behind the reinforcement. This drainage system was also connected to the building below slab drainage system.

Subsequent courses of modular units were then placed, with the proper strength reinforcement products installed and connected with the lock bar, at the elevations shown on the construction plans. A needle punched non-woven geotextile filter fabric was placed adjacent to the back of the modular units and extended 150mm back along the reinforcement. The backfill placement, compaction and testing was an ongoing operation during wall facing and reinforcement placement.

Upon completion of the modular wall construction, pre-cast concrete planks were placed to span the gap between the two walls. The planks were placed on high density polystyrene insulation to protect the building waterproofing membrane.

Figure 3. Modular Unit Placement

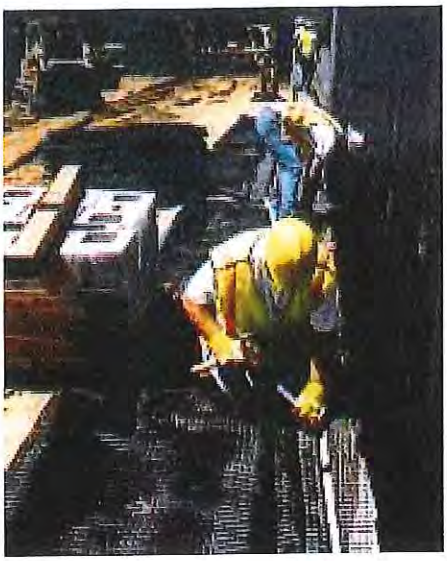

Figure 4. Reinforcement Placement

Figure 5. During Wall Construction

Figure 6. End of Wall Construction

Figure 7. Wall Closure Detail

7 INSTRUMENTATION MEASUREMENTS

Measurements were taken on each of the two slope inclinometers after 3 m of wall and inclinometer casing were installed and at about 1.5m vertical intervals thereafter. Nine measurements were taken during wall construction. These measurements indicate the maximum horizontal wall movement ranged from about 50 to 65mm. The maximum displacement occurred about one-third the way up the wall from the toe. The lateral displacement measured represents approximately 0.5% of the height of wall. Measurements were also taken about 4 months after completion of construction. These measurements indicate the maximum post construction wall displacement to be 7 mm. The US Federal Highway Administration's "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines" 1996, indicates that for extensible reinforcements the anticipated lateral displacement for this wall would have been on the order of 200 to 250 mm. Figure 8 depicts the cumulative horizontal displacement measured during and after construction.

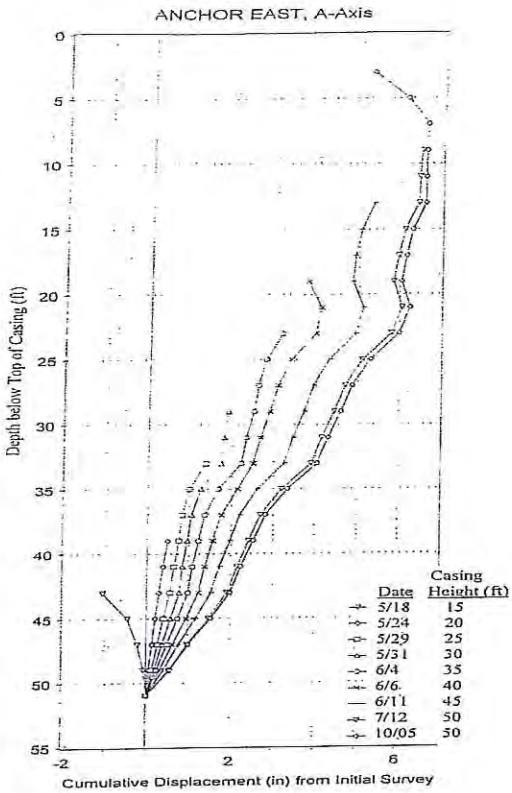

Figure 8. Slope Inclinometer Measurements

8 CONCLUSION

The acceptance in North America of modular retaining wall technology has led to a wider range of applications for this technology in projects with more difficult technical issues and more stringent space constraints. The modular wall constructed at the Convention Center is one such example. The geosynthetic reinforced modular wall saved the owner in excess of $300,000 (US), compared to the concrete counterfort wall option. The counterfort wall would have been in excess of two orders of magnitude more expensive to construct than the modular wall.

The modular wall components were ideally suited to the restricted site access. The wall instrumentation, while of little scientific value, provided the project management team and owner with a comfort level regarding the performance of the modular wall during construction and in the long term. This project proves geosynthetic reinforced modular retaining walls can be used to design and build cost effective, safe, structurally sound retaining walls for a wide variety of challenging applications.

9 REFERENCES

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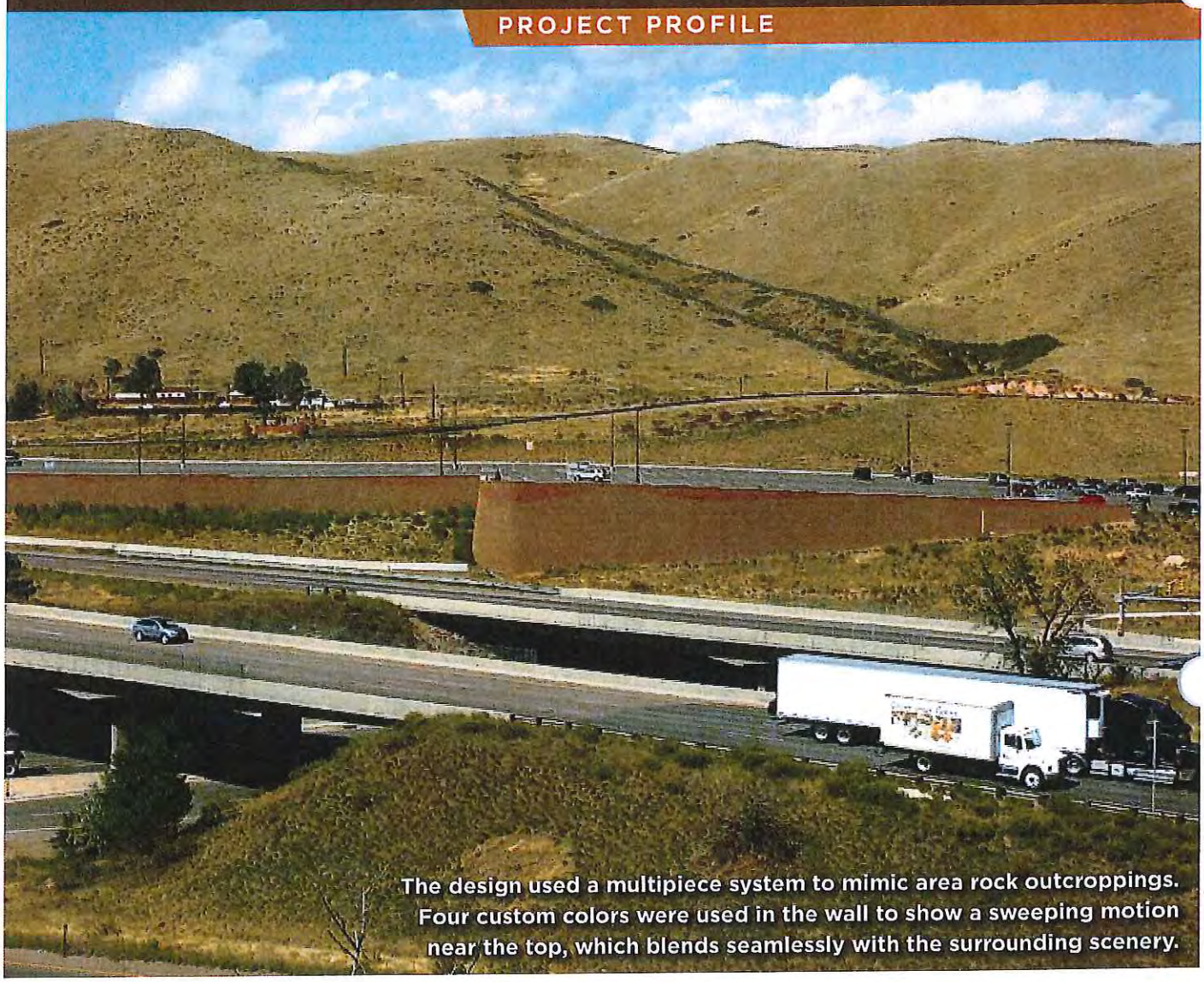
Diamond Pro Stone Cut®
RETAINING WALL SYSTEM

PROJECT PROFILE



The design used a multipiece system to mimic area rock outcroppings. Four custom colors were used in the wall to show a sweeping motion near the top, which blends seamlessly with the surrounding scenery.

Hogback Parking Facility GOLDEN, COLORADO

PRODUCT
Diamond Pro Stone Cut® retaining wall system

MANUFACTURER
Pavestone Company
Henderson, Colorado

WALL DESIGNER
J.F. Sato and Associates
Denver, Colorado

INSTALLER
HTM Construction
Lakewood, Colorado

WALL AREA
28,000 square feet

THE CHALLENGE
Expand parking, upgrade drainage, add landscaping, meet high aesthetic standards and construct the project without closing the nearby Interstate highway exits were just a few of the challenges faced by the team that led the improvement of a "park and ride" facility outside Denver, just off Interstate 70 and U.S. Highway 40. The area known as the Dakota Hogback in the Rocky Mountain foothills had been a popular parking place for Denver commuters and mountain-bound outdoor enthusiasts for years before the Colorado Department of Transportation and Jefferson County decided to update the facility.

Diamond Pro Stone Cut®
RETAINING WALL SYSTEM

PROJECT PROFILE

THE SOLUTION

Designed by Denver engineering firm J.F. Sato and Associates, the Hogback retaining wall was engineered to be both functional and aesthetically pleasing. Colorado DOT Project Manager Martin Herbaugh described the choice of the Diamond Pro Stone Cut® retaining wall system for the wall as the perfect solution that best met the requirements of the project.

The designer chose the product because of its multiple pieces and rough-looking appearance that complement the Rocky Mountain landscape. The design combines four different colors of product: light buff, dark buff, light terra cotta and dark terra cotta that bring to mind the Great Plains to the east and the mountains to the west.

"Although the primary purpose of the retaining wall is that of a support structure, we had high standards for its aesthetics," Herbaugh says. "The parking area is an important piece of the community and a gateway into the mountains."

This engineering feat combines tripling the capacity to 1,181 parking spaces supported by a massive 28,000-square foot retaining wall and redesigned intersections.

A major challenge of the project was building the wall quickly and efficiently while working amidst busy Interstate traffic. Neither the highway nor the nearby exit were ever closed

The 28,000-square foot retaining wall, which peaks at 40-feet-high, supports a parking facility that holds 1,181 vehicles.

Busy exits off Interstate 70 were never closed during construction of the segmental retaining wall.

during construction so that contractors needed to be extra-vigilant about safety at all times. HTM Construction Company of Lakewood, Colorado, built the wall while navigating around the busy jobsite. They also needed to follow a specific installation pattern with the blocks in order to give a "wavelike" look to the wall with alternating colors. HTM Project Manager Wes Lundeby explains that the installation did not take longer than normal, due in part to the easy installation of the Diamond Pro Stone Cut product.

"Wall installation stayed on schedule and contributed to the entire parking facility opening nearly six months early and in time for the upcoming ski season," Lundeby says. "The product is a system designed for efficient wall construction."

THE RESULT

The Hogback facility is now more than just a parking lot. It is a well-known and highly used point of interest for the entire state of Colorado as a gateway to the magnificent Rocky Mountains and bustling Denver. The unique aesthetics of the project and its majestic size have turned what could have been an ordinary DOT project into a work of engineering art.

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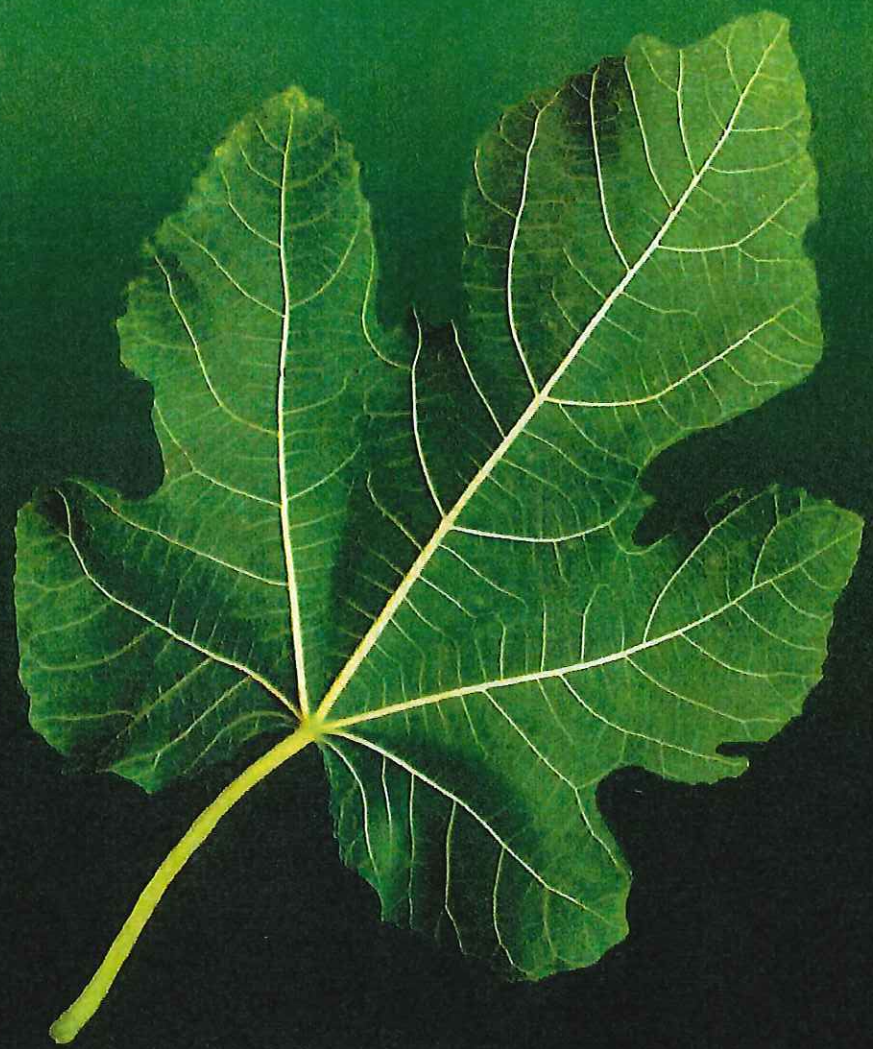

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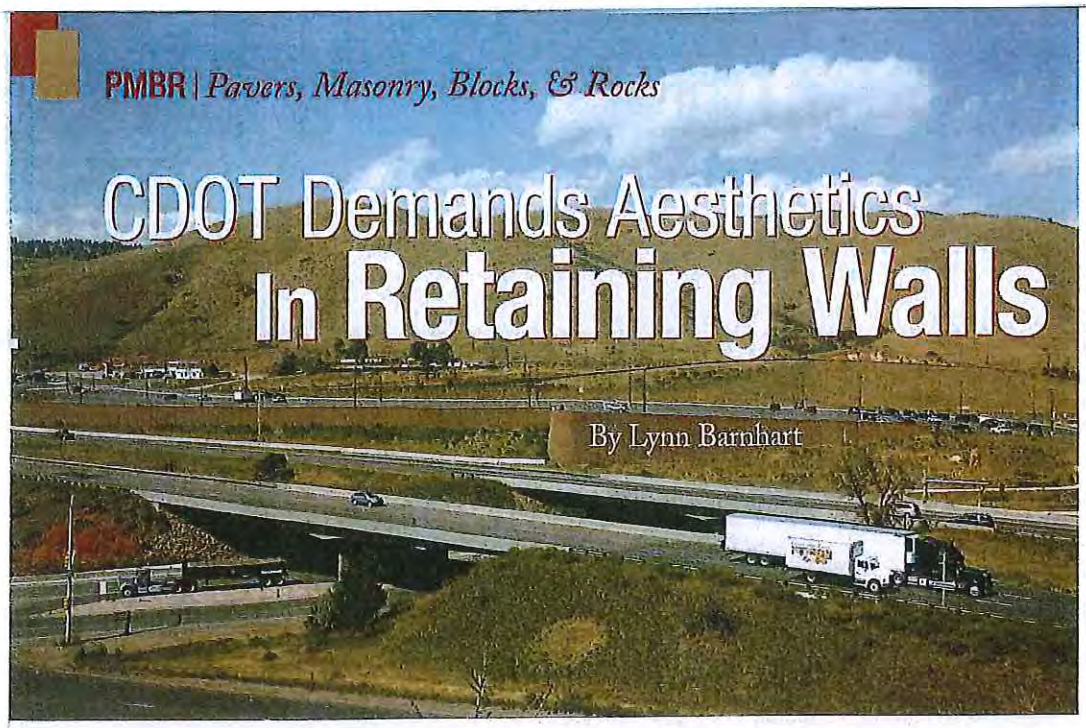
November 2008 The Green Issue LANDSCAPE ARCHITECT AND SPECIFIER NEWS

CDOT Demands Aesthetics In Retaining Walls

By Lynn Barnhart



Left: The design was a collaboration between the engineer and architect, using 7-inch, 11-inch and 18-inch wide units to best mimic and complement area rock outcroppings. The project architect worked with the manufacturer to develop four custom colors that would be installed to show a sweeping motion near the top of the walls, which blend seamlessly with the surrounding Colorado scenery.

PHOTOS COURTESY OF ANCHOR WALL SYSTEMS, INC.

A segmental retaining wall plays an important role in expanding a popular parking spot and blending in with the surrounding Colorado scenery

The Hogback Parking Facility near Golden, Colorado provides four large parking lots for foothills-area residents commuting to metro Denver and for skiers and hikers taking advantage of the Rocky Mountains. Known locally as a 'park and ride,' the adjacent parking areas serve as a gateway in and out of the mountains. The massive complex sits off another engineering marvel, Interstate 70, which cuts through a series of ridges that form a line on the eastern borders of the Rocky Mountains.

The Hogback park and ride is a project of the Colorado Department of Transportation and Jefferson County and is significant in size, scope, and its impact on the surrounding area, known as the Dakota Hogback. The parking areas are located at the intersection of U.S. Highway 40 and Morrison Road, just north of Interstate 70. The $7.8 million, two-year construction project tripled parking capacity to 1,181 parking spaces, reconfigured intersections, upgraded drainage, added landscaping, and significant to supporting the project: new retaining walls.

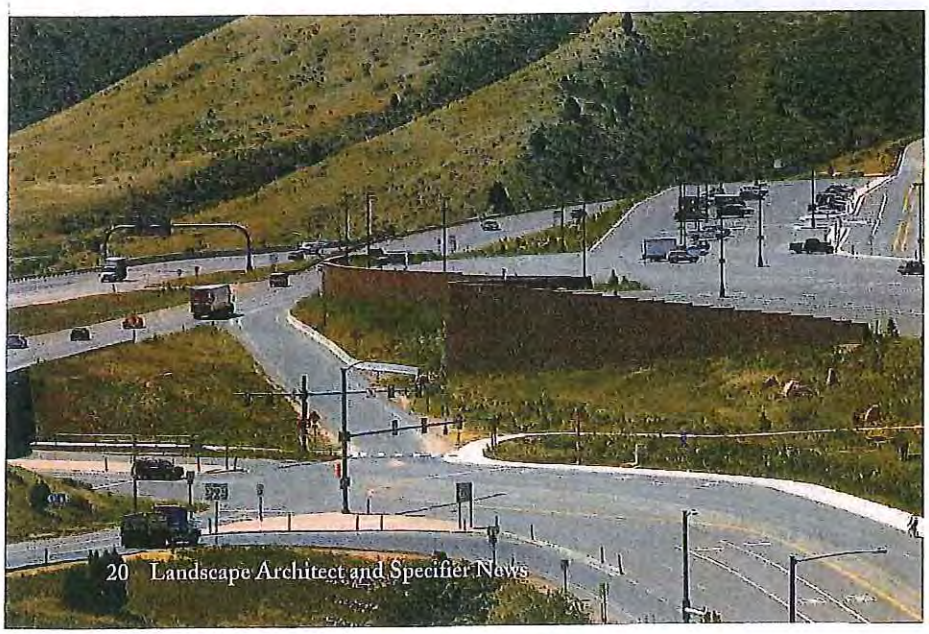
Not Just a Wall

Colorado DOT Project Manager Martin Herbaugh describes the chosen retaining wall product as a straightforward solution to a long list of criteria outlined for the project.

"Although the primary purpose for the retaining wall is that of a support structure, we had high standards for its aesthetics," Herbaugh said. "The parking area is an important piece of the community and a gateway into the mountains."

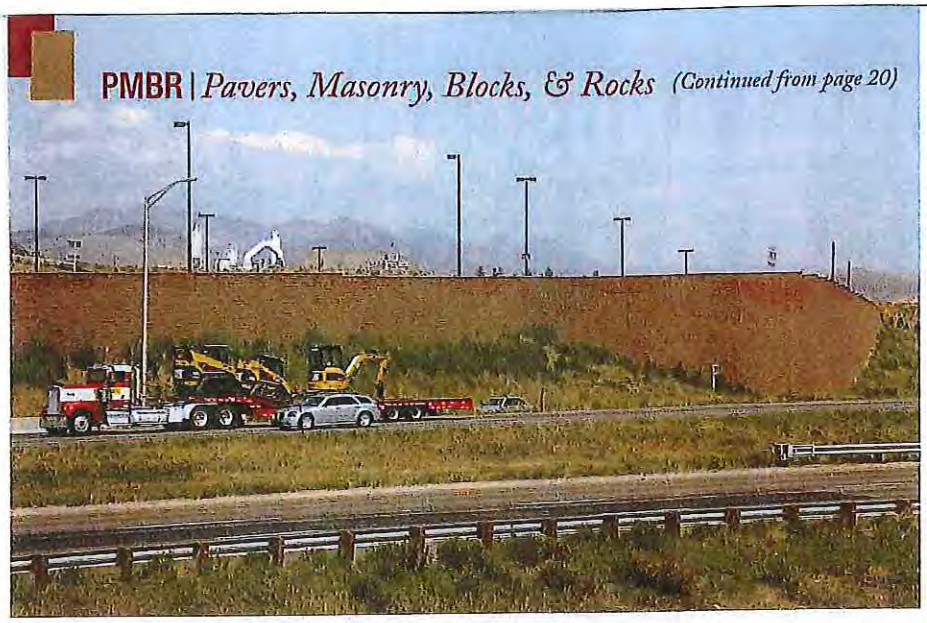
The design phase was led by Denver engineering firm J.F. Sato and Associates and it was a collaboration between many, but none as important as the teamwork of the engineer and architect. The design featured the Pavestone Company's Diamond Pro Stone Cut product using 7-inch, 11-inch and 18-inch wide units to best mimic and compliment area rock outcroppings. The colors, light buff and dark buff, along with terra cotta and dark terra cotta, were chosen to reflect the views of the Great Plains to the east of the area.

The design phase gave way to even greater construction complexities. "The primary challenge during construction was to work around a very busy exit off Interstate 70," said Herbaugh, who notes that neither the highway nor the exit were ever closed during construction. "And in addition to the



Left: Busy exits off Interstate 70 were never closed during construction of the segmental retaining wall. Within minutes, visitors can find Red Rocks Park and amphitheater, Dinosaur Ridge, hiking trails and of course the Rocky Mountains.

(Continued on page 22)



Left: The massive 28,000 square foot retaining wall supports a parking facility that holds 1,181 vehicles. With heights peaking at 40-feet this is no ordinary wall. The structure had to overcome design challenges, intricate construction and reflect the surrounding scenery.

PHOTOS COURTESY OF ANCHOR WALL SYSTEMS, INC.

site challenges, we dictated an installation pattern for the four colors to create the desired design."

HTM Construction Company of Lakewood, Colorado built the retaining wall and its seasoned project manager, Wes Lundeby, has seen a lot of challenging installations. "Following the architect's plan for the color undulation was a first," Lundeby said. "But the result is spectacular." Did having to piece together blocks in different colors hurt efficiency? Lundeby says, "No. In fact, the wall installation stayed on schedule and contributed to the entire parking facility opening nearly 6 months ahead of schedule and in time for the upcoming ski season.

"The product is a system designed for efficient wall construction, and this wall went up well. We worked closely with manufacturer and the architect on the colors and the pattern," said Lundeby who notes that he prefers segmental retaining wall units. Cut over cast-in-place because, he says, "the segmental systems are more landscape and design focused."

Martin Herbaugh agrees with Lundeby aesthetic assessment, "Awesome," Herbaugh notes succinctly. "Segmental retaining walls are great engineering choices, but it's also possible to build nice-looking walls, too. We wanted the wall to look nice and blend with the surroundings. Aesthetics is always important to us."

Form and Function

It's not just the Colorado DOT incorporating thoughtful aesthetics into their retaining wall specifications. National trends point to a rising interest in high-performance walls that are also attractive. But the trend is certainly evident in Colorado.

"Retaining walls used to be the color gray, whether it was in a backyard or supporting a commercial building," Tom Schnetzler notes. "Today, that's changed and you won't find many gray walls. All of our customers, especially in the commercial market, demand multiple colors in the wall and textures that are rough-hewn and natural looking."

A popular trend in Colorado is the use of natural stone incorporated into the wall as an accessory feature. And, national sales data supports Schnetzler's assessment. The product used on the Hogback project is manufactured in three sizes and multiple colors and although it's an engineered product, it's commonly found on high-profile projects where aesthetics count, including a land bridge in historic Williamsburg, Virginia; a high-end 1,600 unit residential development in Washington, DC; in detention ponds situated on a beautiful college campus in Florida; as well as high-end retail developments in nearly all 50 states.

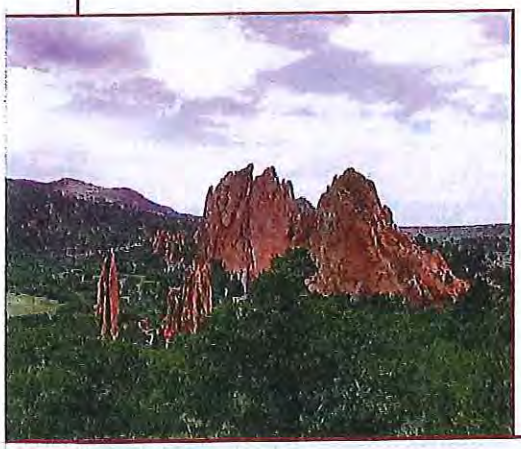
"Today, it's possible to build walls that complement the project," explains the CDOT's Herbaugh. "We can incorporate terraces and curves, and we always finish a retaining wall project with fresh, new landscaping."

More Than a Parking Lot

The Hogback Parking Facility has become a well-known, and well-used, point of interest in the state of Colorado. Enhancements such as increased lighting improves safety and improved access in and out of the lots makes this parking lot a gateway to Colorado's abundant, natural resources. At the grand opening of the facility, CDOT's regional transportation director Jeff Kullman noted that the benefits of the new facility are obvious, right down to the retaining walls and landscaping, which according to Kullman, "fits well with the surrounding environment."

What is a Hogback?

The Hogback Parking Facility is a name that often receives a funny look by visitors. But to native Coloradoans, the Hogback is a beloved geological term. So, what is a Hogback? Hogbacks are sharp-crested ridges with steep slopes on both sides, formed by the eroded flanks of large, stratified rocks. In Colorado, the Dakota Hogback ridge is prominently visible as the first line of foothills along the edge of the Great Plains. The clever name comes from the rock ridges resembling the ridge between the shoulders of a hog.



DESIGN, CONSTRUCTION, AND MONITORING OF A 14.9M HIGH GEOSYNTHETIC REINFORCED SEGMENTAL RETAINING WALL IN A SEISMICALLY ACTIVE REGION

Dean Sandri, P.E.
TC Mirafi, Lake Forest, CA, USA

Gregory Silver, P.E., G.E.
Goffman, McCormick & Urban, Rancho Santa Margarita, CA, USA

Robert Trazo
Goffman, McCormick & Urban, Rancho Santa Margarita, CA, USA

ABSTRACT

Development of a new master planned community in a seismically active area required a 14.9 m high retaining wall to be constructed. The segmental retaining wall option was chosen based on economics, while the installation contractor and materials incorporated in the wall were chosen for their past performance and familiarity to the local regulatory agency. The design was developed using National Concrete Masonry (NCMA) methods. Construction procedures and details of monitoring are discussed. Post construction movements are provided for vertical and horizontal wall deformations. In addition, movements resulting from the October 1999 Hector Mine earthquake are documented. Monitoring of the wall will continue in anticipation of capturing the effect of additional seismic events.

1. INTRODUCTION

Ladera Ranch, a new, mastered planned community in Southern California is currently being developed. The Ladera Ranch development is located several miles east of the well known City of Mission Viejo in the Santa Ana Mountain foothills of Orange County, California. The new community will be approximately 16 square kilometers in size and contain over 8500 homes along with various commercial, recreation and school sites.

Construction of a new community requires development of infrastructure facilities including access roadways. The primary access to Ladera Ranch includes extension of Antonio Parkway, a six-lane arterial roadway which crosses a ravine near the northern entrance to the community. Plans to facilitate crossing the ravine incorporated a bridge along with an originally planned 2:1 slope transitioning from roadway grades down into the existing ravine. However, during the design process for the planned roadway, alignment adjustments were required to accommodate an existing County of Orange storm drain outlet (constructed during an earlier grading phase of the Antonio Parkway extension project) which limited the horizontal distance into which a slope could be fit.

Consideration of several grade transitioning systems including walls and slopes were evaluated. While being cost effective, steepened, reinforced soil slopes were ruled out due to space constraints and lack of approval precedent from the regulatory agency; the County of Orange. Given the height of the retained section, a conventional cantilever wall was ruled out due to cost (estimated at $1.5 million), aesthetics and construction time. Ultimately, a 248 m long by up to14.9 m high (1840 m2) reinforced segmental retaining wall (SRW) was chosen to satisfy the grade transition problem while saving nearly $1,000,000.

2. GEO-ENVIRONMENT CONDITIONS

2.1 Geotechnical Conditions and Earth Material Properties

Subsurface materials at the site proposed for the SRW generally consist of Miocene aged Monterey Formation bedrock overlain by late Quaternary alluvial terrace deposits. The bedrock typically consists of stiff, unoxidized, siltstones and claystones with geologic structure favorable to the proposed wall orientation. The sedimentary bedrock is comprised of low to high plasticity silts and clays with approximately 30 to 40 percent silt and 20 to 50 percent clay size particles. Liquid limit (LL) and Plasticity Index (PI) values range from 40 to 70 and 30 to 50, respectively. Drained effective stress strength parameters (ASTM D-3080) representative of peak conditions were determined to be c'p = 54 kN/m2, Ø'p = 26

degrees.

The alluvial terrace deposits consist of dense to very dense low plasticity clayey sands and sandy clays (SC to CL). The terrace materials contain approximately 30 to 55 percent silt and clay size particles (Passing the No. 200 US Std. Sieve) with LL and PI values ranging from 30 to 40 and 20 to 30, respectively. Shear strengths representative of the in-situ and remolded terrace deposits (no significant difference between the in-situ and remolded conditions) for peak conditions are c'p = 23.9 kN/m2, Ø'p = 32 degrees. Remolded samples were compacted to 90% of maximum density (ASTM D-1557).

Groundwater was not encountered or anticipated to exist within the zone which might influence the proposed SRW over its design life. Geotechnical data at the wall location was extrapolated from borings drilled in the vicinity of the wall (Goffman, McCormick & Urban, Inc., 1996), from observations and testing during preliminary grading of Antonio Parkway (Goffman, McCormick & Urban, Inc., 1999), and from instrumentation borings drilled following construction of the wall.

FIGURE 1: General Location Map Relative To Faults

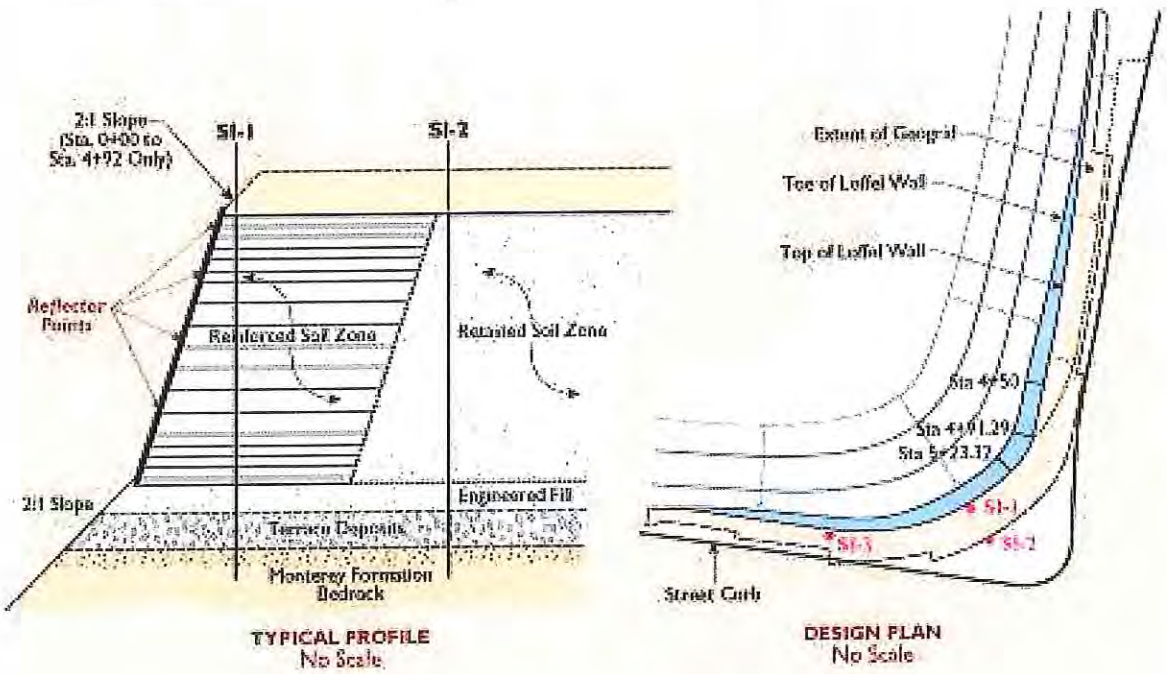


FIGURE 2: Design Plan and Profile

2.2 Seismic Environment

Most of Southern California is subject to some level of ground shaking (ground motion) as a result of movement along active and potentially active fault zones in the region. The nearest seismogenic faults recognized by the California Division of Mines and Geology (CDMG 1999) are the offshore segment of the Newport-Inglewood fault and the Elsinore fault (Jennings, C.W., 1994). These faults are located approximately 15 kilometers southwest and 25 kilometers northeast of the project site, respectively (Figure 1).

Preliminary research by some scientists at the Southern California Earthquake Center (SCEC) suggest the project site may also be located near or underlain by segments of a low-angle fault system (e.g., blind thrusts), the fault surfaces of which do not necessarily break the ground surface during sizeable earthquakes. This fault system, known as the San Joaquin Hills Blind Thrust, has not yet been studied with enough detail to determine the existence, location, or subsurface geometry of the fault let alone classify it as "Active" pursuant to the guidelines of the Alquist-Priolo Earthquake Fault Zoning Act (Hart and Bryant, 1997).

Several sizeable, historic earthquakes have occurred in southern California resulting in ground motions at the site and surrounding area, most recently the October 16, 1999 MW 7.1 Hector Mine Earthquake. Peak horizontal ground accelerations (PHGA) at the site from the Hector mine event were estimated from data available through the California Strong Motion Instrumentation Program (CSMIP). The nearest CSMIP station to the site is Capistrano Beach - 15/Via California Bridge, Station 13795, located approximately 5 kilometers from the site. Review of the preliminary CSMIP data indicate that peak horizontal ground acceleration at Station 13795 was approximately 0.03g. CSMIP stations northwest and east of the site area recorded similar accelerations. Peak acceleration at the bridge bent for Station 13795 was approximately 0.1g. Given these data, PHGA at the project site were approximately 0.03g, while peak accelerations at the crest of the SRW wall were most likely on the order of 0.1g.

The level of potential ground motion at a given site resulting from an earthquake is a function of several factors including earthquake magnitude, type of faulting, rupture propagation path, distance from the epicenter, earthquake depth, duration of shaking, site topography, and site geology. Review of the available literature indicates that a peak horizontal ground acceleration of approximately 0.3 g for 475-year annual return period (Petersen et al., 1996) would be appropriate for the site. The aforementioned return period corresponds to that required by the UBC for the design of structures.

3. DISCUSSION OF SRW CONTRACTOR AND MATERIALS

The selection process for the wall type, construction contractor and materials to be incorporated in the wall was undertaken with strong consideration for the rigorous regulatory review and permitting process as well as time sensitive, critical path posed by the roadway supporting wall structures under consideration.

3.1 SRW Blocks and Geogrid Reinforcement

The materials chosen for wall design included a trough-shaped, plantable segmental block supplied by Soil Retention Systems, polyester fiber XT geogrids as supplied by TC Mirafi, and on-site alluvial terrace soils to be used in the reinforced and retained wall zones. The polymeric reinforcement materials selected for use in the proposed walls were chosen based on their past performance on similarly sized local projects as well as familiarity to the regulatory agency reviewing the project. In addition, the high tensile strength range of the geogrid, stable, large dimension of the trough shaped plantable block, and local availability (dependable US supply for geogrid and S. CA supply for block) also contributed to the selection of the wall system. Properties of the materials used for wall construction are summarized in the following table.

3.2 Wall Building Contractor

The wall building contractor, Soil Retention Systems, was selected based on his on-time delivery of turnkey construction for time-critical structures on many high-end commercial projects and experience with fully plantable (and hence aesthetically desirable) wall systems. Also considered in the selection process was the contractors unique installation process which is fully integrated with the grading activities and failure-free history.

BLOCK	TEST METHOD, UNITS	VALUE
Dimensions	Measured, cm (in)	-
• Length • Width • Height	- - -	50 (19.7) 45 (17.7) 25 (9.8)
• Weight	Kg (lbs)	Approximately 56.7 (125)
• Material • Compressive Strength	- ASTM C-140 psi @ 28 days	Pre-cast Concrete 4,000

GEOGRID	TEST METHOD	VALUE	
TYPE	- -	Type I - 10XT	Type II - 18XT
Polymer	MD x CMD	PET x PET	PET x PET
Coating Type	-	PVC	PVC
Tensilve Strength (Ult)	ASTM D-4595, kN/m (lbs/ft)	115.3 (7,900)	136.6 (9,360)
Creep Reduced Strength	ASTM D-5262, kN/m (lbs/ft)	69.2 (4,740)	81.8 (5,605)
Long Term Design Strength	GRI-GG4, kNm (lbs/ft)	57.2 (3,917)	67.6 (4,632)
Reduced LTDS Required By County of Orange	LTDS/1.5, kN/m (lbs/ft)	38.1 (2,611)	45.1 (3,088)

TABLE 1: Properties of Materials Used in Construction of Segmental Retaining Wall

4. WALL DESIGN

The Ladera SRW was designed in accordance with the National Concrete Masonry Association (NCMA) design methodology (Collin, et al, 1997, and Bathurst, 1998). The NCMA method was selected for design because of its ability incorporate seismic loads and familiarity to the regulatory agency (i.e. County of Orange).

The NCMA design method utilizes Coulomb Earth pressure theory and requires calculation of external, internal and global

safety factors. The NCMA computer program (SRWall 2.1) incorporates geometric parameters including but not limited to block dimensions, wall slope/configuration, soil strength parameters, geogrid strength parameters (including geogrid to soil, geogrid to block interface shear) and shearing/sliding block to block parameters to calculate static safety factors. Conventional traffic surcharge loads from the adjacent roadway (i.e. Antonio Parkway) were modeled using distributed line loads. Global stability was evaluated using slope stability program PCSTABL (USDOT, 1986) assuming two failu modes: 1) rotational failure beneath the wall and 2) translational failure along the soil-geogrid interface.

Seismic wall analyses were conducted using the NCMA seismic procedures. The NCMA seismic design procedures incorporate horizontal seismic acceleration coefficients (in percent gravity). The selected design coefficient corresponded to a seismic event with a 475 year return period (ie. Having a 10 percent probability of exceedance in 50 years reduced by a factor of 1/3 as allowed by the County of Orange).

Although not supported in the literature for accelerations < 0.35g (Bathurst, R.J. and Cai, Z. 1995; and Ling, H. and Leschinsky, 1998), the County of Orange required incorporation of a vertical seismic acceleration coefficient. The vertical acceleration dictated by the County had to be equivalent to a value of at least two-thirds of the horizontal coefficient. Both the horizontal and vertical coefficients were utilized in determining the horizontal dynamic force via the Monobe-Okabe equation. Given these requirements and the seismic environment, a horizontal coefficient of 0.2g and a vertical coefficient of 1.3g were used in the design. Seismic design analysis also included performing a pseudo-static slope stability analysis using a regulatory agency mandated minimum seismic coefficient of 0.15g. Use of a 0.15g seismic coefficient in combination with a safety factor of 1.1 has resulted in satisfactory local dynamic performance of most slopes. Due to the stringent seismic requirements, seismic loading governed the final reinforcement layout and dimensioning of the soil reinforcement components.

The final SRW design incorporated segmental facing block units inclined at 20 degrees from vertical, reinforcing geogrid consisting of Type 1 and Type II geogrids (Table 1), drainage fill and leveling pad consisting of Caltrans Class II Permeable base (State of California Dept of Transportation 1992) and fill soil composed of previously described on-site terrace deposits (for both the reinforced and retained zones) (See Figure 2). The total wall height ranges from 5 to 14.9 m. An approximately 2 (horizontal) to 1 (vertical) slope descends from the toe of the wall along the full 248 m length. The wall toe embedment depth at the maximum height is approximately 1.8 m which renders a corresponding exposed heigh of roughly 13.1 m. The backfill above the wall crest varies in slope inclination from 0 (i.e. level) to 27 degrees (maximu height of 3.2 m). The geogrids are attached to the facing blocks via a wrap-around-pipe-in groove type connection and is set into the top of the facing block. The design geogrids have lengths ranging from 3 to 9.1 m and are spaced vertically at distances ranging from 0.3 to 0.61 m. A total of 23 reinforcement layers were utilized in the maximum wall section.

5. CONSTRUCTION PROCESS

Construction of the 14.9 m maximum height by approximate 248 m long wall was coordinated between the General Grading Contractor, ACI (responsible for fill placement in the adjacent roadway) and the wall building contractor, SRS. The coordination eliminated the back cut and double dirt handling problems and costs associated with typical SRW wall construction projects. The GC's responsibility to the wall contractor was to deliver fill to the wall site as the adjacent roadway grades were raised. The wall builder's responsibility was to handle the soil reinforcement facing blocks, drainage materials and to spread and compact the fill within the reinforced soil wall zone.

Facing blocks were removed from pallets and placed along the wall alignment using a mechanical "grapple" and subsequently adjusted into final resting position by hand. Structural fill was selectively obtained from cut areas in the vicinity of the project site, delivered to the wall area with 27 m3 capacity CAT 657 scrapers, moisture conditioned with water trucks as necessary, and spread into place by motor graders. CAT563 sheepsfoot rollers in conjunction with the wheeled soil delivery equipment were used for compaction. Compaction and soil delivery equipment was operated to within 0.6 m of the facia blocks. Materials within 0.6 m of the facing units were compacted with hand operated equipment. An automated process of filling of the trough shaped SRW units included use of a side dump bucket to spread a windrow of soil along the facing unit alignment. Subsequent to filling, any overfill was leveled and smoothed via hand screed. Pre-cut pieces of geosynthetic reinforcement were placed at the planned elevations and connected to the facing blocks as previously described above.

Construction of the wall progressed over an approximate three-week period during which time about 45,870 m3 of soil was moved into the wall area with production rates of up to 167 m2 of wall facing per day being achieved. Quality control

and construction monitoring services for the wall building phases of construction were provided by Goffman, McCormick & Urban, Inc. of Rancho Santa Margarita. Construction monitoring requirements are noted in Table 2.

ITEM	REQUIREMENT	COMMENT
Block Placement	Per Plan	-
Geosynthetic Placement	Per Plan	-
Fill Strength (peak)	32 Degrees, 500 psf Cohesion	ASTM D-3080
Soil Density	90% at >2% over OMC*	ASTM D-1557
Fill Gradation	Oversize <10 cm	U.S. Standard Sieve

OMC* = Optimum Moisture Content

TABLE 2: Construction Monitoring Requirements

6. INSTRUMENTATION

Monitoring of post-construction movements incorporated arrays of survey reflector points embedded in the facing blocks along with slope inclinometers placed behind the wall face and reinforced zone.

6.1 Reflector Points and Movement Survey

Huitt-Zollars, a civil engineering company with licensed surveyors, was chosen to perform the monitoring program. During construction of the wall, surveys were performed at the face of the wall in order to verify the design wall batter of approximately 20 degrees.

In order to document the post-construction movement of the reinforced SRW, survey reflector point arrays were designed which would be monitored by licensed surveyors. Three vertical arrays of reflector points were set up at three different wall sections. Each array consisted of four points embedded into the block face (Figures 2 and 3) and equally spaced from the toe to the top of the wall. Both horizontal and vertical movements were monitored at three locations along the wall alignment. The three stations chosen included 4+50 (2:1 slope at crest of wall), 4+91.29 (midpoint between 2 other monitoring points), and 5+23.32 (maximum wall height). Table 3 provides the elevation and stationing of each survey reflector.

Two control stations and one backsite were installed in the vicinity of the toe of the wall and top of wall, respectively, and positioned so that surveyors would be able to monitor each of the reflector points. Readings were initiated on December 7, 1998. Reading intervals started at once a week for the first month, with intervals increased to once a month thereafter.

REFLECTOR POSTION	STATIONS		
	4+50 (Wall Height = 13.4 m) (B.O.W. Elevation = 169.7 m)	4+91.29 (Wall Height = 13.1 m) (B.O.W. Elevation = 171.0 m)	5+23.32 (Wall Height = 14.9 m) (B.O.W. Elevation = 172.0 m)
Highest Point	12^1 (~182.9m)^2	10^1 (~184.5 m)^2	11^1 (~186.6 m)^2
2nd Highest Point	1^1 (~179.9 m)^2	7^1 (~180.8 m)^2	8^1 (~182.3 m)^2
2nd Lowest Point	2^1 (~175.9 m)^2	5^1 (~177.4 m)^2	6^1 (~178.7 m)^2
Lowest Point	3^1 (~173.2 m)^2	4^1 (~175.9 m)^2	9^1 (~175.3 m)^2

[1] Reflector Point Designation
[2] Elevation of Reflector Point

TABLE 3: Summary of Survey Reflector Elevations and Stations

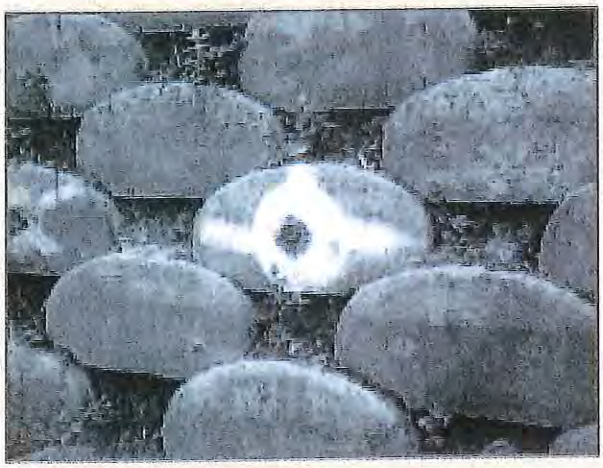


FIGURE 3:
Photograph of Survey Reflector Point

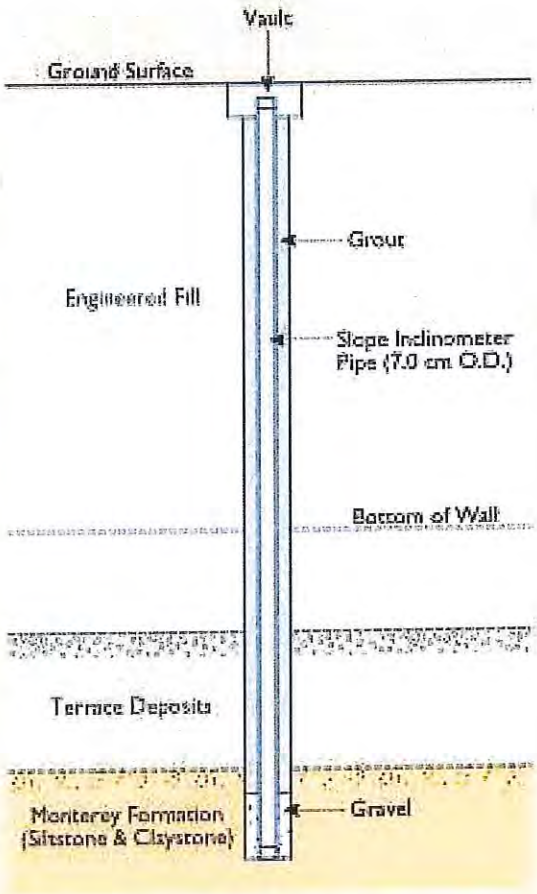


FIGURE 4:
Typical Slope Inclinometer Installation Detail

6.2 Slope Inclinometers

To augment the survey data, three slope inclinometers were installed behind the wall. Slope inclinometer 1 was installed immediately behind the block facing at Station 5+23.32 (corresponds to the highest point of the wall as well as one of the survey arrays). Slope inclinometer 2 was installed at nearly the same stationing (Station 5+23) except that it was positioned at the back of the reinforced soil mass. A third slope inclinometer was installed at Station 6+33 immediately behind the facing block.

Slope inclinometers 1 and 2 were both installed to a depth of 28 m and socketed approximately 3 m into the Monterey formation bedrock. Slope inclinometer 3 is 17 m long and was socketed approximately 5 m into dense terrace deposits. The slope inclinometers were back-filled with a low strength cement-bentonite grout. A typical slope inclinometer installation detail is shown in Figure 4.

The inclinometers were installed on January 11 and 12, 1999 approximately 5 weeks following the completion of the wall. The first baseline reading was taken approximately 1 week after the installation date on January 18 to allow for grout settlement. Consequently, slope inclinometer readings begin roughly six weeks after the start of the survey readings. Readings have been taken on an approximate one month basis from January until December 1999.

7. INSTRUMENTATION MONITORING RESULTS

The survey readings measured horizontal and vertical movement and are shown on Figure 5 - SRW Survey Monitoring Results. Analysis of the plots show that the magnitude of movement in the horizontal direction ranged from approximat 0.5 to 2.5 cm away from the wall in the downslope direction with most values falling in the 1.0 to 2.0 cm range. Vertical movement ranged from approximately 1.5 cm to about 4.0 cm downward. Horizontal movement appeared to slow

significantly after approximately 100 days following the initial reading. After the aforementioned 100 day period, the maximum additional horizontal movement was less than approximately 0.5 cm. The data further indicates that the rates of vertical movement have appeared more steady since the initial reading (rate of about 2.54 cm per 200 days). It appears that stabilization occurred approximately 250 days after the initial reading. Since the 250-day mark, vertical movement has not increased.

Measurement tolerance of the survey data was specified as plus or minus 0.6 cm. In reviewing the survey data, some slight discrepancies may indicate actual tolerance more in the range of 1.0 cm.

Recorded slope inclinometer movements are shown on Figure 6. The attached plots show movement on the "A" axis of the inclinometer. Movement was not recorded on the "B" axis. The "A"+ or positive axis is oriented towards the face of the wall. Movement was recorded over the upper approximately 15 m in Slope inclinometers 1 and 2. This corresponds roughly to the wall height of 14.9 m at that location. Movement was also recorded at slope inclinometer 3 over the upper approximately 10 m of the wall. The wall at that location is 11 m high.

The slope inclinometers indicate approximately 0.25 to 0.6 cm of movement. A majority of the movement appears to have occurred between 100 to 200 days after the base line reading (ie. Approximately 150 to 250 days following the completion of the wall). This movement is in good agreement with the survey data which indicates a similar amount of movement over the same time period. S1-1, S1-2 and possibly S1-3 indicate some deformation after the aforementioned stabilization time period. This movement is very small (ie. 0.1 to 0.3 cm) and is most likely related to strains associated with landscape water infiltration.

Slope inclinometer readings were also recorded over the time period during which the recent Hector Mine earthquake occurred. Figure 7 shows the results of the slope inclinometer readings from October 1 to October 19. Given that post construction wall movements had essentially ceased by October 1st, examination of this set of readings would record any movements associated with the Hector Mine earthquake. The slope inclinometer plots contained in Figure 7 indicate that no significant movements were incurred at the wall during the Hector Mine Earthquake.

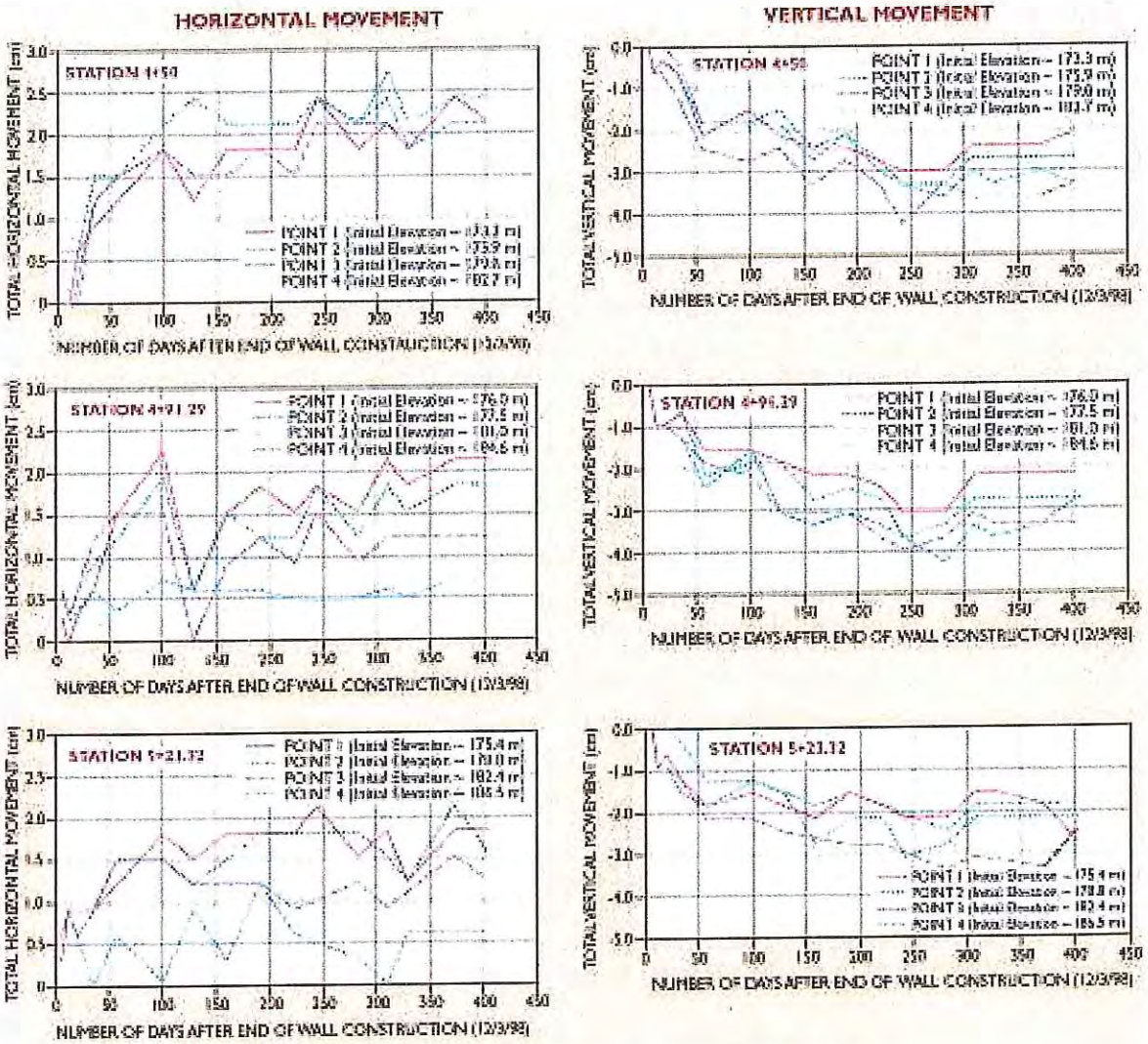


FIGURE 5: SRW Survey Monitoring Results

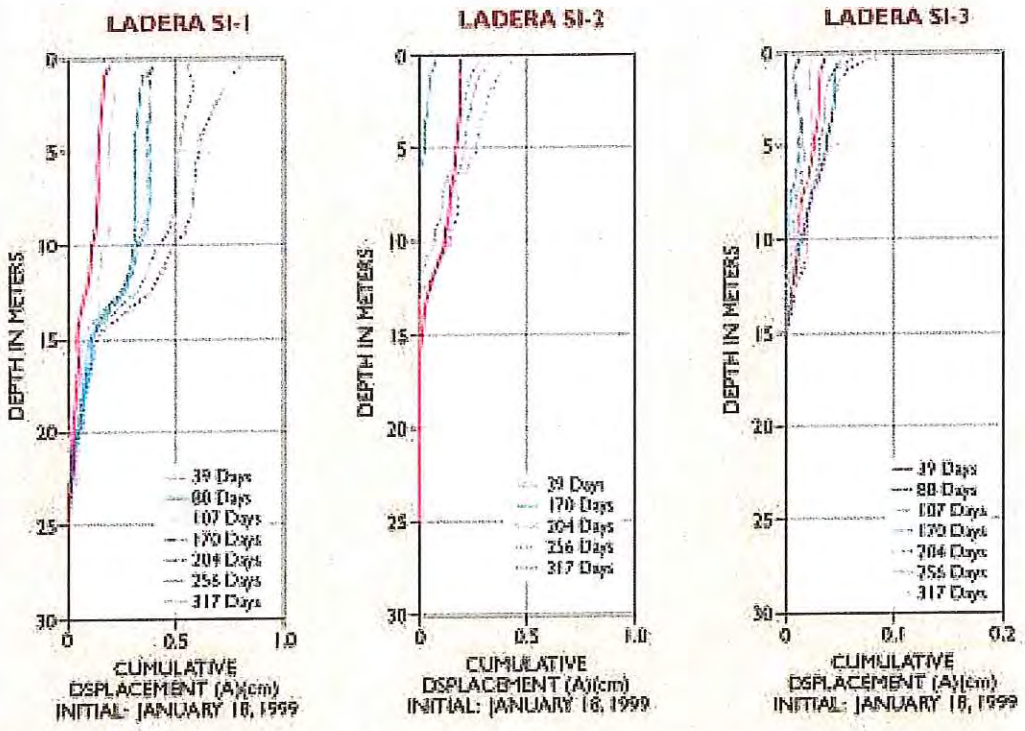


FIGURE 6: Slope Inclinometer Plots for SI-1, SI-2 and SI-3

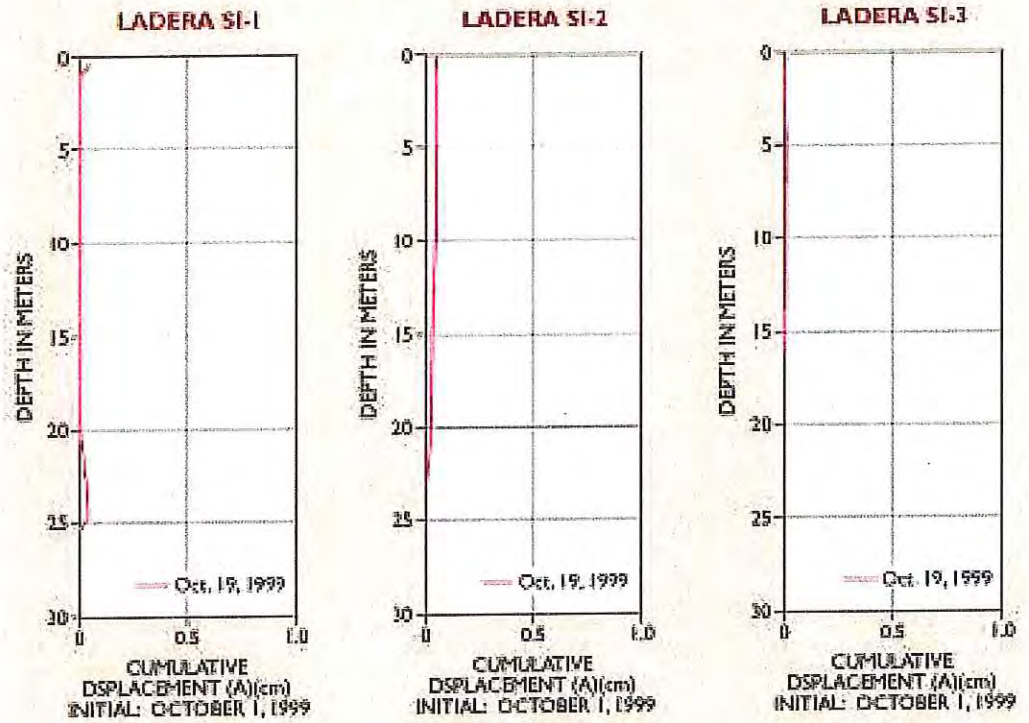


FIGURE 7: Slope Inclinometer Plots During Hector Mine Earthquake

8. DISCUSSION AND CONCLUSIONS

Total post construction horizontal and vertical movements of the wall system are on the order of 0.2% to 0.3% of the tot. wall height with a majority of the movement occurring over an 8 month time period. These movements were significantly smaller than expected but occurred over a longer time period than originally estimated. The small magnitudes of post

construction movement are most likely related to the conservative design procedures and the fact that seismic design controlled. The relatively long time for post construction vertical and horizontal movements to stabilize is believed to be related to the rate of primary consolidation for the relatively fine grained nature of the fill soils used in the reinforced and retained zones.

Very little data exists within the literature in regards to post-construction wall movements of SRW's. Much of the literature in regards to wall movements has concentrated on movements during construction. Bathurst (1994) describes post construction movements for an under-reinforced" SRW wall instrumented as part of a FHWA research project. This wall (the Algonquin wall) was 6.1 m in height and had a 1:20 (horizontal to vertical) face batter. Recorded post construction horizontal movements were on the order of 17 mm (i.e. roughly 0.25% of the height of the wall) occurring over a 109 day or 3 month period. Post construction movements were also recorded for a 3.5 m wall constructed on the campus of the University of Wisconsin - Platteville (Wetzel, et.al., 1995). Both horizontal and vertical movements were recorded for this wall using survey targets mounted on the facing block units. Post construction horizontal movements recorded by the survey targets were approximately 0.05% of the wall height. Post-construction settlement or vertical movements were not recorded.

The recent Hector Mine Earthquake which is estimated to have produced a horizontal ground acceleration of up to 0.1g did not induce any significant movements in the wall. This result is consistent with observations recorded at various MSE walls in the Los Angeles area following the Northridge earthquake (Sandri, 1997). However, even the estimated maximum horizontal ground acceleration at the crest of the wall during the Hector Mine earthquake was roughly 1/2 of the design value. Consequently, the real test of the wall will be during a large seismic event. The slope inclinometer and survey monitoring devices are permanent and will be monitored on a periodic basis over the next several years. This will allow future measure of earthquake induced deformation, should a large earthquake strike the area.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the efforts and cooperation of Soil Retention Systems (wall building contractor) and Huitt-Zollars (Surveyors) without whom the instrumentation and data from it would not be available.

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ANCHOR®
BUILD SOMETHING BEAUTIFUL

Diamond Pro Stone Cut® and Vertica Stone Cut®
WALL SYSTEMS

PROJECT PROFILE

Photo by: Truesdale Photographics

More than 100,000 square feet of Diamond Pro Stone Cut® retaining walls circle the River Bluff high school campus.

River Bluff High School LEXINGTON, SOUTH CAROLINA

PRODUCT
Diamond Pro Stone Cut® and Vertica Stone Cut® retaining wall systems

MANUFACTURER
Southeastern Concrete Products
Columbia, SC

WALL AREA
130,000 square feet

WALL DESIGNER
Jon Huyck
Anchor Wall Systems, Inc.

WALL CONTRACTOR
Harold Brock
Brock Landscape Contractors, LLC
Piedmont, SC

PROJECT MANAGER
Dallas Gailey
Cumming Corp.

PROJECT CIVIL ENGINEER
Kevin Krick
Genesis Consulting Group

THE CHALLENGE
The Lexington School District One in South Carolina secured 150 acres of densely wooded land with wetlands, a highly variable topography and a ravine to build a 524,000 square foot high school building, parking lots and athletic facilities. The size and location of the site were ideal but the extreme conditions required extensive development to make it a suitable building site.

One of the first walls built was a 48-foot-tall (30,000 sq. ft.) Diamond Pro Stone Cut® retaining wall.

THE SOLUTION

The key to transforming the site to make it construction-ready was building 24 retaining walls totaling 130,000 square feet.

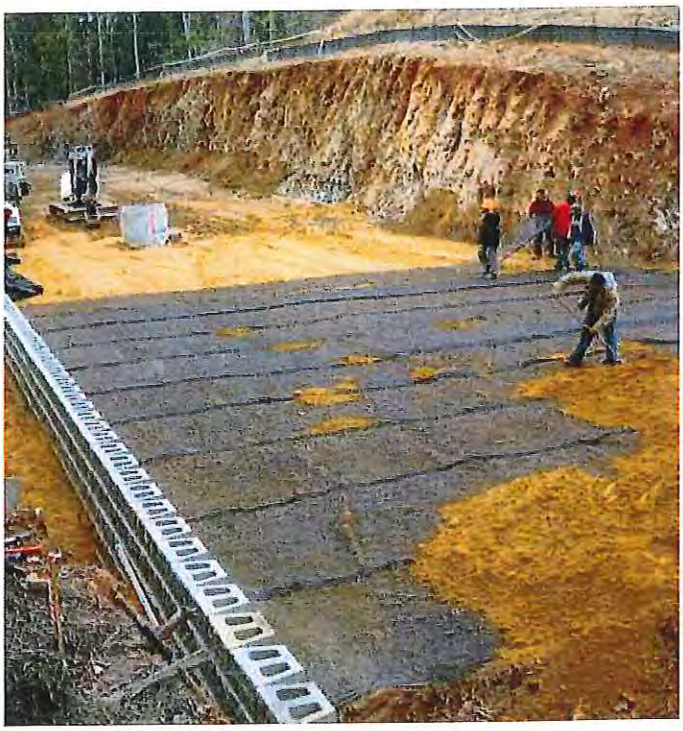
"The River Bluff High School project could not have happened without the retaining walls," said Dallas Gailey, construction manager with Cumming Corp. "The site was unusable without the extensive site work." Added Kevin Krick, the design engineer with Genesis Consulting Group, "It was important to choose the right retaining wall. The Anchor systems were chosen for aesthetics and Anchor's ability to assist in structural design. Because of the size of the walls, we wanted an experienced team that would stand behind the product and design."

DESIGN PARTNERS

Anchor Wall Engineering worked closely with Genesis Consulting on designing the retaining walls and bridges.

A ravine in the middle divided the site into two areas. The east side was developed for the school building. The athletic fields and complex were built on the west side. One of the first walls built was a 48-foot-tall (30,000 sq. ft.) Diamond Pro Stone Cut® retaining wall designed to support the school's main parking lot, which would be used as a staging area for materials needed to build the school. Another 100,000 square feet of retaining walls averaging twenty feet tall circle the campus (and also include walls designed to construct the land bridges to connect the campus).

The grade variations required moving more than one million cubic yards of dirt to level the site. Most of the onsite soils weren't suitable for retaining wall construction and 60,000 cubic yards of sand were hauled to the site to backfill the walls, a critical part of the design to insure long-term stability. To minimize the high cost of importing select sand, Anchor Wall Engineering prepared a design to incorporate some of the suitable on-site soil into the upper heights of the retaining walls.



Most of the onsite soils weren't suitable for retaining wall construction.

AESTHETICS A PRIORITY

The aesthetics of the campus were very important and the district even sought design input from the community. The three-level campus, which sits on a wooded hillside overlooking the lower Saluda River, is a source of community pride and is open to the community for hiking. "The retaining walls went hand-in-hand with the design," said Gailey. "They provide a beautiful look to the overall project."

The school district had the Diamond Pro Stone Cut® system installed on two other school sites before it was chosen for the River Bluffs project. The natural-looking face texture, colors and overall appearance of the system beat the look of uniform gray blocks typically found on massive retaining walls.

The football field prominently features Diamond Pro Stone Cut walls that support a raised pedestrian plaza and entrance to the arena. On the field, the highly visible walls flank the end zone and blend nicely with the materials used throughout the facility.

PRODUCT SOLUTIONS

The Diamond Pro Stone Cut system was ideal for a majority of the project but the Vertica Stone Cut® system was used to build three land bridges spanning the ravines.

Bridges were constructed with massive, 50-foot-wide arch culverts and the Vertica Stone Cut retaining wall system.

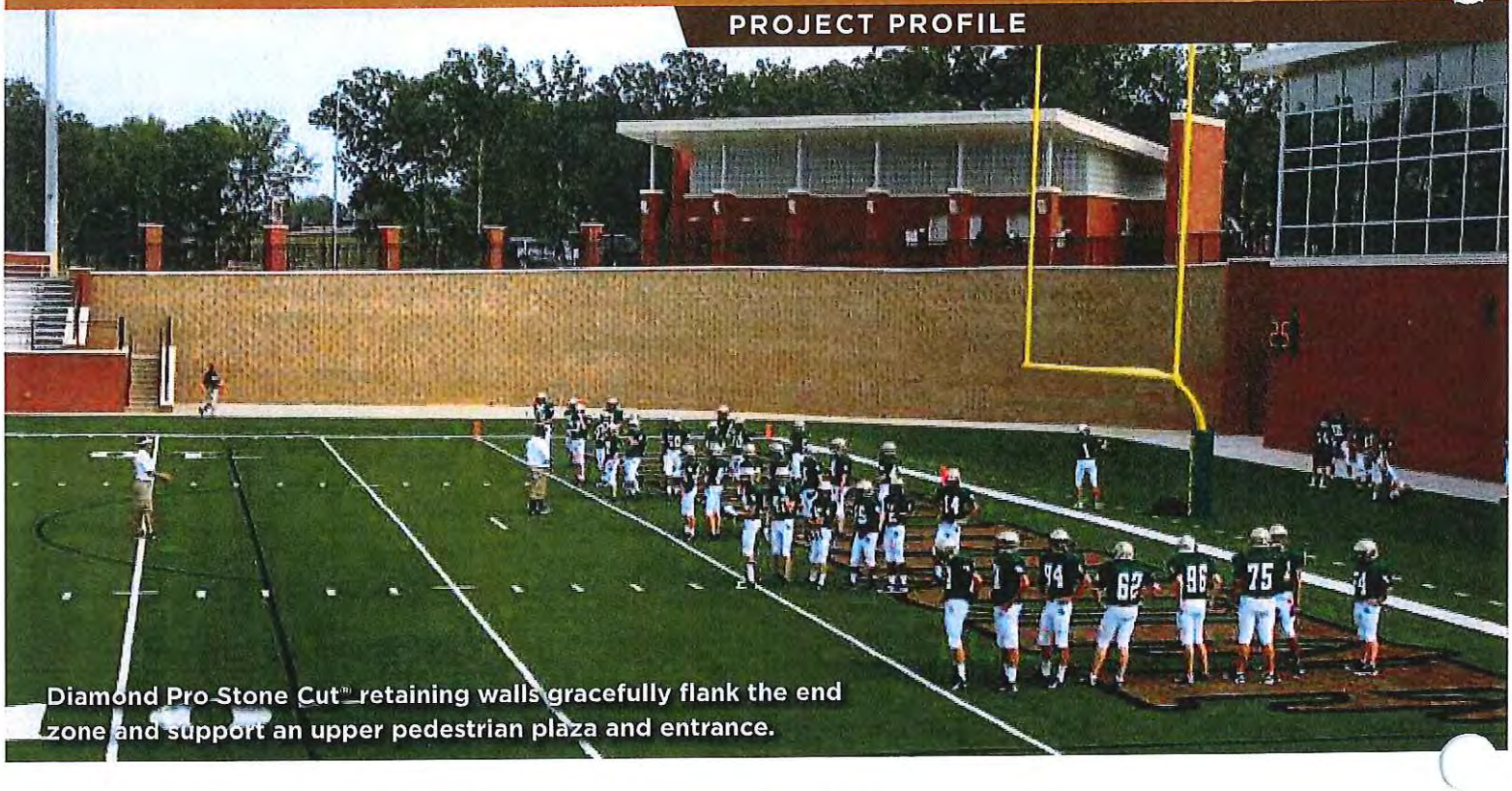
The Vertica Stone Cut® retaining wall system integrates with arch culverts to preserve wetlands and support three road bridges.

Arch culverts were placed in the ravine to protect the wetlands and the Vertica Stone Cut system was built around the culverts. The school district wanted to avoid a large ledge at the top of the arch that would have been created by the seven-degree setback of the Diamond Pro Stone Cut system, so the Vertica Stone Cut system was used because the system's two-degree batter integrates seamlessly with the culverts. Harold Brock of Brock Landscape Contractors, LLC, said wall construction around the culverts was exacting work as his crews used laser levels and skill to keep the courses of block level on each side of the huge, 50-foot-wide culverts. The tallest Vertica Stone Cut retaining wall built on this site reaches 42 feet.

The functional bridges also support the overall design of the campus because the Vertica Stone Cut system has the same face dimensions, texture and color of the Diamond Pro Stone Cut system, so the systems blend nicely together.

Diamond Pro Stone Cut® and Vertica Stone Cut®
WALL SYSTEMS

PROJECT PROFILE



Diamond Pro Stone Cut® retaining walls gracefully flank the end zone and support an upper pedestrian plaza and entrance.

The primary use of the walls was site preparation but the finished walls received praise for overall appearance.

THE RESULT

A large, challenging site was transformed with retaining walls to prepare it for construction. Following completion of the River Bluff High School campus, the retaining walls support the aesthetic design as well as the critical roadway and pedestrian structures. "Visitors comment on how well the walls blend with the architecture and natural surroundings," said Jeff Salters, chief operations officer for Lexington School District One. "The walls enhance the overall campus and support the natural look we tried to preserve on the site."

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Anchor Wall Systems, Inc., 5959 Baker Road, Suite 390, Minnetonka, MN 55345.

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Segmental Retaining Wall Application

Project name : Culture Center in Tae Back city
Location : Kwang Won Province
in Republic of Korea.
Owner: Tae Back City
Duration: April, 2000 to June, 2000.
Products Used: Anchor Vertica Pro
and Caps(7,900ea)
Size Height: 13.4m
Width: 59.0m
Total Area: 790m2
Installation: Geo Marine Eng.Co.,LTD.

Back Ground

Tae Back City is located at the mountain area and coal mine city. City reconstructed very old and narrow rote. As a result of widening the old route, Very steep slopes were newly formed along the new route side. City authorities have been considering proper erosion protection method for one steep slope near culture center entrance. There was vegetable field at the top of slope and below that field very hard rock parts were founded from bottom of slope to 4m high. The owner of vegetable field kept complaining of soil erosion and city had to adopt erosion control method.

Considerations

50 degree of slope, rock parts from bottom of the slope to 4m high.

Erosion control system for vegetable field,

Entrance of city culture center was needed aesthetic

aspect.

Rock parts were very difficult to secure proper length of reinforcement.

The route was curved and busiest main route to Capital city from Tae Back City.

Difficult to find good back fill materials.

The Solution

Decide to install segmental retaining wall with 50 degree batter and bottom part of retaining wall (from base course to 4m high) use 20cm to 40cm thick concrete back fill except hollow fill because of short of reinforce length.

Anchor Vertica Pro locator is for 4 degree batter with normal installation but we planed to place the face of upper block just back of the locator of bottom one to secure 50degree batter and we did.

We chose grooved face Vertica Pro products for matching aesthetic aspect to the culture center entrance.

Result

The combined segmental retaining wall has been a very beautiful success.

It has met two strong typhoon with heavy rain but functioned very well.

City and the owner of field were very satisfied with the finished Anchor Vertica Pro using retaining wall.

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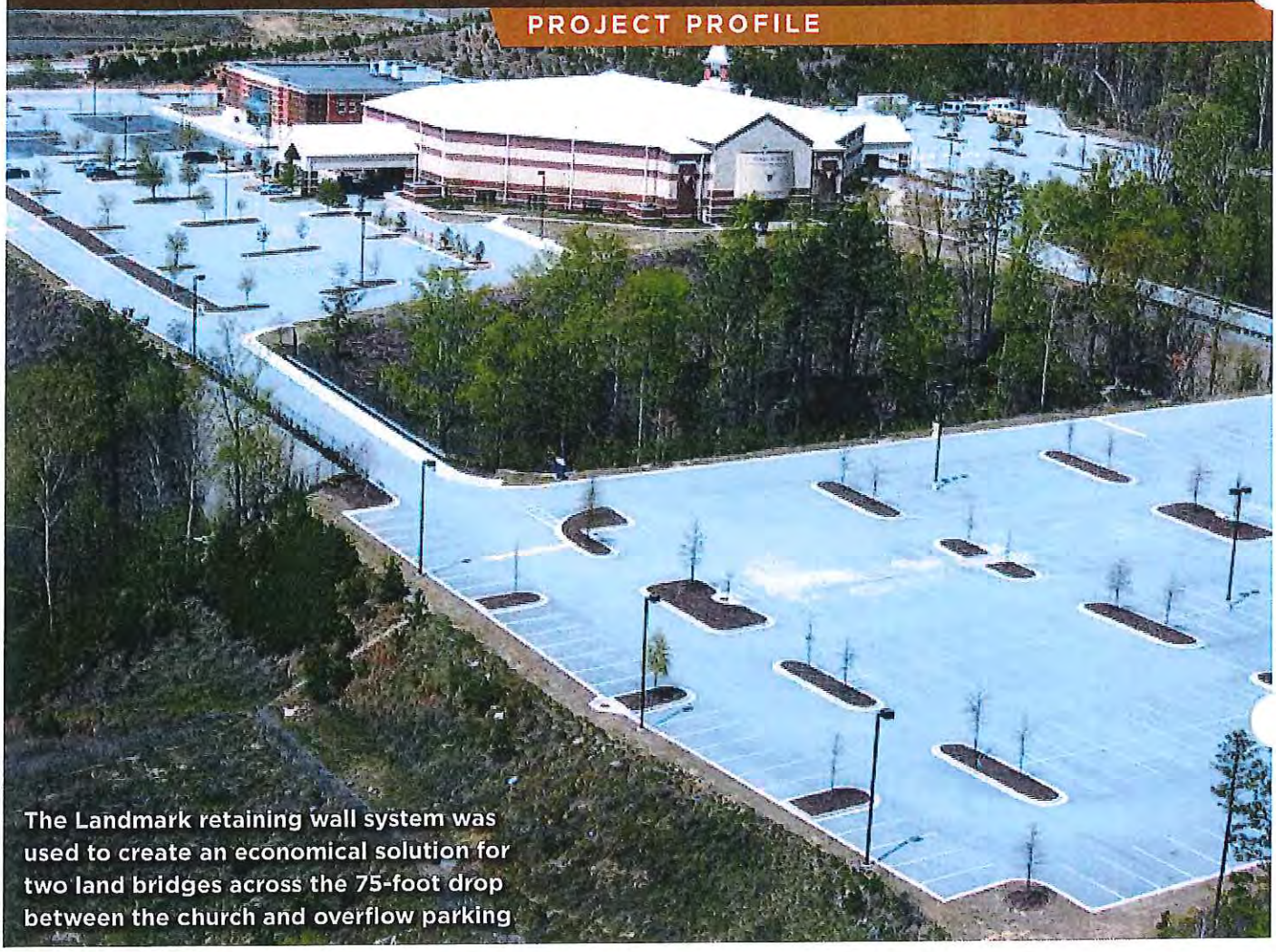
Landmark
RETAINING WALL SYSTEM

PROJECT PROFILE



The Landmark retaining wall system was used to create an economical solution for two land bridges across the 75-foot drop between the church and overflow parking

WORD OF FAITH MINISTRY POWDER SPRINGS, GEORGIA

PRODUCT
Landmark retaining wall system

MANUFACTURER
Pavestone Company
Atlanta, Georgia

WALL DESIGN ENGINEER
Value Engineering Co, Inc.
Alpharetta, Georgia

SITE CONTRACTOR
Century Builders
Houston, Texas

WALL CONTRACTOR
Value Engineering Co, Inc.
Alpharetta, Georgia

WALL DIMENSIONS
60,000 square feet
Heights varied, up to 61 feet

THE CHALLENGE
The Word of Faith Ministry is a large and growing congregation. To meet the congregation's needs for more space, they decided to build a new facility. A large creek flows through the center of the wooded site that was chosen. The 75-foot drop from the church to the creek made it impossible to reach overflow parking. To make the site work, two bridges were required.

EVALUATED BY HITEC IN THE UNITED STATES, RTA IN AUSTRALIA AND BBA IN THE UNITED KINGDOM.

Landmark
RETAINING WALL SYSTEM

PROJECT PROFILE

THE SOLUTION

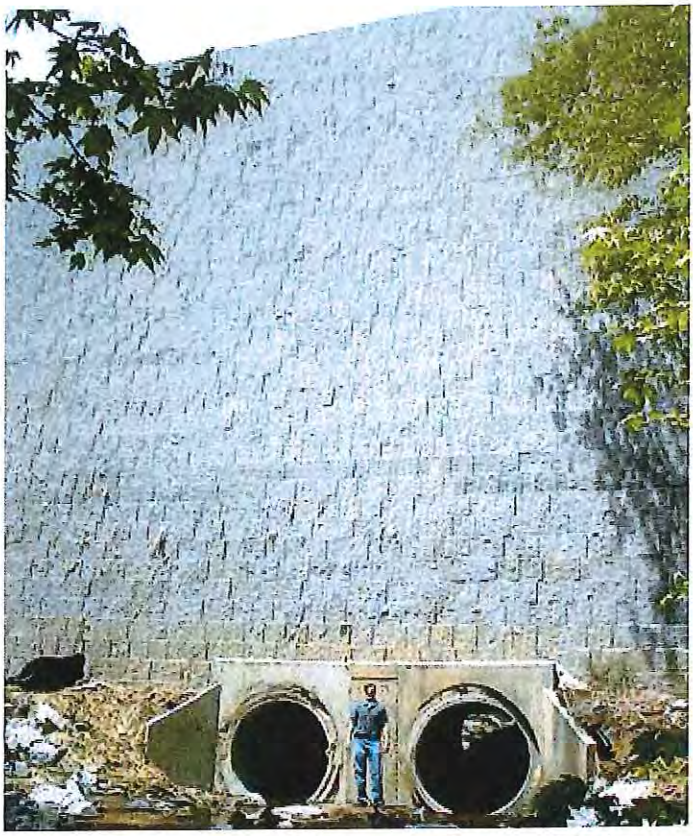
As a specialist in segmental retaining walls, Norm Amend, wall design engineer at Value Engineering Co., realized a land bridge would be a viable solution that was more economical than the proposed bridges.

The Landmark retaining wall system was chosen for the land bridge because the mechanical connection to geosynthetic reinforcement made it possible to build the tall structure that was required. Ultimately, the land bridge became the tallest segmental retaining wall structure the firm has built, at 61 feet. The paved road across the bridge is only 40 feet wide. To provide drainage, the land bridge structures have two six-foot-diameter culverts through the walls.

When the project was completed, seven walls had been built on the site, ranging in length from 114 feet to 981 feet. Native silty-sand soils were used for the reinforced fill.

THE RESULT

The congregation was able to build a new facility with adequate parking on a challenging site.



To provide drainage, the land bridge structures have two six-foot-diameter culverts through the 61-foot-high walls.

This land bridge provides much needed access to overflow parking.

HITEC-EVALUATED

For high performance under extreme loading conditions, the Landmark retaining wall system is a cost-effective option evaluated by HITEC. The Landmark system features a unique mechanical connection, which allows the system to generate extremely high connection values, independent of blocks above the connection. Developed specifically to meet the high standards of the transportation industry, the performance features of the Landmark system make cost-effective design solutions possible using either the American Association of State Highway and Transportation Officials (AASHTO) or the National Concrete Masonry Association (NCMA) design methodology.

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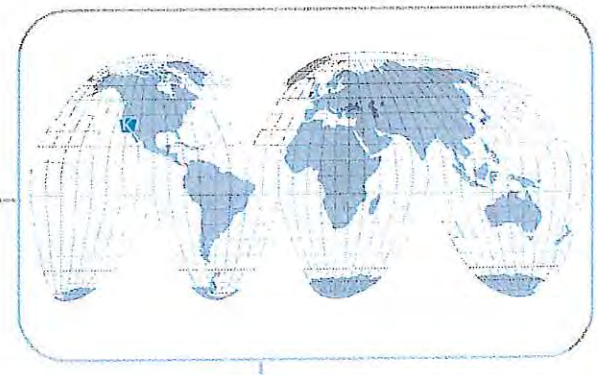
KEYSTONE® RETAINING WALL SYSTEMS
A CONTECH COMPANY

Retaining Excellence™

CASE STUDY

Thurgood Marshall Middle School

San Diego, California



"The Great Wall of Scripps Ranch"

The new Thurgood Marshall Middle School in San Diego, California welcomed its first students in fall 2007 with a campus and athletic fields rivaling that of some colleges. Along with premier educational facilities, the new school's campus is also home to one of the tallest Keystone segmental retaining walls ever built in California. The wall, which was built to combat a 150-foot elevation change, reaches approximately 45 feet at its tallest point and nears 48,000 square feet in total coverage.

"Originally a cast-in-place wall was discussed, but the cost was way out of budget. Soltek changed the site design a bit and reconfigured the retaining walls to make it more cost-effective for the school," said William Naylor, Design Build Program Manager and Vice President, Soltek Pacific.

Fifteen other Keystone retaining walls were built throughout the site, along with the 45-foot tall wall, to level the area and create enough room to construct the school and its facilities. The Keystone Standard unit was selected for all the walls, which totals approximately 100,000 square feet, because it provided a structurally sound and cost-effective solution that also met the critical needs of efficient installation and aesthetic appeal.

Project:	*Thurgood Marshall Middle School*
Location:	*San Diego, California*
Keystone Product:	*Keystone Standard Unit*
Keystone Manufacturer:	*RCP Block & Brick*
Total Wall Area:	*16 walls totaling approximately 100,000 square feet* *Largest wall: 45 ft. high; 1,700 ft. long*
Wall Contractor:	*Geogrid, Inc.*
General Contractor:	*Soltek Pacific*
Wall Engineer:	*ABI Engineering Consultants, Inc.* *Daya Bettadapura, P.E.*

CASE STUDY

LAND MANAGEMENT

Project Site Challenges

The Thurgood Marshall Middle School and its facilities are built on 36 acres of a hillside that is near the Marine Corps Air Station Miramar. Before it was reestablished solely as a Marine Corps Air station, the navy and army both occupied this area. The past military activity conducted at Miramar required the site undergo an extensive "unexploded ordinance removal" effort before any construction could begin. The original unexploded ordinance removal effort, which was planned to be a two-inch screen for 120,000 yards, was changed to a one-inch minus screen for the entire site of 400,000 yards. The extension of the unexploded ordinance removal screening delayed an already tight construction schedule and made efficient wall production an even more critical factor.

Along with site challenges, stringent building codes and the rigorous approval process of the Division of the State Architect (DSA) added to the project's complexity. The DSA ensures California's K-12 schools and community colleges are seismically safe and accessible by reviewing all construction project plans for structural safety, fire and life safety and accessibility.

Design/Installation

"The wall designs had to meet the stringent DSA requirements considering the high seismic accelerations at the site, global stability and on-site soils," said Daya Bettadapura, P.E., President, ABI Engineering Consultants, Inc.

The retaining wall design includes extensive reinforcement with geogrid lengths reaching 40 to 50 feet. The original wall design proposed screening all the on-site material, which consisted of conglomerates of rock and boulders for larger sized soil, and excavating the soils that could not be used for backfill.

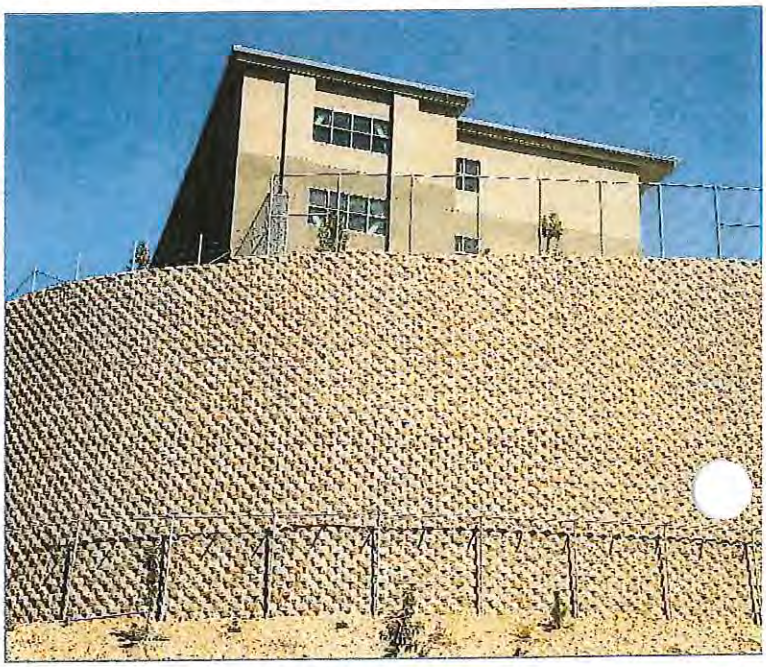
"Since the school's construction could not begin until the wall was finished, there was concern about whether the project could be completed on time especially considering the additional screening and excavation of on-site material. Geogrid proposed using a portable crusher to crush the on-site material instead of screening it. Crushing the material meant that it could be used as backfill and that we could immediately start building the wall. Also, significant costs would be saved," said Ed McCaffrey, Chief Operating Officer and Project Manager, Geogrid, Inc.

Crushing the on-site material and building the 48,000-square-foot wall, now referred to by the local community as "The Great Wall of Scripps Ranch", were conducted at the same time. Approximately 20,000 yards of 3/4-inch crushed rock/gravel, 20,000 yards of class 2 base and miscellaneous materials were produced from the crushing. According to Bettadapura, the more than 80 foot-wide backfill area was filled with the crushed on-site material that was deemed to provide high internal angle of friction.

Geogrid, Inc. constructed the 48,000-square-foot wall within 29 days. The use of several 627 CAT scrapers to import the fill expedited the wall's construction because it allowed Geogrid to place 155,000 yards of backfill behind the wall in the shortest time possible. Also, an estimated $1 million was saved by crushing and using the on-site material.

"Overall, the construction and coordination between Geogrid, Soltek's team and subcontractors, went unbelievably well for walls that size and a site that complex," said Naylor.

The remaining walls were also built to create level areas for athletic facilities, other buildings and parking areas for the school. The walls vary in height reaching up to 25 feet and were built at various times throughout the



school's overall construction. The tallest wall was one of the most important elements of the site's overall development and its efficient installation generated a three-month advance in the overall construction schedule.

Development of Thurgood Marshall Middle School required a major land development solution that would also work within a tight construction schedule and meet stringent building requirements. The Keystone Standard unit provided a complete solution that was structurally-sound, aesthetically appealing and could help maximize production.

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Yeager Airport Runway Extension: Tallest Known 1H:1V Slope in U.S.

John M. Lostumbo[1], P.E., M. ASCE

[1] Region Engineer, TenCate Geosynthetics, P.O. Box 300, East Amherst, NY 14051; PH (412) 779-3740; Email: J.Lostumbo@TenCate.com

ABSTRACT

Yeager Airport was constructed atop mountainous terrain near Charleston, WV in the 1940's. Construction consisted of excavating 7 hilltops and filling surrounding valleys to create a flat site for the runways. Due to this dramatic terrain, development to meet FAA safety regulations was extremely difficult, and some concessions were allowed. However, the airport recently needed to extend Runway 5 approximately 150 meters (500 feet) in order to meet current FAA safety regulations.

Bridges, walls and reinforced slopes were evaluated as options to extend the runway. The geosynthetic reinforced slope option provided the most economical alternative; plus, the "green" faced system allowed for a more aesthetically pleasing alternative to blend into the surrounding green hills. The reinforced structure is a 1H:1V (45 degree) geosynthetic reinforced steepened slope, 74 meters (242 feet) high. This is the tallest geosynthetic reinforced green faced 1H:1V slope constructed in the United States.

INTRODUCTION

Yeager Airport, formerly known as Kanawha Airport, in Charleston, West Virginia was constructed atop mountainous terrain near the city limits. Completion of the airport in 1947 was the culmination of an almost 20 year evolution in air service in the state of West Virginia.

Air service for the Charleston area began in 1930 with the dedication of Wertz Field in Institute, WV, approximately 6 miles outside the city limits. In 1933, the state of West Virginia was one of only two states that did not have air mail service, until American Airlines opened passenger and mail service routes from Washington to Chicago via Charleston. As larger passenger planes began to be used, Wertz Field became more and more limited for use. The small airfield was not suitable for landing larger planes. In the late 1930's, American Airlines notified the City of Charleston that it would discontinue service to Wertz Field because of these limitations.

Charleston realized that a site for a new airport needed to be found in order to keep up with the needs of the aviation industry and to keep air service viable for the Charleston area. A committee evaluated potential sites in the greater Charleston area and determined that the valley floor offered no suitable site large enough. The committee decided "we must build on the hilltops." A series of

semi-connected hill tops know as "Coonskin Ridge" was suggested by the committee as the best site option for an airport, however, significant earthwork would be required to level the site. In 1940, development plans began for the site with many obstacles to overcome. In the meantime, Charleston lost air service as Wertz Field closed in 1942 when the approaches were blocked by the construction of a synthetic rubber plant.

The need for the new site development intensified and construction finally began in October 1944. Construction consisted of excavating 7 hilltops and filing the surrounding valleys to create a flat site large enough for the airport. Earthwork proceeded continuously for 3 years and was finally completed in mid-1947. At the time, this was reported as the second largest earth moving project in history, behind only the Panama Canal. Since the airport was constructed on hilltop ridges, the ground surface slopes steeply down around the airport more than 91 meters (300 feet) to the surrounding Elk and Kanawha rivers. Due to this dramatic terrain, development to met FAA safety regulations was exceptionally difficult and some concessions were made. The airport was completed in 1947 and began operations December 1st as Kanawha Airport. The airport changed names to Yeager Airport in honor of West Virginian Chuck Yeager in 1985. Construction consisted of moving more than 6,881,000 cubic meters (9,000,000 cubic yards) of earth and rock and required more than 907,000 kilograms (2,000,000 pounds) of explosives. Grading along for the project cost approximately $4.5 million, more than 34 times the cost of the site.

In order to comply with current FAA regulations, Yeager Airport was required to upgrade its facilities. Runway 5 required a 150 m (500 ft) extension to meet the FAA requirements. The previous runway did not include the proper airplane safety and emergency stopping area. The challenge was how to extend the runway 150 meters (500 feet) out over a 91 meter (300 foot) high steep slope.

ANALYSIS AND DESIGN

Subsurface Exploration

A geotechnical evaluation of the site was performed to assess the subsurface conditions of the area. Over 100 borings were performed around the airport to evaluate the soil conditions at the slope as well as to identify excavation areas and other site development for the airport. The site soils consisted mostly of weather sandstone underlain by sandstone and some shale.

The borings showed the bearing area consisted mostly of shallow rock consisting of sandstone. The surrounding area and potential borrow sources indicated mostly weather sandstone and rock with some clay seams. Laboratory testing was performed on the site soils and rock for design parameters. Testing included Standard Proctor Compaction tests, grain size analysis, Atterberg Limits, Triaxial Shear Tests and Rock Core Compressive Strength. The results of the soil test borings and laboratory testing showed very favorable subsurface conditions.

The laboratory test results indicated that the maximum dry densities of the weathered sandstone and sand material at the site ranged from 19.2 to 20.9 kN/m^3 (122.1 to 133.1 pounds per cubic foot (pcf)) with an optimum moisture of 8.3 to 11.8 percent. The clay seams with rock fragments had maximum dry densities of 17.9 to 18.8 kN/m^3 (114.3 to 119.5 pcf) with optimum moisture contents of 12.1 to 12.6 percent. The triaxial shear tests indicated internal friction angles of the weather sandstone ranging from 38.9 to 39.6 degrees. Compressive strength testing of the rock cores indicated compressive strength of 30,405 to 97,630 kPa (4,410 to 14,160 psi).

Design Considerations

Based on the subsurface conditions at the site, the design team looked at options to extend Runway 5 the required 150 meters (500 feet). One of the key constraints was that the runway had to remain open during construction. The ground surface of the existing runway was at elevation 288 meters (946 feet). This limited the construction methods, as cranes or large equipment could not exceed elevation 283 meters (930 feet) as to not infringe on the airport's airspace. Bridge type structures, retaining walls and reinforced steepened slopes were all initially considered. A bridge structure was quickly eliminated as being too expensive, too difficult to build and not aesthetically pleasing. A retaining wall was also eliminated as an option due to expense and aesthetics. Additionally, a bridge or wall structure would have required construction cranes and other equipment that may have exceeded the height restriction for construction. Construction of the reinforced slope could be completed with traditional earthwork equipment and the height restrictions would not be an issue. A reinforced steepened slope was determined to be the best option for the project. It offered an economical solution that would be relatively easy to construct and would blend in to the surrounding green hills of West Virginia.

Several reinforced slope options were evaluated, with varying slope face angles. Ultimately it was determined that a 1H:1V green faced (vegetated) slope was the most economical slope option for the project and site conditions. The high bearing capacity of the sandstone and the high friction angle of the on site soils meant the limits of the structure could be kept to a minimum. A reinforced structure this large might require some type of bearing improvement or staging of construction to allow for settlement if not founded on rock. Since the slope would be founded primarily on rock, consolidation of the bearing strata was not a

concern. Also, the high friction angle of the on site soils provided two significant benefits: 1) It eliminated the need to import borrow soil from off site, and 2) It kept the required embedment lengths of the reinforcement material to a minimum.

The design used traditional slope stability analyses and computer program modeling to select the minimum strength requirements, vertical spacing and embedment lengths of the geosynthetic reinforcement. The soil properties used as part of the design are shown below in Table 1.

Table 1. Basic Soil Properties used for Design.

Soil Layer	Unit Weight, γ kN/m^3 (lb/ft^3)	Internal Friction Angle, Φ (degrees)	Cohesion, c (lb/ft^2)
Reinforced Soil Zone	18.1 (115)	36	0
Retained Soil Zone	18.1 (115)	36	0
Bearing Soil Zone	22.0 (140)	40	0

The design of the slope resulted in three types of primary reinforcement strengths being selected. The designed embedment lengths for the tallest slope section ranged from 53 meters (175 feet) at the bottom to 44 meters (145 feet) at the top. Vertical spacing of the primary reinforcement was 0.45 meters (1.5 feet) at the bottom of the slope and 1 meter (3 feet) at the top. The minimum Long Term Design Strength (T_{al}), per Equation 1, for the primary reinforcement are shown in Table 2.

Table 2. Primary Reinforcement Strength Requirements.

Reinforcement Type	Minimum Long Term Design Strength (T_{al}), kN/m (lb/ft)
P-1	56.4 (3,861)
P-2	54.4 (3,725)
P-3	43.4 (2,971)

Where $T_{al} = T_{ult} \div (RF_{CR} * RF_D * RF_{ID})$ [1]

T_{ult} – Ultimate Tensile Strength of Reinforcement
RF_{CR} – Reduction Factor for Creep
RF_D – Reduction Factor for Durability
RF_{ID} – Reduction Factor for Installation Damage

The high quality structural fill available at the project site proved to be very beneficial in the design aspect of the project. However, it also resulted in the use of a very coarse backfill in the reinforced fill zone. Since the gradation of the fill was slightly outside the typical gradations used, site specific installation damage testing was performed to verify the reduction factors used to calculate the Long term Design Strength of the reinforcement. The Mirafi Miragrid XT

Geogrids proposed for the project were tested by a third party testing laboratory to measure the reduction factors for installation damage using the proposed backfill soil for the project. The geogrids proposed were woven polyester uniaxial geogrids coated with PVC. The test results showed the geogrid was highly resistant to installation damage using the proposed rocky backfill soil. Even though the results indicated lower reduction factors could be used, the initial specified reduction factors were used. Since a lower reduction factor would result in a lower calculated minimum ultimate tensile strength of the reinforcement, the higher reduction factors for installation damage were used for consistency and added conservatism. The specified soil gradation is shown in Table 3.

Table 3. Specified Soil Gradation for Reinforced Backfill.

Sieve Size	Specified Project Backfill, Percent Passing (%)	Typical Backfill Gradation per FHWA, Percent Passing (%)
152 mm (6 in)	100	
20 mm (3/4 in)		100
4.75 mm (No. 4)	30 to 100	20 to 100
0.85 mm (No. 20)	0 to 60	0 to 60
0.075 mm (No. 200)	0 to 50	0 to 50

Based on the results of the laboratory testing and following the project specifications, the minimum ultimate tensile strength required for the geosynthetic reinforcement was determined for each type. Reduction factors for creep of the Miragrid XT geogrids were determined by third party laboratory testing per ASTM D5262. Using the appropriate reduction factors for the PVC coated polyester geogrids, the minimum ultimate tensile strength was calculated based on the design. The minimum tensile strength is shown in Table 4. As you can see, the required tensile strength for Reinforcement Type P-1 and P-2 are relatively close, so the same reinforcement was used for both Types. This allowed for less handling, easier placement of the reinforcement, and less waste during construction, because only two types of geogrid were used.

Table 4. Primary Reinforcement Ultimate Strength Requirements for Polyester Geogrid.

Reinforcement Type	Minimum Ultimate Tensile Strength Required (T_{ult}), kN/m (lb/ft)	Actual Ultimate Tensile Strength of Geogrid Used, kN/m (lb/ft)
P-1	160.1 (10,968)	187.9 (12,870)
P-2	154.5 (10,581)	187.9 (12,870)
P-3	123.2 (8,439)	145.2 (9,950)

The facing material for the slope is a small aperture mesh type geogrid. Erosion Control Blankets or other type of bio-degradable erosion control products were not used. Typically, 1H:1V slopes are the transition point between using an erosion control blanket on the face or having to use a wrapped face construction with reinforcing elements. Initially it was considered by the design team to use chain link fencing, draped along the face as the face treatment. However, it was realized that for the long term performance of the structure and for aesthetics, the face needed to be vegetated. Erosion control protection that also promoted fast vegetative growth was the right solution. The design team ended up selecting to embed the facing material into the slope at the primary reinforcement locations and then drape the material over the face with 0.75 meter (2.5 foot) overlaps vertically. The product was a green woven polypropylene mesh that provided erosion protection and allowed for fast germination of the vegetation on the slope face.

Figure 1. Green Mesh Slope Facing Prior to Vegetation

CONSTRUCTION

Perhaps the most notable thing about the construction of the tallest known 1H:1V slope in the United Sates was that there were no notable issues. Construction proceeded without significant problems or delays. The slope and reinforcement material performed as expected and survived several torrential rain falls during construction. The selection of a reinforced slope allowed the airport to continue operation during construction activities.

Construction of the slope was competed in just under 2 years, starting in the late summer of 2005 and finishing in spring 2007. The flexible polyester geogrid allowed for easy installation; time was not wasted having to anchor or

weigh down the material to prevent recoiling. The geogrid was installed as continuous reinforcement from the face of the slope to the required embedment length. No overlapping or splicing of the geogrid in the primary reinforcement direction was permitted. Adjacent panels of reinforced were abutted together to achieve 100% coverage of the reinforcement. The geogrid used for the project was supplied in 3.6 meter (12 foot) wide rolls that allowed for the use of fewer rolls than if a narrower width geogrid was used. Custom geogrid lengths were supplied to the contractor. This allowed for less waste and reduced the amount of cutting of the geogrid to the required lengths. This sped up construction significantly. The flexible geogrids went down smoothly with very little wrinkling and did not require pre-tensioning during installation.

Figure 2. Placement of Geogrid Reinforcement in continuous layers at Bottom Layers of Slope.

The borrow source for the reinforced fill material was on the airport property, close to the reinforced slope area. The borrow material was excavated using track hoes and transported using large off road tri-axial dump trucks when possible. Some ripping with large bulldozers and some blasting was also required at the size. After blasting, the material was crushed in order to meet the gradation requirements in the specifications. Fill placement started at the face of the slope and worked back to the end of the reinforcement. Some of the approximate material quantities used to construct the slope are shown in Table 5.

Table 5. Approximate Material Quantities for the Project.

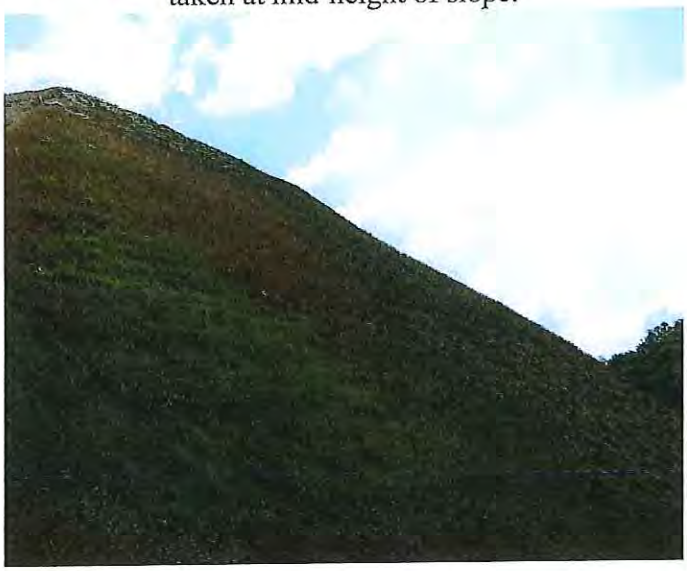
Material	Quantity, Square Meters (Sq. Yards)
Primary Geogrid, P-1 & P-2	321,073 (384,000)
Primary Geogrid, P-3	214,049 (256,000)
Secondary Green Mesh Facing	62,710 (75,000)

Figure 3. Reinforced Slope Construction

CONCLUSION

The reinforced slope constructed at Yeager Airport in Charleston, WV is the tallest 1H:1V geosynthetic reinforced vegetated slope known in the United States. It was completed in the Spring of 2007 and has been performing as expected. The green mesh facing provided an instantly aesthetically pleasing structure that allowed for quick germination of the slope. Vegetation covered the face within a few months of construction. The reinforced slope option provided fast construction, limited to no interference with airport operations, the most aesthetically pleasing structure and was the most economical. The green structure quickly blended in to the picturesque green mountains surrounding the airport.

Figure 4. Shortly after completion, already with good vegetation coverage, picture taken at mid-height of slope.



ACKNOWLEDGEMENTS

Special thanks to the design engineer, Mr. Dane Ryan, PE, Triad Engineering, St. Albans, WV and to Cast and Baker Corporation, Canonsburg, PA and JMD Company, Bethel Park, PA.

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Land Development & Planning
Storm Water Management & Engineering
Hydrology/ Flood Control
Soil BioEngineering & Stream Restoration
Airport Engineering Design & Support
Public Agency/ Municipality Consultant

January 15, 2015
Project No. 1344.12

THE NEW HOME COMPANY
29219 Canwood St., Suite 107
Agoura Hills, CA 91301

Attention: *Mr. Rick Bianchi, Vice President & Regional Manager*

Subject: **UPDATE GEOTECHNICAL STUDIES – ENVIRONMENTAL IMPACT REPORT TECHNICAL ASSESSMENT AND TENTATIVE MAP SUBMITTAL**

Project: **TRACT 71546 - CANYON OAKS DEVELOPMENT**
69 LOT RESIDENTIAL DEVELOPMENT AND COMMERICAL DEVELOPMENT
LAS VIRGENES ROAD & AGOURA ROAD
CITY OF CALABASAS, CALIFORNIA

Dear Mr. Bianchi:

RJR Engineering Group (RJR) is pleased to submit this addendum letter and updated geotechnical studies for the proposed development. This report summarizes the findings and conclusion of our preliminary studies for the Tentative Tract Map submittal and the review of the environmental impacts related to the geology and geotechnical engineering hazards associated with the project. This report is an updated to several previous studies referenced herein. This letter also addresses the City Geotechnical Review, dated December 12, 2014. For clarity, RJR addressed each item in an attached letter, including with this report.

Subsequent to the City feasibility approval, the project site plan has been revised. Based on the results of this study, our previous recommendations remain applicable. It is the opinion of RJR Engineering Group that the proposed development is feasible from a geotechnical standpoint provided our recommendations are implemented during design and construction. This report should stand as a whole and no part of the report should be used to the exclusion of another.

This report completes our scope of services in accordance with our professional agreement. Unless requested in writing, the client is responsible for the distribution and submittal of this report to the appropriate governmental agencies and members of the design team.

We sincerely appreciate the opportunity to be of service on this project. Should you have questions regarding this project or if we may be of any further assistance, please contact our office. We look forward to providing continued service.

Sincerely:

RJR ENGINEERING GROUP

REGISTERED PROFESSIONAL ENGINEER
ROBERT W. ANDERSON
C 58383
EXP. 12-31-16
CIVIL
STATE OF CALIFORNIA

Robert W. Anderson, N.S.P.E., R.C.E., G.C., Juris Doctorate
Principal Civil Engineer - RCE 58383 (CA)

Arizona: RCE 51923
Hawaii RCE 14230
Nevada 22968
Washington PE 47559
Oregon RCE 84690
South Dakota PE11546
North Dakota PE 8252
Colorado PE 44734
New York PE 92272

Certified CPESC #6840 & Instructor
California Certified QSP/QSD #21902 &
Trainer of Record (ToR)
Certified CISEC #1137

Certified CESSWI #3270
Certified CPSWQ #0920
Certified CMS4S #0223 & Instructor

PROFESSIONAL GEOLOGIST
JAMES O'TOUSA
No. 1393
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

James O'Tousa, MS, PG, CEG
Principal - CEG 1393, QSP/QSD 00490, CPESC 7927

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UPDATE GEOTECHNICAL FEASIBILITY STUDIES ENVIRONMENTAL IMPACT GEOTECHNICAL ASSESSMENT AND TENTATIVE TRACT SUBMITTAL VESTING TENTATIVE TRACT 71546 – CANYON OAKS DEVELOPMENT 69 LOT RESIDENTIAL DEVELOPMENT AND HOTEL SITE EAST OF THE INTERSECTION OF AGOURA ROAD AND LAS VIRGENES ROAD CITY OF CALABASAS, CALIFORNIA

1.0 INTRODUCTION

1.1. General Information

This addendum report presents results of additional geotechnical studies conducted by RJR Engineering Group (RJR) for the Tentative Map submittal and Environmental Impact studies. The proposed development is located south of the Ventura Freeway (Highway 101) and east of Agoura Road and Las Virgenes Road, and immediately north and east of Shea Homes (Tract 53534) in the City of Calabasas, California.

This report follows a previous Tentative Tract submittal in June 16, 2014. Subsequently, the site plan was revised to the current 69-lot development with a commercial/hotel site at the northwest corner of the development. This report provides an updated study to address feasibility, potential environmental impacts, and preliminary design criteria for initial design. Detailed geotechnical recommendations will be provided during rough grade design.

The approximate location of the site is shown on the Location Map included in Appendix A. A copy of the Tentative Tract Map is included in Appendix I.

1.2. Available Information

As part of this study, RJR has prepared a Tentative Tract Map for the proposed improvements, as the Civil Engineer of Record. RJR has prepared this report as the Geotechnical Consultant of Record, specifically to address the feasibility of this map. Where hazards or potential hazards were identified, mitigation measures have been provided. Any changes in this data may result in new or additional recommendations and conclusions.

This geotechnical report addresses two areas of study:

a. Potential geologic and geotechnical hazards at the site are identified and evaluated for purposes of addressing feasibility and the EIR studies.

b. Site-specific recommendations and specifications for conceptual site development (EIR and Tentative Map Approval) are provided herein. These recommendations and specifications will be updated during the rough grade and improvement plan phase.

1.3. Purpose

The purpose of our geotechnical investigation is to identify potentially adverse geologic and geotechnical conditions and ascertain the engineering properties of earth materials as part of the environmental studies and feasibility determination of the site. Where hazards are identified, remedial measures are provided to partially or wholly mitigate the hazard to ensure that the less the impacts are less than significant.

Once the EIR process has been completed and improvement plans are prepared, subsequent rough grade/design detailed reports will be prepared to confirm or supplement the findings, conclusions and recommendations of this report.

The purpose of this report is to provide preliminary feasibility level geotechnical analysis and design guidelines for use in the planning and preliminary preparation of the improvement plans.

1.4. Report Standards

This report has been prepared by RJR in accordance with the custom and practice for hillside developments for the Southern California area, as well as, the City of Calabasas requirements. Components of this project (e.g. detention basin, storm drains, and sewer) will be subject to the County of Los Angeles. Therefore, this report and future studies will also satisfy the County of Los Angeles Public Works Geotechnical Standards.

Throughout the report, certain terminology is referenced and assumed. The context and understanding of these terms, even when colloquial in nature, should be maintained in the technical nature of the report for the geologic and geotechnical industry, including but not limited to the American Geological Institute, American Society of Civil Engineers, California Division Mines and Geology, Southern California Earthquake Center, American Society of Testing Materials and others referenced herein.

It is important to note, the purpose of this report is to assess the potential geologic and geotechnical hazards to the site as they pertain to, and potentially affect the proposed building pad and associated improvements. It is important to note that all references and hazards are specifically referenced to the proposed building pads and impacts to the building pad and associated roads. These hazards may affect other areas (e.g. open space and other undeveloped areas) of the site, not evaluated within this scope of work or required by the current Building Code.

Last, unless specifically stated, the assessments and degree of hazard(s) and corresponding damage is based on the available data. There is no guarantee of warrantee that the hazard will not affect adversely affect the proposed development. This report, as is the standard throughout California and the United States does not evaluate hazards not outlined in the Building Codes, such as El Nino, and other acts of nature, that are beyond the current custom and practice in the industry.

This report is establishing acceptable thresholds for purposes of regulatory permitting. For instance, if the site undergoes string ground shaking, the shaking may exceed the design guidelines established by the California Building Code. At the same time, if the threshold of shaking is within the limits established, the buildings may be significantly damaged, but the report assesses the hazards in terms of ingress and egress for safety, not the degree of damage. The assessments herein, as made to prevent catastrophic danger to the residence, not prevent nuisance cracks and damage. Therefore, the context of the assessments and finding should be maintained throughout the review and reliance of this report. For any individual component, RJR should be contacted for clarification and the necessary interpretations.

2.0 SCOPE OF WORK

For this report, the following tasks included:

1. Reviewed information relevant to the subject site and nearby area, including records and reports contained in our own files as well as, data on published maps and available data from the City of Calabasas;

2. Performed additional site review;

3. Reviewed the proposed Tentative Tract Map from a geotechnical point of view;

4. Compiled pertinent maps and plates which include:
   a. Site Location Map
   b. Site Vicinity Map
   c. Regional Geologic Map;
   d. Ground Acceleration Map from CDMG;
   e. Predominant Earthquake Magnitude Map from CDMG
   f. Landslides Shear Test Sample Map from CDMG
   g. Depth to Highest Groundwater
   h. Quaternary Geologic Map
   i. Geologic Cross-Sections

5. Compiled or updated the geologic map and cross sections (1 thru 4), and Geo1-1' and 2-2' for the southern slope illustrating the subsurface exploration (Appendix A);

6. Compiled previous geotechnical laboratory testing and engineering data to perform the necessary engineering analysis for this update;

7. Performed pertinent geotechnical engineering analysis for the project;
   a. Probabilistic and Deterministic Peak Ground Acceleration;
   b. CBC 2010 Seismic Analysis
   c. Earthquake Event Search
   d. Fault Location Search;
   e. Liquefaction Screening;
   f. Lateral Spread Screening;
   g. Seismic Settlement Analysis;
   h. Initial Settlement Screening;
   i. Ground Lurching Screening
   j. Expansive Soil Analysis;

k. Unengineered and Alluvial Soil Limits and Analysis;
l. Slope stability analysis for existing and proposed northern and southeastern slopes;
m. Temporary excavation and buttress design alternative (Alternative #2) for southern slope landslide;
n. Lateral earth pressure design for retaining walls;
o. Initial screening for the proposed segmented geogrid reinforced slope facing;
p. Coefficient of subgrade reaction determination for slabs;
q. Structural Pavements Sections.

8. Revised the slope stability (Appendix D) and geogrid wall designs (Appendix I), and plotted the critical surfaces depicting the factors of safety on corresponding 11 x 17 exhibits.

9. Compiled all geologic and geotechnical hazards, a detailed analysis and corresponding mitigation measures necessary for project development; and,

10. Prepared this preliminary geologic and geotechnical report containing the results, conclusions, and geotechnical recommendations pertaining to proposed improvements on the subject site.

3.0 GEOTECHNCIAL STUDY FINDINGS AND GENERAL INFORMATION

3.1. Site Conditions

The study area is located on the west side of the City of Calabasas, south of the 101 Freeway, immediately east of the existing intersection of Agoura Road and Las Virgenes Road. The project site consists of two undeveloped lots of about 77± total acres in size located east of Las Virgenes Road and south of Agoura Road in the City of Calabasas, California.

The property consists of a northern and southern descending hillside bisected by an ephemeral canyon, which is an eastern tributary to Las Virgenes Creek.

The western boundary of the property is Las Virgenes Road in the northern portion and in the southern portion is the adjacent Tract 53534. The approximate location of the project site is illustrated on the Site Location and Regional Maps included in Appendix A.

On site slopes range in gradient from about 1:1 (horizontal to vertical) in localized slope segments too nearly horizontal (30:1) in the tributary canyons. Natural slopes generally range between 3:1 and 2:1 in gradient. The total elevation change across the site is approximately 320 vertical feet with the elevations ranging from about 780 to 1335 feet above mean sea level.

Previous placed fill is present along the north side of the site and at the western boundary adjacent to Tract 53534 and Las Virgenes Road. It appears that a series of level pads and roadways have been formed across the site. The pad areas appear to be related to previous ranch/grazing activities on the site that have occurred for over 25 years on the site. The unimproved roads appear to be related to the ranching activities, as well as, previous generations of subsurface exploration. Two recent area of fill are present in the northwest area of the site. The first involves the recently constructed, concrete lined, soft bottomed, detention basin constructed as part of Tract 53534 (RJR Rough Grade Compaction Report, 2003). The second area is located along the western boundary of the main canyon and fill placed along the northern side of the main east-west canyon over several episodes of agriculture and grading associated with Shea Homes.

Vegetation on the site consists of natural grasses, shrubs and oak trees are present in the drainages and on the upper portions of the slopes. Detailed biologic and biota studies have been performed by Rincon Consultants as part of the environmental studies.

Drainage of the site is primarily by sheet flow down the existing ground surface and is concentrated and directed to the tributary canyons and then offsite to the west. Based on hydrology studies performed by RJR, the ephemeral stream conveys approximately 600 cfs during a 50 year Capitol Event (RJR, 2007, 2011, 2012, and 2014a and b). RJR has included an existing flood hazard limits map in Appendix A. Flood limits will be significantly altered by the proposed

development, which will be mitigated with a debris/detention basin and storm drain system. A small spring (water seepage) area is present in the main tributary canyon, on the southern descending slope in the eastern area of the proposed development (between the end of the terminal cul de sac and the debris basin). A seepage drainage gallery is proposed to collect and direct runoff to the proposed environmental mitigation areas.

3.2. Proposed Site Development

3.2.1. Proposed Residential and Commercial Development

Based on Tentative Tract Map 71546, dated October 2014, the project will consist of the following elements:

- Proposed commercial pad at the northwest corner of the site near the main entrance, that is a proposed hotel site;
- 2 affordable units;
- 69 custom single family residences;
- Recreation facility and pool;
- Proposed recreation trail and associated improvements;
- Several acres of environmental mitigation areas consisting of the seep mitigation plan and re-location, re-establishment of wet meadows and riparian areas;
- Relocation and expansion of the existing County of Los Angeles (County) detention basin to the east;
- Associated infrastructure including but not limited to: public and private roads, County and private storm drains; sewer, domestic and reclaimed water which will be transferred to Las Virgenes Municipal Water District (LVMWD); various dry utilities; and landscaping, retaining walls, geogrid reinforced segmented slope facing, graded slopes and other improvements that will be maintained by the future Home Owners Association (HOA).

3.2.2. Site Grading Improvements

Under the current ownership, site development was initially evaluated and reports produced between 2004 thru 2005, in 2008 thru 2009, 2011, and now the current proposed project. The proposed improvements have varied and evolved since that time(s).

Site development has been based on competing planning and engineering goals: First, raising grades within the central canyon and development areas to assist in buttressing the existing southern landslide and reducing the required overall height of cut slopes, retaining walls,

balancing earthwork, and accomplishing hydrologic and flood control measures, and accommodate environmental mitigation measures. The second goal was to reduce the overall visual impacts, and still develop superior engineering mitigation solutions for the project.

The site will be mass graded using conventional cut and fill techniques to produce a series of level pads for the proposed commercial and residential development. The proposed development can be divided into the following:

Mass Grading: Conventional grading techniques will consist of cut and fill grading for the mass grading phase to remediate the on-site landslide, unengineered fill, alluvial removals and construction of any required stability fills. The bulk grading will consist of the following phases:

***MG Phase 1*:** This grading will include mitigation measures to remove existing alluvium to depths of approximately 20 to 40 feet below ground surface (bgs). Groundwater may be encountered in the deeper excavations around 35 to 40 feet. Existing alluvium will be re-used, processed, mixed, and placed as engineered fill.

***MG Phase 2*:** The second phase of bulk grading will be the removal of the landslide mass along the southern slope to stabilize the existing landslide complex. Landslide removal and stabilization are presented in the Geolabs report, dated May 27, 2011. A copy of this report has been included in Appendix H of this report. In summary, the landslide repair will consist of excavating a keyway, benching out and cutting the landslide mass, and then replacement with engineered compacted fill. Temporary back cuts were analyzed by Geolabs to ensure adequate temporary stability. RJR has included remedial grading plans to illustrate the proposed grading in detail (Appendix G).

It should be noted that the analysis presented by Geolabs includes a 3-foot continuous layer of clay with residual values. This model does not reflect the actual geologic conditions encountered in the field, where the field exploration encountered changes in structure, distorted areas, or transitions from oxidized bedrock to unoxidized bedock as indicators of the basal slide location. The depiction and analysis presents a reasonable and conservative approach, which has been collectively referred herein as the "winter approach". The temporary excavation provides a reasonable approach if grading occurs during winter or following a strong to severe rainfall season. An alternative removal design has been provided subsequently herein as a "dry season approach".

Calculations are included in Appendix D and the proposed removal and earthwork map are included in Appendix H.

MG Phase 3: construction of stability fills where adverse geologic conditions are encountered in areas of proposed development, including where adverse or questionable bedding orientations or areas of creep or surficial slope instability are identified during rough grading stage.

MG Phase 4: All mass grading will consist of contour-shaped landform grading to return the slopes to the existing grades or to an alternative natural appearance. Depending the proposed schedule, false slopes may be implemented that will minimize additional grading once rough grading is undertaken by ensuring the mass grading is compatible with the future improvements.

Other aspects will depend on the timing of the mass grading phase. If grading occurs during the spring or winter, mass grading may also include the construction of a temporary drainage channel to convey runoff from the eastern drainage to the existing detention facility. As well, the mass grading will be designed to ensure that adequate temporary surface drainage is maintained during periods of rain. This will entail temporary drainage devices and BMP facilities.

Rough Grading: In general, all grading will consist of typical measures and grading techniques that are typical in the hillside areas of southern California and that have been utilized in the City of Calabasas developments. Rough grading will consist of the following phases:

RG Phase 1: Demolish the existing detention basin constructed as part of the Tract 53534 development and relocated to the east of the proposed rough grade pad. A series of additional drainage improvements will be located in other tributary drainage areas. The basins will be constructed with compacted earth embankments and lined with a concrete slope facing, and soft bottom, and inlet tower system in accordance with the County of Los Angeles Flood Control District.

RG Phase 2: Construct a series of super pad by placing engineered fill to rough grade(s) and form the proposed lots and building pads. Pads and lots will then be formed to approximately ±0.1 feet of proposed grades.

RG Phase 3: Construct temporary excavations, as well as, cut and fill slopes at the building pad transitions to accommodate the elevation change from the proposed improvements to existing grades.

RG Phase 4: Construct a series of retaining walls and/slope protection structures per the proposed tentative tract map and conceptual grading plans.

RG Phase 5: The last phase will consist of grading and forming the future proposed streets.

3.2.3. Proposed Infrastructure Improvements

After the rough grading of the street, the following infrastructure improvements will be constructed:

- Contour grading of the transition slopes along the project boundaries to create natural and smooth slopes;
- Private terrace drains, brow ditch, catch basins, subdrain (keyway, bench and walls) and outlet drain lines;
- On- and off-site storm drains system including the private and public lines, street catch basins and related improvements will be installed throughout the tract. The storm drain lines point of connection (POC) will be at two locations. The first will be to the existing downstream facility located at Tract 53534. The second POC will be to the existing underground box structure in Las Virgenes Road;
- Proposed sewer line backbone will be installed for the proposed retail/commercial and residential buildings. The anticipated design will have the sewer line POC to main line located in Las Virgenes Road in front of Tract 53534, south of the project site that was installed as part of Tract 53534 improvements. The sewer lines will ultimately be dedicated to the LVMWD;
- Domestic, fire flow and reclaimed water lines will be installed throughout the tract. Domestic and fire flow lines will be extended for the residential and commercial/retain development. Reclaimed lines will be extended to landscape areas, as required. The anticipated POC will be immediately south of the proposed entrance to the main line that were constructed for Tract 53534;

- Dry utilities will be extended throughout the tract to the proposed improvements;

- Detention facilities, bioswales, infiltration structures, and other storm water management treatment facilities improvements (hybrid train designs throughout the project) will be constructed. This will include extensive LID and Green Infrastructure BMP's to address pollutants of concern;

- Improvements to Agoura Road and Las Virgenes Road which will include street widening, signal relocation/reconfiguration, various utilities, and right of way improvements/landscaping will be constructed as part of the on- and off-site street improvements;

- In-tract streets, alleys, sidewalks, handicap ramps, and parking for the proposed development;

- Construct an extensive drainage curtain gallery to intercept the existing eastern seep, and divert the seep flows to the proposed environmental habitat mitigation areas.

3.3. Previous Geotechnical Work

Subsequent to the 2011 City reviews and "Feasibility Approval", the site was purchased by the The New Home Company (TNHC) and the site plan has been re-designed. In general, the Updated Site Plan (2014 Site Plan) is in general conformance and similar to the 2011 Site Plan from a site development and engineering standpoint.

The current 69-lot 2014 Site Plan still provides:

i. Buttress and significant landslide removal of the southern slope, which remains similar to the 2011 geotechnical mitigation. The buttress has been re-configured based on the revised site plan, but still maintains the general principle design concept of removing a suitable volume of materials and replacing with engineered fill.

ii. The superpad approximate limits and general elevations and step up condition from west to east, from a geotechnical standpoint, is essentially identical to the 2011 Site Plan.

iii. Mass and rough grading approaches, as well as proposed utilities and public works improvements for the 2014 Site Plan are essentially identical to the 2011 Site Plan for feasibility and Tentative Tract Map level analysis;

iv. Slope facing and retaining walls have been subject to minor revisions and adjustments to accommodate the new residential buildings, but in most cases decreased in the 2014 Site Plan from that previously proposed in the 2011 Site Plan except for the proposed Hotel Site; and,

v. Feasibility level assessments for utilities and associated proposed improvements remain identical for the 2014 Site Plan.

This development has been subject to extensive studies and controversies since early investigations in the 1980's. With the accumulation of extensive data, development and evolution of the geotechnical engineering field, experience with other sophisticated sites and failures, development of computer software allowing for more sophistical engineering and seismic analysis, as well as, stricter and enhanced Building Codes have contributed to the industries ability to evaluate the develop complex sites such as the subject site.

To date, the site has been explored by a minimum of forty-five (45) exploratory excavations including bucket auger drill holes, trenches, core holes, and Cone Penetrometer Tests (CPT). In addition to the on-site work, prior to the approval of the residential site improvements at Tract 53534 (Azar/Shea Homes), RJR excavated borings and test pits to better identify the underlying structure and possible limits of mapped landslides (identified by previous consultants). Some of the test pits were drilled offsite to the north of Tract 53534 in the east-west trending tributary area to obtain depths to bedrock and bedding orientations. CPT (Cone Penetrometer Test) borings were also performed to establish depth to bedrock, groundwater, and some soil parameters. During construction of Tract 53534, RJR mapped the exposed temporary cuts and canyon cleanouts.

3.3.1. Work Performed for the 2014 Revised Site Plan and Submittal

This report relies on the previous subsurface and laboratory testing performed during the 2011 studies. Since the proposed Site Plan has been reconfigured, but is essentially the same in form, no additional studies were necessary at this time.

As part of this report, RJR has performed revised geotechnical engineering analysis which included revised slope stability analysis, segmented wall gross and global stability analysis, and updated hazard evaluations and recommendations.

3.3.2. Previous Geotechnical Studies

In general, initial work was performed in the 1980's where a variety of site plans were proposed by Baldwin Development for residential, commercial and mixed use development schemes.

Reports from the early 1980's were not available for review. However, throughout the late 1980's thru the mid 1990's the site currently known as the Shea Homes site was being developed by Pazar and Associates. Various site plans and reports were combined and then separated from the site which was referred to as the "Messenger Site" (previously Baldwin). Due to the existence of the large landslide complex and questions of overall stability, reports prepared for the two sites, together or separate, evaluated the site conditions present on the Messenger/Baldwin site and adjacent areas. During this period, considerable disagreement occurred between the various geologic and geotechnical consultants.

In and around 1991, Bing Yen and Associates and Slosson and Associates, City of Calabasas Reviewers requested testing be performed to confirm or deny the presence of a large mega slide that extended from the upper portions of the site down to the west, daylighting at Las Virgenes Creek. Work performed by West Coast Soils and O'Tousa and Associates (subsequently RJR Engineering Group) consisted of extensive subsurface work which included a 300 foot continuous core and geophysical work on the Pazar/Shea site. The boring conclusively demonstrated that bedrock was intact and no subsurface conditions were encountered to indicate a landslide was present. This work conclusively demonstrated that landslide complex to the east (Messenger site) was confined to the east.

Subsequent reports by O'Tousa and Associates and RJR Engineering, and later review comments by the City Reviewers Bing Yen & Associates and Leighton & Associates hypothesized that the landslide complex on the Messenger/Baldwin site consisted of mass that covered most of the southern descending slope that moved to the north into the existing drainage canyon. These configurations are similar to those found in this report by RJR.

Reports and analysis prepared by Pacific Soils disputed this and presented landslide mass and configurations that were significantly smaller. The City reviewer, Leighton and Associates raised a series of questions requesting that Pacific Soils resolve issues regarding conflicts between their models and interpretations with the subsurface data that had previously been encountered and the known shear data. Additional subsurface work was performed during this time by Neblett and Associates (Note: Neblett and Associates took over the project from Pacific Soils as a result of personnel changes) which consisted of a series of core holes. Different interpretations were made of the cores by Neblett than those made by RJR and Leighton & Associates. As a result, excavation trenches were made at various locations at the site. RJR and Leighton reviewed the subsurface conditions, and determined that the results indicated a deeper feature(s) that those postulated by Pacific Soils and Neblett. No logs for the trenches were produced and these issues were left unresolved. These issues became the framework and basis for RJR's subsurface approach.

The following discussion provides a summary of the work conducted at the site by previous investigators that is on file at the City or available in the RJR files. These studies and addendum letters will be summarized below in chronological order.

GeoSoils, Inc., dated May 14, 1987: This report was produced for The Baldwin Company. The report refers to previous work conducted by R.T. Frankian and Associates and Gorian and Associates. These reports were not available. Work by Geosoils included a review of CDMG info as well as the previous two consultants. This report addressed a large scale area of approximately 1,288 acres designated as Tentative Tract 35596, Calabasas. Borings, trenches, field mapping and stability analyses were performed. The landslide in the area of the development is considered to have a depths ranging from as shallow as 25 feet to over 99 feet (the bottom was not observed). Geosoils concluded the landslide was not structurally controlled by bedding structure. The report described the site materials, geology, landslide configurations, seismicity and provided conclusions and recommendations for stabilization.

West Coast Soils, dated January 5, 1989: This report was produced for Pam Azar and Associates for the proposed commercial development at 4522 Las Virgenes Road. This report refers to previous work conducted by GeoSoils, dated May 14, 1987. Work included a review of records at the City of Los Angeles as well as GeoSoils. West Coast Soils excavated 15 test pits and 6 borings. The site was to be developed with a commercial complex and corresponding parking lot. The report described the site materials, geology (assigns the landslide to the Topanga Formation), landslide debris, geologic structure and provided conclusions and recommendations for site development which include grading, fill depths, paving sections, drainage and the use of settlement markers. Cut slope recommendations of 1 1/2:1 are proposed as acceptable from a gross stability and seismic standpoint. Secondary effects from earthquakes forces such as earthquake induces landsliding, liquefaction and fault rupture are not considered a hazard.

GeoSoils, Inc., dated April 4, 1990: This report was produced for The Baldwin Company as well. The report indicates it is a supplemental report as a review of the revised Tentative Tract 35596 and refers to previous work conducted by GeoSoils. Work by Geosoils in this report includes additional geologic data by way of 76 additional geologic trenches and seven additional borings. Trenches and field mapping and stability analyses were performed. The report presents more specific geotechnical recommendations including cut and fill slopes, rippability, subdrains, drainage, debris protection and lot caps. Recommendations also included placement of fill, benching, subdrain installation, and site monitoring.

West Coast Soils, dated April 16, 1990: This report is an updated geotechnical report and was produced for Pam Azar and Associates for the proposed commercial development at 4522 Las Virgenes Road. This report refers to previous work conducted by West Coast Soils in a report dated January 11, 1989. The proposed development design was based on a grading plan prepared by B & E Engineers. The site was to be developed with a commercial complex and corresponding parking lot. The report briefly reviews some descriptions of the site materials, geologic structure and provides additional geotechnical recommendations for site development, which include specific cut slope recommendations for different slopes, notification of the existing

water well, and suggestions for its future. Also recommendations for the temporary excavations, removals, retaining walls and proposed slabs are provided.

West Coast Soils, dated April 3, 1991: This publication is an addendum report (#2) in response to questions by the County of Los Angeles Review Sheet for the proposed residential development on Tentative Tract Map 22131 and was produced for Pam Azar and Associates. This report refers to previous work conducted by West Coast Soils, Addendum Letter #1 (no copy was available), the previous Review Sheet, the West Coast Soils report dated January 5, 1989, the West Coast Soils update report dated April 16, 1990 and the GeoSoils report dated August 16, 1990. The report answers specific questions by the County of Los Angeles regarding the proposed development.

West Coast Soils, dated June 18, 1991: This publication is a Plan Review for the Tentative Tract Map and a response to questions by the County of Los Angeles Review Sheet for the proposed commercial development on the Tentative Parcel Map 22131 and was produced for Pam Azar and Associates. This report references the previous work conducted by West Coast Soils, dated April 3, 1991, December 12, 1990, January 5, 1989, April 16, 1990, and GeoSoils, dated August 16, 1990. The report answers specific questions by the City of Calabasas regarding the proposed development. This report is considered an update report and provides additional geotechnical recommendations for site development which include the debris basins, stability fills, temporary excavations, shoring, friction piles, lagging, tie-backs, foundations, and retaining walls.

West Coast Soils, dated October 21, 1991: This publication is a Plan Review for Revised Vesting Tentative Parcel Map and a response to request by the City of Calabasas for the Calabasas Promenade development on the Tentative Parcel Map 22131 and was produced for Pam Azar and Associates. This report references the previous work conducted by West Coast Soils and GeoSoils. This report is considered to be an update report, addresses minor tract boundary changes for the site and provides additional geotechnical recommendations for site development with regard to plan review and site observations.

West Coast Soils, dated November 15, 1991: This publication is an addendum report (#3) for the proposed residential development on Tentative Parcel Map 22131 and was produced for Pam Azar and Associates. The report provides additional stabilization analysis and recommendations for the proposed 1 ½: 1 fill slopes and stability fills. Soil cement and geogrid walls are suggested as methods of achieving a factor of safety of 1.5. The report states the shear values were derived by direct shear testing conducted by West Coast Soil, GeoSoils and Grover-Hollingsworth.

West Coast Soils, dated January 15, 1992: This publication is an addendum report (#5) in response to questions by the City of Calabasas Geology and Geotechnical Review Comments Draft E.I.R.-Calabasas Promenade for the proposed residential development on the Revised Tentative Tract Map 22131 and was produced for Pam Azar and Associates. The report answers specific questions by the City of Calabasas regarding the proposed development.

West Coast Soils, dated January 21, 1992: This publication is an addendum report (#6) in response to public comments of geology and geotechnical data for the Draft E.I.R.-Calabasas Promenade on the Tentative Parcel Map 22131 and was produced for Pam Azar and Associates. The report answers specific questions by the public with regard to the proposed development.

West Coast Soils, dated March 5, 1992: This publication is an addendum report (#7) in response to questions by the City of Calabasas Geology and Geotechnical Review Comments Draft E.I.R.-Calabasas Promenade for the proposed residential development on the Revised Tentative Tract Map 22131 and was produced for Pam Azar and Associates. The report answers specific questions by the City of Calabasas regarding the proposed development.

West Coast Soils, dated April 7, 1992: This publication is a Plan Review and addendum geotechnical engineering report and response to questions by the City of Calabasas the for the Calabasas Promenade development on Vesting Tentative Parcel Map 22131 and was produced for Pam Azar and Associates. This report includes work by O'Tousa and Associates for the review responses. The report answers specific questions by the City of Calabasas regarding the proposed development.

Pacific Soils Engineering Inc., dated August 25, 1995: This report was produced for The Baldwin Company for the Calabasas Promenade development on Tentative Parcel Map 22131. This report and investigation was produced at the request of the City of Calabasas reviewer, Leighton and Associates. A deep boring was drilled to ascertain the presence of a large landslide. This report refers to previous work conducted by R.T. Frankian, the mapping done for the C.D.M.G. by Weber in 1984, work conducted by GeoSoils and West Coast Soils. Work has been completed on the property since 1965. Pacific Soils Engineering excavated a deep boring, which was also observed by GeoSoils. The report described the site materials, geology, landslide debris, geologic structure. Pacific Soils Engineering excavated numerous borings including a deep core hole to a depth of 260 feet at the request of Leighton and Associates. However, the core hole produced the bedrock dip and did not orient to geologic structure from the core hole. The report concluded that the landslides observed are relatively shallow and overlain by a considerable thickness of colluvium and that the anomalous topography is explained by the present of a series of prominent folds with a mainly northwest southeast axial trend. The "headscarp" appearance of the top of the slope to the east of the hypothesized landslide was actually being an erosional contact between the Model Formation and the Calabasas Formation as well as minor local sliding. Geotechnical recommendations for the site conditions are to follow once the final plans are for development. The Pacific Soils Engineering report, to our knowledge, has not been accepted by the City of Calabasas.

Pacific Soils Engineering Inc., dated December 15, 1995: This report was produced for Home Depot for the Calabasas Promenade Commercial Development Site. This report refers to previous work conducted by Gorian and Associates, R.T. Frankian, Weber, Dibblee, GeoSoils,

West Coast Soils and RJR Engineering Group. The work by Gorian and Associates and R.T. Frankian was not available. Additional subsurface information was obtained. The report described the site materials, geology, geologic structure and a detailed discussion of the presence and evidence for landsliding. The report states that Leighton and Associates recommended the excavating of deep trenches at the headscarp areas of the hypothesized landslides. Pacific Soils excavated 5 trenches. The logs of these trenches were unavailable for inclusion into the subject report; however, RJR personnel observed the trenches which exposed landslide debris and varying thicknesses of colluvium on the slope surfaces.

A map of the compiled work of the previous consultants is included. The interpretation by Pacific Soils Engineering is a slide may be present on the mid-slope and upper portions of the slopes, but not at the mouth of the main west-draining tributary. The interpretation is that the anomalous topography is explained by the present of a series of prominent folds with a mainly northwest southeast axial trend. The "headscarp" appearance of the top of the slope to the east of the hypothesized landslide was actually being an erosional contact between the Model Formation and the Calabasas Formation as well as minor local sliding. Pacific Soils Engineering some geotechnical recommendations, a compilation of the subsurface data and slope stability analysis for the site conditions are to follow once final development plans are made.

RJR Engineering Group Reports for Shea Homes (2001 thru 2004): RJR provided a Grading Stage report and a series of in construction reports for the development of Tract 53534 for the Shea Homes site. Work presented provides additional subsurface data in the area of the development and the western margins of the Messenger site. The subsurface data derived from these studies is presented on the geologic map with this report.

Copies of these reports are available thru the City or RJR upon request. It is important to note, RJR utilized the data from these consultants and their investigations but did not rely on previous interpretations to ascertain the geologic interpretation presented in this report.

RJR Engineering Group, 2005: The RJR 2005 report addresses a proposed development that includes the buttressing of the existing landslide by in-filling the valley. This report includes the results of a subsurface exploration program that consisted of a two (2) continuous core holes with acoustic profiles, eight (8) bucket auger drill holes, and three (3) Cone Penetrometer Tests (CPT). The report generated 7 cross sections and a detailed geologic map that provided the depicted limits of the landslide, which was the largest depiction to date that provided a landslide that was more than 800 feet wide, 1500 feet long and estimated to be as deep as 180 feet based on computer models. The report provided detailed laboratory testing including the first torsion ring shear testing on the landslide debris and detailed slope stability. The report provided geotechnical calculations for the landslide mitigation, which consisted of over 1.75 million yards of remedial grading, 600,000 yards of mass grading for 40 single family homes, a commercial pad and associated in-tract and off-site improvements.

RJR Engineering Group, January, 2009: The 2009 report consisted of an addendum report based on site plan changes following the City General Plan Update. Site development was now going to consist of conventional grading of a series of super pads for future residential and/or commercial development. The pad reconfiguration also affected the landslide repair. The landslide repair on the southern slope was revised to consist of excavating a significant portion of the existing landslide and unsuitable rock and replacement with engineered fill. The excavated slide mass would then be re-graded to return the slope outside of the development to the existing configuration, or to that configuration to repair sequences of grading that has previously occurred to grade access roads and trenches across the site. This approach would then allow for field adjustments if the landslide configuration and lateral extents vary from that modeled by RJR. Slope mitigation also included a series of keyways, constructed from the top down to repair remove and replace the slide mass with engineered fill and curtain subdrains to control any groundwater or transient water in the vadose zone.

RJR Engineering Group, July, 2009: RJR responded to City review comments. The project was "*Approved from a geotechnical viewpoint for the feasibility level study*" by the City, September 28, 2009.

RJR and Geolabs, 2011: Additional subsurface exploration was performed to further assess the depth and eastern extent of the southern landslide. Previous geologists and other investigators of the site have rendered widely varying interpretations for the limits, geometry, modeling, and depth of landsliding present at the property.

In 2011, additional subsurface exploration was performed at the site. This work consisted of additional test pits and borings performed by RJR, Geolabs and Leighton Associates. This additional work has both confirmed and modified the previous findings and modeling presented by RJR.

The results of this additional work concluded, in summary, the following:

- The eastern limits of the landslide extent to the east approximately 200 to 400 feet based on slide graben encountered in the test pits. The western limits and general remaining limits remain essentially unchanged;

- The landslide depth is not as deep as previously inferred by RJR and has been reduced from 120 to 150 feet to approximately 70 feet;

- No static groundwater surface exists, but rather consists of discontinuous pockets and areas that have accumulated as a water infiltration thru fractures and discontinuities;

- In most borings, no discernable or continuous landslide plane could be identified. Typically the Calabasas Formation lacks the tensile strength to remain in-tact with any movement, yet relatively in-tact rock was observed within the landslide mass. In fact, as was the case with most borings at the site, rock quality, changes in oxidation, structure and other features were used to infer the existence.

The summary of the results are presented in a report prepared by Geolabs is included in Appendix H. The current slope stability modifies the findings in the Geolab design to reflect the current development. The proposed mitigation of the landslide remains the same concept which was adjusted by RJR (Stability Sections G1 and G2) to reflect the newly configured southern slope and revised buttress.

3.4. Subsurface Conditions

Site subsurface conditions are based on the previous studies and investigations performed at the site by Consultants and published maps, as well as, recent studies conducted by RJR.

The site has been explored by Gorian, Geosoils, Pacific Soils, Neblett and Associates, and West Coast Soils for various stages of development. Previous agency reviewers have included the County of Los Angeles, Bing Yen and Associates, Slosson & Associates and Leighton and Associates.

Subsurface exploration has consisted of over fifty exploratory excavations including bucket auger drill holes, trenches, core holes, and Cone Penetrometer Tests (CPT).

In addition to the on-site work, prior to the approval of the residential site improvements at Tract 53534 (Azar), RJR excavated borings and test pits to better identify the underlying structure and possible limits of mapped landslides (identified by previous consultants). Some of the test pits were drilled offsite to the north of Tract 53534 in the east-west trending tributary area to obtain depths to bedrock and bedding orientations. CPT (Cone Penetrometer Test) borings were also performed to establish depth to bedrock, groundwater and some soil parameters. During construction of Tract 53534, RJR mapped the bedrock in the exposed temporary cuts and canyon cleanouts.

3.4.1. Earth Materials

It is important to note that the subsurface conditions, particularly groundwater levels and the consistency of near-surface soils may vary with the seasons, especially rainfall volumes. Therefore, most depths and boundaries between layers are approximate, because they may vary at different locations.

Fill/Soil: Fill materials were previously encountered predominantly in two areas of the site, the northern and southern canyons. The approximate limits of the fill area are shown on the Geologic Map. Additional localized areas of fill may be present along the outside edges of access roads. Estimated depth of fill materials based on our site exploration varies to a maximum of about 40 feet.

Based on the logs of the exploratory boring along the northern side of the tributary canyon, the fill is generally placed in sub-horizontal layers oriented toward the south (canyon axis). The fill/bedrock contact as observed in RJR DH-7 is oriented about 18 degrees toward the canyon axis. All existing fill will be removed from the proposed development areas.

Colluvium/Slope Wash: Colluvium and slope wash deposits are present along the tributary canyon walls with varying thickness. Colluvium/slope wash deposits consists of silty clay and silty sand with thicknesses ranging from 1 to 5 feet.

Alluvium: Alluvium deposits underlie the fill in the main canyon, north of the landslide, and is present in the channels of tributary side canyons. The alluvium consists of clayey silt, silty clay, silty sand, and sand layers. The depth of alluvium in the main tributary canyon is about 25 feet as observed by Pacific Soils Engineering in BHS-1 and BHS-2.

Landslide Debris: Landslide debris is present on the southern slope within the site. Based on the interpretation of all subsurface exploration conducted by various investigators, the most current interpretation of the landslide model is presented in Appendix H.

Bedrock: Bedrock underlies the surficial deposits and consists of interlayered siltstone and sandstone of two different formations, the Modelo Formation and the Calabasas Formation. The bedrock is light tan to gray, moderately hard to hard and locally very hard. The bedrock is tightly folded, fractured, and locally sheared. The bedding planes vary from planar to wavy and the bedding thickness ranges from thinly bedded to thickly bedded. The sandstone beds are thickly bedded whereas the siltstone beds are more thinly bedded.

For specific details of the bedrock at boring and trench locations, refer to the exploratory logs in Appendix B.

3.4.2. Groundwater Subsurface Data

Groundwater seeps were not encountered in the 2009 exploratory trenches and borings. Groundwater seeps and groundwater should be anticipated to be associated with the bedrock surface (platform) at the bottom of the tributary canyons. Groundwater was encountered in the southern canyon at an approximate depth of 40 feet (Boring B-2 @ 38 Ft., B-8 @ 42 Ft.).

Groundwater was encountered at a depth of 35 feet in the north side of the main east-west canyon during 1993 (Boring PSE-12).

Groundwater was encountered during rough grading of Tract 53534 in July 2003 at a depth of 38 feet below ground surface; however, this was in the sixth (6th) consecutive year of below average rainfall.

Recent borings and test pits performed in summer, 2011 encountered seeps in at depths between 48 and 75 while no seeps or groundwater was encountered in other borings to depths of 90 feet. The location of the seep is illustrated on the revised Geologic Map (Appendix B).

3.4.3. Laboratory Testing

Previous reports prepared by RJR for the site and the adjacent Shea Development provide the pertinent geotechnical laboratory testing. Recent testing for the southern slope is also provided in Appendix H for the landslide.

3.5. Chemical Testing Analysis

Chemical reactions that involve formation of expansive products in hardened concrete can lead to adverse effects. Expansion may initially take place without any concrete damage, however, with increasing internal stress may cause closure of expansion joints, deformation and displacement of different areas, cracking, spalling and pop-outs. The potential for sulfate attack and the corrosion of the reinforcing steel are typically evaluated by soil-chemistry tests.

Chemical tests were performed to determine the soil level of sulfate, chloride, pH, and resistivity. Degradation of concrete may occur as a result degradation of the concrete and/or in combination with the corrosion of reinforcing steel.

Corrosion Potential (Sulfates): Degradation of concrete as a result of chemical reactions between hydrated Portland cement and sulfate ions from an outside source may produce expansion of the concrete or may also result in a progressive loss of strength and loss of concrete mass.

Preliminary testing of samples obtained from the surface soils indicate the on-site soils have low levels of sulfates which indicates a low corrosion potential for concrete, less than 74 ppm.

Table 1 - REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE CONTAINING SOLUTIONS

Sulfate Exposure	Water Soluble Sulfate (SO_4) in Soil, Percentage by weight.	Sulfate (SO_4) in Water, ppm.	Cement Type	Maximum Water Cementious Materials Ratio, By Weight, Normal Weight Aggregate Concrete[1]	Minimum $f'c$, Normal Weight and Lightweight Aggregate Concrete, psi
					X 0.00689 for Mpa
Negligible	0.00 – 0.10	0 – 150	---	---	---
Moderate[2]	0.10 – 0.20	150 – 1,500	II, IP(MS), IS(MS)	0.50	4,000
Severe	0.2 – 2.00	1,500 – 10,000	V	0.45	4,500
Very Severe	Over 2.00	Over 10,000	V plus pozzolan[3]	0.45	4,500

[1] A lower water-cementious materials ratio or higher strength may be required for low permeability or for protection against corrosion of embedded items or freezing and thawing

[2] Seawater.

[3] Pozzolan that has been determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement.

The degradation of concrete from the effect of corrosion of reinforcing steel or prestressing tendons in concrete is an electrochemical process. The electrochemical potential to form corrosion cells may be generated in two ways:

Composition cells may form when two dissimilar metals are embedded in concrete, such as steel rebars and aluminum conduit pipes, or when surface variations in the steel exist.

Concentration cells may be formed by differences in the concentration of dissolved ions in the vicinity of steel, such as alkali's, chlorides, and oxygen.

As a result, one of the two metals or different parts of the same metal becomes anodic and the other cathodic. The transformation of metallic iron to rust may be accompanied by an increase in volume, which is dependent on the state of oxidation, to as much as 600 percent the volume of the original metal. Chlorides, pH, and resistivity may all be part of the reinforcement corrosion

Corrosion Potential (Chlorides): Large concentrations of chlorides may adversely affect the reinforcing steel or pre-stressing strands (ferrous materials) within the concrete. When chloride concentration exceeds 18,000 ppm., mitigation measures are usually taken to protect any steel reinforcing within concrete and any steel or cast iron pipe that are in contact with the soil. The chloride content measured in the soil at the site is 110 ppm and is not considered to be by itself corrosive to steel reinforcing with concrete.

Corrosion Potential (pH): Acid rain (often with a pH of 4.0 to 4.5) can slightly etch concrete surfaces, however, strong acid water conditions may warrant special concrete designs or precautions, especially in submerged areas. Concrete with a low water-cement ratio, low permeability, and low to moderate cement content can increase the acid or corrosion resistance of concrete. Typically an acidic pH will not result in adverse concrete until the pH is less than 4.0. The soil pH at the site is tested at 7.9 to 8.2 and therefore is not considered to be corrosive.

Corrosion Potential (Resistivity): Electrical Resistivity is the most common factor in determining soil corrosivity. The typical guidelines suggest mitigation when test results indicate the soil to be moderately corrosive per the following table:

TABLE 2: SOIL CORROSION POTENTIAL

Soil Resistivity, Ohm-Cm	Corrosivity Category
0 – 1,000	Severely Corrosive
1,000 – 2,000	Corrosive
2,000 – 10,000	Moderately Corrosive
Over 10,000	Mildly Corrosive

The soil resistivity of the soil at the site was measured to be 3550 Ohm-Cm and 11,400 therefore; mitigation for the potential for corrosion is required.

Mitigation for the potential corrosion is provided by an increase in concrete cover and the use of Type V concrete for concrete that is exposed to site soils and bedrock. Because the site will be graded and there is a large range in resistivity in the on-site soils, additional resistivity tests are recommended to be performed near the completion of the rough grading to more accurately define the resistivity of the surface soils. As the existing soils are processed and placed as engineered fill, this hazard may be mitigated and the use of Type II may be feasible for structural elements in contact with engineered fill.

4.0. GEOLOGIC CONDITIONS AND ANALYSIS

4.1. Regional Geology

The site is located in the northeastern portion of the Santa Monica Mountains. The Santa Monica Mountains are part of the Transverse Range physiographic province of California. The Transverse ranges are long (approximately 300 miles) and narrow (approximately 15 to 60 miles). Rock formations in the transverse Ranges cover a wider age range than any other natural province in California.

The age of the rocks vary from Precambrian gneisses (1.7 billion years old) to recent alluvium (present day). The Transverse Ranges have very complex geologic structure with every type of faulting and folding accompanying the faulting. However, the folding seems to predominate in the Western part of the ranges and most of the geologic structures are aligned east west. The rock deformation periods are of different ages. The Santa Monica Mountains, overall, are an anticline fold which is faulted and intruded.

The project location is part of the northern edge of the Santa Monica Mountains system. The area has experienced orogeny and folding which has developed an extremely larger antiform and synform and dominates the geomorphology of this region. The Calabasas Formation and Modelo Formation underlie the site.

The Modelo Formation is younger and is stratigraphically above the Calabasas Formation with relative northwest-southeast trending contact, which is an unconformity. The Modelo Formation in this area with bedding generally inclined to the northeast at low to moderate angles while the Calabasas Formation has a prevalent northwest strike and steep to moderate dips to the northeast and southwest. The change in dip direction is a result of tight to more broad structural folds prevalent in the upper part of the Calabasas Formation.

4.2. Stratigraphy

The site is underlain by fill, alluvium, colluvium, landslide debris, and sedimentary rock. The alluvium and colluvium are composed of predominately clays and silts with minor sand and have a provenance from the surrounding bedrock formations. The alluvium, colluvium and depositional in formation mantle the underlying bedrock or slope areas. The lower landslide mantles the bedrock and terminates at the east-west flowing tributary. The sedimentary rock is composed of the Modelo Formation and Calabasas Formations.

The Calabasas Formation is named for a thick, widespread sequence of sandstone, siltstone, claystone and sedimentary breccia and is overlain by the Modelo Formation. Texturally, the Calabasas Formation is predominately siltstone and claystone with thinner beds of sandstone.

The Calabasas Formation is believed to be composed of former continental slope and shelf deposits and is middle to upper Miocene in age. An unconformity exists between the Calabasas Formation and the Modelo Formation.

The Modelo Formation is named for a thick widespread sequence of thinly bedded siltstone, shale with local areas of porcelaneous siltstone and diatomaceous rich shale is upper Miocene in age. The Modelo Formation here is predominately siltstone and shale. The Modelo Formation comprises the steep slopes on the eastern portion of the subject property and also comprises the northern ascending slopes north of the east to west flowing tributary canyon.

The upper part of the Calabasas Formation and the lower part of the Modelo Formation are intensely folded. The Calabasas Formation less lithified and is more susceptible to erosion than the Modelo Formation which leads to the natural erosional variations between the two formations. The Modelo Formation erosional expression is typified by high angle slopes and local vertical slopes and bedrock outcrops as opposed to the Calabasas Formation which has gentle, undulatory or irregular slopes. A vein of gray sandstone has been mapped in with a northwest-southeast trend by Dibblee, 1992.

Minor mineral infilling of fractures was observed in the borings. Gypsum and quart veins were present, but were not laterally continuous or regular. The predominant folding has axial trace orientations to the northwest and southeast but is discontinuous in extent. This implies that the bedding plane structure will be oriented to the northeast and southwest.

The Regional Geologic Maps and other pertinent references are in Appendix A, which illustrates the location of the site to the surrounding geologic conditions. Bedrock outcrops are exposed along the canyon side slopes and as well as road cuts. These bedrock outcrops were mapped and the data compiled on the site Geologic Map.

4.3. Structure

The large-scale structure at the site can be summarized as having conformance with the regional trend and having local surface features unique to the site. The alignment of strikes and dips are consistent with regional aligned patterns mapped during previous work and investigations by other geologists (Weber, 1984; Dibblee, 1992). The overall folding of the underlying strata displays a series of anticlines and synclines with the predominant trend of the fold axis in the northwest-southeasterly direction. The bedding is observed to be wavy, with smaller wavelength and longer wavelength folding. Flexural slip between beds is not uncommon due to the folding and the necessary volumetric change. Shears and/or polished surfaces on bedding were observed in borings excavated by RJR and in borings by the previous consultants. RJR observed bedding consistent with regional trends and sympathetic to the antiform and synform structures mapped by Dibblee, 1992 and others. No strain indicators such as fossil elongation were

observed or noted. The geologic structure was determined from the regional geologic maps of the area, observations of the borings, test pits, and seismic trenches.

Fracture and joint data was examined to assess the impact on the geologic and slope stability of the site. Though noted in boring logs by GeoSoils, Pacific Soils Engineering and previous RJR reports, prevalent, repeatable sets were not present. The formation of the fractures and joints may be due the penecontemporaneous volumetric strain release during uplift and folding of the strata following deposition. Fractures may also have developed during de-watering within stages of burial and sedimentation. Many fractures were found to be discontinuous and some even experienced minor displacements offsetting strata. This kind of accumulative displacement is consistent with compressively formed mountains chains within well-developed fold regimes. In some cases translations of beds can be very significant in developing weak zones between stratigraphic layers. Previous work by previous investigators discussed evidence to indicate soft sediment deformation such as localized Chevron folds and boudinage features indicating low and high strength layers. No volcanic rock is present in the subsurface and therefore not contact alteration of the country rock is present as well. The rock within the landslides may also be fractured as a result of landslide movement.

The Geologic Map enclosed in Appendix A displays the compilation of the data obtained during the investigation by RJR and the previous consultants. The development area is not in a location designated by the California Geologic Survey as neither being in an area of active faulting nor is it located in an Earthquake Fault Study Zone, and therefore no fault studies were deemed necessary for the proposed improvements. The development is not in an area suspected to have active faulting or any hazards due to fault ground rupture.

4.4. Local Geologic Conditions

4.4.1. Site Geology

The local geologic structure of the Modelo Formation and Calabasas Formation bedrock underlying the site is consistent with regional geologic structure, but has shallow to moderate dips with local high dip angles were due to the localized areas of more intense folding and deformation within the formations. The Modelo Formation underlies the northern and eastern slopes of the property. The contact between the Modelo Formation and the Calabasas Formation trends in a northwest-southeast direction across the project location as shown on the Geologic Map. The contact between the Modelo Formation and the Calabasas Formation is an unconformity generally meaning the orientation and/or age of the rocks are different. A bed of sandstone is mapped by Dibblee (1993) and trends in a southeast-northwest direction. Where this bed is intersected by excavations the sandstone unit was very moist to wet and may act as a

conduit for groundwater. The project location is dominated by an unnamed east-west trending tributary canyon which flows west to Las Virgenes Creek.

The slopes of the tributary canyon walls contain varying thicknesses of soil, slope wash and colluvium. The colluvium was observed to have varying thickness and accumulated on moderate slopes and within swales. Slope wash mantles the bedrock on steeper slopes in localized areas. Slope wash materials are not mapped or shown on the Geologic Map and may be considered part of the colluviums unit. The distribution of vegetation (e.g. oak trees, phreatophytes, low shrubs) may indicate local areas of higher groundwater. Alluvium is present in the main tributary canyon and is composed of predominately silts and clays with isolated clasts of siltstone from the Modelo Formation.

Bedrock structural data indicates local folding and the plunge and trend of the synforms in the northwest direction have been the controlling factors as well as contributing to the landsliding in this location. The proposed improvement area is directly affected by the presence of the landslide.

4.4.2. Landslides

General Discussion: The subject of landslides is a widely encompassing subject and cannot be fully covered in a brief summary; however, landslides are downslope motions of earth materials or bedrock or combinations of both. Landslides are a more defined unit and are similar to slumps, but are on a larger scale. They can move by translational movement or rotational settlement or a combination of both. It occurs because of the loss of ability of earth materials to maintain their integrity at a specific gradient and settle or into lesser gradient or position of greater equilibrium. The internal strength of the material is lost and the material settles into a form where the mass is centralized on the downhill side of motion. The material is a cohesively connected unit that settles or moves as a unit. Landslides are usually associated with water because or water increasing the unit weight and decreasing the internal strength of the materials.

The chances of a landslide occurring are increased by increases in slope gradient, looseness of materials, unfavorable bedding (out of slope), clay content of the bedrock, underground springs, unfavorable slope orientation with existing fault boundaries, human disturbance of the landslide or its boundaries, increases in groundwater, earthquake forces, increases in water content and disturbance of the lateral confining forces and/ or the portion of a slope

Evaluation: Landslides were observed during our site investigation of the site and on the slopes immediately above the property. Mapping and subsurface investigation revealed bedrock is inclined at low to high angle, sub-parallel to the slope face, and is moderately to highly folded. The prominate feature is the landslide located on the southern slope. Additional studies have been performed subsequent to the RJR (2009) report which consisted of more extensive studies

and detailed analysis. The results of the analysis are presented in the Geolabs report, dated May 2011 and included in Appendix H.

The remaining features identified to date are primarily surficial debris flows located within existing drainages or shallow creep affected slopes. In general, mitigation of these areas will be required where they potential failures could adversely affect the proposed development. As illustrated on the proposed Site Plan/Tentative Map, these areas generally have enhanced drainage intercept devices and/or additional freeboard to intercept runoff and debris. More detailed studies will be provided during the Grading Stage design.

Mitigation: The mitigation of the southern landslide will consist of a removal of a significant portion of the landslide and replacement with engineered fill to raise the slope factor of safety to 1.5 under static gross stability ad 1.1 under pseudo-static gross stability conditions. The investigation, analysis, and mitigation measures are based on the observations of over four licensed professional geologist and extensive investigation and analysis. In the unlikely event that the field conditions do vary with those modeled to date, the proposed mitigation provides a flexibility to adjust the mitigation measures as necessary.

All other remaining areas of surficial instability, debris flows, or creep will require mitigation measures that will be implemented and designed during the grading stage. These will include drainage devices, wall free board to intercept debris and other standard construction measures that are standard in the construction methods in Southern California.

Since a variety of standard design and construction mitigation measures will provide suitable remedial results, the *risk is low* for landslide to adversely impact the site once the measures are implemented. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

4.4.3. Rock Topple

General Discussion: Rock topple can occur when loose blocks of exposed bedrock are induced to move and travel downslope when set free by earthquake forces, undermining of supporting earth from erosion or animal disturbance. Generally, slopes with a gradient of greater than 3:1 (horizontal to vertical) are more susceptible to rock topple and rolling.

Evaluation: Few moderate size rocks are present on the larger ascending slopes north and south of the main tributary canyon. The grading of the site will decrease the incidence of these hazards

on the proposed improvements. Slopes can be raked and loose rock hazards removed. With these mitigations we believe the risk of rock topple to the site is very low.

Mitigation: No measures are required.

4.4.4. Debris Flow

General Discussion: Debris flows are downslope motions of conglomerations of earth materials as a loosely connected unit that flows rather than settles. Debris flows can be dry or wet materials, but are usually associated with water because or water increasing the unit weight and decreasing the internal strength of the materials in question. The chances of a debris flow occurring are increased by the steepening in slope gradient, looseness of materials, lack of cementation, increases in groundwater, earthquake forces helping to mobilize the mass, looseness of materials in-situ, increases in water content and disturbance of the lateral forces and/ or the toe of a slope.

Evaluation: The new site plan has shifted the development to the north, adjacent to the existing slopes. During periods of prolonged or intense rain, debris flows will occur. Lots 36 thru 44, and to a lesser extent 45 and 46 may be subject to debris flows, as well as the debris basin.

The debris basin has been oversized to account for a possible single event occurrence in accordance with the County of Los Angeles. The required volume is 8,750 cubic yards, and the systems has been designed to hold 9,840 cubic yards.

The remaining areas of proposed development are graded to mitigate against the development of such hazards. Improvements should take into account the possibility of concentrated flow. Site improvements such as the proposed drainage swales and grading will help remove hazards and stabilize surficial conditions. An aggressive erosion control plan will be implemented to help stabilize surficial soils in all areas. With these mitigations we believe the risk of debris flows will be mitigated.

However, areas of existing/natural slopes consist of thicker soil profiles, which historically are prone to debris flows. Weather scarps which are remnants of such events occur throughout the region. Therefore, the natural/existing slopes may be prone to future instability. Therefore, any development within a zone of influence will need to implement the necessary mitigation measures.

Mitigation: Mitigation area with corresponding bioengineering measures has been designed to provide some setback and partially or fully mitigate the adverse impacts along the base of the northern natural slopes. A series of emergency overflow devices will be situated along the drainage, in the event an event blocks drainage. In addition, RJR recommends that the rear yard

privacy walls be designed as debris impact walls along the rear yards of the potentially affected units. This in conjunction with an extensive erosion control measures will serve to mitigate this hazard.

The debris basin will be over-designed to withstand the adverse effects of debris that may accumulate in the basin, as discussed above.

Once a site plan has been developed, additional mitigation measures such as increased building setbacks, interceptor drains, drainage improvements or debris walls can be provided at the grading stage. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

4.4.5. Slumps

General Discussion: Slumps are downslope motions of earth materials as a more defined unit that moves in a translational movement or rotational settlement. It occurs because of the loss of ability to maintain integrity within the mass at a specific gradient. The internal strength of the material is lost and the material settles into a form where the mass is centralized on the downhill side of motion. The material is a cohesively connected unit that settles and moves as a mass. Slumps are usually associated with water because of water increasing the unit weight and decreasing the internal strength. The chances of a slump occurring are increased by increases in slope gradient, material looseness, lack of cementation, increases in groundwater or water content, earthquake forces and disturbance of the lateral confining forces and/ or the portions of a slope.

Evaluation: Soil thickness at the site can be thick and slumps will be generated. Small, local, minor slumps can be difficult to prevent even with significant vegetative cover on slopes.

In the proposed slopes, an aggressive landscaping and erosion control plan will be implemented to help stabilize surficial soils. Site improvements such as the proposed retaining walls and grading will also help remove hazards and stabilize surficial conditions.

In the natural/existing slopes, slumps may be readily generated and any site development within the area will need to be mitigated in a similar manner to debris flows, discussed above.

Mitigation: Once a site plan has been developed, additional mitigation measures such as increased building setbacks, interceptor drains, drainage improvements, stability fill slopes, or debris walls can be provided at the grading stage. In general, the design will be in accordance

with CBC, latest edition, standards and requirements. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

4.4.6. Daylighted Bedding/Structural Control

General Discussion: Measurements of the bedding planes encountered during the site investigation indicated the bedding is oriented in a various array of directions, although the prevalent trend was for dips in the northeast and southwest direction at various of dip angles. Specifically, the bedding consists of a short wave length (tight) folds and result in several dip reversals.

Evaluation: Overall, these dip reversals are favorable because they serve to limit the extent of potential gross failure planes because no inherent fabric is continuous through the section. However, because of the intense folding of the bedrock materials, these materials are highly to moderately fractured and susceptible to raveling- and wedge-type failures.

Mitigation: RJR recommends that stability fills in areas of proposed development may be required for all cut slopes to mitigate any potential hazards and to provide an engineered fill cap for vegetation. The exact location and design will be provided at the grading plan stage. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

4.4.7. Groundwater

General Discussion: Groundwater is the water occurring beneath the earth's surface that saturates the fractures and void space of rock or sediment. The majority of California's groundwater occurs in alluvial stream deposits. Alluvium consists of coarse deposits of sand and gravel as well as finer-grained deposits such as clay and silt. A number of factors dictate the degree to which a body of sediment or rock functions as a resource for groundwater. This includes porosity and permeability/hydraulic conductivity. Porosity is the ratio of the voids in a rock or sediment to the total volume of material and is an indication of how much groundwater can be stored within a certain material. Hydraulic conductivity is the measure of a rock or sediment's ability to transmit water; also, it is often referred to as permeability.

Subsurface conditions can vary resulting in either an unconfined, confined, semi-confined, or perched groundwater condition. When a confining bed, rock unit, or layer maintaining a low hydraulic conductivity is present, groundwater is typically under a confined, semi-confined, or

perched groundwater condition. If groundwater is found below the confining bed, then groundwater is confined beneath, hence confined condition. If groundwater exists above a confining layer it is often perched on top of the confining bed. Under a perched condition, groundwater can be present both above and below a confining bed. An unconfined groundwater condition occurs when there is no confining bed or layer above the groundwater and the pressure on the surface of the groundwater is equal to atmospheric pressure. The top surface of the groundwater in an unconfined condition and referred to as the "groundwater table."

Evaluation: According to CDMG, the historical high groundwater level for the project site is inferred based on the proximity to Las Virgenes Creek at a depth greater than 20 feet in the central canyon area.

Based on site specific testing, groundwater was encountered in a number of exploratory borings within the landslide within discrete zones. However, no water is encountered in the same zones (or near these same elevations) in the nearby borings excavated at the same time or over the past 20 years of the history of the project. Where seeps are encountered, the intensity ranges from very heavy to moist soil that is near saturation. These observations were observed at the New Millennium, Shea Homes, and Standard Pacifica projects.

In the areas outside the southern landslide mass, similar observations of perched or discontinuous zones of groundwater were encountered in exploratory borings and grading in the adjacent tract. An existing surface seep is observed in the southeast tributary drainage. However, no seeps are present in the surrounding tributaries. The presence of this daylighted seep appears to be related to the toe of, and eastern boundary of the southern landslide.

Based on these observations and site testing, it appears that groundwater is influenced by a number of different factors with varying complexities. However, several conditions that influence the presence of groundwater on the site include the permeability of the rock due to fracturing, the presence of sandier beds for conductivity, the folding of the bedding to form local areas of perched groundwater, and basal landslide geometry to provide a barrier on which groundwater may perch. As such, groundwater will be encountered in discontinuous zones and lenses of materials but with no hydraulic communication between these zones.

These physically separate zones will thus limit or provide no static surface when evaluating slope stability and will not be encountered during short construction periods. Based on our experience with Shea Homes project, when groundwater or perches areas are encountered during construction, localized dewatering (allowing the water to drain) will relieve the local pressure, with minor limited spatial degradation of the earth materials.

Groundwater is anticipated to fluctuate seasonally as a result of several factors including rainfall, irrigation, temperature, land use and other factors. Unusual rainfall patterns such as those observed during El Nino and other weather phenomena may result in conditions not anticipated in this study. The assumptions and findings are based on the best available knowledge available at the time of this study and conditions may change or vary from the time of field exploration and observations.

Mitigation: A series of standard canyon and subsurface bench subdrains will be installed at depth to reduce the adverse impacts of groundwater. This measure in conjunction with the placement of engineered fill will serve to reduce the risk associate with groundwater.

Based on the stormwater mitigation requirements, including Low Impact Development measures, infiltration elements will be incorporated into the site. The infiltration elements will consist of a series of injection dry wells located at street drop inlets, as well as, central and de-centralized detention basins and bioswales.

The proposed subdrains as well as, flow to the existing alluvium will intercept and convey excess groundwater to reduce risks to the proposed development. In addition, subdrains will be installed at the upper levels that connect to the storm drain system for additional relief, in the event that conditions develop that were not part of the standard of design (i.e. El-Nino events, etc.) that provide additional redundancy.

Local perched or isolated groundwater may be encountered during grading and will require the contractor to allow the area to properly dewater and soil drying before proceeding. Additional recommendations will be provided during the grading stage, and provisions should be anticipated during construction. This will include the extension of the canyon drain to intercept and collect the surface seep located in the southeast tributary.

Since groundwater will not adversely affect the site and standard measures will provide suitable remedial results, the *risk is low* for groundwater conditions and no additional mitigation measures are required. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

5.0. SEISMIC ANALYSIS

The site is located within the seismically active area of Southern California (*N 34.139, W -118.627*), but outside a Fault Hazard Zone defined by the Alquist-Priolo Earthquake Hazards Act (APEHA) of 1972 revised in 1994. As illustrated by the following sections and analysis, the site is expected to experience moderate to severe ground shaking from both near and distant earthquake sources during the life of the proposed structure. The type and magnitude of the seismic hazard affecting the site are dependent on the distance and causative faults and the intensity and magnitude of the seismic event.

To better understand seismic hazards, the potential adverse effects can be divided into two general categories; hazards due to ground rupture and hazards associated with groundshaking and the secondary affects related to groundshaking.

5.1. Fault Related Ground Rupture

General Discussion: In general terms, an earthquake is caused when strain energy in rocks is suddenly released by movement along a plane of weakness. In some cases, fault movement propagates upward through the subsurface materials and causes displacement at the ground surface. Surface rupture usually occurs along traces of known or potentially active faults, although many historic events have occurred on faults not previously known to be active.

The California Geologic Survey (CGS) establishes criteria for faults as active, potentially active or inactive. Active faults are those that show evidence of surface displacement within the last 11,000 years (Holocene age). Potentially active faults are those that demonstrate displacement within the past 1.6 million years (Quaternary age). Faults showing no evidence of displacement within the last 1.6 million years may be considered inactive for most structures, except for critical or certain life structures. In 1972 the Alquist-Priolo Special Studies Zone Act (now known as the Alquist-Priolo Earthquake Fault Zone Act, 1994, or APEHA) was passed into law which requires studies within 500 feet of active or potentially active faults. The APEHA designs "active" and "potentially active" faults utilizing the same age criteria as that used by the CGS. However, the established policy is to zone active faults and only those potentially active faults that have a relatively high potential for ground rupture.

Ground rupture caused by movement along a fault could likely result in catastrophic structural damage to buildings constructed along the fault trace. Consequently, the State of California via the APEHA prohibits the construction of occupied "habitable" structures within the designated

fault zone and must demonstrate that the structure does not encroach on a 50-foot setback from the fault trace. Per the Alquist-Priolo legislation, no structure for human occupancy is permitted on the trace of an active fault. The term "structure for human occupancy" is defined as any structure used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year. Unless proven otherwise, an area within 50 feet of an active fault is presumed to be underlain by active branches of the fault. Local government agencies may identify additional faults, in addition to those faults mandated by the State, for which minimum construction setback requirements must be maintained.

Analysis: Two considerations were undertaken to evaluate the hazards associated with fault rupture. No known active or potentially active faults traverse the site or towards the site based on existing State of California maps. The second analysis consisted of assessing the proximity of faults, therefore EQFAULT analysis was performed to determine the proximity to regional fault systems. EQFAULT performs deterministic seismic hazard analyses using up to 250 digitized 3-D California faults as earthquake sources. The program computes estimated ground motion at a selected site using available attenuation relations. The analysis allows for a deterministic estimate of how future specific-scenario earthquakes may shake a project site.

Table 3 illustrates the 10 nearest faults with distance in miles between the nearest point on the fault and the site, the maximum magnitude, estimated peak ground accelerations and the slip rate.

TABLE 3: PARTIAL LIST OF NEARBY REGIONAL FAULTS

Fault Name	Source Type	Distance Between Site and Surface Projection of Earthquake Rupture (Miles)	Estimated Maximum Peak Ground Accelerations (g)	Fault Type	Slip Rate (mm/yr)	Estimated Maximum Earthquake (Mw)
Malibu Coast	B	6.6	0.389	DS	0.30	6.7
Anacapa-Dume	B	8.1	0.446	DS	3.00	7.3
Santa Monica	B	9.7	0.267	DS	1.00	6.6
Simi-Santa Rosa	B	12.9	0.217	DS	5.00	6.7
Northridge (E. Oak Ridge)	B	13.0	0.245	DS	1.50	6.9
Palos Verdes	B	14.0	0.183	SS	1.00	7.1
Santa Susana	B	14.9	0.177	DS	3.00	6.6
Hollywood	B	16.3	0.143	DS	4.00	6.5
Oak Ridge (On Shore	B	16.7	0.192	DS	2.00	6.9
Sierra Madre (San Fernado)	B	18.0	0.156	DS	0.50	6.7
Holsier	B	18.9	0.131	DS	0.40	6.5

Reference: EQFAULT and EQSEARCH

A comprehensive list and maps of faults are included in Appendix C. The nearest known active or potentially active fault is the Simi-Santa Rosa Fault system with regional faults located north and south of the site. These faults are considered regional because they can be traced several miles by field geologists (such as Dibblee). As determined from the computer program UBCSEIS, (Blake, 1998), the location of the Simi Santa Rosa Fault is approximately 13 km north of the site. The 1994 Northridge Earthquake epicenter is located about 15 miles (24 km) northeast of the site.

It should be understood that the prediction of future fault rupture is impossible and the lists are based on previously encountered faults or ground rupture. For instance, the 1994 Northridge Earthquake did not cause fault ground rupture but was a significant regional event.

Mitigation: In general, based on the current State mapping and knowledge of ground rupture, the *risk is low* that the site will experience ground rupture and potential is *less than significant*.

5.2. Potential for Ground Shaking

General Discussion: The energy released during an earthquake propagates from its rupture surface in the form of seismic waves. The resulting strong ground motion from the seismic wave propagation can cause significant damage to structures. At any location, the intensity of the ground motion is a function of the distance to the fault rupture, the local soil/bedrock conditions, and the earthquake magnitude. Intensity is usually greater in areas underlain by unconsolidated material than in areas underlain by more competent rock.

Earthquakes are characterized by a moment magnitude, which is quantitative measure of the strength of the earthquake based on strain energy released during the event. The magnitude is independent of the site, but is dependent on several factors including the type of fault, rock-type, and stored energy. Moderate to severe ground shaking will be experienced in the project area if a large magnitude earthquake occurs on one of the nearby principal late Quaternary faults and may cause structural damage to the on-site improvements.

A Deterministic Seismic Hazard Analysis (DSHA) involves four basic steps:

i. Identification of sources;
ii. Determination of the controlling earthquake for each source regardless of time;
iii. Selection of a ground motion relationship; and,
iv. Computation of the design ground motion parameters.

The design ground motion in the DSHA results from only a single magnitude earthquake, on a single source, at a single distance from the site, without regards to the likelihood that an event with the selected magnitude and distance will occur. As a result, it is not possible to assess the level of exposure of risk to the site.

A Probabilistic Seismic Hazard Analysis (PSHA) considers all possible magnitude earthquake (usually above some minimum magnitude, m_o), on all significant sources, at all possible distances, with consideration given to the likelihood of each combination. Therefore, using PSHA allows a potential facility to be designed for ground motion with a specified probability of exceedance.

The accuracy in the prediction of these analyses are based on numerous factors, including the assumption that the sources chosen are realistic and reasonably complete subset for analysis. Many recent earthquakes have occurred along previously unmapped faults, therefore, the data set for these analyses are regularly updated by various State Agencies.

Detailed discussions of Probabilistic Seismic Hazard Analysis (PSHA) and Deterministic Seismic Hazard Analysis (DSHA) are presented in CDMG Open File Report 96-08/ U.S.G.S. Open File Report 96-706, and Department of Conservation, Division of Mines and Geology Special Publication 117. Extensive references of the available literature are presented in these references. The Southern California Earthquake Center indicates that local, possibly unknown or unrecognized surface faults present higher earthquake risks than known, large regional faults for most areas of Southern California that may generate ground accelerations in excess of 1.0g

Analysis: The number or frequency of large magnitude earthquakes that may occur during the life of the project cannot be predicted reliably. To better quantify the possible exposure, EQSEARCH was used to perform searches of a historical-earthquake catalog using an abbreviated (M=4.0 and above) and supplemented version of the California Division of Mines and Geology computerized earthquake catalog for the state of California.

The program computes estimated ground motion at a selected site using available attenuation relations. The results from EQSEARCH, provides an estimate of how historical earthquakes may have shaken a project site. For each historic epicenter in the search area, EQSEARCH provides the data source, latitude, longitude, date, time, depth, magnitude, computed site-Modified-Mercalli-Intensity, and the approximate epicenter-to-site distance. Table 3 presents a summary of the analysis for the 10 nearest faults known to be able to cause an earthquake event. Based on the analysis, historical records indicate that the area has experienced shaking from a number of seismic events over the course of the last century and a half. Some of the seismic events that likely resulted in varying degrees of ground motion at the site are the earthquakes of 1812, 1827, 1852, 1855, 1857, 1893, 1936, 1952, 1956, 1965, 1971, 1974, 1977, 1991, and 1994. The 1812 and 1857 events are thought to have occurred along the Mojave Segment of the San Andreas

Fault and caused significant damage to developed areas of southern and central California. Those earthquakes were estimated to have had moment magnitudes of approximately M7.1 and M7.8, respectively. The 1952 Tehachapi earthquake had an estimated moment magnitude of M7.7. *Therefore, based on the PSHA analysis, over the past 200 years, the closest earthquake was approximately 6.8 miles away, and the correspondingly largest PGA experienced in the area is 0.266g.*

Ground shaking is primarily a function of the distance between areas and the seismic source, the type of materials underlying the site and the motion of fault displacement. *Based on the deterministic analysis (DSHA), the maximum exposure is the Anacapa-Dume Fault, located approximately 8.1 miles which is capable of generating a PGA of 0.44g based on a maximum earthquake magnitude of 7.3 (Mw).* As illustrated on the tables included in Appendix C, the associated risk decreases drastically to 0.2g and less as the larger regions faults are located at greater distance from the site.

Based on the results of the PSHA and the DSHA, it is likely that the site will experience at least one moderate to severe ground shaking event on one of the nearby principal late Quaternary faults.

The potential hazards or adverse effects of ground shaking would depend on several factors that include the severity of ground shaking; the nature, depth, and extent of the seismic event; the type of structures involved; and, the local topography. The Northridge (1994) earthquake showed how peculiarities in basin and other topographic effects could play a significant role in ground accelerations at particular areas. For instance, ground accelerations exceeding 1g were recorded at areas far from the epicenter of the Northridge earthquake.

Based on the observable affects from several events, including the Northridge (1994), San Fernando Earthquake (1971), Loma Prieta Earthquake (1989) and the Alaska Earthquake (1964), under-designed building foundations may fail resulting in excessive building settlement or collapse; underground tanks or buried utilities may be prone to uplift or failure; and, access roadways may become blocked or impassable, preventing emergency vehicles from accessing the sites. In addition, broken utility lines could result in fires, inhibit or contaminate water supplies and cut off services to the residences and structures. However, at the site, the potential for amplification of long period waves due to local geomorphic and geologic conditions is not likely on the relatively flat, engineering fill pads.

It is important to note that the California Building Code the standard of practice is not intended to prevent cosmetic to major structural damage to the on-site improvements. Rather, the

acceptable design levels are to prevent catastrophic collapse and prevent ingress and egress. In general, the light loading of the two-story residence (Type V construction) and concrete tilt up commercial/ retail does not present an increased or unacceptable condition and is typical of most developments throughout this region. The results of recent events indicate that the newer buildings and structures are performing as intended and catastrophic failure is more associated with antiquated designs and the results of secondary effects of ground shaking (ie liquefaction or tsunamis). Since the building(s) will be structurally designed in accordance with the latest CBC, 2010 design parameters, the *risk is low* and no additional mitigation measures are required to mitigate ground shaking for the site design.

FRISKSP: FRISK was developed in 1978 by the USGS to perform site-specific probabilistic seismic hazard analyses. The result of the analysis provides an estimated ground motion that can be associated with a single earthquake magnitude. A summary of the methodology is provided in Appendix C.

Results of FRISKSP Analysis. In the study area, horizontal spectral accelerations with a 10 percent probability of exceedance in a 50-year time period (i.e., a 475-year return period) and a 100-year time period (i.e., a 949-year return period) using Bozorgnia, Campbell Niazi (1999) attenuation relation. It should be noted that although the seismic hazard model used for this study predicts the probability of exceedance for various levels of acceleration in a given exposure period, the model is not able to account for the effect that the passage of time since past earthquakes has on future earthquake probability. Earthquakes result from the gradual buildup of stresses on faults until enough stresses have accumulated to cause an earthquake-producing rupture to occur. The earthquake rupture typically relieves at least some of the accumulated stresses, so that in the years immediately following a large earthquake on a fault (while stresses are still low) there is typically a relatively low probability of another large earthquake occurring again (Agnew et al., 1988). The longer the elapsed time since the last occurrence of a large earthquake on a fault, the greater the likelihood that a future earthquake will occur on that fault. However, recent studies (Harris et al., 1995) have suggested that earthquakes can induce stresses on neighboring faults that may delay, hasten, or even trigger subsequent earthquakes on those faults. Therefore, although an earthquake may reduce the seismic hazard on its causative fault, it may increase the hazard on other nearby faults.

Hazard Deaggregation. Because probabilistic seismic hazard analyses compute ground motion probabilities from thousands of different earthquake magnitude and distance combinations, it is useful to perform hazard deaggregation to determine which of the modeled magnitude and distance contributions contributed most to the probability of exceedance of a selected ground motion (e.g., 950-year return period ground motion). FRISKSP has an option that allows the user to perform hazard deaggregation for specified peak ground accelerations (in this case, the 475- and 950-year-return-period accelerations). From our hazard deaggregation, we estimate that the 475- and 950-year modal magnitudes are about M=6.5 to M=7 and the modal distances are

0 to 5 km. As illustrated on the Probability of Exceedance Plots in Appendix C, and the Hazard Activity Figures, the mean probability for exposures within a frequency of 25 years is approximately 0.20g and increases at a 100 year frequency to be on the order of 0.40g

The number or frequency of large magnitude earthquakes that may occur during the life of the project cannot be predicted reliably. However, based on the FRISK study and past historic events, it is probable the study area will experience at least one major earthquake during the next 50 years. However, the order of magnitude is relatively low, relative to most areas of California and should be anticipated to be less than 0.40g.

State of California Division of Mines and Geology (2003): Seismic analysis for the purposes of this study is based on a "Design Basis Earthquake Ground Motion" which would have a 10 percent probability of exceedance in a particular 50-year period (return interval of 475 years). A regional probabilistic seismic hazard evaluations prepared by California Division of Mines and Geology estimated that ground accelerations of approximately 0.40g (alluvium) for a Peak Horizontal Ground Acceleration (PHGA). This PHGA corresponds to a moment magnitude of 7.3.

Mitigation: In general, the design of all buildings and structure will be in accordance with CBC, 2010 standards and requirements. The implementation of the proposed mitigation measure will reduce the potential impacts to *less than significant* with mitigation.

5.2.1. California Building Code Design Criteria

The California Building Code requires seismic design based on a response spectra considering an earthquake with a 2 percent probability of exceedance in 50 years (return interval of 2,475 years). The seismic coefficients for the foundation should be designed using the CBC values. This site is located within a zone requiring structural design to resist earthquake loads. Section 1613A of the California Building Code (CBC) 2010 is based on the 2006 International Building Code which requires the mapped spectral response acceleration parameters. These parameters include a five percent critical damping at 0.2 seconds (S_s) and 1.0 seconds (S_1). In addition, a Site Category and Class as well as Site Coefficients F_a and F_v must be determined for use in the structural design relative to strong ground shaking.

The CBC assigns a Site Class based on the average soil properties within the upper 100 feet of the soil profile per Section 1613.5.5. Table 4 presents summary of these properties and classes.

Table 4: CBC Site Class Definitions

Site Class	Soil Profile	Average Properties in the Upper 100 feet (Section 1613.5.5)		
		Shear Wave Velocity, v_s (feet/second)	*Standard Penetration Test, N (blows/foot)*	*Undrained Shear Strength S_u (psf)*
A	Hard Rock	> 5,000	-	-
B	Rock	2,500 to 5,000	-	-
C	Very Dense Soil and Soft Rock	1,200 to 2,500	> 50	> 2,000
D	Stiff Soil Profile	600 to 1,200	15 to 50	1,000 to 2,000
E[1]	Soft Soil Profile	<600	< 15	< 1,000
F[2]	Profile Requiring Site-Specific Evaluation			

Note 1: Site Class E also indicates any profile with more than 10 feet of soil having the following characteristics: A Plasticity Index, PI > 20, Moisture Content w >/= 40%, and Undrained Shear Strength S_u , 500 psf. The Plasticity Index, PI, and the moisture contract, w, shall be determined in accordance with the approved national standards.

Note 2: Site Class F includes any profile containing soils having one or more of the following characteristics: 10 Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive slays, collapsible weakly cemented soils, 2) Peats and/or highly organic clays (H > 10 feet of peat and/or highly organic clay where H = thickness of soil), 3) Very highly plasticity clays H > 25 feet with plasticity index, PI > 75), and, 4) Very thick soft/medium stiff clays (H > 120 feet).

Site Class, spectral accelerations and seismic design coefficients have been determined for the site based on Table 1613A.5.2 of the CBC and the USGS, "*Earthquake Ground Motion Parameter Java Application*".

Table 5: CBC Seismic Design Values

Seismic Category:	D
Site Class:	D
Spectral Response Acceleration Short Period (S_s):	1.948 g
Spectral Response Acceleration 1.0 Second (S_1):	0.739 g
Site Coefficient (F_a):	1.00
Site Coefficient (F_V):	1.50

See Appendix C for associated calculations and remaining design values. The values are provided for convenience and should be verified by the project structural engineer.

5.2.2. Vertical Ground Motions

General Discussion: No suitable empirical method has been developed to analyze vertical ground accelerations. Borzorgnia, et.al. (1995) determined that near-field seismic events, ratios could exceed the horizontal motions. Subsequent recent studies by Borzorgnia, et. al., (1999) determined that at close distances and for large earthquakes, the peak vertical accelerations can be about 1.6 times the peak horizontal acceleration.

Analysis: Under the current codes no requirement has been set forth for vertical ground motions. The potential for amplification of long period waves due to local geomorphic and geologic conditions should be considered possible as it is for most development in the region located on hillsides and in a narrow valley.

5.2.3. Duration of Groundshaking

Several methods are available to evaluate groundshaking duration. A simplified set of relationships was established by Bolt, B.A. and other, (1975). Based on this relationship, groundshaking at the site would be on the order of 20 to 30 seconds for a strong to severe earthquake

Table 6: Estimated Duration of Groundshaking

Distance from Site (Miles)	Moment Magnitude (M_w)		
	6.0	7.0	8.0
6.2	12 seconds	26 seconds	34 seconds
31	3 seconds	22 seconds	28 seconds
62.1	0	4 seconds	6 seconds

* All values assume seismic wave frequency of greater that 2Kz

5.3. Hazards Associated with the Secondary Effects of Ground Shaking

Potential hazards resulting from the secondary effects of ground shaking include: liquefaction, lateral spreading, seismic compression/settlement, tsunamis, and landslide induced earthquakes.

5.3.1. Liquefaction

General Discussion: Seed (1979) defined liquefaction as a condition where a soil will undergo continued deformation at constant low residual stress or with low residual resistance, due to the buildup and maintenance of high pore water pressures, which reduce the effective confining pressure to a very low value. Pore pressure buildup leading to liquefaction may be due either to static or cyclic stress applications and the possibility of its occurrence will depend on the void ratio or relative density of sand and the confining pressure. It may also be caused by a critical hydraulic gradient during an upward flow of water in a sand deposit. Other factors include but not limited to:

- magnitude and proximity of the earthquake;
- duration of shaking; soil types;
- grain size distribution; clay fraction content; density;
- angularity;
- effective overburden;
- cyclic loading; and,
- soil stress history.

Liquefaction is more likely in poorly-graded, saturated, low-density sands. With increasing overburden, density, and clay-content, the likelihood of liquefaction decreases. In regards to clay content, recent studies over the past ten years has demonstrated that clays with certain properties can be prone to liquefaction and thus the "Chinese Method" is not reliable, and therefore, both sand and clay deposits are herein evaluated and screened.

The semi-empirical field-based methods (Idriss & Boulanger, 2006), which evolved from the simplified procedure by Seed and Idriss (1971) are by far the most widely used methods in assessing the cyclic liquefaction potential of sand. The simplified procedure has two essential components:

a) an analytical framework to organize past case history experiences; and,

b) a suitable in situ index to represent soil liquefaction characteristics (Idriss & Boulanger, 2006). In situ penetration tests have proved to be useful for representing soil liquefaction characteristics because they not only provide an indication of denseness, but also reflect other important characteristics such as fabric, gradation, cementation, age, and stress history (Seed, 1979).

The simplified procedure provides a boundary curve that separates cases of observed liquefaction and those with no notable liquefaction in a two-dimensional plot of seismic loading, in terms of Cyclic Stress Ratio (CSR) versus a normalized in situ index test value. The boundary curve also serves as a correlation between the in situ index test value and the Cyclic Resistance Ratio (CRR). The term CRR may be considered as the maximum CSR that a soil can resist before liquefying. Traditionally, the result of the liquefaction potential analysis using the simplified procedure is presented in terms of a factor of safety (F_s) defined as the ratio of CRR over CSR. No soil liquefaction is predicted if $F_s > 1$. The assessment of liquefaction potential in terms of factor of safety is generally known as the deterministic approach.

Evaluation: Two conditions exist:

a. *Alluvium*: The existing on-site alluvium has a consistency that is loose to medium dense in consistency. Groundwater is typically at a depth of 40 feet, but due to infiltration and layers of clay, areas of near to complete saturation may occur in the sediments. Therefore, the alluvial and loos soils may be prone to liquefaction in a strong to severe event and mitigation measures should be implemented.

b. *Engineered Fill and Bedrock*: Due to the consistency and/or lithification the engineered fill and bedrock are not prone to liquefaction and no mitigation is necessary

Mitigation: To mitigate the potential hazard all loose and unsuitable alluvium will be removed and replaced with engineered fill. These measures will consist of a through canyon cleanout as depicted on the map in Appendix G as part of mass grading. In addition, canyon subdrains will help prevent static groundwater conditions.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

5.3.2. Lateral Spreading

General Discussion: Lateral spread is the finite, lateral displacement of sloping ground (0.1 to < 6 percent) as a result of pore pressure buildup or liquefaction in a shallow, underlying soil deposit during an earthquake. Lateral spreading, as a result of liquefaction, occurs when a soil mass slides laterally on a liquefied layer, and gravitational and inertial forces cause the layer, and the overlying non-liquefied material, to move in a downslope direction. The magnitude of lateral spreading movements depends on earthquake magnitude, distance between the site and the seismic event, thickness of the liquefied layer, ground slope or ratio of free-face height to distance between the free face and structure, fines content, average particle size of the materials comprising the liquefied layer, and the standard penetration rates of the materials.

Widespread lateral spreading is generally not applicable to fine-grained soils, nor to sandy soils where:

1) Standard penetration values [$(N_1)_{60}$] are greater than 15; and,
2) Where the standard penetration rates are less than 15 and the potentially vulnerable layer is less than 1 meter thick.
3) Liquefied layer has no free face or is inclined at a slope of less than 0.1 percent.

Further, the magnitude of ground displacement in a liquefaction failure is influence by the volumetric response of these sandy soils during liquefaction. A contractive soils response can lead to very dramatic failures while a dilative response tends to limit the magnitude of displacements. Therefore, a low confining pressure can result in a dilative behavior, even for a somewhat loose packing of soil grains.

A potentially significant phenomena in a lateral spread is the upward slow of pore water within the liquefied soils deposits without a change in the overall volume. In a liquefied state, individual grains tend to sink under the influence of gravity. The net result is for the liquefied soil in a layer to progressively densify near the bottom and loosen/soften near the top. Therefore, there is a tendency for an upward migration of pore water and void space.

Lateral spread may occur over looser, weaker soil near the top of the liquefied deposit. If the liquefied soils is overlain with a relatively impervious layer, upward slowing pore water will be trapped and contribute to the formation of a weaker soil zone in the top portion of the liquefied deposit. Since the movement of water and soil grains takes time, Castro (1987) suggests that this

phenomenon might develop in relatively thin layers but not throughout the depth of thick liquefied deposits. However, even in thick, uniform soil deposits, the tendency for soil grains to settle would result in formation of a progressively, slightly weaker soil toward the top of the liquefied deposit. However, it is important to note, that the general analysis assumes conservatively, undrained conditions (Seed, 1979). However, the migrations of pore water in a partially drained condition have a significant impact on the magnitude of displacements in the lateral spread. Stark and Mesri (1992) found that partial drainage of excess pore pressures can produce an increase in shear resistance as sliding progresses. Rapid drainage of excess pore pressures from the liquefied soil zone may be sufficient to stabilize the slide before large deformations occur.

Numerous researchers have consistently observed a correlation between horizontal surface displacements in a lateral spread and the thickness of the underlying liquefied soil deposit (Yasuda, et. al., 1992a; Tokida, et. al., 1993; Hamada, et. al, 1986; Bartlett and Youd, 1992a, 1992b, 1995; O'Rourke and Pease, 1997). The influences of the liquefied thickness are as follows:

1) Since shear deformations occur across the full depth of the liquefied deposits, the net surface displacement will increase the greater liquefied thickness. If the shear strain was constant with depth, the lateral displacement profile would be linear and, for a given shear strain, the net surface displacement would increase with liquefied thickness.

2) As the thickness of the liquefied soil deposit increases, a greater upward migration of pore water might occur. Then, the significance of the resulting soft zone near the top of the deposits would increase with increasing liquefied thickness.

3) The drainage path for excess pore pressure s increases with the thickness of the liquefied soil. As a result, portions of a thicker liquefied deposit will remain liquefied for a longer period of time and cause greater surface displacements.

Horizontal displacements in a lateral spread can range up to several meters with smaller associated settlements. Characteristic patterns or ground deformation include ground fissures or tension cracks at the head of the slide. Subsidence typically occurs at the head of a lateral spread with heaving at the toe. Sand boils, a common indication of soil liquefaction, are frequently observed in the lower portions of a lateral spread. Lateral spread is defined here to include only lateral sliding of gently sloping ground due to soil liquefaction at relatively shallow depths and does not refer to the large horizontal slows associated with deep-seated liquefaction failures. This definition of lateral spread also specifically excludes two types of liquefaction-

induced ground failure that can produce similar patterns of surface movements. These types of slumping or embankments and tilting of retaining walls have a genetic failure mechanism involving rotational slide or slumping (Varnes, 1978).

Evaluation: Two conditions exist at the site:

Alluvium: The existing on site alluvium are relatively loose and have low penetration rates ($N_{1(60)} < 15$. In addition, the alluvial deposits may be situated at a sufficient slope that in the event to a strong to severe event, they may be prone to flow failures towards Las Virgenes Creek.

Engineered Fill and Bedrock: Due to the consistency and/or lithification the engineered fill and bedrock are sufficiently dense (high penetration rates) and are not prone to lateral spread.

Mitigation: To mitigate the potential hazard all loose and unsuitable alluvium will be removed and replaced with engineered fill. These measures will consist of a through canyon cleanout as depicted on the map in Appendix G as part of mass grading. In addition canyon subdrains will help prevent static groundwater conditions.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

5.3.3. Seismic Compression/Settlement

General Discussion: Seismic settlement occurs when cohesionless materials (sands) densify as a result of ground shaking. Settlement of medium-dense sands could result from a strong earthquake even if groundwater did not rise and groundshaking did not induce liquefaction.

The analysis divides the soil deposit into very thin layers and calculates the settlement for each layer. The calculations are divided into two parts, dry soil settlement and saturated soil settlement.

The soil above the groundwater table is dry soil and soil below the groundwater table is saturated soil.

Table 7: Standard Penetration Rates versus Relative Density Estimates

$(N_1)_{60}$	D_r (%)
3	30
6	40
10	50

The total settlement at a certain depth is the sum of the settlements of the saturated and dry soil.

Analysis: Two existing conditions exist that have been analyzed for seismic settlement:

Alluvium: The existing on-site alluvium has a consistency that is loose to medium dense in consistency. Therefore, the granular soils that do not liquefy may be prone to settlement during a strong to severe seismic event and mitigation measures should be implemented.

Engineered Fill and Bedrock: Due to the high density and/or lithification the engineered fill and bedrock are not prone to seismic settlement and no mitigation is necessary. .

Mitigation: To mitigate the potential hazard all loose and unsuitable alluvium will be removed and replaced with engineered fill. These measures will consist of a through canyon cleanout as depicted on the map in Appendix G as part of mass grading.

The implementation of the proposed mitigation measures will reduce the potential impacts to less than significant with mitigation.

5.3.4. Ground Lurching

General Discussion: Ground lurching occurs as a result of earthquake wave front striking stream banks, artificial embankments, bluffs and other geomorphic features at right angles resulting yielding of the materials in the unsupported direction. The initial affect is to produce a series of ore or less parallel cracks separating the ground into blocks. With increasing intensity lurch cracking develop ground fractures, cracks, and fissures, as well as, settlement, compaction, and sliding.

Evaluation: Ground lurching is anticipated to occur along the alluvial channels, in the unconsolidated sediments that form the existing drainage channel. Slopes consisting of bedrock will not be prone to lurching due to the high density of the bedrock.

Mitigation: The existing alluvial slopes will be excavated as part of grading and replaced with engineering fill.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

5.3.5. Seiches

General Discussion: Seiches are an oscillation of the surface of an inland body of water that varies in period from a few minutes to several hours. The key requirement for formation of a seiche is that the body of water be at least partially bounded, allowing the formation of the standing wave.

Seiches are often imperceptible to the naked eye, and observers in boats on the surface may not notice that a seiche is occurring due to the extremely long wavelengths. The effect is caused by resonances in a body of water that has been disturbed by one or more of a number of factors, most often meteorological effects (wind and atmospheric pressure variations), and seismic activity or by tsunamis. Gravity always seeks to restore the horizontal surface of a body of liquid water, as this represents the configuration in which the water is in hydrostatic equilibrium. Vertical harmonic motion results, producing an impulse, which travels the length of the basin at a velocity that depends on the depth of the water. The impulse is reflected back from the end of the basin, generating interference. Repeated reflections produce standing waves with one or more nodes, or points that experience no vertical motion. The frequency of the oscillation is determined by the size of the basin, its depth and contours, and the water temperature.

The longest natural period for a seiche in an enclosed rectangular body of water is usually represented by the Merian formula:

$$\text{Period}(T) = \frac{2L}{\sqrt{gh}}$$

Where,

L is the length,
h the average depth of the body of water, and
g the acceleration of gravity.

Higher order harmonics are also observed. The period of the second harmonic will be half the natural period; the period of the third harmonic will be a third of the natural period, and so forth.

Lake seiches can occur very quickly: on July 13, 1995, a big seiche on Lake Superior caused the water level to fall and then rise again by three feet (one meter) within fifteen minutes, leaving some boats hanging from the docks on their mooring lines when the water retreated. The same storm system which caused the 1995 seiche on Lake Superior produced a similar effect in Lake Huron in which the water level at Port Huron changed by six feet (1.8 m)over two hours. On Lake Michigan, eight fishermen were swept away and drowned when a 10-foot seiche hit the Chicago waterfront on June 26, 1954. Lakes in seismically active areas, such as Lake Tahoe in California/Nevada, are significantly at risk from seiches. Geological evidence indicates that the shores of Lake Tahoe may have been hit by seiches and tsunamis as much as 10 m (33 feet) high in prehistoric times, and local researchers have called for the risk to be factored into emergency plans for the region.

Earthquake-generated seiches can be observed thousands of miles away from the epicenter of a quake. Swimming pools are especially prone to seiches caused by earthquakes, as the ground tremors often match the resonant frequencies of small bodies of water. The 1994 Northridge earthquake in California caused swimming pools to overflow across southern California. The massive Good Friday Earthquake that hit Alaska in 1964 caused seiches in swimming pools as far away as Puerto Rico. The earthquake that hit Lisbon, Portugal in 1755 caused seiches in canals 2,000 miles (3,000 km) away in Scotland and Sweden. The 2004 Indian Ocean earthquake caused seiches in standing water bodies in many Indian states as well as in Bangladesh, Nepal, and northern Thailand. Seiches were again observed in Uttar Pradesh, Tamil Nadu, and West Bengal in India as well as in many locations in Bangladesh during the 2005 Kashmir earthquake. The 1950 Chayu-Upper Assam earthquake is known to have generated seiches as far as Norway and southern England. Other earthquakes in the Indian sub-continent known to have generated seiches include the 1803 Kumaon-Barahat, 1819 Allah Bund, 1842 Central Bengal, 1905 Kangra, 1930 Dhubri, 1934 Nepal-Bihar, 2001 Bhuj, 2005 Nias, 2005 Teresa Island earthquakes.

Nagasaki Bay is a typical area in Japan where seiches have been observed from time to time, most often in the spring. On March 31, 1979, the Nagasaki tide station recorded a maximum water-level displacement of 2.78 meters (9.1 feet), at that location and due to the seiche. The maximum water-level displacement in the whole bay during this seiche event is assumed to have reached 4.70 meters (15.4 feet), at the bottom of the bay. Seiches in Western Kyushu, including Nagasaki

Bay, are often induced by a low in the atmospheric pressure passing South of Kyushu Island. Seiches in Nagasaki Bay have a period of about 30 to 40 minutes.

Seiches can also be induced by tsunami, a wave train (series of waves) generated in a body of water by a pulsating or abrupt disturbance that vertically displaces the water column. On occasion, tsunamis can produce seiches as a result of local geographic peculiarities. For instance, the tsunami that hit Hawaii in 1946 had a fifteen-minute interval between wave fronts. The natural resonant period of Hilo Bay is about thirty minutes. That meant that every second wave was in phase with the motion of Hilo Bay, creating a seiche in the bay. As a result, Hilo suffered worse damage than any other place in Hawaii, with the tsunami/seiche reaching a height of 14 m and killing 159 inhabitants. Seiche waves may continue for several days after a tsunami.

Evaluation: A large detention facility will be located east of the proposed development to intercept, detain, and treat runoff. If a seismic event were to occur during the detention phase, the potential for a seiche may exist. The likelihood of such an event is remote, but the potential still exists.

The other potential for this hazard will be the recreation pool and local residential pools. These hazards will involve local splashing and nuisance water.

Mitigation: The detention facility will be constructed with a minimum of 1 foot of freeboard and secondary emergency overflow in the event of a seiche wave during seismic events.

The local pools and recreation facility pool are more nuisance water from sloshing during a seismic event, but can be mitigated with proper deck drainage and setback from residences or structures.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

5.3.6. Tsunamis

General Discussion: Tsunamis, or seismic sea waves, are large oceanic waves generated by earthquakes, submarine volcanic eruptions or large submarine landslides. They are capable of traveling long distances across ocean basins, and can force large quantities of water up onto shore at high velocities. The forces involved with tsunamis are of such large magnitude that the only positive means of protection is to avoid areas subject to tsunamis.

These waves have a long wavelength (distance from the crest of one wave to the crest of the succeeding wave), normally over 100 miles, and very low amplitude (height from crest to trough). As these waves approach shallow water, the speed decreases from a deep water speed of over 600 m.p.h. to less than 30 m.p.h., and their energy is transferred from wave speed (velocity) to wave height (amplitude) waves as high as 80 to 100 feet. The intensity of the wave(s) is unpredictable and may continue for several hours. The waves can arrive onshore in intervals of up to an hour, and since there are usually a number of waves, the threat usually exists for as long as ten to twelve hours. Tsunamis are sometimes preceded by a trough, which appears to be similar to an extremely low tide. The wave itself may follow the trough by 15 to 45 minutes.

Although the arrival time of waves can be predicted, the intensity of the wave when it reaches shore cannot be predicted. Tsunamis are a threat, not because they are extensive or frequent, but because the destruction they cause can be devastating. Tsunamis can cause loss of life from drowning, and they can cause extensive damage to structures on or near beaches and river mouths. In addition, water systems can be contaminated, power supplies disrupted, transportation systems blocked or disrupted, oil and gas pipelines compromised, and communications pathways along the coast destroyed. There can also be an increased occurrence of fire from broken oil or gas tanks or lines, as well as flooding from blocked rivers, etc.

Evaluation: The site is located sufficiently inland and at an elevation such that the risk of tsunamis is nil.

Mitigation: No mitigation measures are required.

5.3.7. Earthquake-Induced Landslides

General Discussion: Hazards to the improvements of the property include earthquake induced landslides which encompasses several categories. Landslides are downslope motions of conglomerations of earth materials or bedrock or combinations of both. Landslides are a more defined unit and are similar to slumps, but are on a larger scale. They can move in a translational movement or rotational settlement or motion. It occurs because of the loss of ability of earth materials to maintain their integrity at a specific gradient and settle or into lesser gradient or position of greater equilibrium. This category encompasses these features, which develop as a result of the increased loading from seismic energy.

Evaluation: In general the State of California has been identified to be in area prone to seismic hazard. Based on the slope stability analysis and geologic mapping, occurrences of the before mentioned hazards may occur at the site if shaking is severe enough.

Existing Slopes: Areas of natural/existing slopes may be prone to future instability in a strong to severe event. Therefore, any development within a zone of influence will need to implement the necessary mitigation measures, which can range from setback to defection walls. Once a site plan has been developed, additional mitigation measures can be provided at the grading stage.

Manufactured Slopes: The proposed slopes will be designed with sufficient design, configuration, and shear strength to withstand earthquake-induced landslides. The engineered fill will be properly compacted, benched, and constructed with subdrains to mitigate any potential issues related to strong seismic events within the scope of the California Building Codes.

Existing Landslide: In the present configuration, the existing landslide may be prone to re-activation in the event of a strong to severe earthquake. The proposed removal and replacement scheme will provide sufficient support, and will mitigate the hazard.

Mitigation: The following mitigation measures will be implemented as part of site improvements:

Existing Slopes: Any development within a zone of influence of any slope (deemed as able to discharge runoff or debris directly to a developed area with no routing) which does not provide the sufficient factors of safety will need to implement the necessary mitigation measures which can range from setback to retaining walls to stability fills. Once a Rough Grading Plans has been developed, additional mitigation measures can be implemented at the grading stage.

Manufactured Slopes: All slopes shall be constructed using acceptable custom, practice and techniques for hillside construction. The slopes will be constructed with a sufficient configuration, design, shear strength, and proper drainage to ensure the appropriate performance of the slope. All finished slopes shall have a factor of safety of 1.5 or greater for static conditions and 1.1 for pseudostatic conditions.

Existing Landslide: The existing landslide will be removed and replaced in accordance with the studies presented herein to derive a suitable factor of safety. All slopes shall be constructed using acceptable custom, practice, and techniques for hillside construction. All finished slopes shall have a factor of safety of 1.5 or greater for static conditions and 1.1 for pseudostatic conditions.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

6.0. GEOTECHNICAL CONSIDERATIONS

6.1. Expansive Soils

General Discussion: Expansive soils swell or heave with increases in moisture content and shrink with decreases in moisture content. Montmorillontic clays are most susceptible to expansion. Foundations for structures constructed on expansive soils require special design considerations.

Evaluation: In general onsite soil deposits consist of silty sand and sandy clays. The clay and silt fractions are anticipated to be moderately to highly expansive. The bedrock should be considered low to moderately expansive.

Mitigation: High plasticity design values will be used to account for possible variations. Pre-moistening of expansive foundation subgrades can reduce the potential and the effects of the shrink/swell cycles. Fat clays (LL > 50) should not be used as structural fill under foundations, pavements, slabs or retaining wall backfill.

If expansive soil is used within the zone of influence (upper 7 feet) for foundations (LL > 20), the placement of expansive soils to ensure the soils are not over-compacted and placed with high soil-water contents have been demonstrated to reduce the shrink and swelling of the soils in future cycles. Therefore, the grading specifications can provide recommendations for thorough mixing to prevent differential swelling. In addition, the soils should be compacted to a minimum of 90 percent relative compaction but no greater than 93 percent or as specified by the project geotechnical engineer. Last, the soil-water content should be specified 3 to 5 percent over optimum or as specified by the project engineer.

Thickened slabs, extending slab edges and additional reinforcement will reduce negative impacts from any expansive soil movement. In addition, the use of capillary break under slabs, will reduce the potential for moisture transport and pumping that leads to moisture infiltration as a result of heat and moisture gradients. It is essential that sand thickness under slabs be used for concrete curing only and be kept at 2 inches or less. The American Concrete Institute has found that greater thicknesses tend to provide conveyance of excessive moisture under the slabs.

Implementation of the above mitigation measures would reduce the impacts of expansive soils to *less than significant.*

6.2. Existing Fill

General Discussion: Uncontrolled artificial fills are considered to be unsuitable for support of structures and other improvements. This is typically due to any number of reasons which include but not limited to: high voids which may collapse or consolidate upon loading; high organics

which decay leaving additional voids or high moisture soils which compress; inconsistent mixtures of fills which may perform differently, changes in consistency over short spans which leads to differential settlement; uneven expansion potential which may result in differential movement of foundation elements, lack of proper benching which may lead to fill creep, and numerous other conditions.

Older controlled fills tend to be prone to hydroconsolidation, excessive settlements or creep. This is a result in the change of compaction methods and efforts (i.e. three layer method versus five layer method for maximum density determinations), experience in keyways, subdrains, benching and many other factors. In addition, older fills may tend to lose integrity due to several factors including bioturbation, organic material decay, shrink swell cycles and other mechanisms that adversely affect the fills.

Therefore, the custom and practice in the industry typically dictates that these types of fills not be relied on for structural support of foundations or slabs. Typical mitigations range from total removal to specially designed structural elements or in-situ treatments.

Evaluation: Isolated unengineered and previously engineered fill is located on the site. The larger areas of fill are illustrated on the Geologic Map. Fill materials that have been generated on the site due to ranching and other related activities are included within the area of proposed development may not be shown, but are within areas designated to be improved, and as such will be removed.

Mitigation: All fill materials on the site will be removed and replaced with engineered fill, or removed to expose bedrock.

Implementation of the above mitigation measures would reduce the impacts of expansive soils to *less than significant*.

6.3. Hydroconsolidation

General Discussion: Hydroconsolidation occurs when soil layers collapse (settle) when water is added under loads. Natural deposits susceptible to hydroconsolidation are typically aeolian, alluvial, or colluvial materials, with high apparent strength when dry. The dry strength of the materials may be attributed to the clay and silt constituents in the soil and the presence of cementing agents (i.e. salts). Capillary tension may tend to act to bond soil grains. Once these soils are subjected to excessive moisture and foundation loads, the constituency including soluble salts or bonding agents is weakened or dissolved, capillary tensions are reduced and collapse occurs resulting is settlement.

Evaluation: Loose onsite artificial fills and soil have a relative low in-situ density. These types of soils tend to be susceptible to collapse, resulting in excessive settlements.

Mitigation: All fill and loose soil on the site within the area of proposed improvements will be removed and replaced with engineered fill.

Implementation of the above mitigation measures would reduce the impacts of expansive soils to *less than significant*.

6.4. Subsidence

General Discussion: Subsidence is the sinking of the ground surface caused by the compression of soil layers. The causes range from groundwater, oil and gas withdrawal, oxidation of organics, or the placement of additional fill over compressible layers.

Evaluation: No conditions were encountered at the site that would result in subsidence, therefore the possibility is nil.

Mitigation: No mitigation measures are necessary.

6.5. Basal Inclination or Varying Thickness of Fill over Natural Slopes

General Discussion: In general, two conditions can typically be encountered that involve the inadequate/improper placement of fill over existing slopes

a). Differential thicknesses of fill below structures can result in unacceptable levels of differential settlement, if the variation in thickness occurs over relatively short distances.

b). The placement of fill on inclined surfaces and/or without adequate benching or keyways may result in unacceptable levels of movement or settlement related to creep or the development of landsliding or slumping.

Evaluation: Existing fills appear to have been generated due to various on-site activities, including ranching. Fills have been pushed onto the existing slope as dump fills that were not properly keyed and benched, thereby forming inclined contact surfaces that are inherently unstable.

Mitigation: All existing fills will be excavated and replaced as engineered fill to prevent unacceptable movement or settlement. Future fills will be placed in accordance with the engineering recommendations presented in this report.

All future fills will be constructed with lateral support from retaining walls or keyway(s), subdrain(s), properly benched and compacted per the engineering recommendations in this report. In addition, the fill thickness under the residence will be maintained at a relatively uniform thickness across the building (no fill thickness differential greater than 5 feet).

Implementation of the above mitigation measures would reduce the impacts of fills on natural ground or slopes to *less than significant.*

6.6. Slope Deformation

General Discussion: A cursory evaluation of seismic displacement has been provided to give an order of magnitude estimate to the amount of displacement that could be expected in response to a range of median peak horizontal ground accelerations. Newmark's method treats a landslide or sliding block as a rigid-plastic body, (i.e. the mass does not deform internally), experiences no permanent displacement at accelerations below the critical or yield level, and deforms plastically along a discrete basal shear surface when the critical acceleration is exceeded. Other assumptions in the analysis include:

1. The static and dynamic shearing resistance of the soil is taken to be the same;
2. The effects of dynamic pore pressure are neglected;
3. The critical acceleration is not strain dependent and thus remains constant throughout the analysis;
4. The upslope resistance to sliding is taken to be infinitely large such that displacement is prohibited.

The Newmark's sliding block analysis for estimating seismic displacements require an initial estimate of t he yield acceleration for a selected cross section. The yield acceleration is the horizontal seismic force required to produce a safety factor of 1.0.

Evaluation: The following considers the potential areas that may exhibit conditions susceptible to slope deformation:

Existing Slopes: Areas of natural/existing slopes may be prone excessive slope deformation. Therefore, any development within a zone of influence will need to implement the necessary mitigation measures which can range from setback to stability slopes or special retaining wall designs. Once a site plan has been developed, additional mitigation measures can be provided at the grading stage.

Manufactured Slopes: The proposed slopes will be designed with sufficient shear strength to withstand any permanent slope deformations. The engineered fill will be properly compacted, benched and constructed with subdrains to mitigate any potential issues related to strong seismic events within the scope of the California Building Codes.

Existing Landslide: In the present configuration, the existing landslide may be prone to excessive permanent deformations. The proposed removal and replacement scheme will remove the potentially unsuitable condition and replace with engineered fill. The repair scheme will be designed to ensure that an adequate factor of safety is provided for the slope.

Mitigation: The following mitigation measures should be implemented in the design of the project:

Existing Slopes: Any development within a zone of influence of any slope which does not provide the sufficient factors of safety and has excessive deflections which would result in a possible slope failure or adversely impact the proposed improvements, will need to implement the necessary mitigation measures which can range from setback to retaining walls to stability fills. Once a Rough Grading Plans has been developed, additional mitigation measures can be implemented at the grading stage.

Manufactured Slopes: All slopes shall be constructed using acceptable custom, practice and techniques for hillside construction. The slopes will be constructed with a sufficient configuration, design, shear strength and proper drainage to ensure the appropriate performance of the slope. All finished slopes shall have a factor of safety of 1.5 or greater for static conditions and 1.1 for pseudo-static conditions.

Existing Landslide: The existing landslide will be removed and replaced in accordance with the studies presented herein to derive a suitable factor of safety. All slopes shall be constructed using acceptable custom, practice, and techniques for hillside construction. All finished slopes shall have a factor of safety of 1.5 or greater for static conditions and 1.1 for pseudo-static conditions.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

6.7. Slope Stability

General Discussion: Slope stability analysis utilized the commercial computer Stedwin for the gross and pseudo-static analysis. Stedwin computes the factor of safety of earth and rock slopes. The program allows the analysis of both simple and complex problems for a variety of slip surface

shapes, groundwater and pore-water pressure conditions, soil properties, analysis methods and loading conditions. Using limit equilibrium, the program can model heterogeneous soil types, complex stratigraphic and slip surface geometry, and variable pore-water pressure conditions using a large selection of soil models for determining the factor of safety's for slope analysis as well as determining Newmark analysis displacements. Information regarding the program and associated theory can be obtained from www.stedwin.com.

This analysis determines the factor of safety for the various slope conditions along the northern portion and eastern areas of the site to assess overall stability under static and pseudo-static conditions. An assessment of landslide along the southern slope is discussed in the Geolabs report in Appendix H.

It is essential to recognize that the subsurface analysis is based on the available subsurface data, interpretations, and geotechnical testing available at this time. In addition, the modeling makes certain assumptions about groundwater, that no pressure build up will occur unless modeled, that the shear strength and subsurface conditions properly characterize the conditions, slope maintenance and drainage is properly maintained, etc. Variations in these conditions, broken pipes or sprinklers, El Nino events, acts of nature or unforeseen or unanticipated events may change the results.

Assessment Standard: Slope stability is generally defined by a corresponding factor of safety determined by the project civil engineer. A factor of safety is defined as the ratio of the sum of all driving forces divided by the sum of all resisting forces.

New construction and any upgrades to a residential structure are generally held by all agencies (including the City of Calabasas) and standard of practice to have a factor of safety of 1.5 for static conditions and 1.1 for pseudo-static conditions. These standards are utilized by almost all local, county, state and federal agencies and are relatively universally accepted criteria for slope stability analysis.

Temporary excavations have been analyzed to achieve an industry standard factor of safety of 1.25 under static conditions.

Failure Mechanism: In general, the bedrock materials appear to be relatively homogenous for the purposes of the analysis. Lateral subsurface conditions including change in bedding dip amount, change in bedding orientation, and change in material strengths along bedding surfaces were assumed to be uniform for the purposes of the analysis. No fabric, planes of weakness or other factors were encountered that would dictate wedge, irregular or planar failure types. Therefore, cylindrical failures were assumed since the circular-shaped failure forms the least surface area per unit mass.

Section 1-1 (south side) does present a possible apparent dip component that is oriented downslope, and could potentially present a daylighted condition. However, structure and layers were found to not be continuous between borings and over any aerial extent. Therefore, the potential for daylighted conditions or possible components is not realistic on a global scale for gross stability analysis.

Survey Data: RJR utilized approximate field measurements based on the site survey. No specific measurements were taken at the cross section locations. The data utilized in the analysis is based on the site topography provided in the site survey. Given the height and extent of the slopes, variations and error in the survey would not significantly change the results. The slope stability analysis provide an reasonable order of magnitude that approximates the existing and proposed conditions.

Slope Modeling – Overall Slope: Cross-section 1-1, 1'-1', thru 4-4' was developed for this property based on the proposed site improvements, the local topography, and subsurface conditions encountered during drilling to model the overall slope for purposes of analysis. The geologic map and geologic cross sections were used as a base for the slope stability.

Pseudo-static analysis was performed utilizing a seismic coefficient of 0.15 to simulate dynamic loads under static conditions. This analysis has generally been accepted as a fairly conservative manner to estimate the factor of safety of a slope under seismic loading. No site conditions were observed that would warrant a higher seismic coefficient for the site.

The geotechnical modeling did modify the cross sections or made the following assumptions:

a. Given the bedrock type, hardness, and height for this analysis, no tension cracks were assumed relevant in the analysis.

b. The shear strengths utilized in the sloe analysis were based on samples collected at much shallower depths than the critical surfaces extend. Therefore, the shear strengths are likely to significantly underestimate the shear strength at depth in the unoxidized, less weathered bedrock. Therefore the factors of safety are relatively conservative for the analysis. However, the use of the lower values will account for any local variations and changes that may occur in the subsurface conditions. As a result, future exploration may significantly change the results of this analysis.

c. Based on previous analysis, a static groundwater surface was placed in the analysis but does not exist in the field.

Material Strengths for Analysis: Material strengths are based on pertinent index values obtained during laboratory testing of the subsurface materials. RJR performed a series of direct shear tests

on the various materials encountered at the site to determined ultimate or fully-softened values. RJR tested siltstone beds and clay zones that were encountered during the subsurface exploration.

Bedrock strengths across the site were derived from previous tests by RJR and other consultants. Fully softened strengths were applied to bedrock in the analysis. Residual strengths would have been applied to any out of slope bedding conditions.

Residual tests using RJR's Torsional Ring Shear Machine were performed on claystone/slide plane materials sampled throughout the site. RJR derived a representative shear strength value for the slide plane by utilizing a composite shear strength envelope from the compiled residual tests. A residual clay layer strength value was also applied to the landslide mass for the purposes of analysis. Residual values were applied to the static conditions while fully softened strengths were applied to the pseudostatic conditions.

Table 8 – Shear Strength Values for Analysis

Siltstone (Tc- Fully-Softened):	Phi: 30 degrees	Cohesion: 500 psf
Slide Plane (Residual):	Phi: 10 degrees	Cohesion: 1000 psf
Landslide Material (Qls – Fully Softened):	Phi: 20 degrees	Cohesion: 540 psf
Siltstone (Tm - Fully-Softened):	Phi: 38 degrees	Cohesion: 700 psf
Engineered Fill (Ef - Ultimate):	Phi: 39 degrees	Cohesion: 520 psf

Fully softened values were used for static and pseudo-static conditions.

Groundwater Conditions: Static Groundwater was not encountered within the depths of the subsurface exploration in the areas of the landslide and slopes, and was only encountered at depth in the canyon. For purposes of analysis, a phreatic surface was established to simulate effluent discharge. It is unlikely that a static groundwater surface would exist given the character of the bedding, as well, the fracture pattern does not appear to have a continuous fabric as well as the fact that discharge is intermittent. It is more likely that water will migrate thru the bedrock along bedding in a series of discontinuous patterns with no hydraulic communication over any aerial extent. Localized mounding may occur in the areas but is not anticipated to affect the overall slope stability since there is not lateral extent of a groundwater surface.

Seismic Loading: Ground accelerations was based CDMG, 1996 modeling. This value was derived based on a "Design Basis Earthquake Ground Motion" which would have a 10 percent probability of exceedence in a particular 50-year period (return interval of 475 years). A regional probabilistic seismic hazard evaluations prepared by California Division of Mines and Geology estimated that ground accelerations of approximately 0.40g (soft rock) for a Peak Horizontal

Ground Acceleration (PHGA). This PHGA corresponds to a moment magnitude of 7.3. Based on the seismic analysis performed herein including the PSHA and DSHA, and given the relatively low seismic exposure and associated hazard at the site, a horizontal seismic coefficient (k_h) of 0.15 was assumed for the slope stability analysis.

Evaluation: RJR created a series of cross sections to evaluate existing and proposed conditions for the northern slope and the southern slope east of the existing landslide. The cross sections provide the critical slope conditions for each condition to assess gross overall stability.

Table 9: Slope Stability Analysis

Analysis No.	Section	Condition	Analysis	Limits (Uncorrected) Initiation			Termination		Factor of Safety	Comments
Appendix D										
1	1b-1b'	Circular	Static	0	200		300	670	1.391	Detention Basin Northern Slope
2	1b-1b'	Circular	Pseudo	0	200		300	670	1.078	Detention Basin Northern Slope
3	1b-1b'	Specific Surface	Newmark's	-	-		-	-	-	0.352 Permanent Displacement; Yield = 0.1532 (%g)
4	1a'-1a'	Circular	Static	0	200		300	982	1.513	Detention Basin Southern Slope
5	1a'-1a'	Circular	Pseudo	0	200		300	982	1.155	Detention Basin Southern Slope
6	2'-2'	Circular	Static	140	200		400	1000	1.758	Northside Natural Slope
7	2'-2	Circular	Pseudo	140	200		400	1000	1.310	Northside Natural Slope
8	3-3'	Circular	Static	120	200		300	920	1.623	Northside Western Most Natural Slope
9	3-3'	Circular	Pseudo	120	200		300	920	1.231	Northside Western Most Natural Slope
10	G1-G1'	Circular	Static	1100	1600		1800	2300	1.844	Global – Southern Buttress Slope
11	G1-G1'	Circular	Pseudo	1100	1600		1800	2300	1.181	Global – Southern Buttress Slope
12	G1-G1'	Circular	Static	1300	1766		1800	2300	1.913	Upper Slope – Southern Buttress Slope
13	G1-G1'	Circular	Pseudo	1300	1766		1800	2300	1.163	Upper Slope – Southern Buttress Slope
14	G2-G2'	Circular	Static	579	900		1251	2145	2.546	Global – Southern Buttress Slope
15	G2-G2'	Circular	Pseudo	579	900		1251	2145	1.620	Global – Southern Buttress Slope
16	G2-G2'	Circular	Static	969	1247		1541	2040	3.582	Upper Slope – Southern Buttress Slope
17	G2-G2'	Circular	Pseudo	969	1247		1541	2040	1.851	Upper Slope – Southern Buttress Slope

18	GAA-GAA'	Circular	Static	744	775		850	1100	1.261	Lower Local Slope - Static
19	GAA-GAA'	Circular	Static	Spec. Surface			Spec. Surface		2.037	Upper Local Slope – Landslide - Static
Appendix I										
20	SS-SS'	Circular	Pseudo	65	67		90	120	2.298	Front Commercial Slope Seg Facing - Adj to Las Virgenes Road
21	SS-SS'	Circular	Static	383	420		445	545	1.748	Rear Commercial Seg Facing – Behind
22	SS-SS'	Circular	Pseudo	383	420		445	545	1.362	Rear Commercial Slope Seg Facing – Behind Building

Cross Sections 1 thru 3 provide evaluation of the existing northern slopes (Appendix D, Analysis No. #1 thru #9). Cross section 1 has been divided in Section 1a-1a' (Analysis #4 and #5) and 1b-1b' (Analysis #1 through #3) for the southern and northern (respectively) slope components (adjacent to the debris basin). The computer printouts and the geotechnical cross section with the depiction of the most critical surface are presented in Appendix D. All results indicate a factor of safety of 1.5 or greater for static and 1.1 or greater for pseudo static conditions, except for Section 1 northern slope. The northern slope adjacent to the detention basin rendered a factor of safety of 1.39, and a pseudo-static factor of safety of 1.078. A Newmark's analysis rendered permanent deformation of 0.35 feet (Analysis No. #3). Additional evaluations and analysis will be performed to assess whether the slope, in the current configuration is acceptable or whether mitigation measures to raise the factor of safety will be required during the Rough Grading Plan Review, which will include final slope stability.

Cross Section G1 and G2 along the southern slope, originally used in the Geolabs report have been revised and re-analyzed by RJR to demonstrate the global factor of safety and the local factor of safety for the remaining landslide surface which is now proposed to be supported by an engineered fill buttress. The updated geology cross sections are included in Appendix A, and the geotechnical cross sections are in Appendix D.

An additional temporary excavation analysis was performed to demonstrate the feasibility of the buttress excavation or slot cuts for the lower slope and the upper slopes when the slide plane is partially exposed by excavation activities. The computer printouts and the geotechnical cross section with the depiction of the most critical surface are presented in Appendix D. All results indicate a factor of safety of 1.5 or greater for static and 1.1 or greater for pseudo static conditions.

Cross Section SS-SS' is located thru the commercial site (Analysis No. #17 - #$19). This analysis was broken into two sections, one to address the segmented wall at Las Virgenes Road, and the second analysis to address the rear wall/slope condition behind the proposed hotel. The computer printouts and the geotechnical cross section with the depiction of the most critical surface are presented in Appendix I. All results indicate a factor of safety of 1.5 or greater for static and 1.1 or greater for pseudo static conditions.

Mitigation: For the slopes analyzed, except Cross Section 1-1, the factors of safety are in accordance with City and County standards. No mitigation measures are necessary.

Additional studies will be performed for the northern slope. Mitigation measures will most likely involve, if required, a retaining wall or reconstruction with a stability fill and geogrid to provide the necessary lateral support for the slope. The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant.*

6.8. Geotechnical Temporary Excavation Analysis

General Discussion: Temporary excavations consist of slopes to be constructed as part of construction or excavations adjacent to existing foundations.

Evaluation: Site specific temporary excavations will be provided for the site overexcavations, slope facing, alluvial removals, utilities and retaining walls during the grading plan stage.

General Site Recommendations: In general, for all areas except the southern landslide removals, the following recommendations may be used for planning purposes:

Non-Surcharged Excavations: Temporary vertical excavations up to 4 feet in may be made for short construction periods in soils and up to 10 feet in bedrock. Excavations in excess of these vertical heights shall be trimmed back to a 1:1 unless a determination is made by the project geologist is less. Any temporary excavations in wet alluvium of soils shall be trimmed back to 1-1/2 or less as determined in the field.

Surcharged Excavations: Any excavations within a 2:1 plane, or a zone of influence of an existing wall, retaining wall, structure, or building, shall be considered a surcharged foundation and will require specific recommendations before any excavations occur in the area to prevent undermining or the removal of lateral confining pressure for the element.

Where excavations are performed adjacent to the existing property line wall, the excavation should offset 5 feet of the wall and then be constructed. Any materials that are within the area not removed by the temporary excavation that are deemed unsuitable will be benched out during the placement of fill under the supervision of the project geologist.

No excavation should occur within a plane that extends 5-foot horizontal from the building and then 2:1 plane projecting down from that point to the excavation, from any existing structure without additional recommendations from RJR. Any excavations within these areas will require shoring or slot cutting.

Slot Cuts: Excavations in the existing fill and alluvium where 1:1 slopes cannot be implemented may utilize slot cuts. The exact height of the temporary excavation and width of the required slots will be determined once detailed design plans have been prepared. For planning purposes we propose the following recommendations. Slot cuts shall be excavated a maximum width of 12 feet with an A-B-C slot configuration with supporting wedge slope angles at 1:1 gradients to a height of 15 feet during periods of no rain, under the continuous inspection of RJR. The results of the analysis are included in Appendix E.

Additional Requirements: No temporary excavations shall be made or maintained during periods of rain without the approval of the project geotechnical consultant.

It shall be the responsibility of the contactor to provide construction sequencing or shoring plan for any surcharged excavations. As well, it shall be the owner and contractors responsibility to notify the County and the project geotechnical consultant prior to any grading.

Southern Landslide Removal: The report included in Appendix H provides an alternative for the slope removal. This analysis assumes a three-foot thick continuous clay layer. Such conditions were not observed during the subsurface exploration but provide a reasonable approach during periods of, or following, unseasonably high or prolonged rainfall. The corresponding remedial grading plan and earthwork map is included in Appendix F.

A second alternative temporary excavation for the landslide mitigation has been further defined by RJR based on the actual geologic field conditions (Appendix D Southern Slope Analysis, Analysis #20 - #22). The analysis assumes fully softened conditions to simulate highly sheared and distorted bedrock. This analysis and removal scheme can be implemented during spring and summer following average to below average rainfall. The engineering stability calculations and

proposed remedial plans are presented in Appendix D, and the corresponding remedial plan and earthwork map is included in Appendix F.

Mitigation: The contractor should construct all slopes in accordance with these recommendations, and shoring plans will be required as discussed in the geotechnical reports. Temporary excavation recommendations are presented subsequently in this report for planning purposes. Site-specific geotechnical recommendations will be provided during the grading stage.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

6.9. Surficial Stability

General Discussion: Surficial stability evaluates the upper 4 to 6 feet of the slope. These conditions are typically characterized by low confining pressures that generate limited cohesion. Analysis typically consists of considering several factors including parallel drainage. The standard of practice generally utilizes an infinite wedge based on the analysis by Campbell, USGS Paper 851 (1975). Antidotal observations and previous studies indicate that, in general, slopes greater than 2:1 are prone to increased maintenance and higher risks of failure in high intensity and/or long duration rainfalls, and require mitigation measures or setbacks.

Evaluation: The following considers the potential areas that may exhibit conditions susceptible to surficial slope deformation:

Existing Slopes: Natural slopes across the site range up to 2:1 (horizontal to vertical) with local slopes ranging up to 1:1. These slopes are composed of landslide debris, alluvial soils or fill or bedrock. These materials tend to form as slope wash or breakdown from weathering, forming variable thickness soil layers. The weather materials may lack sufficient strength, with increasing slope gradient to generate a suitable factor of safety and may be prone to localized surficial failures (Appendix E). Therefore, any development within a zone of influence will need to implement the necessary mitigation measures, which can range from setback to stability slopes or special retaining wall designs. Once a site plan has been developed, additional mitigation measures can be provided at the grading stage.

Manufactured Slopes: The proposed slopes will be designed with proper materials sufficient shear strength to ensure proper surficial slope stability. RJR performed a series of shear strength tests on the existing soil, which ranged from silts to sands. Based on low normal pressures, established a shear strength envelope for the analysis. The results of the analysis demonstrate that the surficial stability of the engineered fill will be stable (Appendix E). With the passage of time, natural and man-made processes can destabilize and degrade fill slopes and effectively decrease compaction. Therefore, to ensure long-term stability, it is essential that a proper maintenance, landscape, and drainage program is established.

Existing Landslide: In the present configuration, the existing landslide may be prone to surficial slope instability due to the reduction of tensile strength and long term weathering. The proposed removal and replacement scheme will remove the potentially unsuitable condition and replace with engineered fill. The proposed slopes will be designed with proper materials sufficient shear strength to ensure proper surficial slope stability. RJR performed a series of shear strength tests on the existing soil which ranged from silts to sands. Based on low normal pressures, established a shear strength envelope for the analysis. The results of the analysis demonstrate that the surficial stability of the engineered fill will be stable (Appendix E). With the passage of time, natural and man-made processes can destabilize and degrade fill slopes and effectively decrease compaction. Therefore, to ensure long-term stability, it is essential that a proper maintenance, landscape, and drainage program is established.

Mitigation: The following mitigation measures should be implemented in the design of the project:

Existing Slopes: Any development within a zone of influence of any slope which does not provide the sufficient factors of safety which could result in a possible surficial slope failure, will need to implement the necessary mitigation measures which can range from setback to retaining walls to stability fills, with extensive erosion control measures. Where derbis flows may occur, additional measures including debris walls will be implemented on lots adjacent to the existing northern slopes that are in question. Once a Rough Grading Plans has been developed, additional mitigation measures can be implemented at the grading stage.

Manufactured Slopes: All slopes shall be constructed using acceptable custom, practice and techniques for hillside construction for surficial stability. The slopes will be constructed with a sufficient configuration, design, material type with sufficient shear strength and proper drainage

to ensure the appropriate performance of the slope. This will also include sufficient slope cover, drainage, and planting to assist in long-term stability.

Existing Landslide: All slopes shall be constructed using acceptable custom, practice and techniques for hillside construction for surficial stability. The slopes will be constructed with a sufficient configuration, design, material type with sufficient shear strength and proper drainage to ensure the appropriate performance of the slope. This will also include sufficient slope cover, drainage and planting to assist in long term stability.

All slopes involved with the developments should be constructed with an erosion control mat and a thorough vegetation and landscape plan be implemented as part of site development. RJR recommends that a maintenance program be implemented by the project architect for the future owners to follow to ensure that all drainage devices are properly maintained, rodent control measures are implemented, propose slope maintenance and irrigation is maintained.

On-site manufactured slopes will be composed of engineered fill, where the outer 15 feet will consist of a stability fill compacted to 93 percent relative compaction. In general, it is our opinion that the surficial soils on sloping ground are susceptible to future erosion. To minimize future surface degradation, it is essential that all slopes be constructed with an erosion control mat and vegetated as soon as possible. Specific analysis, recommendations and design criteria will be presented in the Grading Stage report.

The implementation of the proposed mitigation measures will reduce the potential impacts to *less than significant* with mitigation.

7.0. SUMMARY AND CONCLUSIONS

RJR Engineering Group has performed this feasibility geologic and geotechnical engineering study for Vesting Tentative Tract Map 71547. The project will consist of the following elements:

- Proposed commercial pad at the northwest corner of the site near the main entrance, that is a proposed hotel/commercial development;
- 2 affordable units;
- 69 custom single family residences;
- Recreation facility;
- Several acres of environmental mitigation areas consisting of the seep mitigation plan and re-location, re-establishment of wet meadows and riparian areas;
- Relocation and expansion of the existing County of Los Angeles (County) detention basin;
- LID and green infrastructure or BMP's that consist of bioinfiltration measures, grass swales, wetlands and other enhanced vegetation mitigation areas, trash screens with oil/grease screens, and other measures to be determined;
- Associated infrastructure including but not limited to: public and private roads, County and private storm drains; sewer, domestic and reclaimed water which will be transferred to Las Virgenes Municipal Water District (LVMWD); various dry utilities; and landscaping, retaining walls, geogrid reinforced segmented slope facing, graded slopes and other improvements that will be maintained by the future Home Owners Association (HOA).

The 2014b (69 Lot) Site Plan still provides, but not limited to the following improvements and measures:

v. Buttress and significant landslide removal of the southern slope, which remains essentially identical concept as prior concepts, but have been revised and recalculated to reflect the new site plans. Some value engineering and refinement will occur during rough grading plans;

vi. The superpad approximate limits and general elevations and step up condition from west to east, from a geotechnical standpoint, is essentially identical to the prior Site Plan. The pad has been adjusted to the new development limits and configuration;

vii. Mass and rough grading approaches, as well as proposed utilities and public works improvements for the 2014 Site Plan are essentially identical to the prior site plans for purposes of the feasibility and Tentative Tract Map level analysis. The current site plan has been revised to reflect the new proposed site plan;

viii. Feasibility level assessments for utilities and associated proposed improvements remain identical for the current Site Plan.

This development has been subject to extensive studies and controversies since early investigations in the 1980's. With the accumulation of extensive data, development and evolution of the geotechnical engineering field, experience with other sophisticated sites and failures, development of computer software allowing for more sophistical engineering and seismic analysis, as well as, stricter and enhanced Building Codes have contributed to the industries ability to evaluate the develop complex sites such as the subject site.

To date, the site has been explored by a minimum of forty five (45) exploratory excavations including bucket auger drill holes, trenches, core holes, and Cone Penetrometer Tests (CPT). In addition to the on-site work, prior to the approval of the residential site improvements at Tract 53534 (Azar/Shea Homes), RJR excavated borings and test pits to better identify the underlying structure and possible limits of mapped landslides (identified by previous consultants). Some of the test pits were drilled offsite to the north of Tract 53534 in the east-west trending tributary area to obtain depths to bedrock and bedding orientations. CPT (Cone Penetrometer Test) borings were also performed to establish depth to bedrock, groundwater and some soil parameters. During construction of Tract 53534, RJR mapped the exposed temporary cuts and canyon cleanouts.

Based on this investigation, and the available data from previous studies of the site and surrounding areas, the primary geologic hazards identified at the site during this investigation were:

1. Southern Landslide. A large landslide complex has developed on the southern slope and extends to the south-southeast off-site. Based on the subsurface investigation and subsequent engineering analysis, the global factor of safety of the slide complex is less than 1.5 under static conditions and 1.1 for pseudo-static conditions. Therefore, a removal of a significant portion of the landslide mass will be removed, subdrains installed, and replacement of the slope with compacted engineered fill has been designed as mitigation to bring the factor safety of the landslide mass in excess of 1.5 for static conditions and in excess of 1.1 for pseudo-static conditions global and local stability.

2. Hazards associated with strong to severe groundshaking. The site will be subjected severe groundshaking during the lifetime of the proposed structures. Project designers and the owner should understand that the code values and design parameters from the CBC 2010 code are presented as minimum values, and are not intended to prevent damage, but only to prevent catastrophic collapse and minimize risk to human life.

Based on our review of the drill hole data and CPT soundings, the existing alluvial soils in the central canyon, will be subject to liquefaction, ground lurching, lateral spread, and/or seismic settlement in a strong to severe seismic event. To mitigate this potential hazard, RJR recommends that all alluvium be removed and be replaced with engineered fill. This mitigation is intended as a reasonable solution to eliminate unacceptable seismic induced settlement, and provide a more homogenous, consistent foundation soil for the future road and storm drain.

3. Presence of existing fill/loose soil and alluvium. Loose soil and existing non-certified fill is located in the canyon areas of the site and isolated areas of the site.

The central canyon has approximately 5 to 40 feet of alluvium. The in-situ density of these soils, composition, and consistency are highly variable. Based on compressibility tests from previous studies from the site and surrounding areas indicated not only high strain rates, but indicated that the soils were prone to hydrocollapse and/or hydroconsolidation. All alluvial materials will be removed to expose competent bedrock, processed and placed as engineered fill.

Artificial fill has been placed in areas near the tract entrance and near the existing corral areas. These materials have been approximately located on the Geologic Map. The exact locations will be identified on the design plans at the Grading Stage, and will be removed as part of site development and replaced as engineered fill.

All trench backfill from previous on-site investigations will be removed as part of rough grading and replaced with engineered fill.

4. Adverse Bedding Conditions

Measurements of the bedding planes encountered during the site investigation indicated the bedding is oriented in a various array of directions, although the prevalent trend was for dips in the northeast and southwest direction at various dip angles. Specifically, the bedrock is folded into short wave length (tight) folds and this results in several dip reversals. Overall, these dip reversals are favorable because they serve to limit the extent of potential gross failure planes because no inherent fabric is continuous. However, because of the intense folding of the bedrock materials, these materials are highly to moderately fractured and susceptible to raveling- and wedge-type failures.

RJR has recommended that all cut slope (or fill slopes less than 15 feet in width) be over-excavated and re-constructed with a stability fill to mitigate this potential hazard. Since these beds are not continuous wedges or planes, no additional buttressing is deemed necessary.

5. Settlement of Deep Fills and Different Settlement

To mitigate the presence of loose alluvial soils, as discussed above, we recommend that all alluvial soils be removed in the southern canyon. The thickness of the proposed alluvial removals coupled with the additional engineered fill necessary to buttress the slide will result in fill thicknesses ranging greater than 150 feet. To reduce elastic and immediate settlement all engineered fill thickness will be placed as follows:

a. Fills greater than 15 feet from rough grade will be compacted to 90 percent relative compaction at a soil-water content of approximately 2 percent to 5 percent over optimum value.

b. Fill thicknesses in excess of 40 feet from rough grade will be compacted to 93 percent below a thickness depth of 40 feet at a value of optimum to 2 percent over optimum. Where fills exceed 60 feet, fill greater than 60 feet of thickness to 95 percent relative compacted at a soil-water content of approximately optimum value. Drainage blankets will be placed at 30 to 40 foot intervals to reduce excess pore pressures. The exact remedial measures will be provided during the Grading Stage.

To reduce the risks of long-term settlements, a waiting period will occur after rough grading to allow the fill to reach 90 percent consolidation (t_{90}), and remaining pore pressures dissipate. The exact waiting period will be determined as a part of the Grading Stage report. This will include the installation of settlement monitors on the deep bedrock excavations to measure heave, and in the fill to confirm consolidation levels.

6. On-Site Surficial Slope Failures

All on-site surficial slope failures and areas of excess erosion within the area of the proposed development will be benched out or excavated as part of the slope construction. In areas along the northern slopes, where debris may potentially impact the development, additional measures will be taken to mitigate the hazard. These areas will be further assessed as part of the Grading Stage report to determine if additional design considerations are necessary, based on the ultimate site plan design.

7. Shallow Bedrock Conditions

Due to the presence of shallow bedrock, based on the proposed rough grade elevations, rock will be exposed at the surface in several areas. This will result in complications with the utility and plumbing lines, as well as, landscaping and the potential for sulfate heave. Therefore, all pads will be over-excavated to provide uniform fill thicknesses. The exact limits of vertical and horizontal over-excavation and re-compaction will be determined and presented in the Grading Stage report. For planning purposes, preliminary recommendations are presented below.

8. Moderate to High Sulfate Soils

Chemical testing indicates that on-site soils have low sulfate content. RJR's experience with Calabasas Formation indicates that many areas may contain high sulfate concentrations. RJR has provided grading techniques for proper water treatment of the soil, processing to aerate the soil, and special concrete (Type V) as necessary. Additional testing will be performed near the end of rough grading to determine if special concrete, or other recommendations, are necessary.

To reduce the potential for slope raveling related to sulfate expansion, all cut slopes will be over-excavated and re-built with a minimum 15 foot thick stability fill and all pads will be over-excavated and replaced with processed engineered fill.

9. Debris Flows from Upper Slope Areas

Based on mapping of the slopes in the region, debris flows occur in the residual soils occurring on natural slopes with gradients steeper than 2:1 (horizontal to vertical). We would expect that there is a potential for surficial failures in the upper reaches of the slopes above the area proposed development and the off-site slopes from materials within the slide mass and steeper residual soil slopes.

In areas along the northern slopes, where debris may potentially impact the development, additional measures will be taken to mitigate the hazard. In remaining portions of the site, these areas are located at sufficient distance from the development such that the only potential impact will be nuisance mud, which should be diverted by drainage terraces that will be located at the top of slopes and/or addition freeboard on retaining walls or slope facing. The exact size and dimensions of the drainage devices will be determined at the Grading Stage. This will include particular measures along the northern slopes that are contiguous to the development and desilting/detention basin.

10. Expansive Soils

Residual soils, existing artificial fills, and proposed materials to be excavated at the site consist of sandstone, siltstone, and claystone fragments. The clay and silt materials tend to be moderately to highly expansive. To mitigate the potential for expansive soils, all foundations and slabs will be designed for highly expansive soil conditions. These design parameters will be confirmed during the Grading Stage, and then again after rough grading has been completed.

11. Site Flooding in the Central Canyon

Although not specifically addressed within the scope of this geotechnical study, based on our previous experience with the site and Tract 53534, approximately 600 cfs flows thru the central canyon from upslope tributary areas. At the present time, the runoff flows thru an undeveloped channel, to an debris basin that was constructed by Tract 53534 which ten connects to an existing 5.5' x 5' arch structure at Las Virgenes Road. To mitigate the potential impacts of flooding and to allow for site access, RJR proposes to extend the storm drain system, and reconstruct the desilting basin upslope of the subject property. This basin will also provide detention of the runoff flows to attenuate the flowrates to reduce potential downstream flooding.

In general these hazards present varying degrees of hazard to the site but are readily mitigated by standard construction measures and techniques that are readily employed in the engineering field. The only hazard identified at the site that cannot be reliably mitigated is the groundshaking. The hazard and exposure to the site remains similar to all other sites in the region and the proposed construction will not exacerbate the hazard.

No conditions were encountered that could not be mitigated within the guidelines and specifications of the current codes, guidelines and custom and practice in the industry for geotechnical engineering.

Based upon the available data, from our review, investigation and analysis, the subject residential tract and associated improvements are feasible from a geologic and geotechnical engineering standpoint. The site will be free of landslides, minor slippage and settlement within the guidelines and limitations described in this report. In addition, the proposed development and grading will not adversely impact the stability of the surrounding areas outside of the proposed development.

This report has been prepared to assess and provide mitigation measures as necessary to establish feasibility of the project at a tentative tract level. This report has been prepared for approval from the City of Calabasas in accordance with the Subdivision Map Act for the approval of the Vesting Tentative Map.

Once preliminary site plans have been developed additional review will be required to address any remaining design issues and mitigation measures. Specific design specifications and recommendations will be provided at the Grading Stage Approval. Section 8.0 has been provided to use in the initial grading stage design based on the current site plan and proposed development.

8.0. GEOTECHNICAL RECOMMENDATIONS

The following recommendations, which are presented as guidelines to be used by the project designers, have been prepared assuming RJR Engineering Group will update these recommendations at the Grading Stage. These recommendations are provided as initial design guidelines for initial design and cost estimating for the planning phase.

The following geotechnical recommendations are provided as guidelines and will be adjusted as necessary for the specific site conditions encountered during site construction. Where these recommendations do not specifically address a particular site condition, construction method or materials specification, the Standard Specifications for Public Works Construction Projects (Greenbook), latest edition, should be used. Where there is a conflict between the RJR specifications and the Greenbook, the more restrictive condition should be assumed, unless revised by RJR.

8.1. Earthwork

These specifications present general procedures and requirements for grading and earthwork and anticipated for overall construction of the proposed project. Recommendations contained in this report should be considered a part of the project specifications and supersede any prior recommendations or provisions. Evaluations performed by RJR Engineering Group during the course of grading may result in new recommendations that could supersede these specifications or recommendations of this report.

It shall be the responsibility of the contractor to provide adequate equipment and construction methods to accomplish the work in accordance with the applicable grading codes or agency ordinances, these specifications and the approved grading plans.

If, in the opinion of RJR Engineering Group, unsatisfactory conditions, survey control, inadequate compaction, soil-water content, fill mixture, consistency, adverse weather, or other conditions which may adversely affect the project are resulting in a quality of work less than required in these specifications, RJR Engineering Group will reject the work and recommend that construction be stopped until the conditions are rectified or made appropriate.

8.1.1. Site Preparation

Areas of the site to be built upon, paved, or excavated should be stripped to remove any surface debris, vegetation and organic topsoil (clear and grubbed). Soil containing more than 2 percent by weight of organic matter should be considered an organic soil and is not suitable for use in structural fill. Stripping depths should be determined in the field. However, for planning purposes, an average stripping depth of 4 inches may be assumed.

Strippings should be wasted off-site or used in landscaping, as designated by the project architect. Any shrubs designated for permanent removal should be cut down, and the stumps and roots should be removed.

All existing structures designated for removal should be demolished, and the debris wasted off-site. All existing concrete foundations, pavements, utility lines and pipes should be excavated, removed, and wasted off-site.

8.1.2. Grading

The site will be mass graded using conventional cut and fill techniques to produce a series of level pads for the proposed commercial and residential development. The proposed development can be divided into the following:

Mass Grading: Conventional grading techniques will consist of cut and fill grading for the mass grading phase to remediate the on-site landslide, unengineered fill, alluvial removals and construction of any required stability fills. The bulk grading will consist of the following phases:

***MG Phase 1*:** This grading will include mitigation measures to remove existing alluvium to depths of approximately 20 to 40 feet below ground surface (bgs). Groundwater may be encountered in the deeper excavations around 35 to 40 feet. Existing alluvium will be re-used, processed, mixed and placed as engineered fill.

***MG Phase 2*:** The second phase of bulk grading will be the removal of the landslide mass along the southern slope to stabilize the existing landslide complex. Landslide removal and stabilization are presented in the Geolabs report, dated May 27, 2011. A copy of this report has been included in Appendix H of this report. In summary, the landslide repair will consist of excavating a keyway, benching out and cutting the landslide mass, and then replacement with

engineered compacted fill. Temporary back cuts were analyzed by Geolabs to ensure adequate temporary stability. RJR has included remedial grading plans to illustrate the proposed grading in detail (Appendix G).

It should be noted that the analysis presented by Geolabs includes a 3 foot continuous layer of clay with residual values. This model does not reflect the actual geologic conditions encountered in the field, where the field exploration encountered changes in structure, distorted areas, or transitions from oxidized bedrock to unoxidized bedock as indicators of the basal slide location. The depiction and analysis presents a reasonable and conservative approach, which has been collectively referred herein as the "winter approach". The temporary excavation provides a reasonable approach if grading occurs during winter or following a strong to severe rainfall season. An alternative removal design has been provided subsequently herein as a "dry season approach". Calculations are included in Appendix D and the proposed removal and earthwork map are included in Appendix H.

MG Phase 3: construction of stability fills where adverse geologic conditions are encountered in areas of proposed development, including where adverse or questionable bedding orientations or areas of creep or surficial slope instability are identified during rough grading stage.

MG Phase 4: All mass grading will consist of contour-shaped landform grading to return the slopes to the existing grades or to an alternative natural appearance. Depending the proposed schedule, false slopes may be implemented that will minimize additional grading once rough grading is undertaken by ensuring the mass grading is compatible with the future improvements.

Other aspects will depend on the timing of the mass grading phase. If grading occurs during the spring or winter, mass grading may also include the construction of a temporary drainage channel to convey runoff from the eastern drainage to the existing detention facility. As well, the mass grading will be designed to ensure that adequate temporary surface drainage is maintained during periods of rain. This will entail temporary drainage devices and BMP facilities.

Rough Grading: In general, all grading will consist of typical measures and grading techniques that are typical in the hillside areas of southern California and that have been utilized in the City of Calabasas developments. Rough grading will consist of the following phases:

RG Phase 1: Demolish the existing detention basin constructed as part of the Tract 53534 development and relocated to the east of the proposed rough grade pad. A series of additional drainage improvements will be located in other tributary drainage areas. The basins will be constructed with compacted earth embankments and lined with a concrete slope facing, and soft bottom, and inlet tower system in accordance with the County of Los Angeles Flood Control District. The basin will also be designed to further attenuate the hydrograph and allow for the increased runoff resulting from the proposed development, as required.

RG Phase 2: Construct a series of super pad by placing engineered fill to rough grade(s) and form the proposed lots and building pads. Pads and lots will then be formed to approximately ±0.1 feet of proposed grades.

RG Phase 3: Construct temporary excavations, as well as cut and fill slopes at the building pad transitions to accommodate the elevation change from the proposed improvements to existing grades.

RG Phase 4: Construct a series of retaining walls and/slope protection structures per the proposed tentative tract map and conceptual grading plans.

RG Phase 5: The last phase will consist of grading and forming the future proposed streets.

The materials arising from the stripping operations and removal areas as well as foundation excavations that are considered suitable for reuse as structural fill should be stockpiled for subsequent use. The suitability of the materials should be determined in the field by the project engineer at the time of excavation. Alternatively, these materials should be suitable for on-site landscaping as necessary.

On-site, any imported soil proposed for use as structural fill should be inorganic. Soil containing more than 2 percent by weight of organic matter should be considered organic and should not be used as engineered fill. All import should be tested and approved by RJR prior to delivery to the site.

The proposed fill materials should be thoroughly mixed and processed to achieve consistent soil-water content with uniform soil mixture and consistency. The fill materials should be reasonably free of large soil lumps or clods, and free of uneven features that would inhibit compaction

efforts. Care should be made to ensure that the soil is not over watered or that too much effort is applied in the compaction effort which could result in subgrade pumping.

The soil surface exposed by stripping and excavation activities should be approved by RJR prior to fill placement. The limits of all bottom excavations shall be precisely surveyed at this time.

8.1.3. Compaction

Structural fill using the on-site soils, or approved import, should be placed in layers, each not exceeding 8 inches loose thickness (before compaction), water conditioned and compacted as specified above. All fill shall be compacted with a sheepsfoot or similar method, as approved by RJR to ensure adequate compaction.

Isolated areas or areas with limited access may be compacted with hand equipment or track-walked. In these areas fills shall be placed in layers not exceeding 4 inches, water conditioned and compacted as specified above. All fill shall be compacted as approved by RJR. All compaction standards are based on ASTM Test D1557. All materials placed as engineered fill shall be placed at 90 percent relative compaction at about optimum soil-water content, unless otherwise specified as requiring special compaction.

Compaction Standards: All compaction standards are based on ASTM Test D1557.

General Compaction: All materials placed as engineered fill shall be placed at 90 percent relative compaction at 1 to 3 percent over optimum soil-water content, unless otherwise specified as requiring special compaction.

Special Compaction: All engineered fill placed within 10 feet of a slope face or at a depth greater than 40 feet shall be compacted to 93 percent relative compaction to approximately optimum soil-water content. Where fills exceed 60 feet, fill greater than 60 feet of thickness to 95 percent relative compacted at a soil-water content of approximately optimum value. All utility lines and the upper 18 inches of pavements shall be compacted to 95 percent relative compaction to approximately optimum soil-water content. Compaction tests should be performed every 18 to 24 vertical inches and/or 1,000 cubic yards of fill or as determined necessary by the field engineer to verify adequate compaction and ensure proper soil-water content. Drainage blankets will be placed at 30 to 40 foot intervals to reduce excess pore pressures. The exact remedial measures will be provided during the Grading Stage.

Compaction of fill on slope faces should include at least one test shall be taken for each 5,000 square feet of slope face and/or 10 feet of vertical height of slope. At least 1/2 the required compaction tests will be made in the outer 5 to 10 feet of the final fill slope surface including tests on the final fill slope surface. Continuous observation of the placement of compacted fill is required for all slopes that exceed a gradient of 3:1.

8.1.4. Bottom Excavations Removal Depths and Limits of Grading

Removal of existing fill and unsuitable materials will be made in the area of the proposed improvements during construction. To provide a homogeneous foundation blanket, we recommend:

Landslide Excavations: All landslide excavations shall be constructed in accordance with the remedial grading plans. This will include establishing a series of multi-level bottom excavations, which will extend a minimum depth (per the plans) into competent bedrock.

Single Family: At this time, all residences will be placed on engineered fill. Fill placement and benching will be constructed in a manner to ensure that the fill thickness differential across any structure shall not exceed 5 vertical feet in thickness. Minimum fill thickness below the structure shall be 5 feet to ensure that the foundations are placed on a minimum of 3 feet of fill that extends 5 feet horizontally beyond all improvements on the pad.

In the event cut or transition pads are encountered, the pad should be over-excavated and sloped at approximately 1 percent towards the streets. All bottom excavations shall be sloped as directed by the project engineering geologist or geotechnical engineering consultant towards drains or deeper areas of fill to ensure that a "bath tub effect" for water accumulation does not occur. Specific recommendations will be provided during grading because they are based on grading sequence.

Based on the present design, Lots 47, 48, 61, 62, 68-74 are transition pads that will require over excavation to create a homogenous fill layer. The remaining pads will be fill pads as a result of alluvial and/or landslide mitigation.

Recreation Facility Structure: All ancillary structures will be over-excavated to ensure that all foundations are supported on the engineered fill placed in accordance with the specifications contained within the "New House Foundation" section above.

Hotel Site: At this time, the proposed hotel is proposed to be situated in the central portion of the commercial pads. Cut depths in the area of the proposed building will be in the order of 1 to 30 feet. These depths increase to over 50 feet in the area of the eastern parking area and rear slope facing structure.

The northern property line retaining wall will be a soldier pile retaining wall that will provide temporary and permanent support of the northern slope.

Site-specific exploration will be required during the Grading Stage to ensure that no additional uncertified fill is present. The existing bedrock and uncertified fill will be over-excavated to mitigate the variable consistency and expansive potential between the sandstone and siltstone, as well as, potential hardness of layers that would inhibits local utilities and landscaping. Therefore, the entire pad will be over-excavated to provide a fill layer to facilitate future excavations, utilities, homogenous foundation conditions, and landscaping soils. The exact depths will be determined in subsequent studies. For purposes of planning, all streets shall be over-excavated 9 feet vertically that extends a minimum of 5 feet horizontally. All landscape areas shall be over-excavated 5 feet vertically and 5 feet horizontally beyond the proposed construction footprints.

The building pad will be over-excavated to a depth approximately 5 feet below the bottom of the foundation, and a horizontal distance equal to 2 times the footing width or 5 feet, whichever is greater. Fill placement and benching will be constructed in a manner to ensure that the fill thickness differential across any structure shall not exceed 5 vertical feet in thickness. Minimum fill thickness below the structure shall be 5 feet to ensure that the foundations are placed on a minimum of 3 feet of fill that extends 5 feet horizontally beyond all improvements on the pad.

Residential Slabs: All slabs will be supported by the residential foundations, and will be founded on the engineered fill placed in accordance with specifications contained within the "New House Foundation" section above.

Driveway and Pavements: We recommend that over-excavation limits extend a minimum of 18 inches below subgrade and minimum of 12 inches beyond the limits of all pavements, or beyond curb and gutter and sidewalk where present.

Previous Trenches: All trench backfill from previous utility lines will be removed as part of rough grading and replaced with engineered fill.

Areas of New Fill: Areas of new fill will consist of keyways, benching and removal of unsuitable materials to place engineered fill.

Pool Foundation Subgrade: A minimum excavation depth of three feet (3) feet below bottom of the pool foundation grade under the pool. The limits of the excavation shall extend a minimum distance of 1 foot outside the perimeter of the pool. This will yield 3 feet of compacted fill below the foundations and 2 feet of fill and 12 inch subdrain below the remaining portions of the pool.

Hardscape: We recommend a minimum of 1.5 feet for overexcavations in areas of proposed hardscape provided all fill is completely removed in the area. We recommend that over-excavation limits extend a minimum of 1 foot beyond the limits of all hardscape.

All areas of removal shall be mapped by RJR during construction, and illustrated on a map in the Rough Grade report. RJR will conduct a site review with the grading contractor prior to the start of grading to review approximate depths and limits of removal. The limits of the pool must be precisely known and staked in the field prior to grading.

The bottom excavation(s) shall be accurately surveyed to measure the lateral limits, dimensions and elevation and approved by a representative of RJR.

8.1.5. Keyways

All structural fills or stability fills to be placed on sloping ground (greater than 5:1), and should be constructed with a keyway. Table 10 provides the keyway design parameters.

Table 10: Keyway Construction Parameters

a. Width:	8 feet
b. Slope into Hillside:	2 percent

c. Depth into Embedment Materials: 3 feet (or as determined in the field)
d. Embedment Materials: Competent Bedrock

The fill keyway should be located such that the projected slope face occurs within the middle one-third of the keyway. The location and limits of the keyway shall be staked by the contractor or his surveyor, and observed by RJR Engineering Group prior to excavation.

All keyways will be required to be constructed with a backdrain system, which should be located at the inboard side of the keyway. Subdrains will then be placed in accordance with the following minimum criteria:

a. Every 15-20 vertical feet or the Grading Plan;
b. At the location of any seeps or areas of high soil-moisture content;
c. Bedrock contacts where significant changes in lithology occur where permeable and impermeable layers occur;

All keyways shall be accurately surveyed to measure the lateral limits, dimensions and elevations, and illustrated on a map in the Rough Grade report. RJR will conduct a site review with the grading contractor prior to the start of grading to review approximate depths and limits of removal. The limits of the building must be precisely known and staked in the field prior to grading.

8.1.6. Benching

Benching should be a minimum of 8 feet to as much as 16 feet in horizontal distance for every 4 vertical feet, and smaller intermediate benches may be made for ease of construction.

Benching into side slope conditions or areas of limited access shall be achieved with a minimum of 4 feet in horizontal distance for every 4 vertical foot.

8.1.7. Bench and Keyway Subdrains

The subdrains will be installed in all proposed fill slope keyways, stability fills, slope facing, behind all retaining walls, and at the location of all seeps or wet areas that may be indicative of

groundwater or groundwater movement. The exact location will be determined in the field; however, we anticipate subdrains will be installed every 15 vertical feet.

All drains will consist of a curtain drain that consists of a 4 inch diameter, perforated pipe encased in a 12 to 18 inch thick layer of gravel. The subdrain pipe should be located within 3 inches of the base of the drain rock and should consist of one of the following types of pipe:

1. ASTM C508 or ASTM D2751 Asbestos Cement Pipe (ACP)
2. SDR 35 or ASTM D1527, Schedule 40 Acrylonitrile Butadiene Styrene (ABS) pipe
3. ASTM D3034, SDR 35 or ASTM D1785, Schedule 40 Polyvinyl Chloride Plastic (PVC)

Pipe perforations shall be at 45 degree angles (approximately) to one another on opposing sides of the pipe every 8 to 12 inches. The pipe shall be placed such that the perforations are located down.

Gravel shall consist of a durable, clean, 3/4 inch to 1-1/2 inch diameter drain rock. The drain rock shall extend along the backcut a minimum of 3 feet from the top of pipe. The gravel should be compacted in place with small, hand operated vibratory compactor.

The gravel drain rock should be wrapped to separate the gravel from the surrounding soil or rock (burrito-style construction) with a high quality geosynthetic fabric such as a Mirafi 140NL, or approved equivalent. The fabric should be handled in accordance with the respective manufacturer's requirements, and should be constructed such that all fabric overlaps are a minimum of 12 inches.

The subdrains should outlet at appropriate discharge locations that will ensure all discharge will not scour or erode the surrounding soil, and the pipe will not become damaged or clogged. The outlet pipe should be a solid pipe that meets minimum specifications set forth above for the subdrain pipe.

The subdrain location, alignment, and materials shall not be changed or modified without the approval of RJR Engineering Group. RJR Engineering Group may, upon review of field conditions, recommend additional drain lines, or alter line, grade, and materials. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to the placement of fill over the subdrain.

8.1.8. Fill Slopes

All fill slopes should be constructed no steeper than 2:1 (horizontal to vertical) and in accordance with the California Building Code, latest edition. All fill slopes placed on ground steeper than 5:1 or unsuitable materials should be keyed and benched in accordance with the recommendations presented herein.

All fill slopes should be over-built approximately 2 to 3 feet, compacted with a sheepsfoot roller as necessary to ensure adequate compaction. All fills placed on the outer 10 feet of an open slope face or reinforced slope shall be compacted to 93 percent relative compaction at a soil-water content of approximately optimum to 3 percent over optimum value. The slope can then be trimmed back to finished grade, and the final slope surface. A lesser compaction may be acceptable in areas of landscaping and shrubs for slopes less than 3:1 for the surface soils. The finished slope should then be track walked(vertically) in an up- and down direction to reduce erosion of the slope.

The top and sides of all slopes should be rounded to produce smooth transitions from the graded slope to the natural slopes. Drainage should be diverted away from all slope faces with a concrete v-ditch, swales, or drainage devices at the top of the slope to collect all drainage. The concrete swale should have a minimum 3 percent slope, as possible to be self-cleaning. Alternatively, extensive landscaping and grass may be established for ease of maintenance and usage rather than swales.

Based on the Building Code and City Municipal Code, terrace drains will be required on taller fill and stability fill slopes. Terrace drains shall slope at 5 percent slopes to an appropriate collection facilities.

It is essential that these slopes are vegetated at the end of rough grade construction and permanent erosion control/NPDES measures are implemented. The future Homeowners will need to establish a maintenance schedule to ensure that the drainage devices are properly maintained. Fill slopes composed of the on-site fills will be prone to raveling and erosion with time, which may decrease and as a result decrease compaction with the passage of time. Therefore, proper drainage and landscaping is essential to reduce the potential for the adverse effects of these processes.

Fill thickness greater than 50 feet will be required to be constructed with a horizontal drainage blanket to reduce elastic and primary settlements and the associated waiting time.

8.1.9. Geogrid Reinforced Fill Slopes and Slope Facing

At the time of this report, segmented retaining walls reinforced with geogrid were proposed to accommodate grade differential for the proposed access driveway. No wall facing or other detailed design was available at this time. Specific analysis, design, and specifications will be performed at the Building stage and incorporated into the final grading plans. This will include detailed wall profiles illustrating geogrid locations, lapping, subdrains, outlet elevations and locations. Slope facing will be utilized at various locations of the tract in lieu of retaining walls to achieve steeper gradients that will be planted and eventually hidden by plants and shrubs.

Wall facing: The blocks are stacked at a varying inclinations at near vertical to a ¾:1, the geogrid connected, and the cells backfilled in one operation.

Geosynthetic Reinforcement: Geogrid will be structurally connected to the block and extend back into the slope. Geogrid will continue to be placed in the 2:1 slopes that are situated between stacked slope facing elements. Intermediate geogrid will be placed between the primary grid for additional reinforcement.

Subdrain: A subdrain will be installed at the termination of the geogrid. The upper 24 inches of backfill should consist of a compacted soil. The proposed slope facing should be provided with a subdrain that consists of a 4 inch diameter, perforated pipe encased in a 12-inch (minimum) thick layer of gravel. The subdrain pipe should be located within 3 to 6 inches of the base of the drain rock and should consist of one of the following types of pipe:

1. ASTM C508 or ASTM D2751 Asbestos Cement Pipe (ACP)
2. SDR 35 or ASTM D1527, Schedule 40 Acrylonitrile Butadiene Styrene (ABS) pipe
3. ASTM D3034, SDR 35, or ASTM D1785, Schedule 40 Polyvinyl Chloride Plastic (PVC)

Pipe perforations shall be at 45 degree angles (approximately) to one another on opposing sides of the pipe every 8 to 12 inches. The pipe shall be placed such that the perforations are located down.

Gravel shall consist of a durable, clean, 3/4 inch to 1-1/2 inch diameter drain rock. The drain rock shall extend to within 24 inches of the ground surface. The gravel should be compacted in place

with small, hand operated vibratory compactor. The gravel drain rock should be wrapped to separate the gravel from the surrounding soil or rock (burrito-style construction) with a high quality geosynthetic fabric such as a Mirafi 140NL, or approved equivalent. The fabric should be handled in accordance with the respective manufacturers requirements, and should be constructed such that all fabric overlaps are a minimum of 12 inches.

The subdrains should outlet at appropriate discharge locations that will ensure all discharge will not scour or erode the surrounding soil, and the pipe will not become damaged or clogged. The outlet pipe should be a solid pipe that meets minimum specifications set forth above for the subdrain pipe. Where the pipes outlet to the beach, no additional erosion measures will be required.

The subdrain location, alignment and materials shall not be changed or modified without the approval of RJR Engineering Group. RJR Engineering Group may, upon review of field conditions, recommend additional drain lines, or alter line, grade and materials. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to the placement of fill over the subdrain.

Foundation Embedment: All walls shall be embedded a minimum of 5 feet below lowest adjacent slope surface into engineered fill or bedrock, which provides 10 feet to the slope face.

Fill Placement: All fill placed behind the slope facing shall be compacted to 93 percent relative compaction in accordance with this report. Continuous inspection will be required during this phase of fill and geogrid placement.

Construction Details: Detailed drawings and notes are presented in the Rough Grading Plans providing installation and construction recommendations and specifications.

Shear Strength Designs: The retaining walls shall be designed in accordance with appropriate shear strength parameters for the engineered fill. For purposes of design, unless otherwise determined by the geotechnical consultant, the following values shall be assumed:

Internal Angle of Friction:	32 degrees
Cohesion:	0 psf
Bulk Weight:	125 pcf

Seismic Design: Given the critical design and proximal location to buildings and other improvements, all slope facing should be designed for a horizontal seismic coefficient of 0.2.

Geogrid Handling: Upon delivery, the geogrid should be checked to ensure the proper material and grid types have been received. A product certification should be provided with each shipment stating the material conforms to specifications set forth in the manufacturer and supplier Care should be taken to prevent mud, wet cement, epoxy, and like materials that may permanently attach to the grid work. The rolled material may be laid flat for storage and should be covered with a light colored tarpaulin to prevent long-term exposure to sunlight. Geogrid materials should be protected from extreme heat or cold to protect against degradation of the geogrid material.

Prior to placing the reinforcement, the excavated area shall be free of loose soil and debris. Subgrade materials should be proof-rolled and tested for compaction to ensure the competency of the foundation soils.

The reinforcement shall be rolled out, cut to length, and laid out at the proper elevation, location and orientation. Orientation of the material is of extreme importance with uniaxial geogrid since these will vary in strength with roll direction. The roll direction of the geogrid should be laid in the direction of the main reinforcement. The contractor shall be responsible for correct orientation.

Reinforcement should be placed as close as possible to the nearest compaction lift as specified above. When primary and secondary geogrid intersect in the same layer the secondary geogrid may be deleted. No special surface is required for the placement of geogrid compaction aids. If a sheepsfoot roller is utilized, the sheepsfoot imprints are an acceptable surface for reinforcement placement.

After being rolled out, the reinforcement material should be tensioned by hand, reasonably free of wrinkles and should lie flat. No overlaps are permitted in the direction of primary strength orientation. Adjacent rolled overlaps should be a minimum of 6-inches for the primary support grids and 3 inches for secondary reinforcement grids. If mechanical connections are deemed necessary, they should be constructed at the time of the overlap construction.

The reinforcement material should be cut to length as specified. The material can be cut with a razor blade, scissors, knife or high speed saw.

Extreme care should be taken to prevent wrinkles in the geogrid from developing and/or slippage of the reinforcement during fill placement and spreading. When practical, fill is to be placed in the direction of primary orientation (direction the geogrid was laid out) to aid in tensioning the fabric. However, if fill must be placed transverse to the roll length direction, slight (4-inch overlaps) between roll widths with the top piece of reinforcement being first to receive fill, will prevent permanent folding of the reinforcement.

No track equipment shall be permitted onto the bare reinforcement. To avoid grid damage, there must be a minimum 6 inches of fill on top of the reinforcement before tracked equipment can be operated. Rubber-tired equipment is allowed to pass over the bare reinforcement at slow speeds (less than 10 mph and without sudden braking). Special care shall be taken not to damage the geogrid during trimming or compaction of the slope face.

8.1.10. Subdrains and Drainage Blankets

8.1.10a. Fill Drainage Blanket

All engineered fills greater than 40 feet in depth shall have a mid-height drainage blanket. The drainage blanket should consist of durable gravel, crushed rock and sand or a combination of these materials that meet the following specifications from Caltrans Standard Specifications, Section 19-3.065, except as modified below:

Sieve Size	Percent Passing
2"	100
No. 4:	50 - 75
No. 50	25 - 50
No. 100	0 - 8
No. 200	0 - 2

A high quality geosynthetic fabric will be placed on the top and bottom of these gravel layers.

Materials should be tested and approved by RJR prior to the delivery at the site.

8.1.10b. Canyon Subdrain

The canyon subdrains should be placed in the central and tributary canyons. The exact location will be determined during the rough grading stage. The canyon subdrain should consist of a

minimum of 8-inch diameter pipe surrounded by a minimum of a 4-foot wide and 18-inches high subdrain, placed into bedrock. Gravel will be mounded up around the trench that encompasses the pipe. Approximately, 9 cubic feet of gravel will be placed per lineal foot of subdrain. The subdrain pipe will be placed in the bottom one-third of the gravel blanket with the perforations place down, and covered with a high quality geosynthetic fabric.

The canyon drain will not be able to outlet; therefore, the drain will be directed to a gravel drain placed against the existing alluvium where it currently flows. However, RJR has recommended an 8-inch standpipe be installed for monitoring and to allow a pump to be installed to remove accumulated water as necessary.

8.1.10c. Stability Fills

Stability fills will be implemented at locations where cut slopes have been designated. The stability fills will serve to mitigate the high sulfate bedrock and potential daylighted bedding planes. Specifically, the bedding consists of a short wave length (tight) and results in several dip reversals. Overall, these dip reversals are favorable because they serve to limit the extent of potential gross failure planes because no inherent fabric is continuous through the section. However, because of the intense folding of the bedrock materials, these materials are highly to moderately fractured and susceptible to raveling- and wedge-type failures. Therefore, the stability fill will mitigate this potential hazard.

Stability fills shall be constructed a minimum of 15 feet in thickness and shall be benched into the existing materials in 8:4 benching. Subdrains shall be installed on a level bench every 15 vertical feet. Details and exact locations will be determined during rough grading plan development.

8.1.11. Cut Slopes

Cut slopes may be constructed no steeper than 2:1 (horizontal to vertical). All cut slopes shall be constructed with stability fills to remediate potential bedding components that may be locally daylighted.

The top and sides of all cut slopes should be rounded to produce smooth transitions from the graded slope to the natural slopes. The termination of all slopes should blend to the natural grade to create a natural appearance of contour grading. The terminations should ensure that

no gully or drainage concentration occurs. The finished face should be vertically track-walked to reduce erosion.

Drainage should be diverted away from all cut slope faces. Terrace drains and brow ditches should be installed at all cut slopes and in accordance with the CBC, latest edition. The Calabasas Formation will ravel and deteriorate with age. Therefore, RJR recommends that all cut slopes be covered with a geosynthetic fabric and landscaped to reduce the potential for future raveling.

8.1.12. Cut Over Fill Conditions

If cut over fill areas are created, RJR recommends one of two options:

a. The entire cut portion of the grading be excavated and replaced with fill; or,

b. A shear key be constructed into the cut portion of the slope to support a fill slope.

The proposed remediation will be provided on the Rough Grade Plans.

8.1.13. Temporary Excavations

Temporary excavations will be required for the proposed construction. However, no grading plan was available so specific recommendations are not provided at this time.

8.1.14. Settlement Monitoring

8.1.14a. Vertical Fill Settlement Monuments

Based on Atterberg limit tests and other index tests we estimate immediate and elastic fill settlements will be on the order of 3- to 4-inches for fill thicknesses greater than 60 feet. The settlement will initiate during construction and will reach 90 percent consolidation (t_{90}) approximately 30 days after rough grade has been achieved. This will ensure that long-term settlement will be within acceptable limits. These settlement estimates assume double drainage conditions, at the top and bottom, and the placement of a mid-fill gravel drain blanket. These estimates are subject to many variables, and as is always the case in deep fills (in excess of 60

feet), elastic settlement occurs as a result of the pore pressure build-up that occurs in these fills during construction. We recommend that a 30 day waiting period be implemented to monitor the settlement rates and magnitude and to verify our estimate.

A monitoring program should be established to measure the amount and rate of settlement that takes place after the initial fill placement and thereafter. To verify settlement parameters and assumptions, a series of settlement monument plates will be established by RJR at select locations where the fill is at its greatest thickness.

Surface settlement monuments will consist of 3' x 3' x ½" steel plates, with a 3-inch, schedule 80 pvc pipe riser extending to finished grade. The contractor will ensure that upon construction and installation of the plates, that there is an adequate connection between the plate and the pipe. The annular space of the pipe should be filled with sand. The riser should be adequately flagged or placed in a vault to protect it during grading. It will be necessary to hand compact around the pipe during grading.

The exact location and number of plates will be determined during the Grading Stage. At this time, we estimate three plates will be placed on top of the alluvial cleanouts. Three additional monuments will be placed within 3 feet of the surface. The exact location and elections of the settlement monuments will be located by a licensed surveyor during construction, and monitored weekly until such time as deemed necessary by RJR to make a determination of the degree of settlement. Subsequent measurements will then be made on a regular schedule to monitor the settlement until the completion of all improvements and development.

8.1.14b. Slope Facing Monuments

RJR recommends that a series of brass plates or equivalent monuments be placed at select locations on the slope facing along the southern and northern walls. These monuments will be used to measure the amount of short- and long-term lateral deformation of the slope facing. These monuments will be monitored during construction and development of the project. The exact location of these monuments will be determined during the Grading Stage.

8.1.15. County of Los Angeles Flood Control Debris Basin

A new debris basin will be constructed in accordance with the County of Los Angeles Department of Public Works requirements for Debris Basins. The basin will also be utilized to provide detention for the project.

All slopes shall be constructed as 2:1 except as noted. All slopes shall be compacted to 93 percent relative compaction and concrete-lined in accordance with the County of Los Angeles requirements.

Where the bottom of the basins are not excavated as a result of the alluvial cleanouts, basins should be over-excavated and recompacted to 90 percent relative compaction. Anti-seep collars shall be placed downstream of the debris basins on the storm drains.
Basin design and details will be provided during rough grading stage.

8.1.16. Subgrade Stabilization

Soil-water contents for fill placement during compaction should be between 2 to 5 percent over optimum value. Should the silty subgrade soils begin to pump due to excessive water and/or over-working, all pumping soils should be excavated. It is essential that the number of passes and use of heavy equipment in this situation be minimized. To stabilize the base to form a firm subgrade bottom to compact against, we recommend that approximately 12 to 18 inches of gravel be placed and worked into the soil. The use of a geosynthetic geogrid would reduce the amount of soil, and may be necessary to reinforce the engineered fill. Additional gravel and fabric may be necessary, and will be determined by RJR Engineering Group, as necessary.

8.1.17. Earthwork Factors

For planning purposes of estimating earthwork quantities, the existing the following factors:

a. Existing Soil or Fill:	5 percent – shrinkage for 95 percent 3 percent – shrinkage for 90 percent
b. Alluvium	10 percent – shrinkage for 95 percent 7 percent – shrinkage for 90 percent
c. Bedrock:	0 to 1 percent – bulking/shrinkage

Local subsidence as a result of the grading operation and construction equipment should be less than 0.1 feet within the engineered fill.

For planning purposes of estimating earthwork quantities, it may be assumed that 98 percent of excavated materials will be suitable for re-use as structural fill. Hard layers, oversize rocks and nodules may require being broken down or removed from the site. Where possible, over-sized materials will be buried in the deeper excavations, but no rocks larger than 6-inches will be placed in the upper 5 feet of any fill placement.

8.1.18. Excavation Characteristics of On-Site Materials

Based on experience with surrounding projects, we do not anticipate any excavation difficulties in the alluvium or bedrock during grading.

Bedrock Excavations: No seismic velocity lines were conducted during these studies. The excavations will encounter layers of sandstone and siltstone. However, based on grading operations from surrounding properties did not required special techniques were necessary. We expect that most of the materials will be rippable with a D9. Over-sized materials (cobble to boulder sized materials) generated from the bedrock excavations should be anticipated during grading operation. However, sandstone beds at depth may require additional effort, and may generate over-sized boulders.

Alluvium Excavations: Alluvial removals will encounter interlayered silt, sand and clay layers. Based on the in-place densities, consistency and penetration resistance, the materials will be rippable with conventional equipment. Wet alluvium is anticipated at depths of approximately 40 feet below grade, which may require special handling or techniques and drying.

8.1.19. Placement of Over-Sized Materials

Over-sized materials generated by rough grading may be specially handled and placed as isolated over-sized materials or in windrows. Over-sized materials will consist of rocks with a diameter greater than 12-inches.

At designated locations, a trench shall be excavated and the rock shall be pushed in. The void space shall be filled in with sand by flooding for the full height of the rock. The following shall be used for the criteria for placing over-sized materials:

a. All oversized rocks shall be located a minimum of 20 below rough grades, or greater than 20 feet of a slope face, and no closer than 15 horizontal feet of any other rock;
b. No oversized rocks shall be located within any easement where deep utilities will be located.
c. All rocks shall be staggered so that rocks do not align vertically.

The location of all rocks should be mapped in and illustrated in the Rough Grade map.

8.1.20. Wet Weather Erosion Control/Local Storm Water Management

➢ Materials that underlie the site may be prone to erosion. If construction takes place during the winter months or rainy periods, winterizing and erosion control and wet weather management techniques will be necessary.
➢
Storm water management practices should be implemented during all phases of construction throughout the year. Coordination with RJR Engineering Group will be necessary if construction takes place during rainy periods.

Due to the slope gradients, the use of multiple stacked sand or gravel backs will be required. Wood stakes and plastic will not be acceptable BMP during the winter months. The volume and high flow velocities will require extensive and detailed design of the BMP's to retard flow and ensure no sediment discharge from the site.

In general, site management practices for all equipment storage, entry areas, re-fueling, as well as, erosion control and prevention should be in accordance with the State of California's Best Management Practices as outlined for SWPPP plans in the *California Storm Water Best Management Practice Handbooks* and the County local stormwater requirements. In addition, BMPs specified in the report entitled *Pollution Control Objectives for Construction Sites and Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* are also applicable.

Additional recommendations include the following:

a. No temporary excavations greater than 4 in depth (unsurcharged) should occur during periods of inclimate weather
b. All stockpiles should be covered and sandbagged during periods of rain.
c. All foundation excavations that were approved prior to rain will be voided and will require re-certification by RJR after the rain event(s) and cleared of mud and water.

d. No excavations along the southern slope for the landslide removal should occur during the winter periods without structural reinforcement of the backcuts (ie piles, soil nails, etc).

8.1.21. Temporary Debris Fence

A temporary debris fence should be installed downslope of the improvement area (to the west) during grading, to protect loose debris and cobbles from falling the slopes. The intended purpose of the fencing is to catch any debris that may fall or topple down from the grading area in the area of existing improvements.

8.1.22. Material Specifications

On-Site Soils: Based on the subsurface program and testing, all on site soils and existing fills will need to be thoroughly mixed and processed to be used as engineered fill. The need for adding water or drying will depend on when grading occurs.

General Fill Materials: General fill should be free of trash, and should contain no more 15 percent by weight of rocks larger than 4 inches (largest dimension) and no rocks larger than 6 inches. Soil containing more than 2 percent by weight of organic matter should be considered organic and is not allowed as engineered fill. General fill materials should have an expansion index of less than 50 and a plastic index of less than 30.

In general, the fills under the pavements should have a minimum R-value (exudation and expansion) of 15.

Select Fill: Select fill has not been specifically recommended at this time. Where used, the select materials should possess the following characteristics:

Expansion Index ≤ 20
Plasticity Index: ≤ 10
Friction Angle ≥ 35 degrees
Gradation:

Maximum Size:	1 inches
Sand Percentage:	50 – 90 percent

Fines (Passing No. 200): 10 – 30 percent

Aggregate Base: Aggregate base should consist of imported materials conforming to Caltrans Standard Specifications for Class II Aggregate Base, Section 26. The minimum CBR value for aggregate base used in heavy traffic areas shall be 80.

Aggregate Subbase: Aggregate subbase should be Class 1 conforming to Section 25 for "Aggregate Subbase"of the Standard Specifications and Standard Special Provisions. Aggregate subbase should have a sand equivalent of at least 21, an R-value of at least 60 for heavy traffic areas.

Asphalt Concrete: Asphalt concrete should consist of Type B, 19-millimeter, maximum/medium grading conforming to Section 39, "Asphalt Concrete" of Caltrans Standard Specifications.

Portland Cement Concrete Pavement: Portland cement concrete to be used for pavement construction should conform to Caltrans Standard Specifications for "Portland Cement Concrete" per Section 90.

Capillary Break Material: Capillary break should be a free-draining material, such as 3/8" pea gravel or an approved permeable aggregate complying with Caltrans Standard Specifications, Section 68, Class 1, Type A or B.

Drainage Blankets: The drainage blanket should consist of durable gravel, crushed rock and sand or a combination of these materials that meet the following specifications from Caltrans Standard Specifications, Section 19-3.065, except as modified below:

Sieve Size	Percent Passing
2"	100
No. 4:	50 - 75
No. 50	25 - 50
No. 100	0 - 8
No. 200	0 - 2

Retaining Subdrains: All subdrains shall consist of clean, durable, river run subrounded to rounded rock with the following specifications:

Sieve Size	Percent Passing
2"	100
1-1/2"	0 – 100
¾"	0

All subdrain pipes should consist of a minimum of 4 inch diameter pipes with outlets every 50 feet. Any pipe extending greater than 100 feet should be increased to a 6 inches in diameter with outlets every 100 feet. All pipe outlets on slopes shall be constructed with a "tee" and staked and protected during construction.

8.2. Retaining Walls

8.2.1. Conventional Cantilever Retaining Walls

The following parameters may be used for the preliminary design of concrete or masonry block cantilever retaining walls.

Geotechnical Strength Parameters: The average bulk density of material placed on the backfill side of the wall will be approximately 125 pcf, with a phi angle of 32 degrees and cohesion of 0 psf for engineered fill.

Foundations: Retaining walls shall be founded on conventional foundations where the ground surface is level in front of the wall. Where retaining walls cannot meet setback, deepened conventional foundations maybe used.

Active Equivalent Fluid Pressures: The proposed retaining wall may be designed to support an "active" equivalent fluid pressure that is assumed to act upon a vertical plane extending down from the ground surface to the bottom of the heel of the wall increasing linearly with depth, starting from zero at the ground surface:

Table 11 - ACTIVE LATERAL EARTH PRESSURES

Slope Gradient	Equivalent Fluid Pressure	
(h:v)	Drained (pcf)	Undrained (pcf)
2:1	75	150

Level	60	120

To account for the expansive tendencies of the on-site fine-grained soils, the calculated values were increased. It should be noted that more granular areas will be encountered and these values may be reduced to the calculated values where site specific testing and observations verify the backfill characteristics.

These values assume on-site granular terrace, and no clay materials shall be used for backfill of the retaining walls. These values are for non-seismic conditions and are based on the assumption that the wall backfill will be adequately drained and the wall will tolerate deflections up to 0.01H to 0.02H (cohesive) to generate "active" pressures. Undrained values have been provided where a suitable subdrain system cannot be installed or properly outlet.

Restrained/At-Rest Equivalent Fluid Pressures: If wall deflections required to generate active pressures cannot be tolerated or the retaining wall will be incorporated as part of the proposed structure, the retaining wall pressure should be designed for an "at-rest" equivalent fluid pressure.

The loading is assumed to act upon a vertical plane extending down from the ground surface to the bottom of the heel of the wall increasing linearly with depth, starting from zero at the ground surface:

Table 12 – AT-REST LATERAL EARTH PRESSURES

Slope Gradient	Equivalent Fluid Pressure	
(h:v)	Drained (pcf)	Undrained (pcf)
2:1	140	175
Level	120	155

Surcharge Conditions:

1. Vehicle: An increase in the equivalent fluid pressure may be necessary if vehicular traffic or any building structures are to be located adjacent (within a 1:1 plane) to the retaining wall. Construction traffic and compaction equipment should be kept a minimum of 5 feet from the retaining wall unless these surcharges are utilized in the design of the retaining walls.

2. Adjacent Walls and Foundations: Vertical surcharges and lateral thrusts from adjacent foundations or retaining walls shall be determined by the project structural engineer and considered where stacked wall conditions (e.g. garage area) occur.

3. Compaction Equipment: Large compaction equipment should be maintained a 1:1 distance from the back of the wall to prevent excess compaction pressures unless accounted for in the retaining wall design in accordance with NavFAC 7.2.

Wall Backfill: All retaining wall backfill should consist of "Select Fill" as specified above. The upper 24 inches of backfill should consist of a compacted soil.

Waterproofing: All retaining walls shall be waterproofed. Waterproofing emulsions or fabrics for the backsides of the retaining walls should be specified by the project architect or structural engineer and reviewed by RJR.

Retaining Wall Subdrains: The proposed retaining walls should be provided with a subdrain that consists of a 4 inch diameter, perforated pipe encased in a 12-inch thick layer of gravel. The subdrain pipe should be located within 3 to 6 inches of the base of the drain rock and should consist of one of the following types of pipe:

1. ASTM C508 or ASTM D2751 Asbestos Cement Pipe (ACP)
2. SDR 35 or ASTM D1527, Schedule 40 Acrylonitrile Butadiene Styrene (ABS) pipe
3. ASTM D3034, SDR 35, or ASTM D1785, Schedule 40 Polyvinyl Chloride Plastic (PVC)

Pipe perforations shall be at 45 degree angles (approximately) to one another on opposing sides of the pipe every 8 to 12 inches. The pipe shall be placed such that the perforations are located down.

Gravel shall consist of a durable, clean, 3/4 inch to 1-1/2 inch diameter drain rock. The drain rock shall extend to within 24 inches of the ground surface. The gravel should be compacted in place with small, hand operated vibratory compactor. The gravel drain rock should be wrapped to separate the gravel from the surrounding soil or rock (burrito-style construction) with a high quality geosynthetic fabric such as a Mirafi 140NL, or approved equivalent. The fabric should be handled in accordance with the respective manufacturers requirements, and should be constructed such that all fabric overlaps are a minimum of 12 inches.

The subdrains should outlet at appropriate discharge locations that will ensure all discharge will not scour or erode the surrounding soil, and the pipe will not become damaged or clogged. The outlet pipe should be a solid pipe that meets minimum specifications setforth above for the subdrain pipe. Where the pipes outlet to the beach, no additional erosion measures will be required.

The subdrain location, alignment and materials shall not be changed or modified without the approval of RJR Engineering Group. RJR Engineering Group may, upon review of field conditions, recommend additional drain lines, or alter line, grade and materials. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to the placement of fill over the subdrain.

Wall Factors of Safety: We recommend the following factors of safety be considered for use in the retaining wall design.

F.S. of at least 1.50 - Sliding - Static Loading
F.S. of at least 1.50 - Overturning - Static Loading
F.S. of at least 1.25 - Sliding - Pseudo-Static Loading
F.S. of at least 1.25 - Overturning - Pseudo-Static Loading

Construction Joints: Construction joints shall be constructed in the retaining wall under the following conditions:

1. Significant wall height changes occur, i.e. greater than 5 feet;
2. Portions of the retaining wall that are constructed in a concave geometry;
3. Foundation depth or width changes greater than 2 feet;
4. Wall lengths greater than 50 feet.
5. Where a change in the bearing material occurs.

All construction joints shall be specified by the project structural engineer on the structural plans.

Dynamic Earth Pressures: All retaining walls shall be designed with dynamic earthquake loads as required by the CBC, latest edition.

For unrestrained walls, the increase in the lateral earth pressure due to the earthquake loading can be estimated using the Mononobo-Okabe theory based on Seed and Whitman (1970). The theory is based on the assumption that sufficient wall movement occurs during seismic shaking to allow active earth pressure conditions to develop.

For restrained walls, the increase in lateral earth pressure due to earthquake loading can also be estimated using the Mononobo-Okabe theory. Based on Seed and Whitman (1970) and supporting studies by Nadim and Whitman (1992), there is indirect evidence that sufficient wall movements may occur during seismic shaking for such that the loading is accommodated by active earth pressures.

In the Mononobo-Okabe theory, the total dynamic pressure can be divided into static and dynamic components. The estimated dynamic lateral force increase (due to seismic loading) for either unrestrained or restrained walls may be taken as:

$$45 * pga * H^2 \text{ pounds per lineal foot of wall}$$

where pga is the peak ground acceleration used for design and H is the height of the wall above the ground surface. The centroid of the dynamic lateral force should be applied at a distance of 0.6 * H above the base of the wall.

To estimate the total dynamic lateral force, the dynamic lateral force increase should be added to the static earth pressure force computed using recommendations for lateral earth pressures presented above.

Lateral earth pressure calculations for the retaining walls are contained in Appendix E.

8.3. Vehicle Pavements

8.3.1. Flexible Pavements

Near surface soils across the site have a low to intermediate pavement-supporting capacity. An R-value of 15 was utilized for the pavement design based on the R-value tests performed on the on-site surface soils. The following presents a summary of the minimum pavement sections.

Table 13 – ASPHALT CONCRETE STRUCTURAL PAVEMENT

Las Virgenes Road:

Traffic Index = 10.5:	Asphalt Concrete:	8.00 inches
	Cl. II Ag. Base	19.00 inches

$GE_{req'd}$: 29.46 inches
GE_{actual}: 34.53 inches

On-Site Streets:

Traffic Index = 5.5: Asphalt Concrete: 4.00 inches
Cl. II Ag. Base 8.00 inches
$GE_{req'd}$: 13.32 inches
GE_{actual}: 18.08 inches

Parking Area and LACFC Access Road:

Traffic Index = 4.5: Asphalt Concrete: 3.00 inches
Cl. II Ag. Base 6.00 inches
$GE_{req'd}$: 8.94 inches
GE_{actual}: 14.10 inches

Pavement construction should comply with the requirements of the Caltran's Standard Specifications, latest edition, except that compaction requirements for pavement soil subgrades should be based on ASTM D1557, and prepared and compacted as previously discussed in Section 7.1 of this report. Class II aggregate base should conform to the appropriate sections of Caltran's Standard Specifications. Aggregate used for asphalt concrete should conform to the grading specified in Section 39.

8.3.2. Concrete Driveway Pavements

Where concrete pavement will be used for the access driveway, the concrete driveway slabs should be constructed on compacted soil subgrade where the upper 12 inches of soil subgrade should be compacted to 95 percent relative compaction based on ASTM D1557. Design criteria will be presented during the grading stage.

8.3.3. Pavement Pavers

Where pavers are used in the driveway or roadway, the pavers should be supported on 18 inches of Class II aggregate base (AB) rock. The upper 12 inches of soil subgrade should be compacted to 95 percent relative compaction based on ASTM D1557. The AB section should be compacted to a minimum of 95 percent relative compaction based on ASTM D1557.

If permeable pavers are utilized in the driveway, the pavers should be located in the level portions of the driveway that do not exceed 10 percent.

8.4. Utility Trenches

Trench Excavations: Vertical trench excavations less than 5 feet deep should be capable of standing with no shoring or bracing for short construction periods except for excavations made near the slope faces where weathered bedrock zones may have compromised the material competency and cohesion. Excavations in this area, loose material, alluvium, or trenches 5 feet or greater should be provided with shoring and bracing. The attention of contractors should be drawn to the State of California Construction Safety Orders for "Excavations, Trenches, Earthwork" for minimum specifications and guidelines.

Trench excavations, shapes and stockpiles shall be made in accordance with the Standard Specifications for Public Works Specifications and Standard Plans (Green Book).

Sand Bedding: For the purposes of this section of the report, bedding is defined as material placed in a trench up to 1 foot above a utility pipe and backfill is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use in bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics and should have a minimum Sand Equivalent (S.E.) of 20.

Approved, on-site, inorganic soil, or imported materials may be used as utility trench backfill and should have a Sand Equivalent (S.E.) of 20. If imported material is proposed for use as trench backfill, a sample of it should be tested and approved by the project engineer before any is delivered to the site.

All sand bedding shall be in conformance with the Green Book requirements. Sand bedding may be jetted or flooded into place, but will require additional mechanical effort in the haunch areas and pipe zone to a compaction of at least 95 percent.

Trench Backfill: Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs and vehicle pavements. In these areas, backfill should be conditioned with water to produce a soil-water content of about optimum value and placed in horizontal layers not exceeding 6 inches in thickness (before compaction). Each layer should be compacted to at least 95 percent relative compaction based on ASTM Test D1557. The upper 24 inches of trench backfill under vehicle pavements should be compacted to at least 95 percent relative compaction.

Thrust Blocks: Where pipelines change directions (greater than 10 degrees) on slopes greater than 5:1, thrust blocks should be used to provide the necessary resistance to thrust forces. In general, the thrust blocks shall consist of a 12 inch square, unreinforced concrete on the downhill side of the pipe.

Thrust blocks to be located on the pressurized side (downhill) of the detention basin, thrust blocks bearing against a specified material shall be designed as follows:

Table 14 – THRUST BLOCK DESIGN

Engineered Fill:	1,500 psf (ultimate) at 4 feet
Soil:	500 psf (ultimate) at 4 feet

The estimated lateral displacement needed to development the ultimate passive pressure for a 2 foot high (square) thrust block, that will be 2 feet in thickness is about one-half inch (or about 0.02H of the block).

Slope Anchors: Concrete slope anchors shall be installed per Green Book in trenches for all pipes placed on sloped steeper than 5:1. The intent of the slope anchors or ditch plugs is to reduce the concentration of subsurface flow, which could cause erosion (subsurface piping) and damage the pipeline or result in surficial instability.

Slope anchors should be located as follows, unless specified by the project civil engineer:

Table 15 – SLOPE ANCHOR DESIGN CRITERIA

5:1 to 4:1	250 feet
4:1 to 3:1	150 feet
3:1 to 2:1	100 feet
> 2:1	50 feet

Slope anchors should consist of a relatively impermeable sand/cement slurry or suitable alternative that extends from the bottom of the trench excavation to within 1 foot of the ground surface.

External Pipe Loads: External loading on pipes will include the dead loads from the weight of soil, loading due to construction activities and traffic live loads.

Loads on pipe due to the overlying soil will be dependent upon the depth of placement, the type of bedding, the type and method of backfill, the type of pipe and the configuration of the trench, and the additional loading from the increased thickness of fill materials. Pipes will be subjected to "trench conditions" and "embankment conditions". For all calculations and assessments the unit weight of the backfill materials may be assumed to be 120 pcf.

Trench conditions are defined as those in which the pipe is installed in a relatively narrow trench (within 2 to 3 diameters of the pipe), and backfilled with bedding and trench backfill. Embankment conditions are defined as those in which the pipe is covered with fill above the ground surface or when the trench is so wide that trench wall side friction does not affect the load on the pipe.

For the proposed construction, pvc pipe should be suitable for trench and embankment conditions so long as the pipes are constructed with sand pipe bedding and properly backfilled with engineered fill.

Pipe Deflections: Flexible and semi-rigid pipes are typically designed to withstand a certain amount of deflection from the applied earth loads. To estimate deflection, a modulus of soil reaction of 500 pounds per square inch may be assumed for the backfill soil types and recommended bedding.

RJR recommends that flexible or semi-flexible pipes are only used in keyway and retaining wall subdrains. All drainage pipes shall use rigid pipes. If the contractor selects the use of a flexible

or semi-flexible pipe, calculations should be provided to RJR with the appropriate specifications to demonstrate suitability.

8.5. LID Recommendations

The project will be subjected to the County of Los Angeles LID requirements. Consideration should be given to exempting any infiltration requirements due to the expansive soils and measure that are being implemented to remove any excess runoff from the development. Infiltrating excess runoff into thick engineered fill is generally not a practice that is acceptable in the industry.

Where implemented, based on the subsurface data and soils type, an infiltration rate of 0.15 inches/hour should be used for design. This is based on the USDA screening methods. Once site specific plans are available the size and exact location of the water quality infiltration areas are finalized, we would recommend that site specific infiltration testing be performed.

8.6. Surface Drainage

A comprehensive drainage system must be designed and incorporated into the final improvement and/or grading and drainage plans. In addition, drainage around the pads must be designed and constructed to ensure proper drainage functions and can be maintained by the homeowners, as intended. We recommend that a precise plan be prepared indicating exact finish grades and the location of all landscaping elements. The following presents minimum recommendations:

Pad Drainage: Pad areas of the site should be finish graded to direct drainage away from all buildings and slopes. Drainage should not be allowed to pond anywhere on the pad, nor on or adjacent to foundations or pavements and should be directed towards suitable collection and discharge facilities. To promote the rapid drainage of surface water and to minimize the risk of water ponding, we recommend gradients adjacent to all buildings should slope away from the building.

All final grading should be required to adequately compact near surface soil, and not allow soil to mound to higher than 0.67 feet below the mud sill or as required by the Building Department and in accordance with CBC, latest edition. Dumping loose soil adjacent to the residence to

achieve final grade is not permitted.

Pad earth swales should be designed with surface gradients of at least 2 percent along the principal direction of drainage, if possible. All swales should be surface compacted (6 inches) to 95 percent and performance tested prior to final signoffs by the project civil engineer and geotechnical engineer.

RJR recommends that abundant area drains and catch basins be installed to collect runoff. Atrium drain grates should be installed in planters and earth areas to prevent clogging.

Landscaping and Planting: Water seepage or the spread of extensive root systems into the soil subgrades of foundations, slabs, or pavements could cause differential movements and consequent distress in these structural elements. Therefore, the location and type of vegetation placed adjacent to structures should be carefully considered in the landscape design.

Where possible, planters immediately adjacent to the structure should be avoided. If necessary, area drains or other devices may be necessary to ensure that all runoff is diverted away from the foundations. Plants around the structure should be of a variety that utilizes minimal amounts of watering. It will be the responsibility of the homeowner to maintain the planting. Any alterations to the planting should be reviewed by a Landscape Architect. This information should be disclosed to the homeowner at the time of purchase.

Irrigation: An adequate irrigation system will be required to sustain landscaping. Any leaks or defective sprinklers require repair immediately. Automatic sprinkler systems should be adjusted to ensure constant soil-water content, but prevent over-watering of the yard area. This will require seasonal system adjustments.

Planting and Slope Irrigation: Immediately following the completion of rough grading, any slope or area disturbed by the construction should be planted with vegetation designed to blend the area with the surrounding terrain and development and the permanent NPDES requirements implemented. The slope plantings should be erosion and fire resistant. It is recommended that a Landscape Architect familiar with these types of plants be consulted. An adequately designed sprinkler system should be installed prior to any slope plantings.

Numerous planting guides have been offered over the years by various landscape architects and it is impossible to list all of the potentially favorable plants for hillsides. Additional recommendations for fire and erosion control plants may be obtained from a landscape

architect.

9.0. ADDITIONAL SERVICES AND FIELD OBSERVATIONS

Plan Check Review: Given the complex nature of the seismic and geologic regime in Southern California and the uncertainties associated with the subsurface conditions, geologic and geotechnical reports are prepared based on limited data which may represent all or a part of the actual site conditions. Localized conditions can and do vary across the site. Therefore most government and public agencies review the reports and provide comments and review. These reviews provide a second party review to the findings, conclusions and recommendations provided in this report. In some cases this information may be subject to modification and change. Therefore, it may be necessary for RJR to coordinate with the various agencies and provide addendum reports as additional work to our original scope.

This report has been prepared for the purposes of feasibility and additional work and review will be necessary for the Grading and Building Stage phase of the project. It shall be the Owner/Client sole responsibility to ensure that the other consultants, designers and contractors are provided copies of the original reports and any addendums and letters. A list of these reports and letters should be listed on the project plans for reference.

Plan Review: Because of uncertainty regarding subsurface conditions and materials properties, this report has been prepared. RJR should be provided the opportunity to review the proposed Site Plans, Foundation Plans and Grading Plans and construction drawings, and to comment on the geotechnical aspects of the project plans and specifications before they are finalized. The purpose of the review will be to ensure that the modeling and assumptions are valid, and evaluate if the recommendations in this report have been properly implemented in the design and specifications.

Geotechnical Site Control: If RJR is not retained to perform field geotechnical observations, testing and approvals the recommendations and findings presented herein are voided. It is essential to understand that the findings and conditions of the site are based on limited data which as to be verified during construction. Therefore, the interpretations, findings, conclusions and recommendations may change as more information is obtained.

RJR does not provide surveying for the project during construction. It shall be the responsibility of the client, his agents, successors in interest or contractor to ensure that adequate line and grade, as well as, elevation control is provided for use during site testing and observations.

RJR is not responsible for the performance of work by third parties on the project, including but not limited to the architect, civil engineer, structural engineer, surveyor and contractors. RJR's observation of work and plans performed by others does not relieve said parties of their responsibility to perform their tasks in accordance with the plans, specifications, safety requirements and standard of care as it pertains to their respective field. RJR will provide observations, testing and advice as it pertains to the field services expressly contracted under the terms of RJR's Standard Agreement.
RJR's approvals of the geotechnical conditions are valid for that specific tie and condition. This approval may become invalidated with any and all changes to the field condition, subsequent changes of elevations, grades, changes in design or construction, alterations of drainage, as well as the passage of time, acts of god or other unforeseen conditions or variations of the assumed models, unless expressly approved by RJR.

RJR will not be responsible for the acts, errors or omissions of the contractors or other parties associated with the project or project site.

Any changes to site improvements including but not limited to: grades, elevations, drainage, slopes, foundations, subdrains, proposed improvements and structures' location or design without the express written consent of RJR invalidates any previous approval, express or implied by this report or subsequent reports.

Construction Monitoring: Geologic and geotechnical assessments are necessary during construction to verify and observe the subsurface conditions. The construction process is an integral design component with respect to the geotechnical aspects of the project. It is important to understand that geology and geotechnical engineering is an inexact science, and is subjective in nature due to a myriad of variations and combination of conditions that may occur at and adjacent to a site. Acceptable conditions at one site may lead to catastrophic failure at another, and it is important to understand the interrelationships of the various natural and man-made processes that occur and may influence a site. As a result it may not be possible to anticipate and characterize the surface and subsurface conditions at a site, and fully understand the potential site impacts based on the available data. Therefore the interpretations are based on the best available data at the time. Proper geotechnical observations and testing during construction is imperative in allowing the geotechnical engineer the opportunity to verify the assumptions made during the design process.

RJR should be retained during site development to observe compliance with the design concepts and geotechnical recommendations. It is essential that the owner and contractor understand

and arrange the contracts accordingly, that change may and do occur do to foreseeable and unforeseen conditions do to the complex interactions of processes and relationships, as well as, changes in construction methods and phasing.

10.0. LIMITATIONS AND CONDITIONS

Report Use: The recommendations contained in this report are based on the proposed site improvements as supplied by the Client. Any change in the plans, information and data will render our recommendations invalid unless we are commissioned to review the change and to make any necessary modifications and/or additions to our recommendations. Our recommendations have been made in accordance with the principles and practices generally employed by the geotechnical engineering profession. This is in lieu of all other warranties, expressed or implied. This report is presented for the exclusive use of the Client and is not transferable or applicable to other sites. This report and its contents are copyrighted and shall not be copied, reproduced or used in any manner without the express written permission of RJR Engineering Group.

Plan Review: Geotechnical review of the future grading and foundations should be performed when the site plans become available. Modifications to the plan or this report may arise from our review. Therefore, we should review the project plans for feasibility as soon as possible to ensure that the recommendations contained in this report are applicable to the proposed improvements. Failure to provide RJR the opportunity to review the plans will invalid any and all findings of this report.

Agency Review: The findings, conclusions and recommendations in this report are preliminary in nature until the review and approval by the Agency. Therefore, RJR recommends that the use of this information not be relied upon until such time as the necessary reviews and approvals have occurred.

Accuracy of the Topographic Map and Site Plans: The geotechnical analysis of a particular site and subsequent conclusions and recommendations with respect to a proposed project are highly dependent on certain factors which include but are not limited to the topographic conditions of the site, adjacent slopes and grades, and/or the location of the property lines. It should be understood that it is RJR's assumption that the provided topographic map accurately depict the locations of the existing structure, ground surface, site improvements, proposed structures, easements, proposed grades and other relevant features.

RJR has used this topographic map and associated site plan as the basis for this study, and any changes may alter or change the results of the analysis and report. It should be understand that RJR's use of the topographic survey, grading plan, and/or site plans does not imply or verify the accuracy, completeness, quality or correctness of the respective plan. If at a time subsequent to

the completion of this report a revision is made to the site topographic map or site plans, the findings, conclusions and recommendations of this report may be partially or wholly invalidated or revised. These revisions could result in additional exploration, testing, analysis and recommendations.

Locations of Subsurface Exploration: The location and elevation were used using a tape and bruton pocket transit, and interpolation between contours, reference to existing features illustrated on the topography map. The location and elevation of the exploratory excavations are only as accurate as these methods allow and based on our best efforts to properly locate the borings. The locations are approximate and may be subject to variations depending on the method used, and should be considered accurate only to the degree implied by the method used, unless otherwise indicated.

Changes in Conditions: Subsurface exploration of any site is necessarily confined to selected locations. Conditions may, and often do, vary between and around such locations, especially in slope failures. The results of the subsurface conditions presented in this report are valid at the time and location of the observation, under the given site, weather, and the experience of the professional at the time of the exploration. Extrapolation of these conditions and modeling to any other location of the site is based judgment and may and will vary from the actual conditions. In summary, if observation or exploration was performed at a certain location, it may not be indicative of the portions of the site not explored or observed. If the client or contractor requires site or location specific data, then additional testing should be performed.

Should conditions differ from those encountered in our explorations, during the project development, additional exploration, testing and analyses may be necessary, as well as, changes in project design and construction. The client has the responsibility to ensure that RJR is provided all design plans, calculations and specifications for the site.

In addition, it is essential for all parties to recognize and understand that the geotechnical field is a science prone to a wide variety of differing opinions. As such, the data presented in this report may be scrutinized and evaluated by another professional or professional in a different manner. This may lead to varying or completely different opinions and interpretations. In addition, the understanding or acquisition of additional data may partially or wholly render different findings, conclusions and recommendations than those originally presented.

The client is responsible to see that all parties to the project, including the designer, contractor, subcontractors, etc. are made aware of this report in its entirety. It shall be the Clients and their

Contractors responsibility to ensure that RJR is properly and timely notified of any constructions and possible changes in conditions. Site conditions due change with the passage of time, therefore, the conclusions and recommendations should not be relied upon if the site is subjected to a major earthquake, severe storms or other phenomenon without further review by RJR.

Land use, site conditions (both on- and off-site) or other factors may change over time, and additional work may be required with the passage of time. The findings, conclusions and warranties provided in this report may and will change with time with respect to engineered fill, fill slopes, slope stability, expansive soils, drainage and other aspects of the site. Many factors discussed in this report and not included within the scope of this report may alter or negate the findings of this report with the passage of time. The results of any compaction or density results may and will change with the passage of time and may vary depending on the method used by the researcher.

Geotechnical Construction Verification: Users of this report should recognize that the construction process is an integral design component with respect to the geotechnical aspects of the project. Because geotechnical engineering is an inexact science due to the variability of the natural processes, construction methods and phasing, unanticipated or changed conditions can occur with time. The findings, testing, conclusions and recommendations contained in this report are based on relatively limited testing and sampling of the materials encountered at the site. Therefore, proper geotechnical observations and testing during construction is imperative to allow the geotechnical engineer the opportunity to verify the assumptions made during the design process. This will enable us to compare the generalized site conditions assumed in this report with those found at the site at the time of construction, and to verify that construction complies with the intent of our recommendations. If conditions or features of the site or surrounding area are observed to be different than described herein, this office should be notified immediately for our evaluation.

Changes in the design and recommendations should be anticipated during construction which may affect the grading, foundations and other aspects of the design and the owner and contractor should anticipate these changes in their agreements. Failure to provide RJR the opportunity to perform construction observations and testing will invalid any and all findings of this report.

Hazardous Materials: The scope of our geotechnical services did not include any environmental assessment for the presence or absence of hazardous/toxic materials in the soils, surface water,

subsurface waters or atmosphere. Any statement or absence of statements in this report or data presented herein regarding odors, unusual or suspicious items, or conditions observed are strictly for descriptive purposes.

Custom and Practice in the Industry: In performing our professional services, RJR has generally accepted geologic and geotechnical engineering principles and applied the degree of care and skill ordinarily exercised by civil engineers and geologist in the geotechnical field, under similar circumstances by reputable professional in this areas and similar localities. The conclusions and recommendations have been made based on the limited scope of work and studies and are based on the best available data available to RJR at the time of this report. Further, it should be understood that RJR has made certain assumptions as to the construction and development which includes the type of work and phasing. Additional information and plans may modify these findings and conclusions. No other warranties, express or implied, is made as to the professional advice and work performed for this report.

11.0. REFERENCES

Published Consultant Reports

1. *California Division of Mines and Geology, 2001, Seismic Hazard Evaluation of the Malibu Beach 7.5-Minute Quadrangle, Los Angeles County, California*: California Division of Mines and Geology Open-File Report, scale 1:24,000.

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APPENDIX A

REFERENCE: Photomapper by AirPhotoUSA, Copyright 1995-2005

P.N. 1344.11

NORTH

SATELLITE IMAGE
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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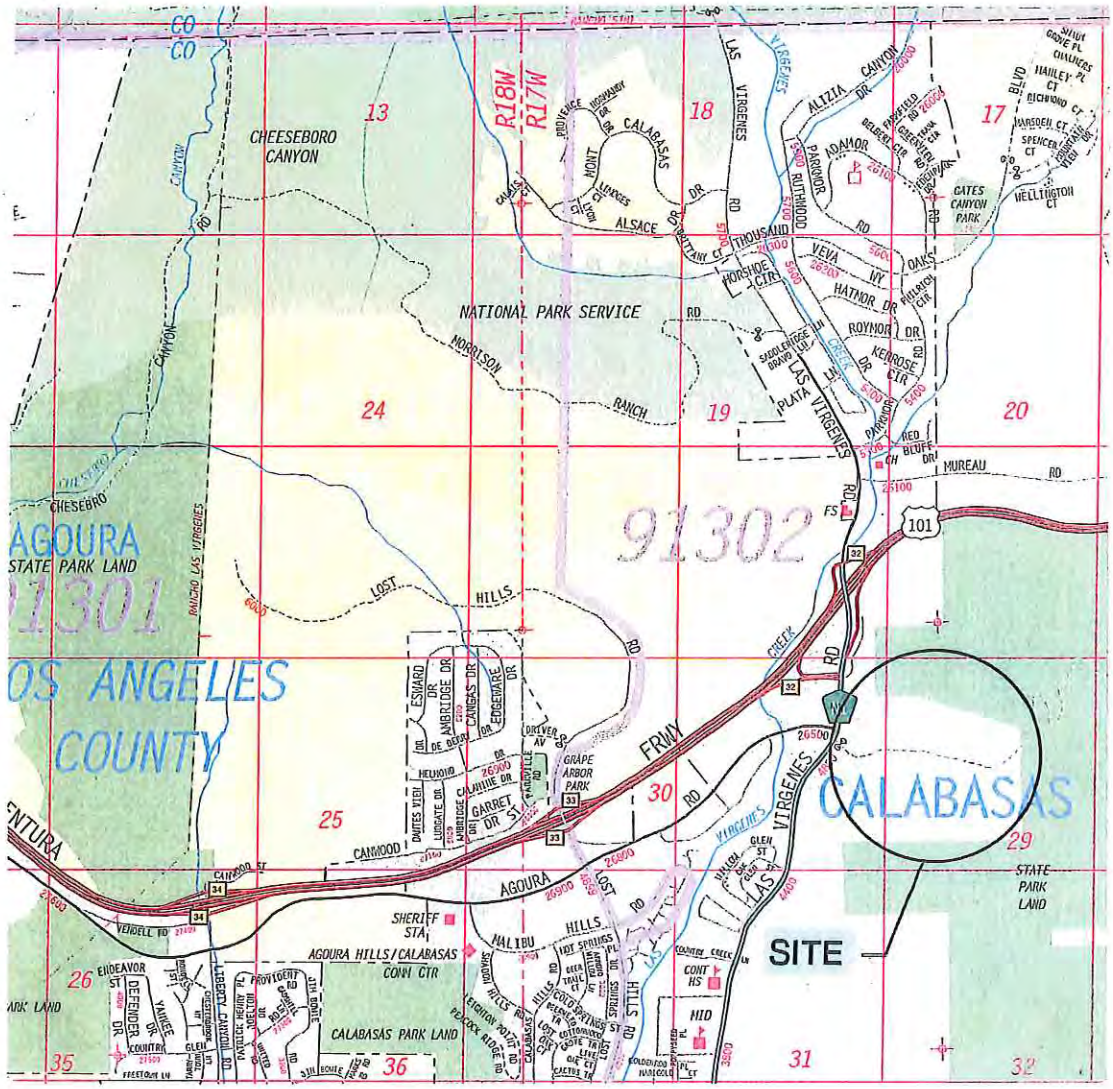

REFERENCE: Thomas Brothers Guide, 2006, Los Angeles County Page 559

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NORTH

SITE LOCATION MAP

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Scale: 1" = 2,400'

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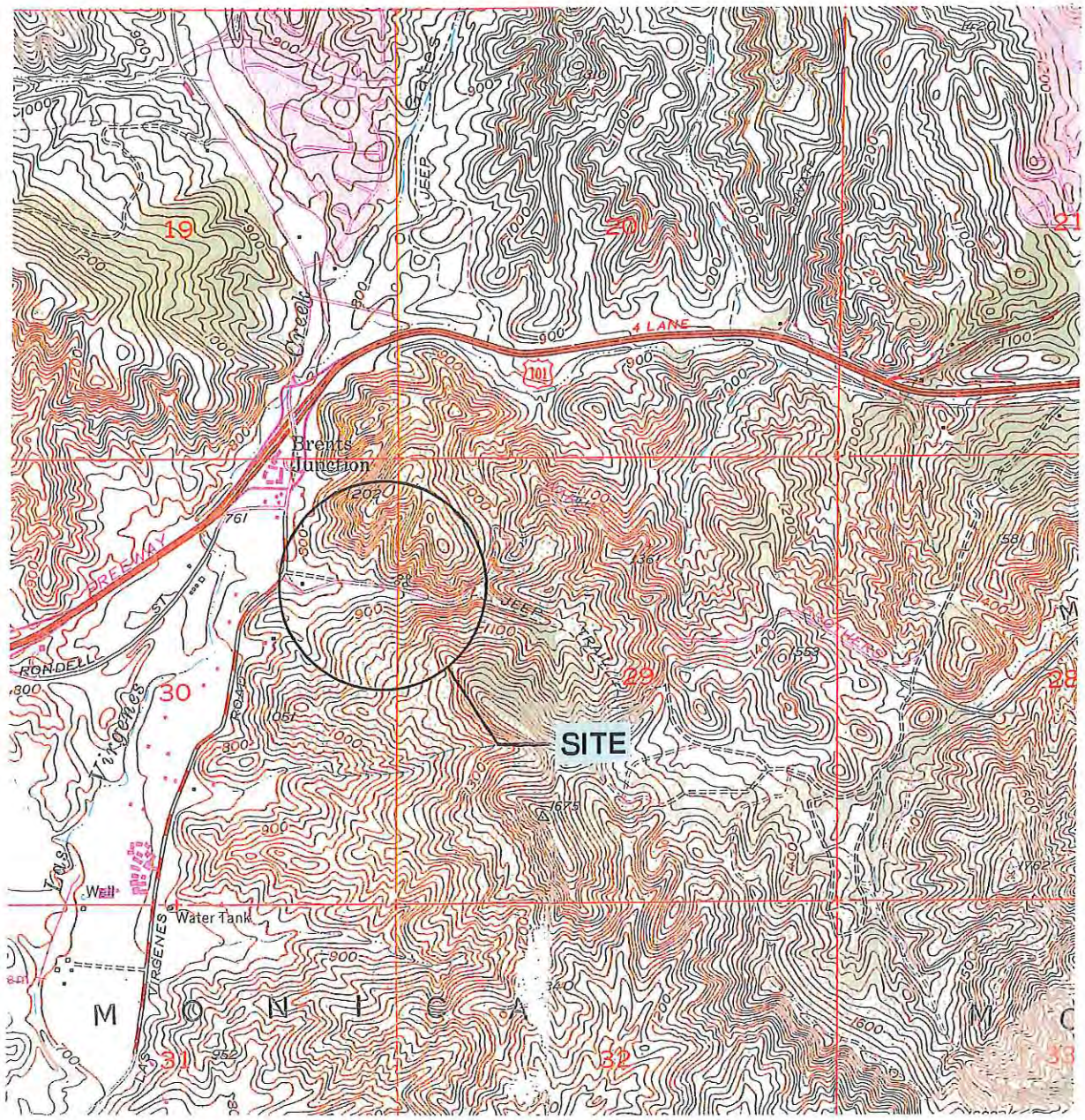

REFERENCE: United States Department of the Interior, Geologic Survey, State of California, Department of Water Resources, Calabasas Quadrangle, 7.5 Minute Series (Topographic), Los Angeles and Ventura Counties, 1952 (Photorevised 1967)

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NORTH

SITE VICINITY MAP

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Scale: 1" = 2,000'

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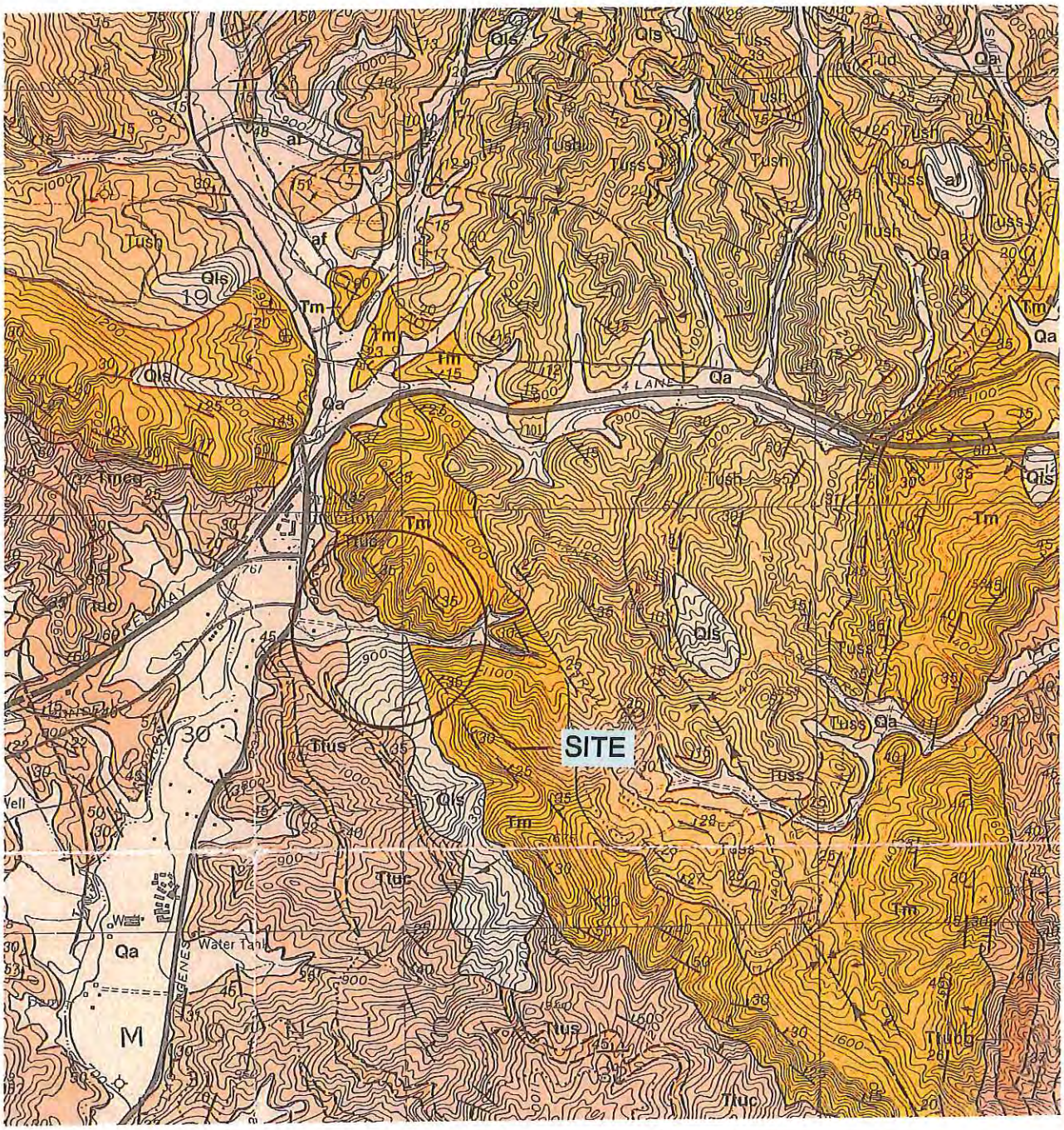

REFERENCE: Thomas W. Dibblee, Jr. and Helmut E. Ehrenspeck, Geologic Map of the Calabasas Quadrangle, Los Angeles and Ventura Counties, California, 1992

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NORTH

REGIONAL GEOLOGIC MAP

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Scale: 1" = 2,000'

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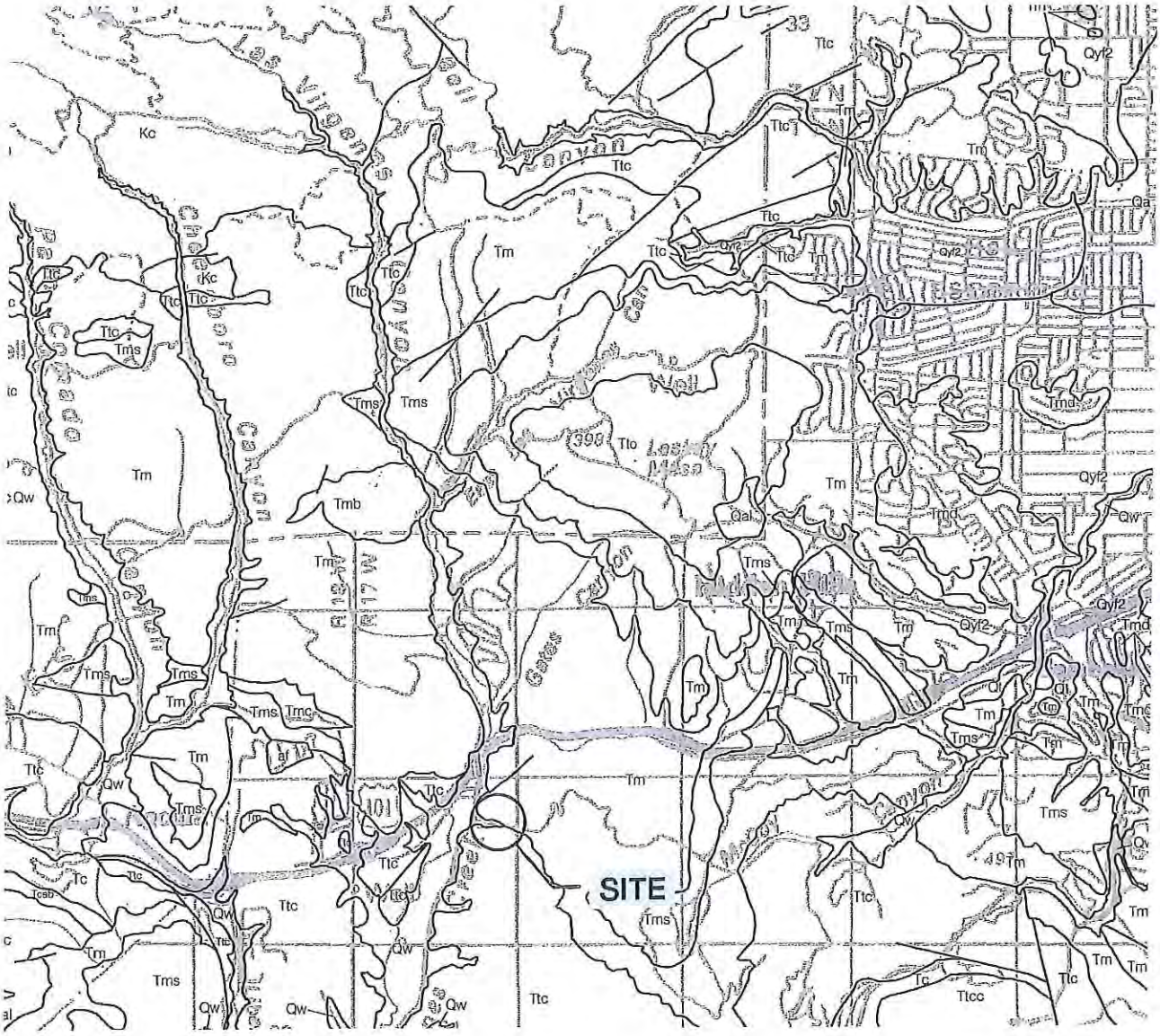

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report for the Calabasas 7.5 Minute Quadrangle, Quaternary Geologic Map, Los Angeles and Ventura Counties, California, 1997 (Revised 2001)

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NORTH

QUATERNARY GEOLOGIC MAP

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Scale: 1" = 2,780'

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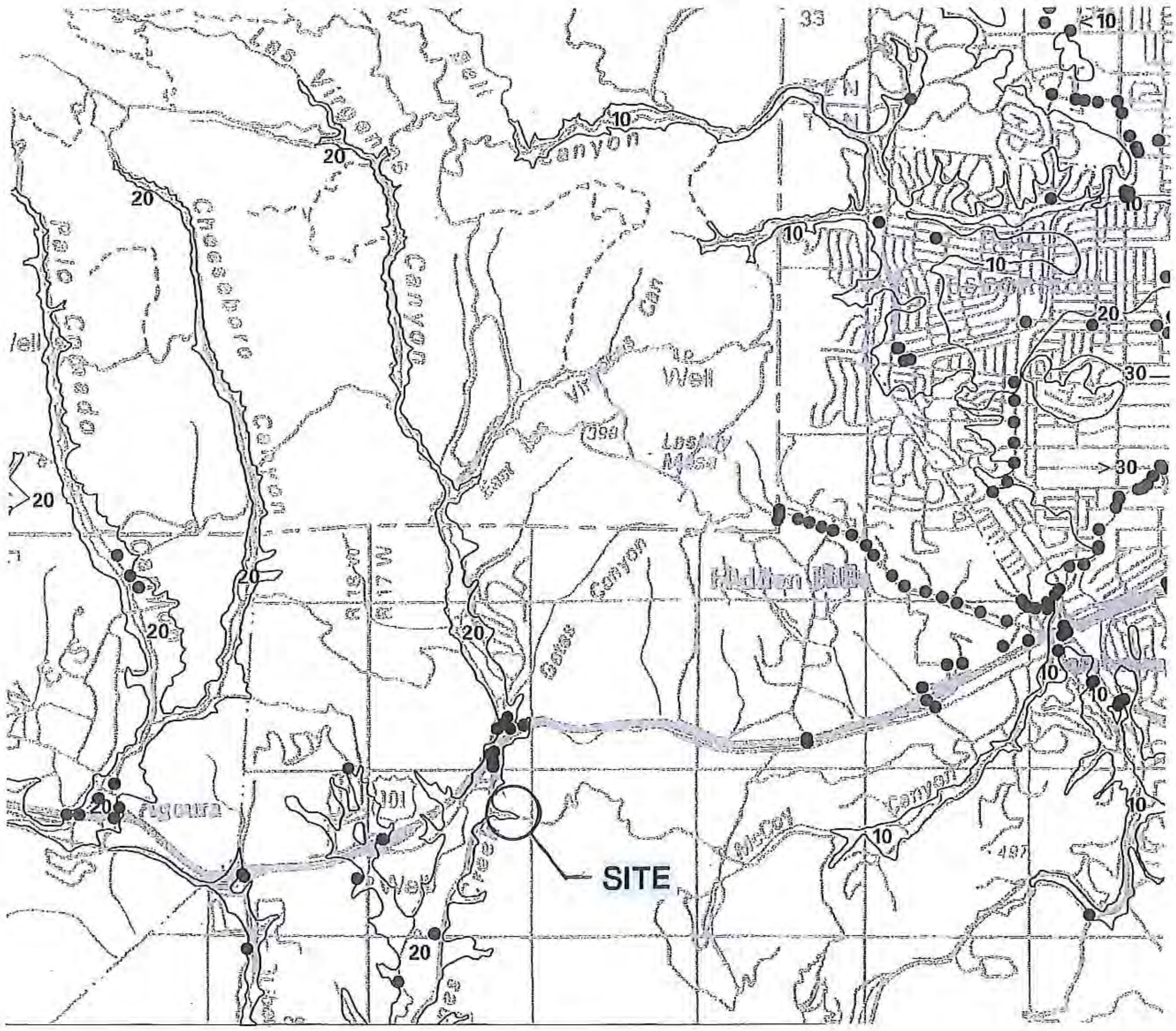

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report for the Calabasas 7.5 Minute Quadrangle, Historical High Groundwater Map, Los Angeles and Ventura Counties, California, 1997 (Revised 2001)

P.N. 1344.11

NORTH

Scale: 1" = 3,300'

HISTORICAL GROUNDWATER LEVELS

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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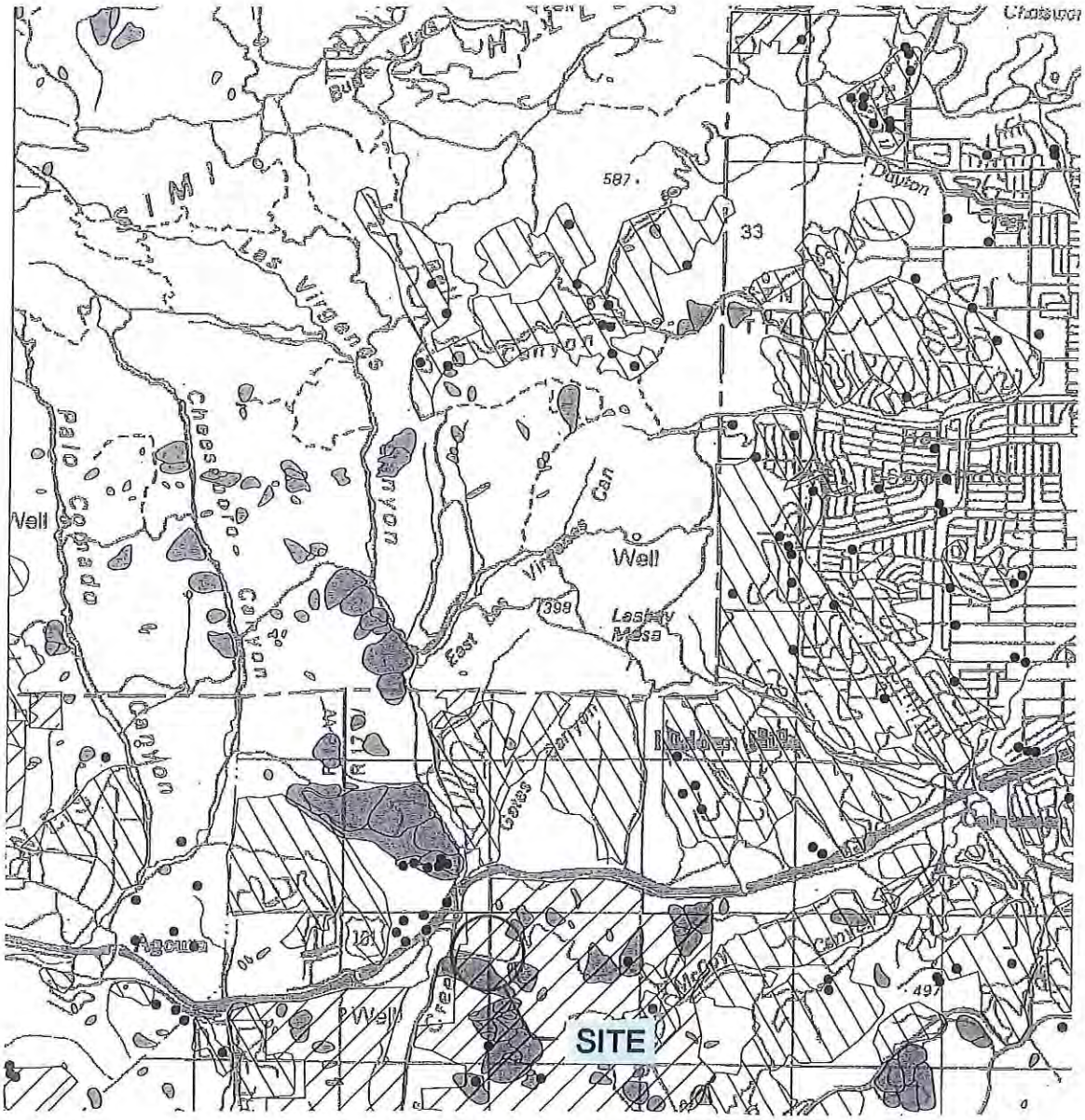

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report for the Calabasas 7.5 Minute Quadrangle, Landslide Inventory Map, Los Angeles and Ventura Counties, California, 1997 (Revised 2001)

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NORTH

Scale: 1" = 3,300'

LANDSLIDE INVENTORY

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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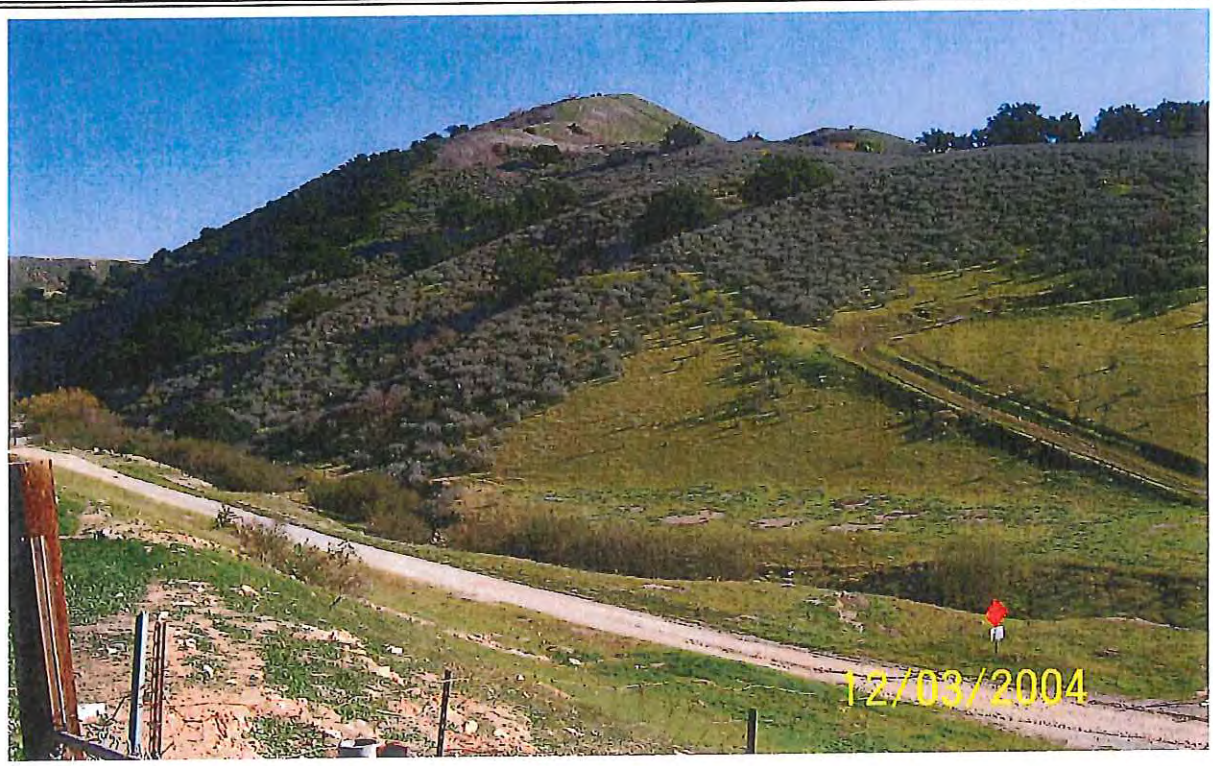

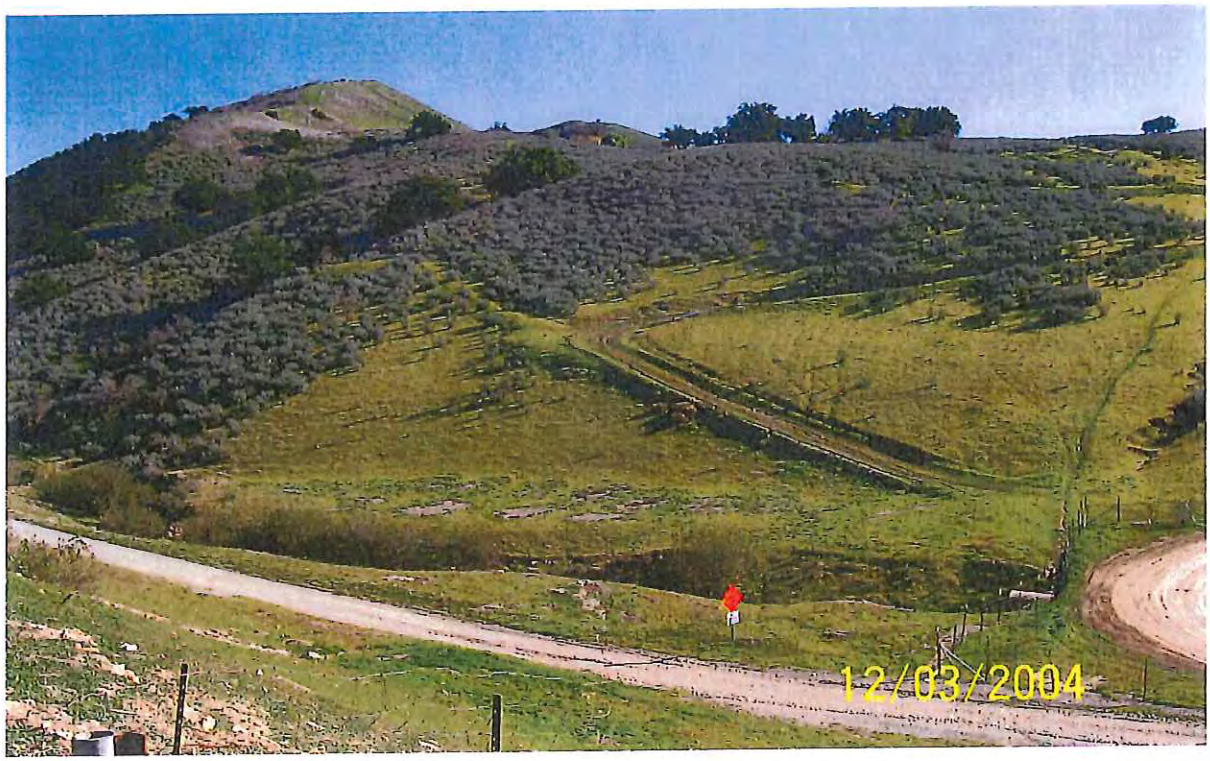

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PHOTOS 1 AND 2
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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PHOTOS 3 AND 4
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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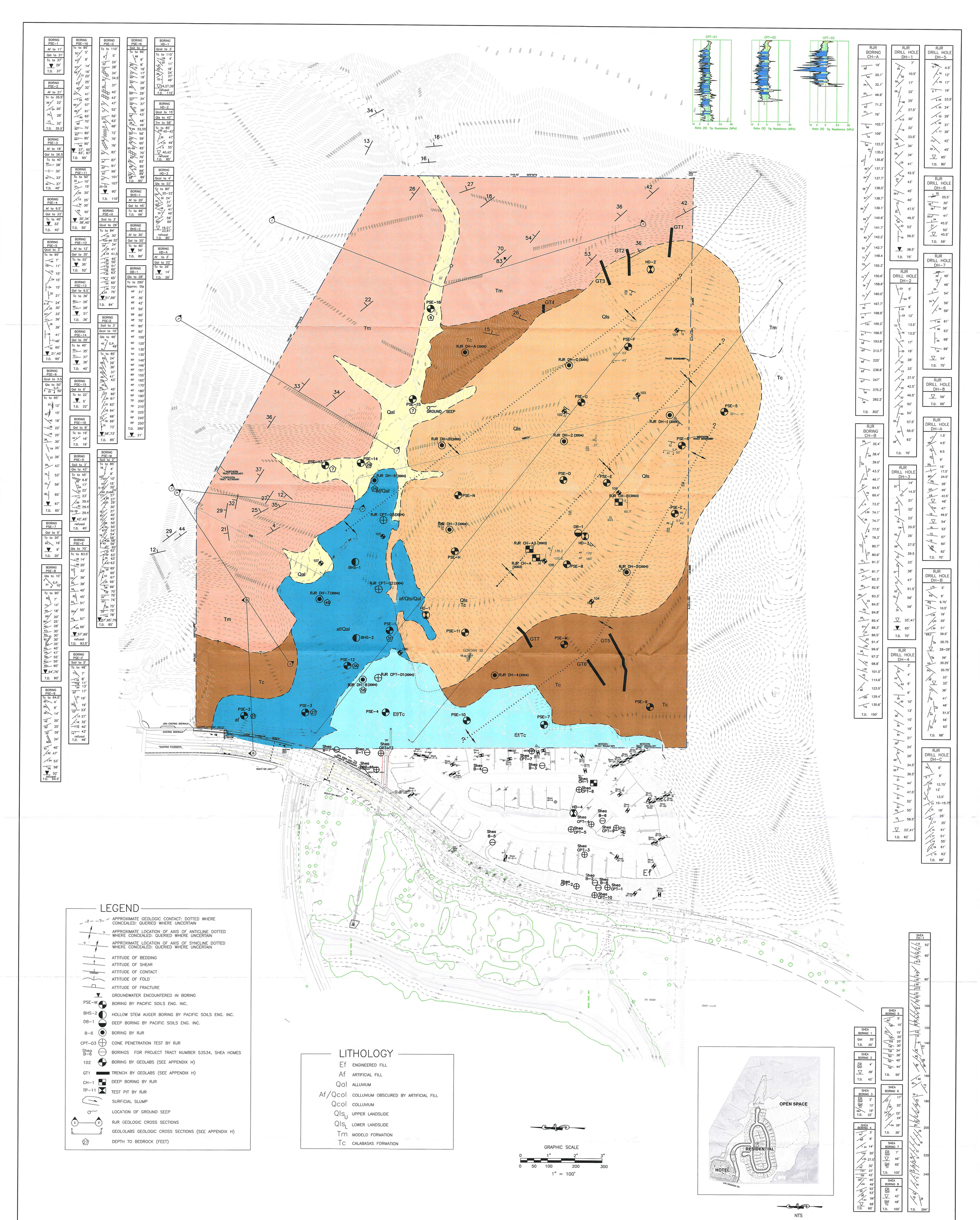


LEGEND

- APPROXIMATE GEOLOGIC CONTACT: DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF ANTICLINE DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF SYNCLINE DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- ATTITUDE OF BEDDING
- ATTITUDE OF SHEAR
- ATTITUDE OF CONTACT
- ATTITUDE OF FOLD
- ATTITUDE OF FRACTURE
- GROUNDWATER ENCOUNTERED IN BORING
- PSE-M — BORING BY PACIFIC SOILS ENG. INC.
- BHS-2 — HOLLOW STEM AUGER BORING BY PACIFIC SOILS ENG. INC.
- DB-1 — DEEP BORING BY PACIFIC SOILS ENG. INC.
- B-6 — BORING BY RJR
- CPT-03 — CONE PENETRATION TEST BY RJR
- Shea B-6 — BORINGS FOR PROJECT TRACT NUMBER 53534, SHEA HOMES
- 102 — BORING BY GEOLABS (SEE APPENDIX H)
- GT1 — TRENCH BY GEOLABS (SEE APPENDIX H)
- CH-1 — DEEP BORING BY RJR
- TP-11 — TEST PIT BY RJR
- SURFICIAL SLUMP
- LOCATION OF GROUND SEEP
- RJR GEOLOGIC CROSS SECTIONS
- GEOLOLABS GEOLOGIC CROSS SECTIONS (SEE APPENDIX H)
- DEPTH TO BEDROCK (FEET)

LITHOLOGY

Ef	ENGINEERED FILL
Af	ARTIFICIAL FILL
Qal	ALLUVIUM
Af/Qcol	COLLUVIUM OBSCURED BY ARTIFICIAL FILL
Qcol	COLLUVIUM
Qls_U	UPPER LANDSLIDE
Qls_L	LOWER LANDSLIDE
Tm	MODELO FORMATION
Tc	CALABASAS FORMATION

GRAPHIC SCALE

0 1" 2" 3"

0 50 100 200 300

1" = 100'

NTS

GEOLOGY & GEOTECHNICAL PLAN

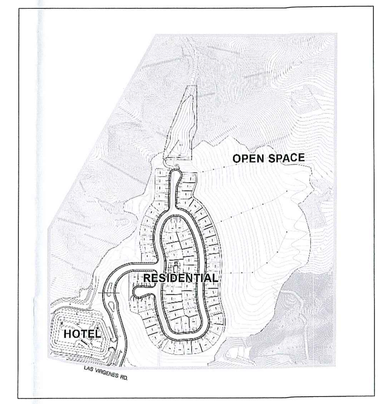
CANYON OAKS

THE NEW HOME COMPANY

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

PREPARED BY:

RJR ENGINEERING GROUP
Planning-Civil Engineering-Flood Control/Hydrology
Geotechnical Engineering-Geology-Water Resources-Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com



LEGEND

- APPROXIMATE GEOLOGIC CONTACT: DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF ANTICLINE DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF SYNCLINE DOTTED WHERE CONCEALED: QUERIED WHERE UNCERTAIN
- ATTITUDE OF BEDDING
- ATTITUDE OF SHEAR
- ATTITUDE OF CONTACT
- ATTITUDE OF FOLD
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- B-6 — BORING BY RJR
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- SURFICIAL SLUMP
- LOCATION OF GROUND SEEP
- RJR GEOLOGIC CROSS SECTIONS
- GEOLOLABS GEOLOGIC CROSS SECTIONS (SEE APPENDIX H)
- DEPTH TO BEDROCK (FEET)

LITHOLOGY

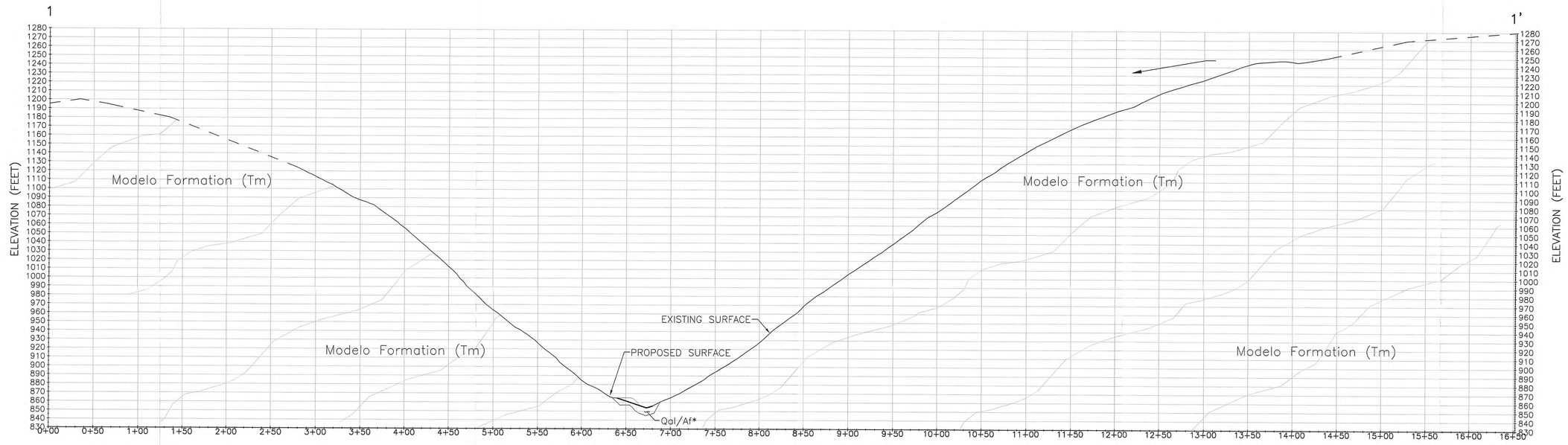
Ef	ENGINEERED FILL
Af	ARTIFICIAL FILL
Qal	ALLUVIUM
Af/Qcol	COLLUVIUM OBSCURED BY ARTIFICIAL FILL
Qcol	COLLUVIUM
Qls_U	UPPER LANDSLIDE
Qls_L	LOWER LANDSLIDE
Tm	MODELO FORMATION
Tc	CALABASAS FORMATION

GRAPHIC SCALE
0 40 80 160 240
1" = 80'

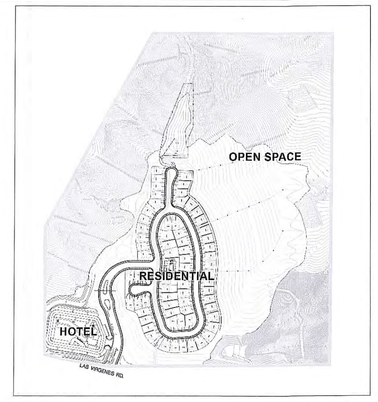
GEOLOGY & GEOTECHNICAL PLAN
WITH PROPOSED SITE PLAN
CANYON OAKS

THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

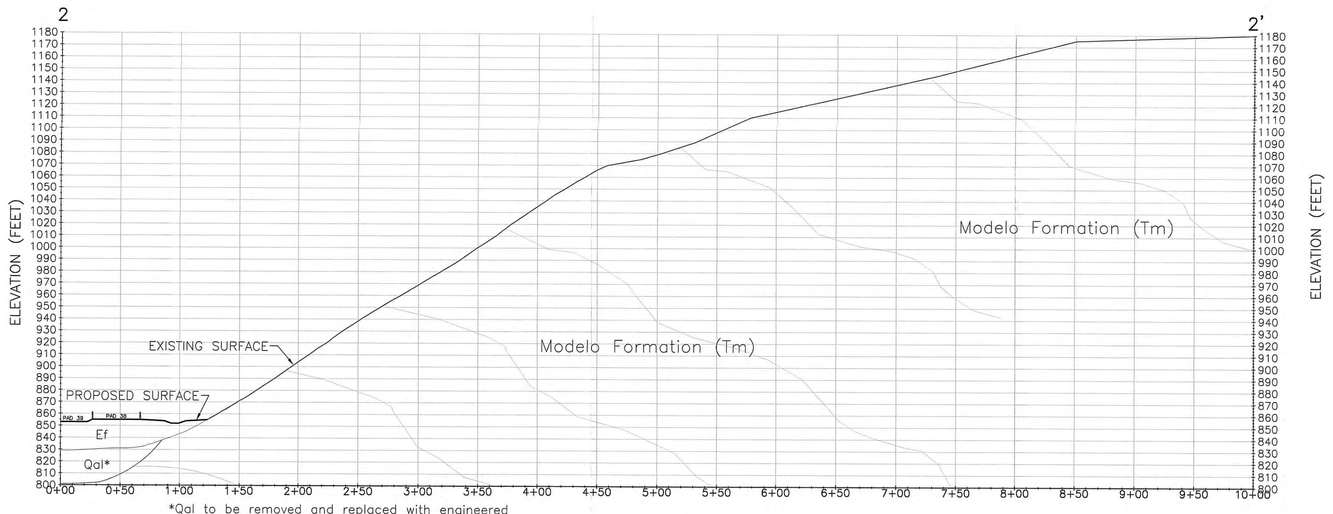
PREPARED BY:
RJR ENGINEERING GROUP
Planning Civil Engineering Flood Control Hydrology
Geotechnical Engineering Geology Water Resources Water Quality
2500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3835 (805) 485-8496 FAX
890 Osos Street, Suite A San Luis Obispo, CA 93401
(805) 595-0218 (805) 595-0256 FAX
E-mail: rjr@rjreng.com



SECTION 1–1'

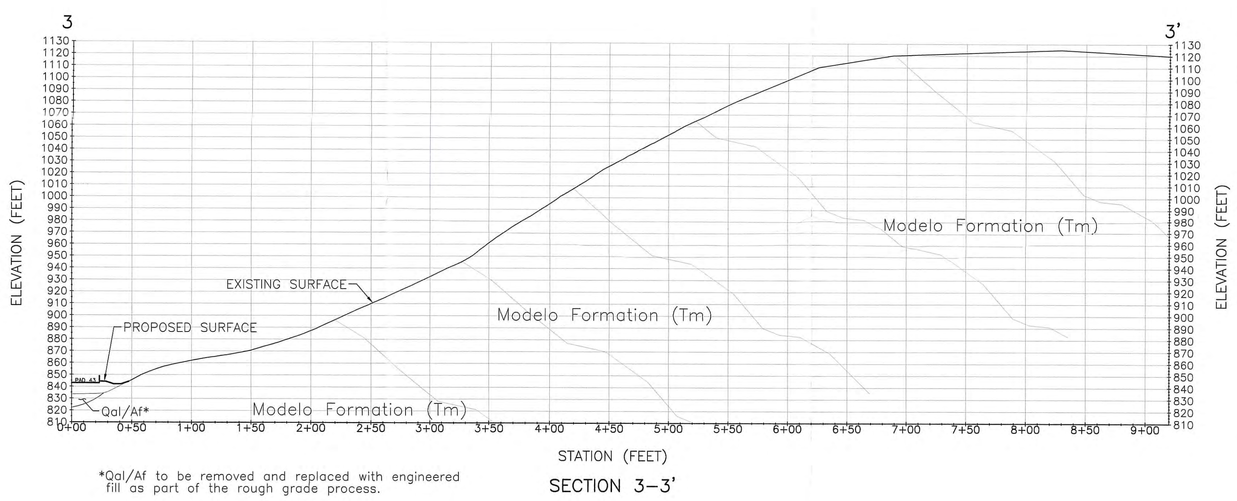


NTS



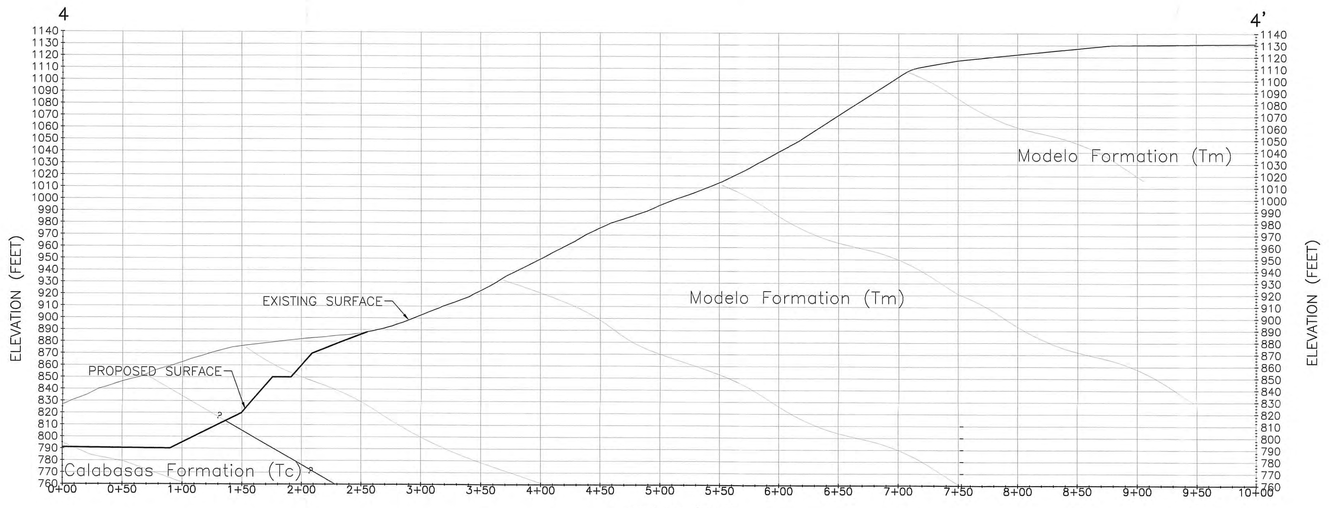
*Qal to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 2–2'



*Qal/Af to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 3–3'



SECTION 4–4'

GRAPHIC SCALE

0 1" 2" 3"

0 30 60 120 180

1" = 60'

LEGEND

Af	Artificial Fill
Ef	Engineered Fill
Qal	Alluvium
Tc	Calabasas Formation
Tm	Modelo Formation
	Approximate Geologic Contact
	Assumed Subsurface Geologic Contact
	Existing Surface
	Proposed Surface
	Existing Surface to be Graded/Improved

GEOLOGIC CROSS SECTIONS

CANYON OAKS

THE NEW HOME COMPANY

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

PREPARED BY:

RJR ENGINEERING GROUP

Planning • Civil Engineering • Flood Control/Hydrology
General Engineering • Biology • Water Resources • Water Quality
3500 Calle Reposo, Camarillo, California 93012-8030
(805) 485-3535 (800) 485-8486 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
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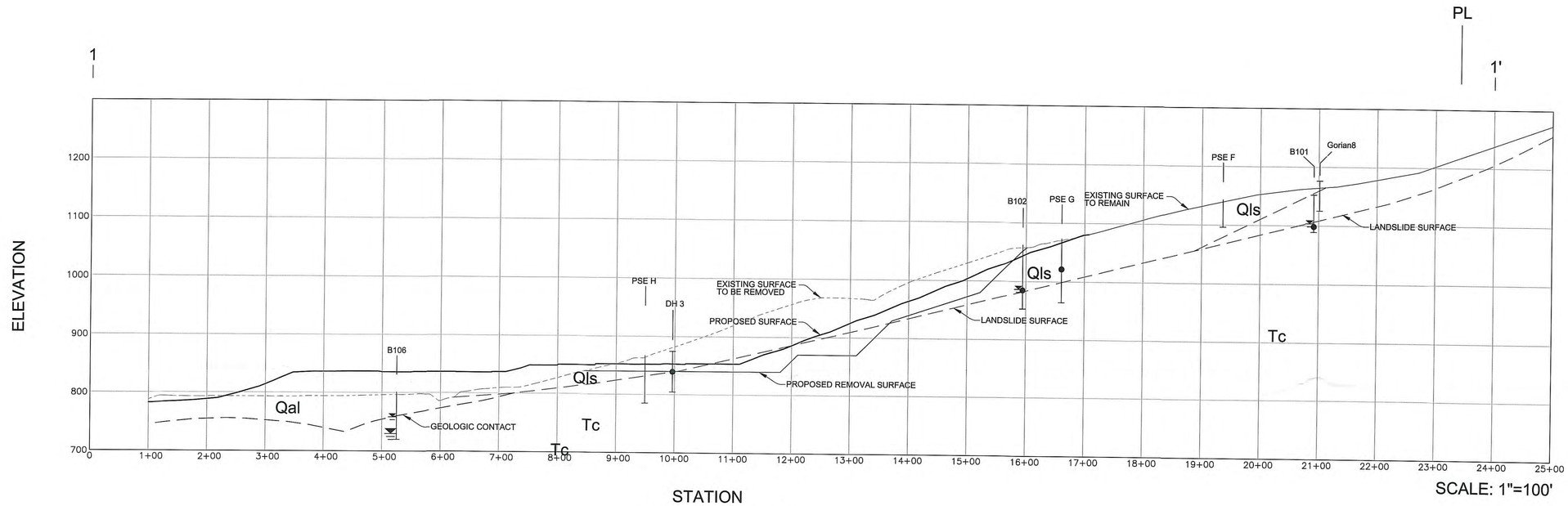
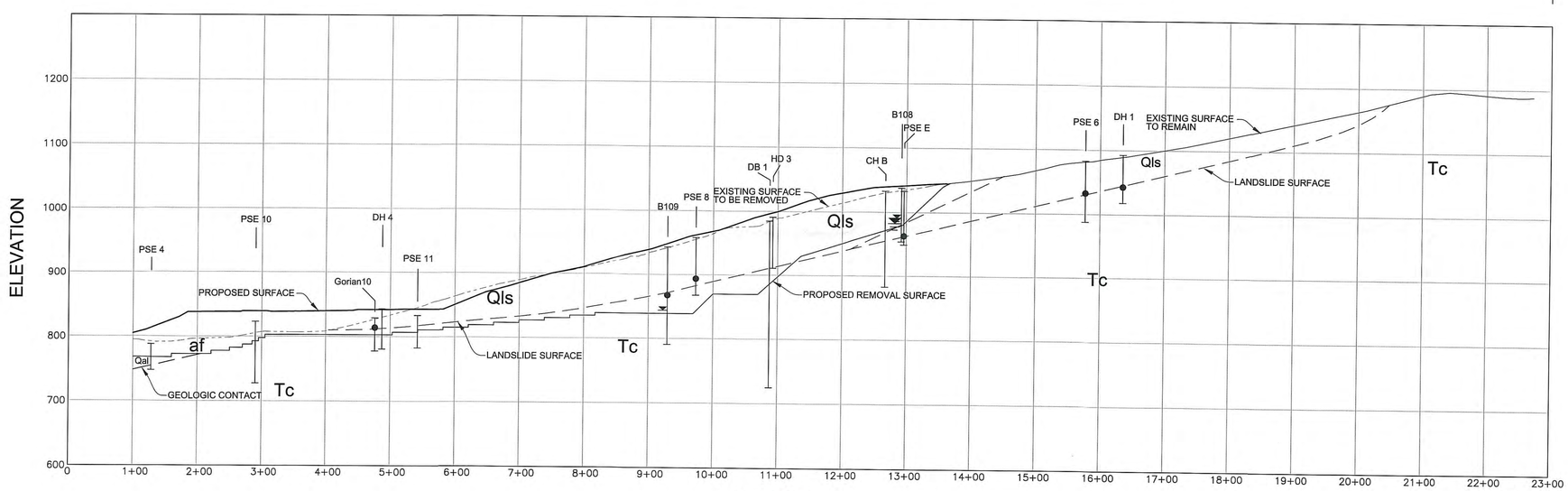


SCALE: 1"=100'

SECTION 1-1'



SCALE: 1"=100'

SECTION 2-2'

GRAPHIC SCALE
0 1" 2"
0 50 100 200
1" = 100'

LEGEND

- SLIDEPLANE
- GROUNDWATER LEVEL
- SEEPAGE LEVEL
- Af ARTIFICIAL FILL
- Qal ALLUVIUM
- Qls LANDSLIDE
- Tc CALABASAS FORMATION

Revised 10/12/10 for water and Qls depths

PREPARED BY:

RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485–3535 (805) 485–8488 FAX
890 Oese Street, Suite A, San Luis Obispo, CA 93401
(805) 595–0216 (805) 594–0258 FAX
E–mail: rjr@rjreng.com

SOUTHERN SLOPE
GEOLOGIC X-SECTIONS 1-1' and 2-2'
TENTATIVE TRACT NO. 71546
CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

APPENDIX B

LOGGED BY: ASG/DAO
DRILLING DATE: 11/15/05-11/16/05
CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 70'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL 0-3"**								
	1				SANDY CLAY to SILTY CLAY: grayish brown, medium stiff, dry.								
	2				- abundant rock fragments to 2" dia., angular to subangular, porous								
	3				**CALABASAS FORMATON (Tc):** SILTSTONE and SANDSTONE: light brown to light tan to light olive, hard, dry to slightly moist.								
	4				- interbedded, fine to medium grained with rare coarse grains, well cemented, interlayered SILTSTONE and SANDSTONE, thinly bedded, moderately fractured, roots, rootlets								
	5				@ 1.5' BEDDING ATTITUDE **N60W/11NE**								
	6				@ 4.5' beds are truncated								
	7				@ 4.5' BEDDING ATTITUDE **N28W/26NE**								
	8				@ 6' SAND bed ~ 1' thick, prominent fracture								
	9				- CLAY filled fracture with SANDSTONE below, out of slope truncated bedding, SANDSTONE and SILTSTONE over SANDSTONE, partially sheared clays, black deposits								
	10				**@ 6.5' SHEAR ATTITUDE N65-66E/22NW**, beds above are truncated into fracture zone, shear zone is	7							
	11				@ 7' interbedded SANDSTONE and SILTSTONE								
	12				@ 9' BEDDING ATTITUDE **N80E/22NW**								
	13				@ 9.2' kayotic bedding w/rare gravels to 0.75" dia., round to subround, xenoliths of SANDSTONE within the SILTSTONE, highly fractured, grayish								
	14				- possible subaqueous slump								
	15				@ 11' no apparent continuity or striated bedding, polished surfaces								
	16				- wavy bedding, tightly folded and intensely fractured								
	17												
	18												
	19												
	20					11							

DRILL HOLE A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: ASG/DAO
DRILLING DATE: 11/15/05-11/16/05
CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 70'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20				@ 15' BEDDING ATTITUDE **N04W/25NE** - interbedded SILTSTONE and SANDSTONE, highly fractured @ 17' becomes more competent with FOLD AXIS w/ **SW dip** @ 17.5' vertical bedding **N15W** (overturned beds) @ 18' gypsum crystals, bedding tightly folded FOLD AXIS w/ **NE dip** @ 19' SILTSTONE: brown to light reddish brown/orangish brown, hard, moist - abundant gypsum crystals, locally blocky, zones of very intense fracturing @ 22' increase in fractures, very hard rock, poorly defined bedding, gypsum infilling @ 23.4-24.5' hard, lots of xenoliths @ 24.5' well defined SILTSTONE and SANDSTONE bedding BEDDING ATTITUDE **N44W/85NE** @ 25' massive, convoluted, highly fractured @ 28' very poorly bedded BEDDING ATTITUDE **N11E/26SE** @ 30.5' xenoliths in SILTSTONE, possible slide, highly silicified, dark brown SILTSTONE and SANDSTONE clasts @ 32' gray in color, less weathered, hard, poorly bedded, massive, moist, locally clastic @ 33' xenolith, coarse gravels, iron staining, subangular to subround in SILTSTONE matrix @ 34' MUDSTONE, dark brown, poorly bedded, massive								
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30					20							
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40					29							

DRILL HOLE A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: ASG/DAO
DRILLING DATE: 11/15/05-11/16/05
CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 70'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40				@ 40' very hard, suggestion of bedding BEDDING ATTITUDE **N23W/22NE** @ 42.5' MUDSTONE, poorly bedded, BEDDING ATTITUDE **N15W/23NE**								
	41												
	42												
	43												
	44												
	45				@ 46' water seepage								
	46												
	47				@ 47' FRACTURE ATTITUDE **N52E/61SE**								
	48												
	49				@ 49.5 BEDDING ATTITUDE **N06E/15SE**								
	50												
	51												
	52												
	53				@ 53' BEDDING ATTITUDE **N03W/8NE**								
	54				@ 54' gray beds, very hard, abundant water seepage								
	55												
	56												
	57				@ 57' BEDDING ATTITUDE **N06E/17SE**								
	58												
	59												
	60					35							

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PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 70'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60				@ 60' BEDDING ATTITUDE **N18E14SE**								
	61												
	62				@ 62' very hard, very silicified, well bedded, interlayered SILTSTONE with underlying SANDSTONE CONTACT ATTITUDE **N42E56SE**								
	63												
	64												
	65				@ 65' interbedded SILTSTONE and SANDSTONE								
	66												
	67												
	68												
	69												
	70												
	71												
	72				Total Depth = 70' No Groundwater Seepage @ 46' and 54' No Caving Backfilled with Drill Cuttings								
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

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PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL 0-3"**								
	1				SILTY CLAY: brown, dry, loose.								
					- porous, rare coarse sand, irregular contact with underlying material								
	2				**CALABASAS FORMATON (Tc):**								
	3				SILTSTONE and SANDSTONE: tan to light brown to buff to light gray, firm, slightly moist to moist.								
	4				- thinly bedded, bioturbation in upper few feet, interbedded SILTSTONE and SANDSTONE, roots and rootlets, porous in upper few feet, weathered								
	5				@ 4' less weathered, abundant fractures, abundant carbonate veinlets, interlayered SILTSTONE and SANDSTONE								
	6				@ 5' SILTSTONE beds ~1/16 to 3" thick, SANDSTONE beds ~ 1/2 to 1" thick								
	7				BEDDING ATTITUDE **N16W/10SW**								
	8				@ 8' minor folding, minor deformation, increase in moisture								
	9				@ 9' BEDDING ATTITUDE **N35E/62NW**	10							
	10				@ 9.25' Sheared beds, possible slide contact zone of deformed bed								
	11				@ **9.75'** SHEAR ATTITUDE **N05E/20NW**								
	12				@ 10.5' BEDDING ATTITUDE **N21E/9NW**								
	13												
	14				@ 14' Chevron Fold, shearing and folding								
	15				Fold Axis: **N31E plunging 16NE**								
	16				- increase in iron staining with depth, increase in bed disruption with depth, poorly lithified, moist and friable								
	17				@ 15' root zone								
	18				@ 17' becomes harder with depth, 6" wide SANDSTONE bed to 17.5', medium gray to gray SILTSTONE below								
	19				@ 19' BEDDING ATTITUDE **N20W/36SW**								
	20				- some clay filled fractures	16							

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CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20				@ 20' BEDDING ATTITUDE **N49W/33SW**								
	21				@ 21' hard gray zone, anoxic SILTSTONE, BEDDING ATTITUDE @ contact of unweathered SILTSTONE and SANDSTONE, **N32W/30SW**								
	22												
	23				- SILTSTONE becomes more abundant with depth								
	24				@ 23' hard siliceous layer								
	25												
	26				@ 26.5' FRACTURE ATTITUDE **N04W/63SW**								
	27				@ 26.75' BEDDING ATTITUDE **N79W/35SW**								
	28				- beds are locally folded and fractured								
	29				@ 28-29' water seepage @ 29' BEDDING ATTITUDE **N65E/36SE**								
	30				- poorly weathered and anoxic	20							
	31				@ 30.25' BEDDING ATTITUDE **N18W/16NE**								
	32				@ 30.5' northerly dipping Chevron Fold @ 30.75' Shear Zone SHEAR ATTITUDE **N35E54NW**								
	33				@ 33' BEDDING ATTITUDE **N46W/30SW**								
	34				@ 33-35' hard SANDSTONE truncating into SILTSTONE								
	35				@ 33' water seepage								
	36				@ 36' BEDDING ATTITUDE **N41E/21NW**								
	37												
	38												
	39				@ 39.5-40.5' Sand bed ~1' thick								
	40					26							

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PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				@ 41' BEDDING ATTITUDE **N76W/18SW**								
	42												
	43				Interbedded SANDSTONE and SILTSTONE, unweathered								
	44												
	45												
	46				@ 46' BEDDING ATTITUDE **N83E/33SE**								
	47				@ 47-48.5' thick SANDSTONE								
	48												
	49												
	50												
	51				@ 51.5' BEDDING ATTITUDE **N71W/24SW**								
	52				@ 52.5-55.5' SANDSTONE, poorly bedded, very hard, resistant, fine to medium grained								
	53												
	54												
	55												
	56				@ 56' BEDDING ATTITUDE **N73W/9SW**								
	57												
	58												
	59												
	60												

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LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60					35							
	61				@ 61' SILT bed ~ 1/4" thick								
	62												
	63				@ 63' BEDDING ATTITUDE **N78W/25SW**								
	64												
	65												
	66												
	67												
	68												
	69												
	70				Total Depth = 68' No Groundwater Seepage @ 28-29' & 33' No Caving Backfilled with Drill Cuttings								
	71												
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

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PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 70'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL/SLOPE WASH 0-2.5'** SILTY CLAY: dark brown, moist, medium stiff. - porous, roots, rare rock fragments to 0.5-1.5" dia.								
	1												
	2				**SOIL 2.5-4':** @ 2.5' SANDSTONE: light brown, hard, dry. - SANDSTONE and SILTSTONE bed, contact with overlying material is subparallel, lots of bioturbation @ 2.5-4' SILTY SAND to SANDY CLAY: light brown, dry, medium stiff. - mottled, carbonate rock fragments, rare fine gravels, angular to subangular, minor carbonate veinlets @ 4-6' pulverized weathered bedrock, highly weathered								
	3												
	4												
	5												
	6												
	7												
	8												
	9				**CALABASAS FORMATON (Tc):** SANDSTONE and SILTSTONE: brown to light brown, medium hard, dry. - thinly interbedded, intensely fractured, iron staining, carbonate staining @ 6' BEDDING ATTITUDE **N60E/34NW** @ 9' increase in hardness, fractures are blocky, increase in carbonate BEDDING ATTITUDE **N16W/5SW** @ 10' SANDSTONE bed 3" thick @ 12.75' CHEVRON FOLD UPPER LIMB @ 12.75' **N40W/25SW** AXIS @ 13' **N85W/5SW** LOWER LIMB @ 13.5' **N62E/15NW** @ 15-15.75' SILTSTONE BEDDING ATTITUDE **N27W/13SW** @ 19' BEDDING ATTITUDE **N50W/13SW**, clean bedding, thinly bedded 1/16-1.5" thick interbedded SILTSTONE and SANDSTONE, very regular interbedding	11							
	10												
	11												
	12												
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20					17							

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PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21												
	22												
	23												
	24												
	25				@ 25' BEDDING ATTITUDE **N29W/10SW** - very regular bedding								
	26												
	27												
	28				@ 28' harder SANDSTONE								
	29				@ 28.5- 40' SANDSTONE, fine to medium grained, weekly cemented, rare coarse grains								
	30					22							
	31				@ 31' band of iron staining, SANDSTONE has little xenoliths of SILTSTONE, very poorly defined bedding to massive								
	32												
	33												
	34												
	35				@ 35' small CLAY layer inside the SANDSTONE								
	36				BEDDING ATTITUDE **N66W/17SW**								
	37				@ 37' SILTSTONE seam 3" thick								
	38				alternating thick SANDSTONE and thin SILTSTONE layers								
	39												
	40					33							

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CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				@ 41' BEDDING ATTITUDE **N41W/14SW**								
	42												
	43												
	44				@ 44-46.25' graded bedding, fine to coarse grained								
	45												
	46				@ 46.5-46.75' SILTSTONE xenoliths in the SANDSTONE								
	47				@ 46.75' SANDSTONE								
	48												
	49												
	50				@ 50' increase in coarse grains								
	51				@ 51' BEDDING ATTITUDE **N42W/17SW**								
	52				- thinly bedded alternating SILTSTONE and SANDSTONE								
	53												
	54												
	55				@ 55' BEDDING ATTITUDE **N35W/14SW**								
	56												
	57				@ 57' SANDSTONE, massive, poorly bedded								
	58												
	59												
	60												

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CHECKED BY: RWA

PROJECT NO.: 1344.10
LOCATION: Las Virgenes Road

DRILLING METHOD: Lodril
DRILLED BY: Roy Brothers Drilling
BACKFILLED WITH: native material

TOTAL DEPTH: 68'
DEPTH TO WATER: NA AFTER: NA

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60					36							
	61				@ 61' ANGULAR UNCONFORMITY SANDSTONE to SILTSTONE **N51W/16SW**								
	62				@ 62' BEDDING ATTITUDE **N17W/23NE**								
	63												
	64				@ 63' thick sequence of SANDSTONE and SILTSTONE interlayered BEDDING ATTITUDE **N26W/15NE**								
	65												
	66				@ 63.5' alternating SILTSTONE and SANDSTONE with more abundant SILTSTONE								
	67												
	68												
	69												
	70				Total Depth = 68' No Groundwater No Caving Backfilled with Drill Cuttings								
	71												
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

DRILL HOLE C
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LOGGED BY: DAO
DRILLING DATE: 4-18-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: 38.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL** SILTY CLAY; very dark gray, damp, stiff to hard - blocky, slightly porous - abundant small rock fragments, angular to subangular, 1/4" to 3" in length - @ 3' lighter gray - becoming more rocky with depth, weathered rock fragments, - abundant carbonate staining, with thick veinlets.								
	6				**LANDSLIDE DEBRIS** SANDSTONE AND SILTSTONE: gray, damp, stiff, very fractured. - weathered rock fragments with clay infilling in cracks, some charcoal fracture infilling - @ 7' Bedding Attitude: **N28E/25NW** - @ 9' bedrock locally more coherent thinly bedded, damp, stiff, convoluted, abundant iron staining, intensely fractured - @ 10.5' Bedding Attitude: **N63W/65SW** - @ 12'-14' heavily iron stained, chaotic bedding								
	15				- @ 15'-16' SILTSTONE; thinly bedded, chaotic, less abundant sandstone - @ 17' Bedding Attitude: **N45W/55NE**								

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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: 38.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20				- less fractured with clay infilling, more coherent bedding								
	21												
	22				- @ 22' Bedding Attitude: **N75W/26NE**								
	23												
	24												
	25				- @ 25' bedding folded steeply								
	26				- @ 25' Bedding Attitude: **N78W/48SW** - thinly bedded siltstone								
	27												
	28												
	29												
	30				- @ 30' Slide Plane Attitude: **N35W/13SW**								
	31												
	32				- @ 32' Bedding Attitude: **N66W/19SW**								
	33				- @ 33.5' Slide Plane Attitude: **N39E/18NW**								
	34				- 1/4" wide plastic clay, continuous around boring								
	35				- @ 34' Bedding Attitude: **N20W/22NE** - @ 34' Bedding Attitude: **N47W/28NE**								
	36				- bedding becomes more regular and uniform								
	37												
	38												
	39				- @ 38.5' Groundwater Encountered								
	40												

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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: 38.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				- @ 41' Bedding Attitude: **N40E/23SE**								
	42				- @ 42.5' Slide Plane Attitude: **N40W/10SW**								
	43				- @ 43' Shear Attitude: **N49W/23NE**								
	44												
	45				- @ 45' Slide Plane Attitude: **N21E/26NW**								
	46				- @ 46' Bedding Attitude: **N20E/12NW** - thin siltstone above sandstone								
	47				- @ 47.5' Slide plane with slickensides								
	48				- @ 47.5' Slide Plane Attitude: **N69E/44NW** - dark brown to black clay, wet and plastic, hard below								
	49				- @ 49.5' Slide Plane Attitude: **N40E/06NW**								
	50				- CLAY; dark brown to black, wet, hard **BEDROCK: CALABASAS FORMATION** SANDSTONE AND SILTSTONE AND MUDSTONE below slideplane								
	51												
	52												
	53				- @ 53' Bedding Attitude: **N50E/23SE**								
	54												
	55												
	56				- @ 56.5' Bedding Attitude: **E-W/10S**								
	57												
	58												
	59												
	60												

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DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: 38.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60				- Coring 60-62' - fractured bedrock section with caving, no downhole logging beyond 60'								
	61												
	62												
	63												
	64												
	65												
	66												
	67												
	68												
	69												
	70												
	71												
	72												
	73												
	74												
	75				Total Depth = 75' Groundwater @ 38.5' Caving below 60' Backfilled with drill cuttings								
	76												
	77												
	78												
	79												
	80												

DRILL HOLE 1
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
DRILLING DATE: 5-14-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: N/A AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL**								
	1				SILTY CLAY; very dark gray, damp, very stiff to hard.								
	2				- blocky, slightly porous								
	3				- abundant small rock fragments angular to subangular, to 3" in length								
	4				- rock fragments are randomly oriented								
	5				- color change at 2', less soil and more tan to brown weathered bedrock								
	6				**BEDROCK: CALABASAS FORMATION**								
	7				SANDSTONE AND SILTSTONE; tan, brown, and olive grey, damp, moderately strong.								
	8				- thinly bedded, interlayered, more highly fractured in upper few feet								
	9				- @ 5.5' more coherent bedrock, less weathered, more defined bedding								
	10				- @ 5' Bedding Attitude: **N73E/23SE**								
	11				- @ 6' Bedding Attitude: **N74W/04SW**								
	12				- interlayered siltstone and sandstone thickness varies between less than 1/4" to more than several inches								
	13				- less fractured with depth								
	14				- minor bedding offsets along fractures								
	15				- minor surface developed at 9',								
	16				- @ 9' Attitude on minor shear: **N08W/ 33SW**								
	17				- @ 12' Bedding Attitude: **N85E/23SE**								
	18				- @ 13.5' fold in bedrock, with attitudes on anticline limbs: **N70E/ 73NW and N69E/ 70SE**								
	19				- @ 17' Bedding Attitude: **N51E/41SE**								
	20				- @ 19' Bedding Attitude: **N89E/25SE**								

DRILL HOLE 2
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

TOTAL DEPTH: 70'
DEPTH TO WATER: N/A AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21												
	22												
	23												
	24				- @ 24 to 26 feet sandstone bedrock contains siltstone ripup clasts in poorly cemented sandstone matrix								
	25												
	26				- @27' very hard and well cemented sandstone								
	27												
	28				- @ 28' Bedding Attitude: **N49W/22SW** on siltstone bed								
	29												
	30												
	31												
	32												
	33												
	34				- @ 33' Bedding Attitude: **N46W/13SW** - from 33.5 to 34.5 feet sandstone layer								
	35												
	36												
	37												
	38				- @ 37.5' Bedding Attitude: **N42W/18SW** on siltstone beds								
	39												
	40												

DRILL HOLE 2
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: N/A AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41												
	42				- @ 42.5' Bedding Attitude: **N56W/25SW**								
	43				- some gypsum in layers of siltstone starting at 43', approximately 1/2" thick								
	44												
	45												
	46				- @ 46.5' Bedding Attitude: **N48W/23SW**								
	47												
	48												
	49												
	50				- @ 50' Bedding Attitude: **N42W/22SW**								
	51												
	52				- continuing interlayered siltstone and sandstone								
	53												
	54				- @ 54' Bedding Attitude: **N76W/54SW**								
	55												
	56				- @ 56' bedding overturns, still thinly bedded siltstone								
	57				- @ 57.5' Bedding Attitude: **N77W/55NE**								
	58												
	59				- @ 59.5' Bedding Attitude: **N75E/35NW**								
	60												

DRILL HOLE 2
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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CHECKED BY: JOT

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

TOTAL DEPTH: 75'
DEPTH TO WATER: N/A AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60												
	61												
	62												
	63												
	64				- @ 63' Bedding Attitude: **N59E/28NW** - sandstone layer starting at 63.5' to 67' - sandstone continuing to approximately 67' then interlayered siltstone and sandstone								
	65												
	66												
	67												
	68												
	69												
	70												
	71				Total Depth = 70' No Groundwater No Caving Backfilled with drill cuttings								
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

DRILL HOLE 2
CALABASAS HOLDINGS
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: 36',47' & 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**ARTIFICIAL FILL** SILTY CLAY: medium dark gray brown, humid to damp, stiff. - dessication cracks, minor root hairs								
	1												
	2				**SOIL/ COLLUVIUM** SILTY CLAY: medium gray to olive brown, damp, stiff to hard. - infrequent angular to subangular rock fragments to 3" in length								
	3												
	4				**LANDSLIDE DEBRIS** SANDSTONE AND SILTSTONE: yellowish brown to tan, damp, medium stiff. - highly weathered, fractured with decreasing soil infilling bedrock fractures and increasing rock competency at 7' - thinly bedded with some iron staining, caliche veinlets								
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14				- @ 14' Bedding Attitude: **N86E/23NW** - @ 14.5' Bedding Attitude: **N46W/21NE**								
	15												
	16												
	17												
	18				- bedding becomes less distinct, less coherent some iron staining								
	19												
	20												

DRILL HOLE 3
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
DRILLING DATE: 4-23-04
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: 36',47' & 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20				- contact between more high angled and coherent siltstone above less well bedded and coherent below - @ 21' Bedding Attitude: **N56E/31NW** - gypsum crystal formation at 21.5', in siltstone beds - @ 22' Bedding Attitude: **N85E/20NW** - @23' bedrock is highly fractured with poorly displayed bedding - @ 23' Bedding Attitude: **N30E/16NW** - @24' undulatory sandstone bed with poorly defined siltstone bed - @ 25.5' Slide Plane Attitude: **N79E/19NW** - bedrock changes to more grey in color light to medium grey, moist, strong - @ 26' Bedding Attitude: **N72W/18NE** - more olive grey in color with depth - @ 27.5' Bedding Attitude: **N52E/28NW** - bedding is more well bedded, less fractured, more coherent - @ 29.5' Bedding Attitude: **N30E/23NW** - some slickenslides on siltstone partings - abrupt change in bedding below, slide plane, at 33' - @ 33' Slide Plane Attitude: **N43E/18NW** **BEDROCK: CALABASAS FORMATION** SANDSTONE AND SILTSTONE: medium grey, damp to wet, strong. - @ 36' saturated sand, actively weeping from wall of boring - hard layer at 36, prismatic and lens-shaped sheared rock, highly disturbed - @ 38' Bedding Attitude: **E-W/37N** - sandstone ends at 38' - seep at 36'								
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												

DRILL HOLE 3
CALABASAS HOLDINGS
LAS VIRGENES ROAD
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: 36',47' & 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41												
	42				- @42' very hard and resistant sandstone bed, with smooth surface								
	43				- @43' bedding turns to become vertical and overturn								
	44												
	45												
	46												
	47				- @ 47' Bedding Attitude: **N49E/41NW** - seep at 47'								
	48				- continuing interlayered siltstone and sandstone								
	49												
	50												
	51				- @ 51.5' Bedding Attitude: **N57E/55NW**								
	52												
	53												
	54												
	55												
	56				- @ 56' Bedding Attitude: **N75W/75NE**								
	57												
	58												
	59				- bedrock very hard starting at 59' - @ 59' Bedding Attitude: **N49E/35NW**								
	60				- very gray and hard at 60'								

DRILL HOLE 3
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: 36',47' & 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60												
	61												
	62												
	63												
	64												
	65				- @ 65' groundwater								
	66												
	67												
	68												
	69												
	70				Total Depth = 70' Seeps at 33' and 41' Groundwater at 65' No Caving Backfilled with drill cuttings								
	71												
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

DRILL HOLE 3
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: DAO
DRILLING DATE: 4-23-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 62'
DEPTH TO WATER: SEEP @ 33',41' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**SOIL**								
	1				SILTY CLAY: grey brown, damp, stiff.								
	2				- porous, blocky, with infrequent weathered subrounded to subangular rock fragments to to 1" dia.								
	3				- increasing number of rock fragments with depth								
	4				**BEDROCK: CALABASAS FORMATION**								
	5				SANDSTONE AND SILTSTONE: grey to medium brown, damp, medium strong.								
	6				- thinly and well bedded, minor staining								
	7				- @ 3' Bedding Attitude: **N31E/25NW**								
	8				- @ 4' Bedding Attitude: **N60E/16NW**								
	9				- convoluted bedding trucates against more competent bedding, harder and better defined								
	10				- bedrock continues more well bedded, moderately fractured, with minor iron staining								
	11				- fold in boring at 6'								
	12				- @ 6' Fold Axis Orientation: **N52E**								
	13				- associated bedding: **N40E/63SE** and **N02E/30NW**								
	14				- @ 10' Bedding Attitude: **N32E/62SE**								
	15				- @ 13' Bedding Attitude: **N38E/58NW**								
	16				- siltstone bed with well defined parting, no striae								
	17				- @ 15' Bedding Attitude: **N25E/35NW**								
	18												
	19				- @ 19' Bedding Attitude: **N22E/40NW**								
	20												

DRILL HOLE 4
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 4-23-04
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 62'
DEPTH TO WATER: SEEP @ 33',41' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21				- poorly defined slide plane, ridges in bed, but no striae								
	22				- @ 21' Slide Plane Attitude: **N10E/38NW**								
	23				- fold in bedrock, crenulated slightly								
	24				- @ 24' Bedding Attitude: **N28E/32NW**								
	25												
	26												
	27												
	28												
	29				- @ 29' Bedding Attitude: **N64E/65NW**								
	30												
	31												
	32												
	33				- seep at 33'								
	34				- @ 34.5' Bedding Attitude: **N17E/55NW**								
	35				- start of anoxic beds, unweathered, less fractured								
	36												
	37												
	38				- bedding showing flexure slip along siltstone partings								
	39												
	40				- @ 39.5' Shear Plane Attitude: **N08E/47NW** - staining, some striae, parallel to bedding								

DRILL HOLE 4
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: DAO
DRILLING DATE: 4-23-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 62'
DEPTH TO WATER: SEEP @ 33',41' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				- seep at 41'								
	42												
	43												
	44				- @ 44' Bedding Attitude: **N18E/47NW**								
	45												
	46												
	47				- @ 47.5' Bedding Attitude: **N20E/43NW** - more flexure slip related partings on siltstone beds - becoming more brown in color with depth								
	48												
	49												
	50												
	51												
	52				- @ 52' Bedding Attitude: **N20E/43NW** - becoming much harder with depth after 52'								
	53												
	54												
	55				- fold at 55', new attitude - @ 55' Bedding Attitude: **N20W/70NE**								
	56												
	57												
	58				- @ 58.5' Bedding Attitude: **N11W/73NE**								
	59												
	60												

DRILL HOLE 4
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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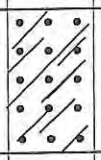
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 62'
DEPTH TO WATER: SEEP @ 33',41' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60												
	61												
	62				Total Depth = 62' Seeps at 33' and 41' No Caving Backfilled with drill cuttings								
	63												
	64												
	65												
	66												
	67												
	68												
	69												
	70												
	71												
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79												
	80												

DRILL HOLE 4
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: DAO
DRILLING DATE: 4-23-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 80'
DEPTH TO WATER: SEEP @ 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**ARTIFICIAL FILL**								
	1				SILTY CLAY: medium dark grey brown, humid to damp, stiff.								
					- dessicated, minor root hairs, porous								
	2				**SOIL**								
	3				SILTY CLAY: medium grey to olive brown, damp, stiff to hard.								
					- infrequent angular to subangular rock fragments to 3" dia.								
	4												
	5				**POSSIBLE COLLUVIUM**								
					SILTY SAND: yellowish brown, damp, stiff.								
					- fine grained, some subangular coarse grains								
	6				- massive, slightly blocky, irregular contact with soil above								
	7				- @ 4.5' Contact Attitude: **N23E/12NW**								
	8				- fractured with carbonate infilling in fracture surfaces, damp, hard, stiff, rare rock fragments, abundant carbonate								
	9				**LANDSLIDE**								
	10				SILTSTONE AND SANDSTONE: olive to light brown, damp. Hard.								
	11				- more highly weathered in upper section								
					- chaotically bedded								
	12				- increasing rock competency starting at 9'								
					- irregular areas of sandstone blocks, siltstone and fine to medium grained sand								
	13				- grey brown to olive								
	14				- @ 12' Bedding Attitude: **N59W/19SW**								
					- from 13' to 13.5' sandstone bed								
	15				- from 13.5' to 15.5' grey silstone bed								
	16												
	17				- @ 17' Bedding Attitude: **N52W/45SW**								
	18				- bedding becoming less distinct, less coherent some iron staining								
	19				- @ 19' Bedding Attitude: **N06E/09NW**								
					- siltstone and sandstone truncates, some flexure slip in beds								
	20				- bedding is slightly wavy and deformed								

DRILL HOLE 5
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 4-22-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: SEEP @ 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21												
	22												
	23				- @ 23.5' Shear Surface Attitude: **N20W/26SW**								
	24				- no striae on bed - @ 24' Bedding Attitude: **N28W/25SW**								
	25				- shear plane is subparallel to bedding, more sandy below, still thinly bedded siltstone and sandstone								
	26												
	27												
	28												
	29				- @ 29' Bedding Attitude: **N33W/33SW**								
	30												
	31				- @ 31' thinly layers of sandstone and siltstone color changes to very grey and unweathered - @ 31' Bedding Attitude: **N30W/25SW**								
	32												
	33				- some charcoal present in siltstone interlayers in fracture infilling, some clastic rock fragments, subrounded to rounded								
	34				- @ 33' changes to light olive sandstone and siltstone, moist, very poorly bedded, iron stained								
	35												
	36												
	37				- hard sandstone layer at 37', bedrock is highly fractured								
	38												
	39				- @ 39' Bedding Attitude: **N42W/17SW** on siltstone bed								
	40												

DRILL HOLE 5
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
DRILLING DATE: 4-23-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: SEEP @ 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				- grey siltstone, slide plane at 42'								
	42				- @ 42' Slide Plane Attitude: **N41E/17NW** - scraped clay sample from slide plane								
	43				**BEDROCK:CALABASAS FORMATION** SANDSTONE: tan, damp, medium stiff.								
	44				- sandstone is immediately below slide plane, fine to medium grained, poorly indurated, but very hard locally								
	45				- @ 45' Bedding Attitude: **N45E/25NW**								
	46				- @46' to 47.5' bedrock is caving								
	47				- no downhole logging below 47.5'								
	48												
	49												
	50												
	51												
	52												
	53												
	54												
	55												
	56												
	57												
	58												
	59												
	60												

DRILL HOLE 5
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
DRILLING DATE: 4-23-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 70'
DEPTH TO WATER: SEEP @ 65' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60												
	61												
	62												
	63												
	64												
	65				- seep at 65'								
	66												
	67												
	68												
	69												
	70												
	71												
	72												
	73												
	74												
	75												
	76												
	77												
	78												
	79				Total Depth = 80'								
	80				Seeps at 65' Caving at 46' to 47.5' Backfilled with drill cuttings								

DRILL HOLE 5
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 08-09-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 59'
DEPTH TO WATER: SEEP @ 45.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**CASING**								
	1				**ARTIFICIAL FILL** SILTY CLAY: medium brown, damp, stiff. - mottled in color - abundant angular to subangular rock fragments to 3" in length								
	2												
	3												
	4												
	5				CLAY: black, becoming olive gray with depth, moist, very stiff to hard. - abundant angular to subangular siltstone rock fragments to 5" in length - contact sub-horizontal and irregular, S 5° - locally fewer rock fragments - some carbonate veinlets, locally discontinuous - locally sandy, massive								
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13				- @ 13' rock fragments with no infilling, abundant clay veinlets								
	14				**ALLUVIUM** SILTY CLAY: olive gray, moist, medium stiff.								
	15				- fewer rock fragments than above								
	16				- @ 16' color change to yellowish brown, abundant siltstone rock fragments to 4" in length, angular to sub-angular, slightly mottled - minor red and yellow staining								
	17												
	18				- @ 18' fewer rock fragments, abundant carbonate veins								
	19												
	20												

DRILL HOLE 6
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: DAO
DRILLING DATE: 08-09-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 59'
DEPTH TO WATER: SEEP @ 45.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21												
	22												
	23												
	24				- @ 24' rocky layer, 6" wide								
	25												
	26				**BEDROCK: CALABASAS FORMATION** INTERLAYERED SILTSTONE AND SANDSTONE: tan sandstone, olive gray siltstone, moist, moderately hard to hard.								
	27				- thinly bedded, highly fractured								
	28				- @ 25.5' Contact Attitude: **N11W/ 22NE** - contact is rougly planar, irregular								
	29												
	30				- @ 30' Bedding Attitude: **N5E/38NW**								
	31												
	32				- @ 32' gypsum crystals in some layers								
	33												
	34												
	35				- @ 35 - 37' minor lenticular sands								
	36				- @ 36' Bedding Attitude: **N8E/38NW** - wavy bedding								
	37				- beds more plastic, softer								
	38												
	39												
	40												

DRILL HOLE 6
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
DRILLING DATE: 08-09-04
CHECKED BY: JOT

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 59'
DEPTH TO WATER: SEEP @ 45.5' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41				- @ 41' Bedding Attitude: **N5E/ 32.5NW**								
	42												
	43				- @ 43.5' wet sand layer								
	44												
	45			▽	- seep @ 45.5'								
	46				- @ 45.5' Bedding Attitude: **N6W/ 34NE**								
	47				- @ 46' color is predominately medium gray with some tan layers								
	48				- @ 47.5' color change to all gray								
	49				- wavy bedding, anastimosing beds								
	50				- @ 50' Bedding Attitude: **N35W/ 51NE**								
	51												
	52												
	53												
	54												
	55												
	56												
	57												
	58												
	59				Total Depth = 59' Seep at 45.5' No Caving								
	60												

DRILL HOLE 6
CALABASAS HOLDINGS
LAS VIRGENES ROAD
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: SEEP @ 54' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				CASING								
	1				ARTIFICIAL FILL SANDY CLAY: light tan to dark brown, soft to firm with depth, slightly moist. - few rock fragments to 2" in length - mottled in color								
	2												
	3												
	4												
	5												
	6												
	7				- color change to medium brown, no layering								
	8												
	9												
	10												
	11												
	12												
	13												
	14												
	15												
	16				- @ 16' - 17' SANDY CLAY: gray, organic rich, dips 8°N								
	17				- @ 17' SILTY CLAY: brown, rock fragments to 1" in length								
	18												
	19				- slight increase in moisture								
	20												

DRILL HOLE 7
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DRILLING DATE: 08-06-04
CHECKED BY: DAO

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: SEEP @ 54' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20												
	21												
	22												
	23				SILTY CLAY: blue gray, soft to firm, moist - dips 18°S - @ 23' - 23.5' cobbles								
	24												
	25												
	26												
	27				SANDY CLAY: medium brown, firm, slightly moist to humid, rock fragments to 1" in length								
	28												
	29												
	30												
	31												
	32												
	33												
	34												
	35												
	36				- @ 36' - 38' color change to tan								
	37												
	38				- @ 38' color change to gray brown								
	39												
	40												

DRILL HOLE 7
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LAS VIRGENES ROAD
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: SEEP @ 54' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40												
	41												
	42												
	43												
	44												
	45												
	46				- @ 46' color change to medium brown, firm, rock fragments from 1-2" in length - contact dips approximately 18°S								
	47												
	48												
	49				**BEDROCK: CALABASAS FORMATION** SANDSTONE AND SILTSTONE: tan to orange brown to gray, moist, moderately hard. - highly fractured and weathered, with some relic bedding, thin, wavy bedding - @ 49' Contact Attitude: **N10W/ 25SW** - @ 49' Relic Bedding Attitude: **N65W/ 16NE** - @ 51' rock becomes less weathered - @ 53' red rust colored, beds approximately 1/2 - 3/4" thick, bedded, discontinuous layers - @ 54' Bedding Attitude: **N15W/ 25NE** - @ 54' Slight Seep								
	50												
	51												
	52												
	53												
	54												
	55												
	56				- @ 56' Shear Attitude: **N55W/ 24NE** - shear zone approximately 1/4" thick on bedding plane, no offset, beds polished, thin gouge (<1mm thick) - folded section below 56'								
	57												
	58												
	59												
	60												

DRILL HOLE 7
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 75'
DEPTH TO WATER: SEEP @ 54' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	60				- @ 59' Bedding Attitude: **N55W/ 24SW**								
	61				- @ 61' Bedding Attitude: **N12W/ 90**								
	62				- @ 63' Bedding Attitude: **N20W/ 80SW**								
	63				- @ 63' color change to blue gray								
	64												
	65												
	66												
	67												
	68				- @ 68' Bedding Attitude: **E-W/ 45S**								
	69				- @ 69' Bedding Attitude: **N10E/ 24NW**								
	70												
	71												
	72												
	73												
	74												
	75				Total Depth = 75' Slight Seep 54' No Caving								
	76												
	77												
	78												
	79												
	80												

DRILL HOLE 7
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: DAO
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PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

TOTAL DEPTH: 60'
DEPTH TO WATER: 56' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	0				**ALLUVIUM/POSSIBLE FILL** CLAYEY SILT: gray, dry, medium stiff. - some angualr to subangulr siltstone rock fragments to 12" in length - slightly porous								
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
	13												
	14				- @ 13.5' color change to brown and more moist								
	15				- @ 15' SILTY CLAY: dark olive brown, moist, stiff - abundant angular rock fragments, more abundant red staining								
	16												
	17												
	18												
	19												
	20												

DRILL HOLE 8
CALABASAS HOLDINGS
LAS VIRGENES ROAD
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LOGGED BY: DAO
DRILLING DATE: 08-05-04
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DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

TOTAL DEPTH: 60'
DEPTH TO WATER: 56' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	20				- continuing SILTY CLAY: dark olive brown, very stiff to hard, moist with abundant rock fragments								
	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30				- continuing SILTY CLAY: olive brown, stiff, moist, non-porous, abundant angular to sub-rounded rock fragments to 1' in length, some red staining								
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												

DRILL HOLE 8
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LOGGED BY: DAO
DRILLING DATE: 08-05-04
CHECKED BY: JOT

DRILLING METHOD: BUCKET AUGER WITH DOWNHOLE SAMPLER
DRILLED BY: ROY BROTHERS DRILLING
BACKFILLED WITH: NATIVE SOIL

PROJECT NO.: 1344.20
LOCATION: LAS VIRGENES

TOTAL DEPTH: 60'
DEPTH TO WATER: 56' AFTER: N/A

Elevation	Depth	Sample	Graphic Symbol	USCS	MATERIAL DESCRIPTION	Penetration Rate/Foot	Dry Density (PCF)	Water Content (%)	Liquid Limit (%)	Plastic Index (%)	Passing #200 Sieve (%)	Shear Strength	Other
	40				- color change to medium brown, moist, medium stiff, abundant siltstone rock fragments to 1/2" length								
	41												
	42												
	43												
	44												
	45												
	46												
	47												
	48												
	49												
	50				- color change to brown, moist, stiff, abundant angular to sub-rounded siltstone rock fragments to 2" length								
	51												
	52												
	53												
	54												
	55												
	56				- @ 56' Groundwater								
	57												
	58				**BEDROCK: CALABASAS FORMATION** SILTSTONE: tan, very hard.								
	59				Total Depth = 60' Groundwater @ 56' No Caving								
	60												

DRILL HOLE 8
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
0						12/1/2003	Started Drilling with Punch Core Bit
1							**1' 0" Soil**
2				83%			SILTY CLAY; dark brown, firm
3							
4							
5	5						
6							**5'6" Interlayered**
7				68%			SILTSTONE AND SANDSTONE; med to light brown, orange, and gray, thinly bedded, bedding planar
8							- @ 7' 3" Bedding Angle: 30°
9							
10	10				12:30 PM		**Siltstone**
11				67%	5		med to light brown, orange, and gray, thinly bedded
					12:35 PM		- @ 11' 2" Bedding Angle: 30°
							Changed to Conventional Core Bit
12	12				1:07 PM		**10' 8" Siltstone**
13							medium to light brown, orange, and gray, wavy bedding
14				17%	9		- bedding warps from 45° to 70°
15							
16					1:16 PM		**16' 8" Sandstone**
							light brown to light gray, medium grained
17	17				1:29 PM		
18							
19				44%	17		
20							- @ 20' 3" Fracture Angle: 62°

DRILL HOLE CH-A
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DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
20							
21					1:46 PM		- @ 21' 5" Bedding Angle: 45°
22	22				1:59 PM		
23							
24				27%	4		**25' 8"Sandstone** light gray, medium grained, hard, cemented - iron staining
25							**26' 0" Siltstone** light brown, orange, and gray, moderately firm to firm, thinly bedded
26					2:03 PM		- @ 26' 11" Bedding Angle: 42°
27	27				2:15 PM		
28							
29				13%	12		
30							
31					2:27 PM		- @ 31' 8" Bedding Angle: 49°
32	32				2:30 PM		
33							
34				8%	28		
35							**36' 7" Sandstone** light gray, medium grained, hard, cemented
36					2:58 PM		Remove all Pipe to Retrieve Stuck Sample
37	37				3:54 PM		
38							**37' 1" Siltstone** light brown, orange, and gray, thinly bedded
39				100%	9		- @ 39' 6" Bedding Angle: 31°
40							

DRILL HOLE CH-A
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CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
40							**Siltstone cont'd**
41					4:03 PM		- @ 40' 8" Bedding Angle: 34°
42	42				7:45 AM	12/2/2003	
43							
44				38%	9		
45							- @ 45' 5.5" Bedding Angle: 59°
46					7:54 AM		- @ 46' 3.5" Bedding Angle: 49°
47	47				8:08 AM		
48							
49				57%	9		- @ 49' 9" Bedding Angle: 44°
50							- @ 50' 2" Bedding Angle: 40°
51					8:17 AM		- @ 51' 0.5" Bedding Angle: 50° - @ 51' 7" Bedding Angle: 44°
52	52				8:27 AM		
53							**54' 0" Siltstone** light brown, orange, and gray, firm, wavy bedding
54				60%	11		- bedding warps 45° to 54°
55							- @ 55' 1" Bedding Angle: 70° - @ 55' 4.5" Bedding Angle: 45° - @ 55' 6" Bedding Angle: 54°
56					8:38 AM		- @ 56' 1.5" Bedding Angle: 76°
57	57				8:53 AM		
58							
59				38%	7		
60							- @ 60' 8.5" Bedding Angle: 79°

DRILL HOLE CH-A
CALABASAS HOLDINGS
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LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
40							**Siltstone cont'd**
41					4:03 PM		- @ 40' 8" Bedding Angle: 34°
42	42				7:45 AM	12/2/2003	
43							
44				38%	9		
45							- @ 45' 5.5" Bedding Angle: 59°
46					7:54 AM		- @ 46' 3.5" Bedding Angle: 49°
47	47				8:08 AM		
48							
49				57%	9		- @ 49' 9" Bedding Angle: 44°
50							- @ 50' 2" Bedding Angle: 40°
51					8:17 AM		- @ 51' 0.5" Bedding Angle: 50° - @ 51' 7" Bedding Angle: 44°
52	52				8:27 AM		
53							**54' 0" Siltstone** light brown, orange, and gray, firm, wavy bedding
54				60%	11		- bedding warps 45° to 54° - @ 55' 1" Bedding Angle: 70°
55							- @ 55' 4.5" Bedding Angle: 45° - @ 55' 6" Bedding Angle: 54°
56					8:38 AM		- @ 56' 1.5" Bedding Angle: 76°
57	57				8:53 AM		
58							
59				38%	7		
60							- @ 60' 8.5" Bedding Angle: 79°

DRILL HOLE CH-A
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LAS VIRGENES ROAD
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DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
60							**Siltstone cont'd**
61					9:00 AM		- @ 61' 8.5" Bedding Angle: 52°
62	62				9:11 AM		
63							
64				38%	12		**65' 1.5" Siltstone**
65							- gradual color change to medium gray and light brown, firm, thinly bedded
66					9:23 AM		- @ 65' 7" Bedding Angle: 50° - @ 66' 2" Fracture Angle: 60° - @ 66' 4" Bedding Angle: 49° - @ 66' 9" Fracture Angle: 58° with 1/4" offset
67	67				9:35 AM		
68							
69				58%	9		
70							- @ 70' 3.5" Bedding Angle: 35° - @ 70' 11.5" Bedding Angle: 55°
71					9:44 AM		- @ 71' 5.5" Bedding Angle: 38°
72	72				9:59 AM		
73							
74				46%	6		**74' 11.5" Siltstone**
75							medium gray, firm, thinly bedded - @ 75' 0" Bedding Angle: 40° - @ 75' 11" Fracture Angle: 34°
76					10:05 AM		- @ 76' 8.5" Bedding Angle: 76°
77	77				10:23 AM		
78							- @ 78' 11.5" Bedding Angle: 65°
79				70%	12		- @ 79' 5.5" Fracture Angle: 11°
80							

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
80							**Siltstone cont'd**
81							- @ 80' 4.5" Bedding Angle: 65°
					10:35 AM		
82	82				10:47 AM		
83							
84				41%	6		
85							- @ 85' 11" Bedding Angle: 53°
86							- @ 86' 1.5" Bedding Angle: 59°
					10:53 AM		Stopped to Fix Snagged Cable
87	87				1:41 PM		
88							
89				46%	6		**89' 8.5" Siltstone with Clay**
90							medium gray, very firm, thinly bedded
91							- @ 91' 4.5" Bedding Angle: 45°
					1:47 PM		
92	92				1:55 PM		
93							
94				32%	27		
95							**95' 5" Sandstone**
96							light gray, medium grained, hard, cemented
					2:22 PM		- @ 95' 8" Bedding Angle: 43°
97	97				2:36 PM		
98							
99				44%	7		**99' 9.5" Siltstone withClay**
100							medium to dark gray, moderately firm, thinly bedded

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
100							**Siltstone cont'd**
101					2:43 PM		- @ 101' 0.5" Bedding Angle: 50°
102	102				2:53 PM		
103							
104				18%	13		
105							
106					3:06 PM		- @ 106' 8.5" Bedding Angle: 57°
107	107				3:16 PM		
108							
109				48%	11		
110							- @ 110' 2" Bedding Angle: 65° - @ 110' 7" Bedding Angle: 64°
111					3:27 PM		
112	112				3:38 PM		
113							
114				37%	8		
115							- @ 115' 5.5" Bedding Angle: 74°
116					3:46 PM		- @ 116' 5.5" Bedding Angle: 75°
117	117				3:57 PM		
118							**118' 2" Sandstone** light gray, medium to coarse grained, firm, uncemented
119				77%	13		**118' 5.5" Siltstone** light to medium gray, firm, thinly bedded
120							- @ 119' 11.5" Bedding Angle: 60°

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
120							**120' 5" Sandstone**
121					4:10 PM		light gray, medium grained, hard, cemented
122	122				4:16 PM		
123							
124				26%	15		
125							
126					4:31 PM		- @ 126' 3.5" Fracture Angle: 10°
							126'2" - 126'6" - %PASSING 200: 30.5, PL: 19, LL: 40, PI: 21
127	127				8:27 AM	12/3/2003	**126' 7.5" Siltstone with Clay**
128							dark gray, moderately firm
129				23%	6		
130							
131					8:33 AM		
132	132				8:44 AM		
133							
134				5%	27		
135							
136					9:11 AM		**136' 9" Sandstone**
							light gray, medium grained, uncemented
137	137				9:25 AM		
138							
139				46%	25		**139' 8.5" Siltstone**
140							light to medium gray, firm, thinly bedded

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
140							**Siltstone cont'd**
141					9:50 AM		- @ 140' 2.5" Bedding Angle: 41° - @ 140' 6.5" Bedding Angle: 52° -@ 141' 10" Bedding Angle: 40°
142	142				10:01 AM		
143							
144				44%	17		
145							- @ 145' 1" Bedding Angle: 43°
146					10:18 AM		- @ 146' 1" Bedding Angle: 59°
147	147				10:32 AM		**147' 4" Interlayered** SILTSTONE AND SANDSTONE; medium to dark gray, firm, thinly bedded siltstone, medium to dark gary, medium grained, uncemented sandstone
148							
149				58%	12		- @ 147' 11.5" Fracture Angle: 10° - @ 149' 2.5" Contact Angle: 69° - @ 149' 6" Bedding Angle; 68°
150							
151					10:44 AM		- @ 150' 5" Fracture Angle: 0°
152	152				10:55 AM		
153							
154				75%	11		
155							**156' 4" Interlayered** SANDSTONE AND SILTSTONE; light to medium gray, firm, thinly bedded siltstone, light to medium gray, fine to medium grained, uncemented sandstone
156					11:06 AM		
157	157				11:24 AM		Sample Stuck, pulled up pipe to retrieve
158							
159				35%	29		
160							**160' 3" Sandstone** light to medium gray, medium grained, uncemented

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
160							**Sandstone cont'd**
161							- @ 160' 10.5" Fracture Angle: 30°
					11:53 AM		Stopped to Fix Snagged Cable
162	162				2:38 PM		- @ 162' 0" Bedding Angle: 48°
163							
164				33%	15		
165							**165' 3" Siltstone**
							light to medium gray, firm, thinly bedded
166							- @ 165' 8" Bedding Angle: 45°
					2:53 PM		- @ 166' 6" Bedding Angle: 49°
167	167				3:23 PM		- @ 167' 6" Slickensides
168							- @ 168' 6.5" Bedding Angle: 56°
169				53%	9		- @ 169' 5" Bedding Angle: 49°
170							- @ 170' 8" Bedding Angle: 42°
171							- @ 171' 4" Bedding Angle: 44°
					3:32 PM		Rig Broken Down
172	172				11:40 AM	12/4/2003	
173							
174				0%	5		- @ 174' 0" Bedding Angle: 70°
175							
176							
					11:45 AM		
177	177				12:05 PM		
178							- @ 178' 7" Bedding Angle: 41°
179				0%	11		- @ 179' 2" Bedding Angle: 47°
180							**180' 0" No Recovery**

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
180							**No Recovery cont'd**
181					12:16 PM		
182	182				12:33 PM		**No Recovery**
183							
184				0%	3		
185							
186					12:36 PM		
187	187				12:51 PM		**No Recovery**
188							Switch to Punch Core Bit
189				0%	7		
190							
191					12:58 PM		
192	192				1:16 PM	12/5/2003	Attempted to Drill with Punch Core Bit Attempted to Drill with Inner Barrel Backed Off 1/2" Drilling Unsuccessful, Switched to Conventional Core Bit
193							**193' 10.5" Sandstone** medium gray, medium grained, uncemented
194				63%	13		
195							
196					1:29 PM		
197	197				1:47 PM		
198							**198' 1" Siltstone** medium gray, firm, wavy bedding - microfold @ 200' 7" - @ 198' 9.5" Bedding Angle: 70° - @ 199' 5" Bedding Angle: 80°
199				78%	10		
200							

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
200							**Siltstone cont'd**
201					1:57 PM		- @ 201' 1" Bedding Angle: 50°
202	202				2:47 PM		
203							
204				43%	19		**204' 10" Siltstone**
205							medium gray, firm, thinly bedded
206					3:06 PM		- @ 206' 3.5" Bedding Angle: 53°
207	207				3:31 PM		
208							
209				42%	14		
210							- @ 210' 5.5" Bedding Angle: 51°
211					3:45 PM		
212	212				4:03 PM		
213							
214				44%	8		- @ 214' 10" Bedding Angle: 59°
215							- @ 215' 10.5" Bedding Angle: 60°
216					4:11 PM		
217	217				7:45 AM	12/8/2003	
218							
219				43%	6		
220							- @ 220' 5.5" Bedding Angle: 54°

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO
DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
220							**Siltstone cont'd**
221					7:51 AM		
222	222				8:20 AM		
223							
224				20%	6		
225							
226					8:26 AM		**226' 0" Interlayered** SILTSTONE AND SANDSTONE; medium gray, firm, wavy bedding, medium gray, coarse grained, firm, uncemented sandstone
227	227				8:45 AM		
228							
229				15%	7		
230							
231					8:52 AM		**231' 3" Siltstone** medium gray, firm, thinly bedded - @ 231' 6" Bedding Angle: 80°
232	232				9:09 AM		**No Recovery**
233							
234				0%	2		
235							
236					9:11 AM		
237	237				9:31 AM		
238							
239				51%	7		**239' 5.5" Interlayered** SILTSTONE AND SANDSTONE; light gray, firm, thinly bedded siltstone, light gay, medium to coarse grained, uncemented sandstone
240							

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
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CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
240							**Interlayered cont'd**
241					9:38 AM		- @ 240' 0.5" Bedding Angle: 30° - @ 241' 1" Bedding Angle: 31°
242	242				10:00 AM		
243							
244				33%	6		
245							- @ 245' 9" Bedding Angle: 59°
246					10:06 AM		- @ 246' 4.5" Bedding Angle: 55°
247	247				10:28 AM		
248							
249				48%	12		**249' 7" Siltstone** light to medium gray, firm, thinly bedded
250							- @ 249' 11" Bedding Angle: 67°
251					10:40 AM		- @ 251' 0" Bedding Angle: 60° - @ 251' 0.5" Fracture Angle: 70°
252	252				11:03 AM		
253							
254				18%	38		
255							
256					11:41 AM		- @ 256' 4" Bedding Angle: 71°
257	257				12:40 PM		
258							
259				40%	26		
260							- @260' 4" Bedding Angle: 36°

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
260							**Siltstone cont'd**
261					1:06 PM		- @ 261' 4.5" Fracture Angle: 60°
262	262				1:31 PM		
263							**263' 0" Sandstone**
264				77%	32		medium gray, medium grained, firm, uncemebted - @ 263' 4.5" Fracture Angle: 50° - @ 263' 5" Bedding Angle: 44°
265							**263' 6.5" Siltstone**
266					2:03 PM		light to medium gray, firm, thinly bedded - @ 263' 11" Bedding Angle: 56° - @ 265' 8" Bedding Angle: 58°
267	267				2:32 PM		
268							
269				63%	30		- @ 269' 3.5" Bedding Angle: 36°
270							- @ 270' 4.5" Bedding Angle: 48° - @ 270' 8.5" Contact Angle: 60°
271					3:02 PM		
272	272				7:55 AM	12/9/2003	
273							**272' 11" Sandstone** medium gray, fine to medium grained, uncemented, poorly defined bedding - @ 274' 4" Fracture Angle: 17°
274				82%	39		**274' 6" Siltstone** medium to light gray, firm, thinly bedded
275							- possible slikensides on siltstone - @ 274' 7" Bedding Angle: 58°
276					8:34 AM		- @ 275' 7" Bedding Angle: 55° - @ 276' 7" Bedding Angle: 44°
277	277				8:56 AM		
278				97%	54		- @ 277' 11" Bedding Angle: 65° - @ 278' 8" Bedding Angle: 64°
279					9:50 AM		Down for Bit, Circulation, and Water
280	279.5			0%	10:06 AM 16		**No Recovery**

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
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CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
280							**No Recovery cont'd**
281					10:22 AM		
282	282				10:36 AM		
283							
284				50%	34		**284' 6" Interlayered** SILTSTONE AND SANDSTONE; medium gray, firm, thinly bedded siltstone, medium gray, medium to fine grained, uncemented sandstone - @ 285' 0" Bedding Angle: 51° - @ 285' 5" Bedding Angle: 53°
285							
286					12:10 PM		- @ 285' 10" Bedding Angle: 56
287	287				12:28 PM		
288							
289				67%	24		- @ 289' 7" Bedding Angle: 58°
290							- @ 290' 7" Bedding Angle: 58°
291					12:52 PM		
292	292				1:00 PM		**292' 2" Siltstone** medium gray, firm, thinly bedded - @ 292' 11" small, 2" thick sandstone interval - @ 292' 10" Bedding Angle: 56°
293							
294				97%	19		- @ 294' 1" Bedding Angle: 60°
295							- @ 295' 10" Bedding Angle: 53°
296					1:19 PM		
297	297				1:24 PM		**297' 1" Interlayered** SILTSTONE AND SANDSTONE; medium gray, firm, thinly bedded siltstone, medium gray, fine grained, uncemented sandstone - fractures with minor displacement
298							
299				98%	20		- @ 297' 9" Fracture Angle: 67° - @ 297' 11" Bedding Angle: 46°
300							- @ 299' 1" Bedding Angle: 49°

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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DRILLING DATE: 12-01-03 through 12-09-03
CHECKED BY: JOT

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

TOTAL DEPTH: 302'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
300							**Interlayered cont'd**
301							- @ 300' 9" Bedding Angle 52°
302	302				1:44 PM		Total Depth = 302'
303							No Caving
304							
305							
306							
307							
308							
309							
310							
311							
312							
313							
314							
315							
316							
317							
318							
319							
320							

DRILL HOLE CH-A
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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CH-A

Depth: 31' - 70'

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Depth: 70' - 112'

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CH-A

Depth: 112' - 157'

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Depth: 157' - 180'

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Depth: 202' - 263'

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Depth: 263' - 292.5'

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CH-A

Depth: 292.5' 302'

MESSENGER INVESTMENT SITE

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FEATURE ORIENTATIONS

CLIENT: RJR ENGINEERING
PROJECT: Acoustic Televiewer Survey
BOREHOLE ID: CH-A

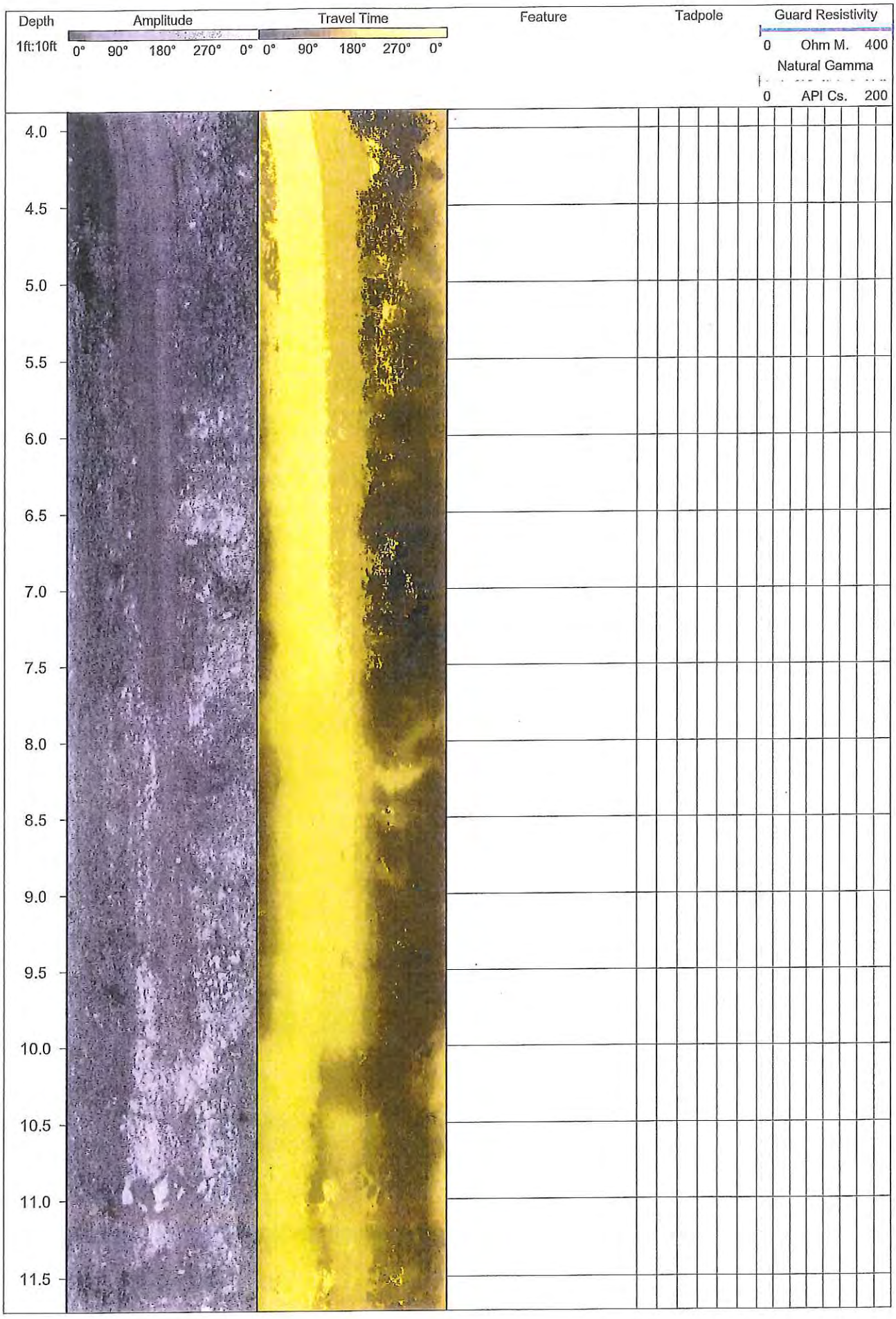
Depth, ft	Azimuth, degrees (a)	Dip, degrees (b)	Depth, ft	Azimuth, degrees (a)	Dip, degrees (b)
19.0	264	58	142.2	36	62
20.1	258	49	142.7	34	53
32.1	322	34	148.4	31	71
46.9	76	57	150.3	47	73
71.2	257	53	150.6	32	71
79.0	70	77	158.9	24	76
102.1	273	60	160.0	33	71
109.0	257	73	167.7	260	63
122.2	282	60	168.9	263	54
135.2	16	45	169.2	253	51
135.8	7	47	169.5	279	51
137.3	39	60	193.8	282	56
137.7	29	64	213.7	286	67
138.0	28	58	225.0	287	66
138.7	42	67	238.9	282	63
139.1	30	60	247.0	280	61
140.6	34	66	275.2	278	56
141.7	24	53	282.2	289	46

(a) Azimuth is expressed in degrees and is the angle from north to east (i.e., clockwise).

(b) Dip is expressed in degrees. 0° means a horizontal feature and 90° is a vertical feature.

BOREHOLE GEOPHYSICS & HYDROPHYSICS
COLOG
A DIVISION OF LAYNE CHRISTENSEN COMPANY

11001 Etiwanda Avenue
Fontana, CA 92337
909-390-2833 909-390-6097 FAX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Travel Time
0° 90° 180° 270° 0°
Feature
Tadpole
Guard Resistivity
0 Ohm M. 400
Natural Gamma
0 API Cs. 200
4.0
4.5
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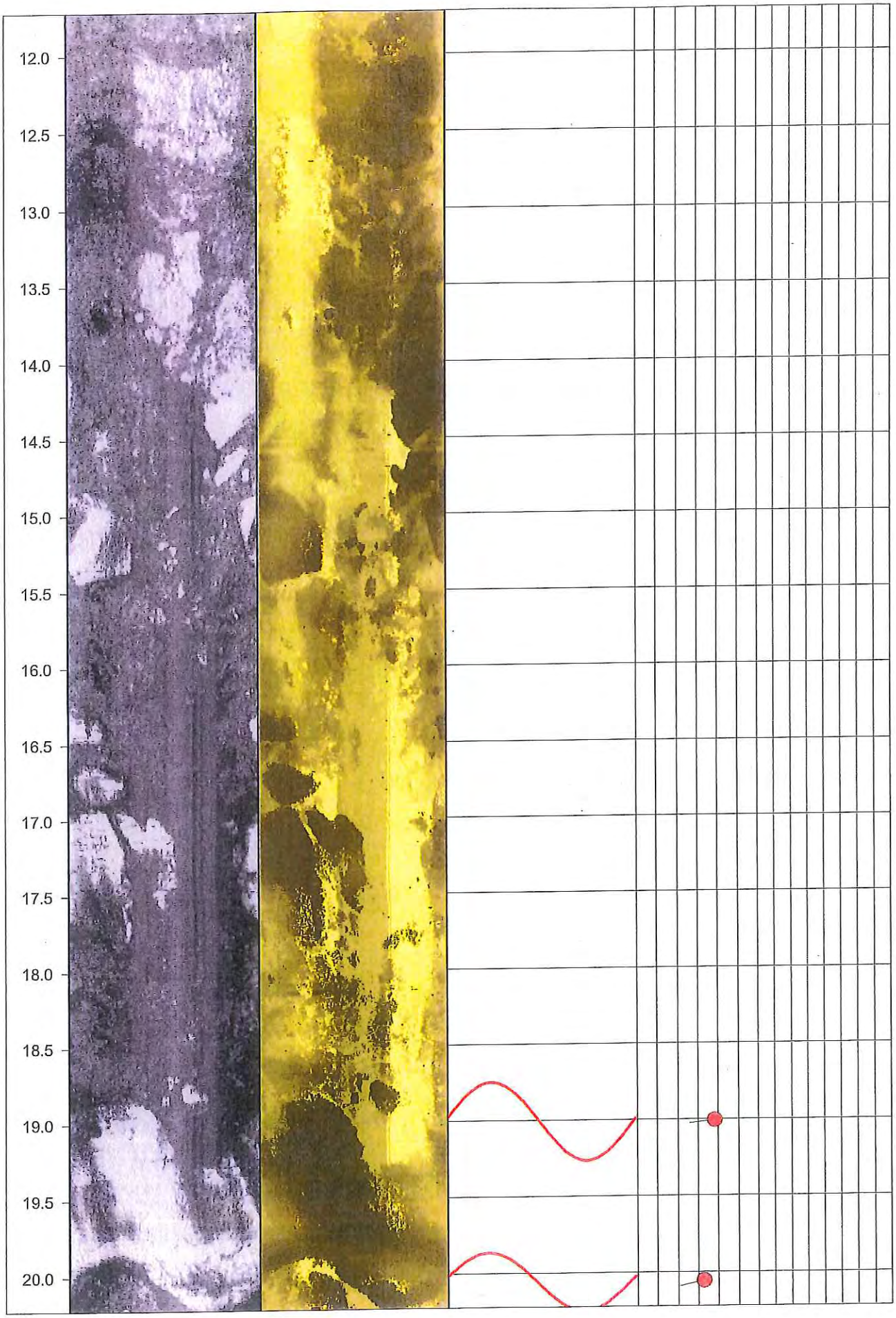
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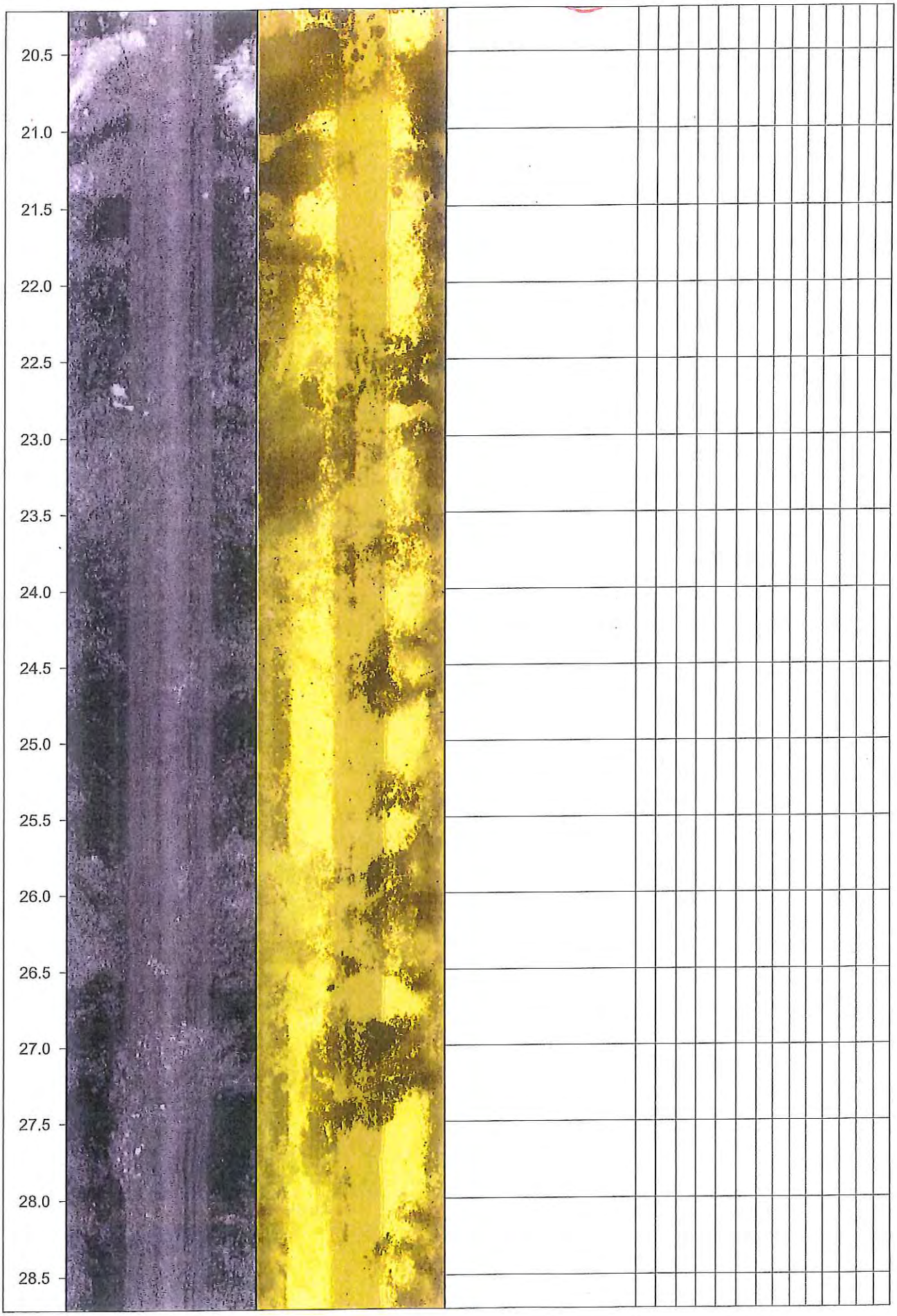
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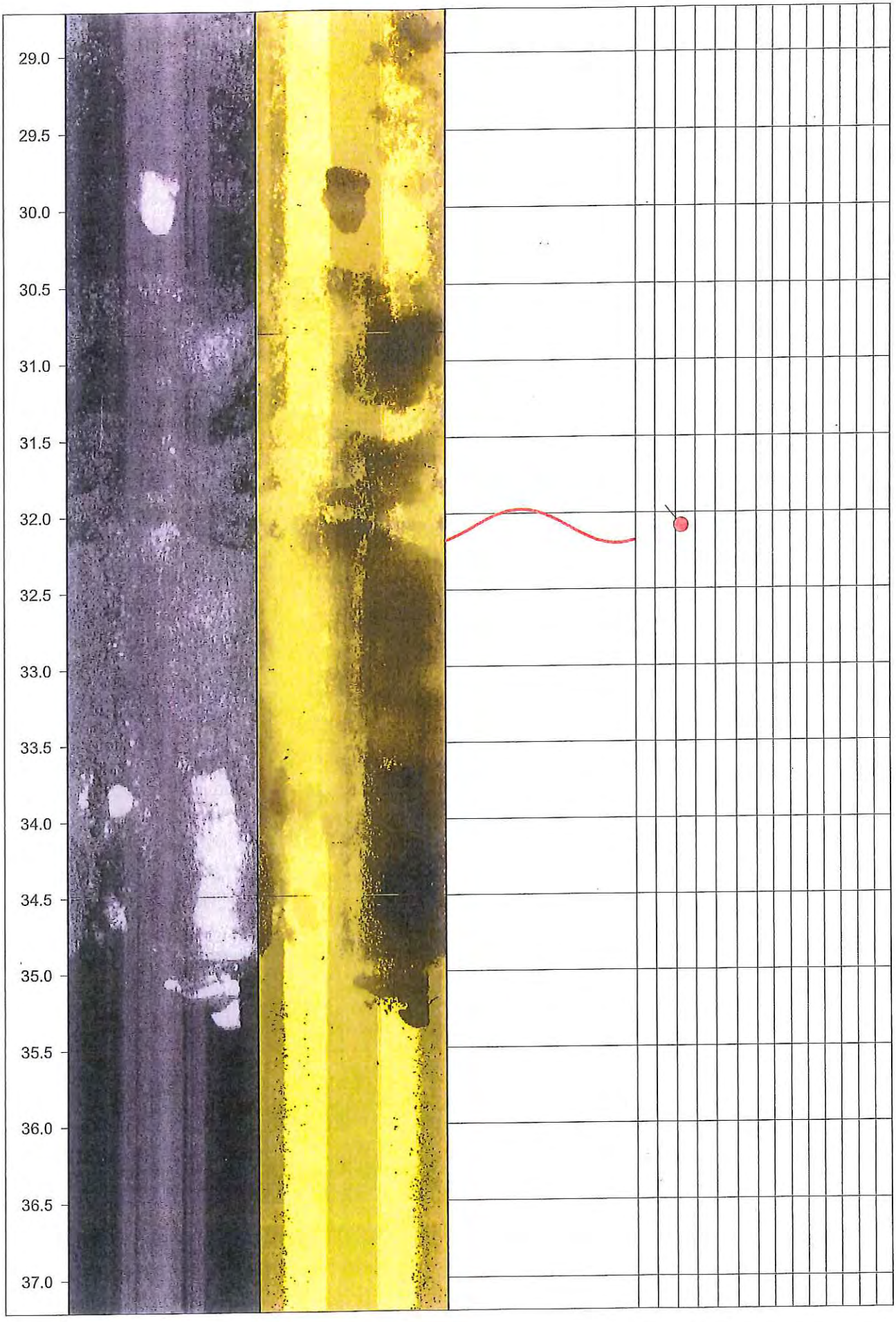
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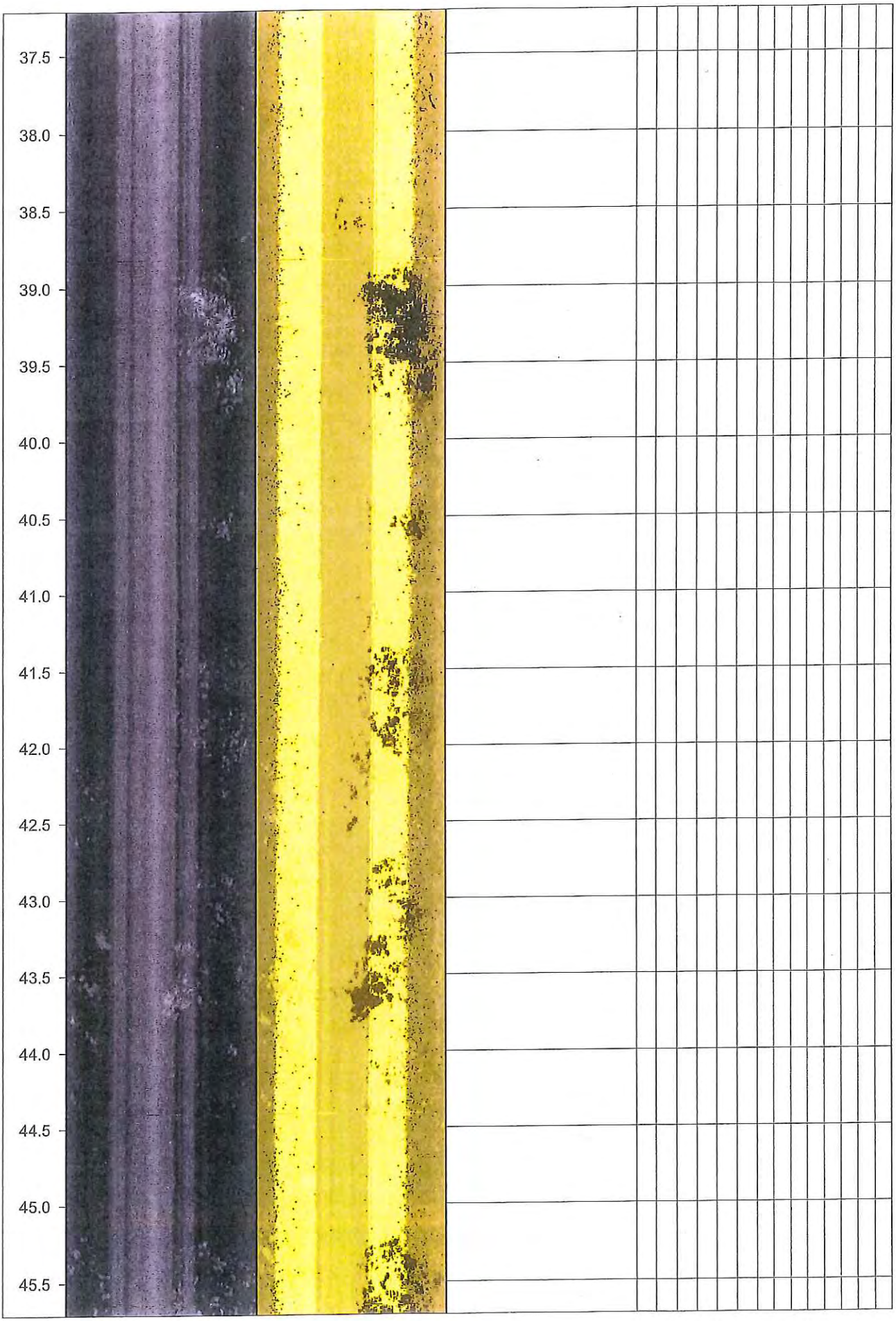
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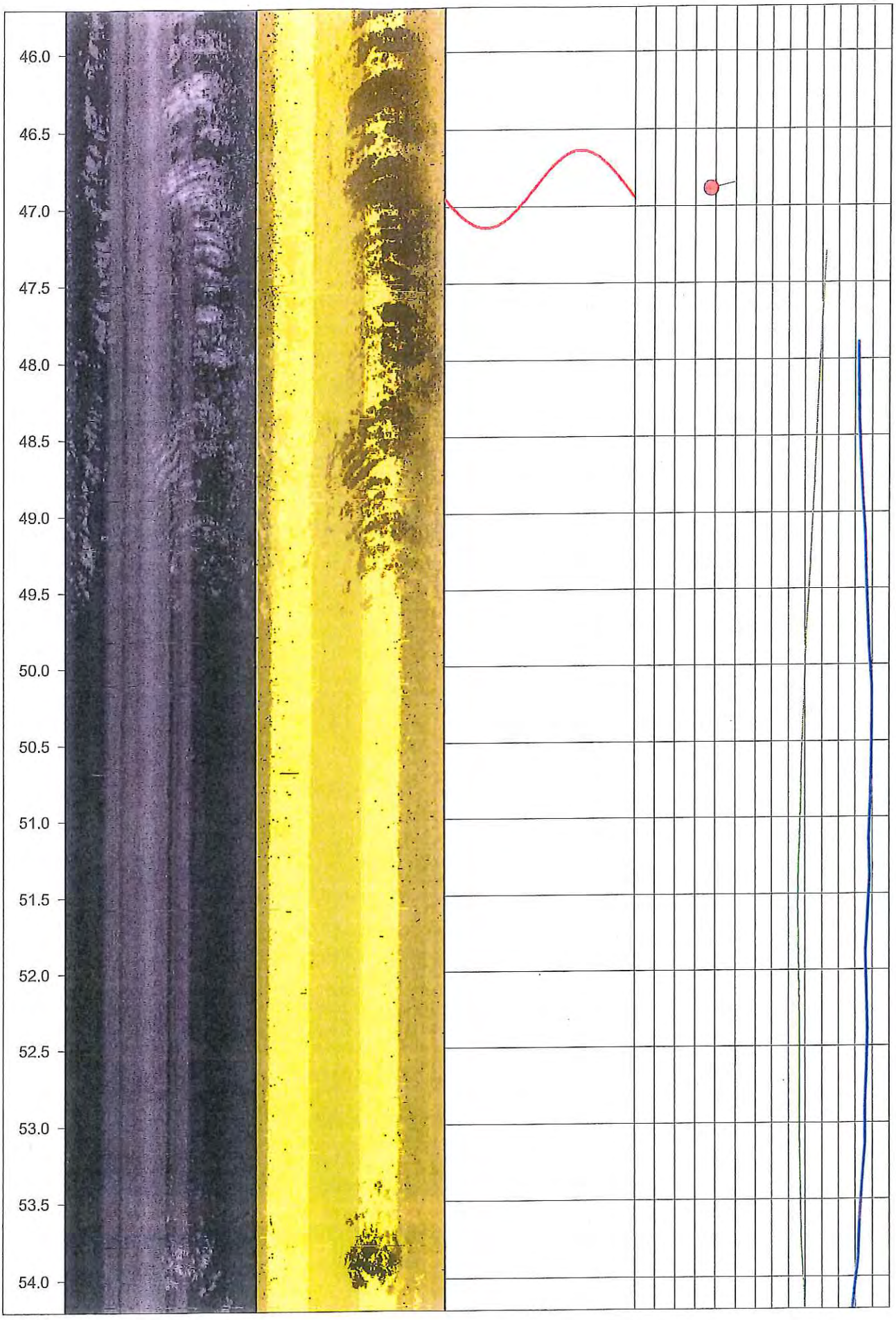
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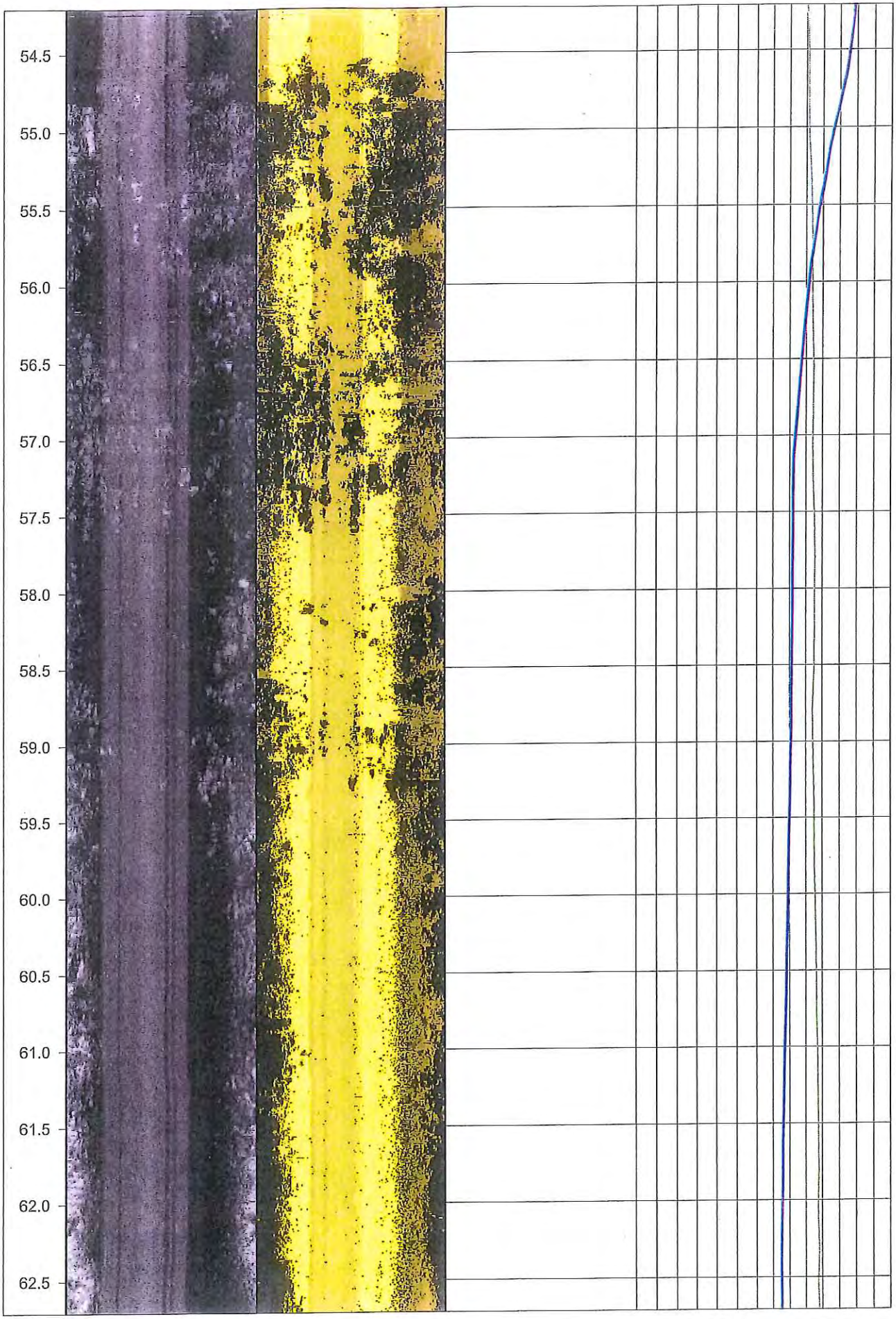
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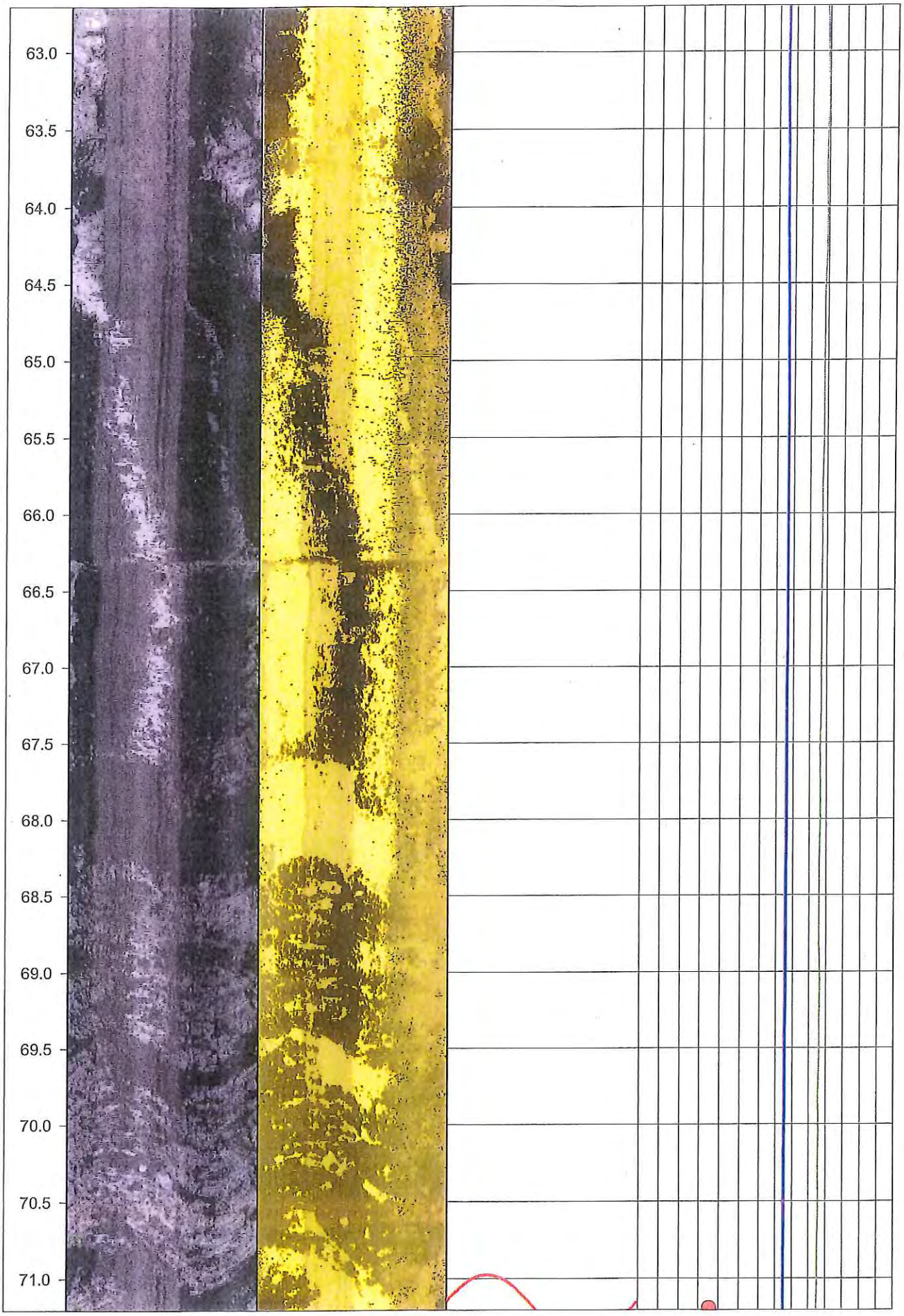
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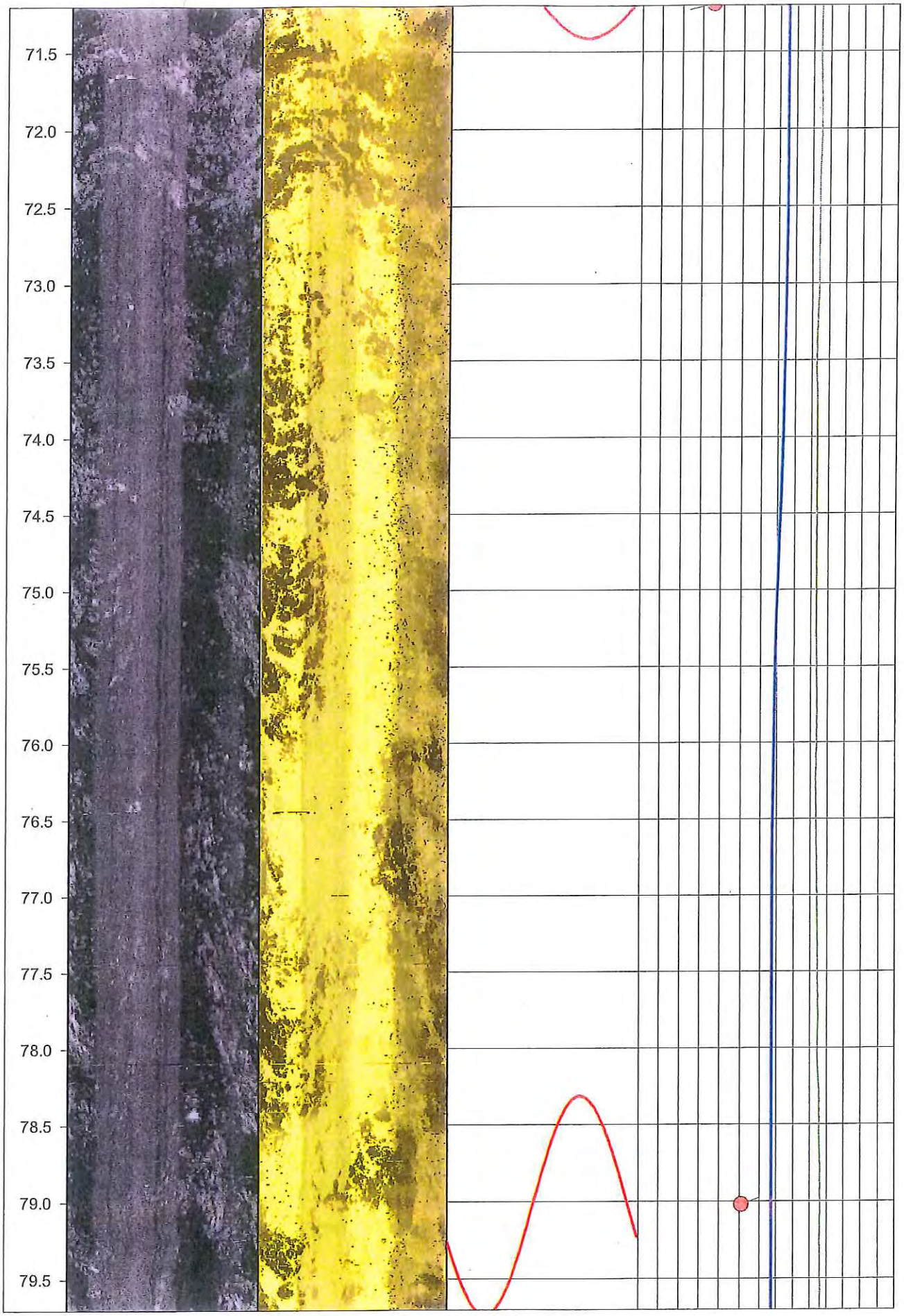
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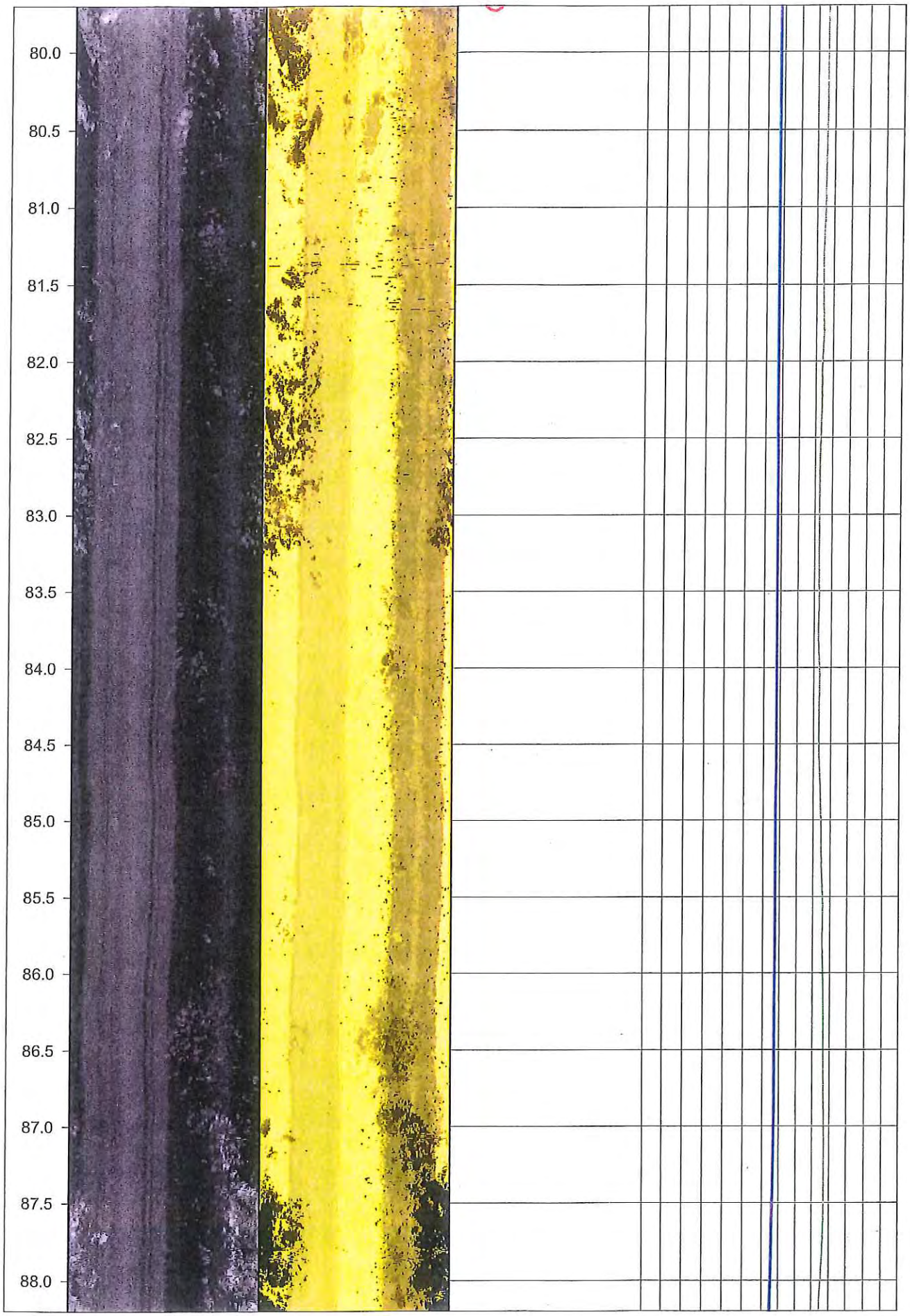
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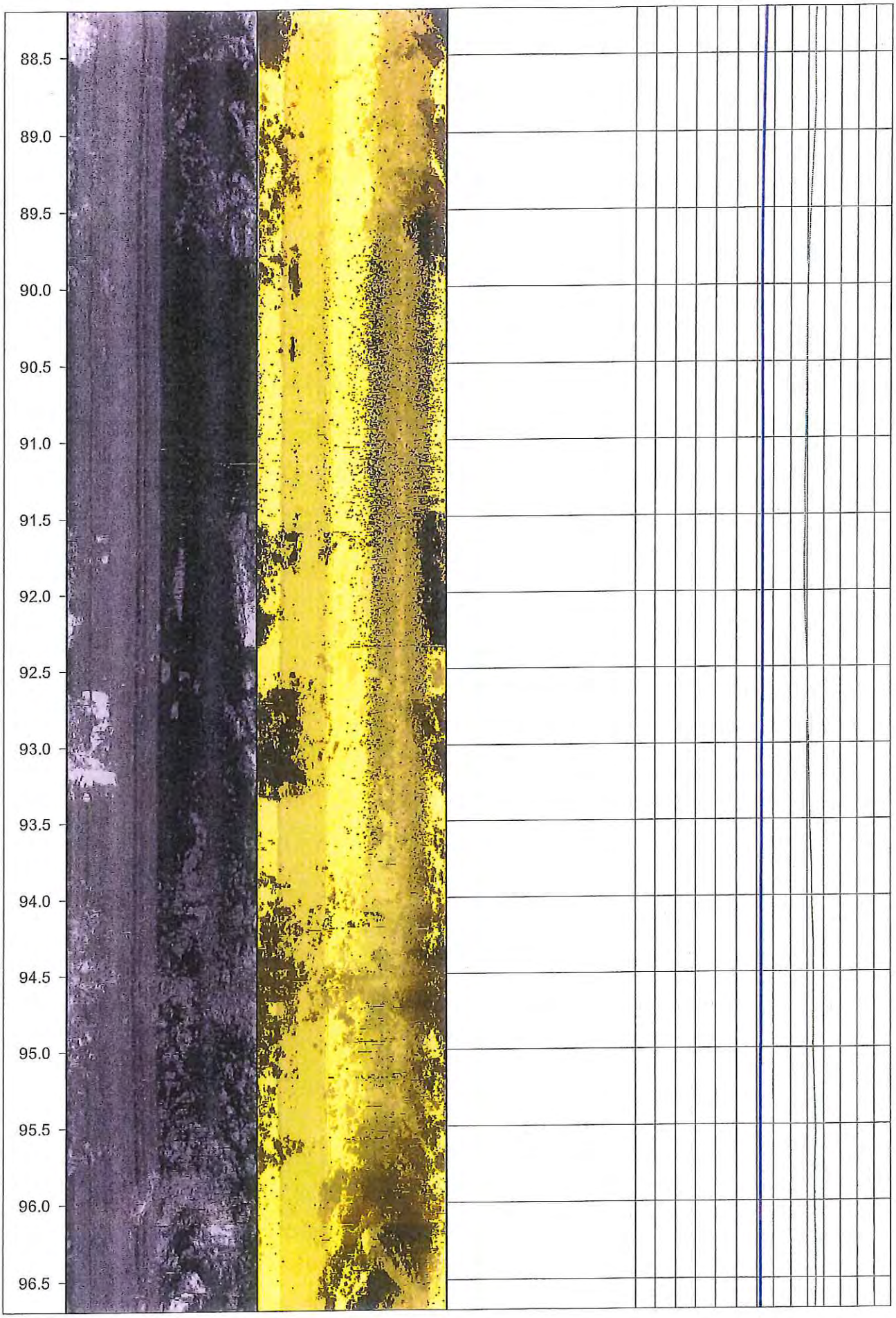
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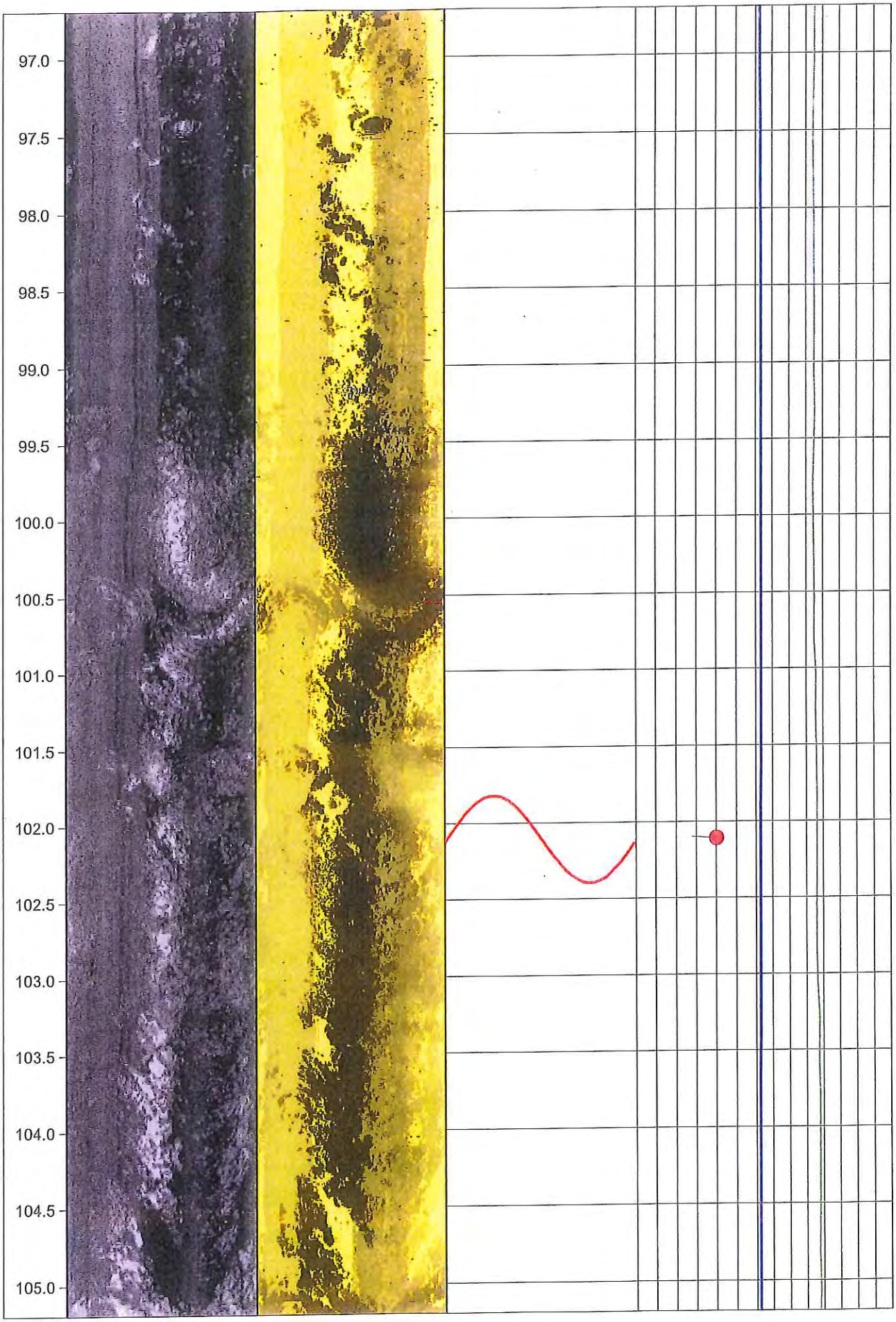
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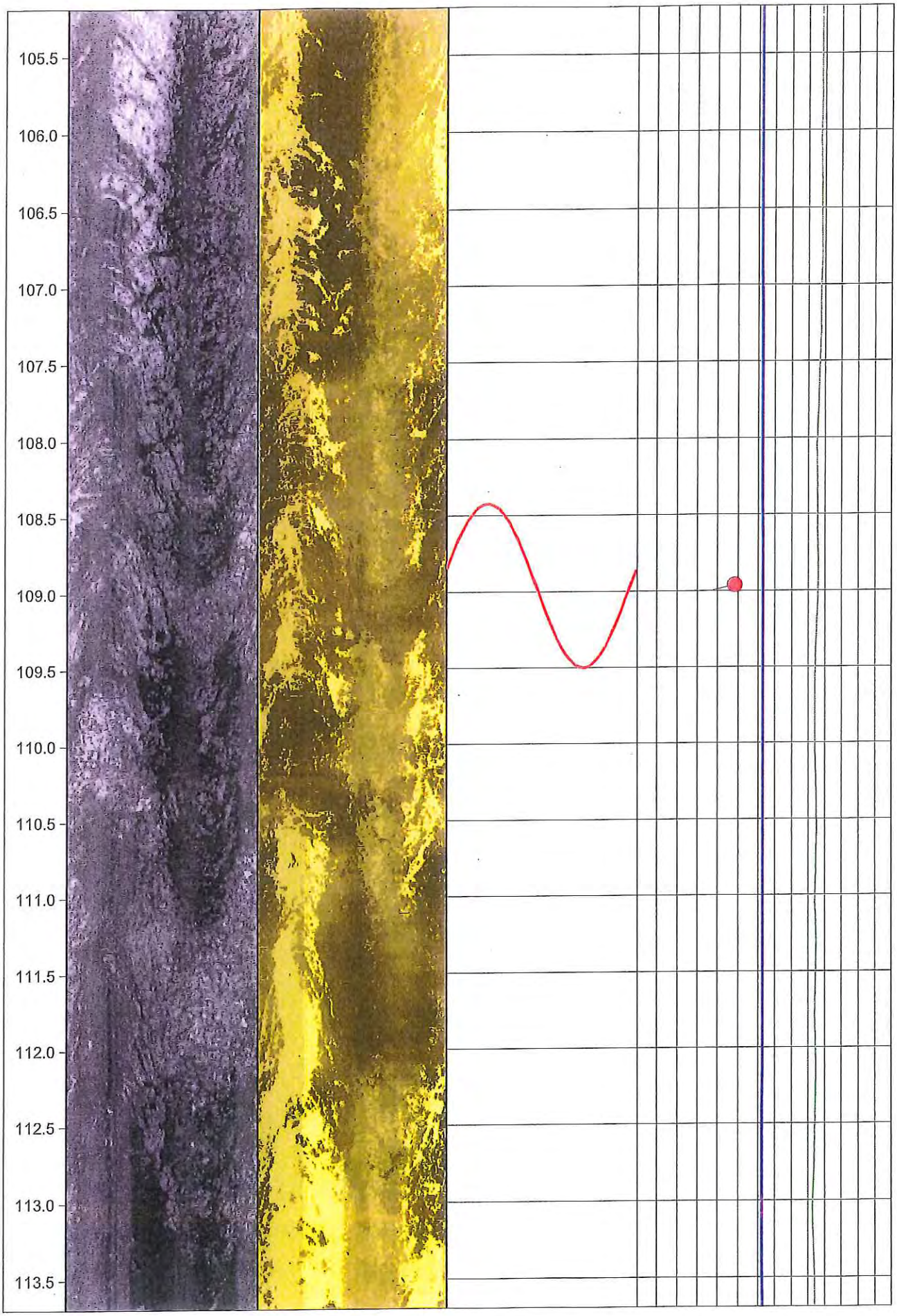
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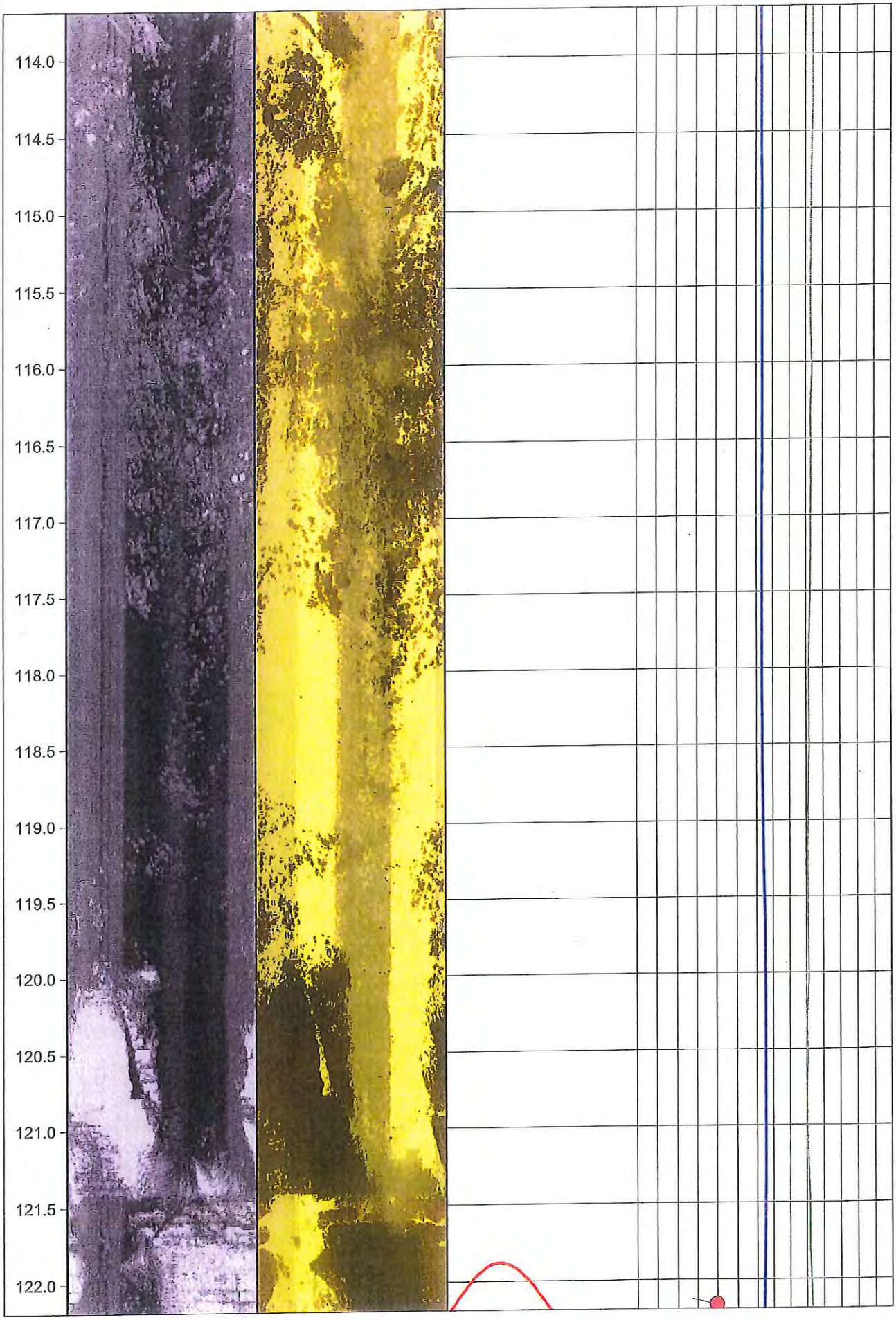
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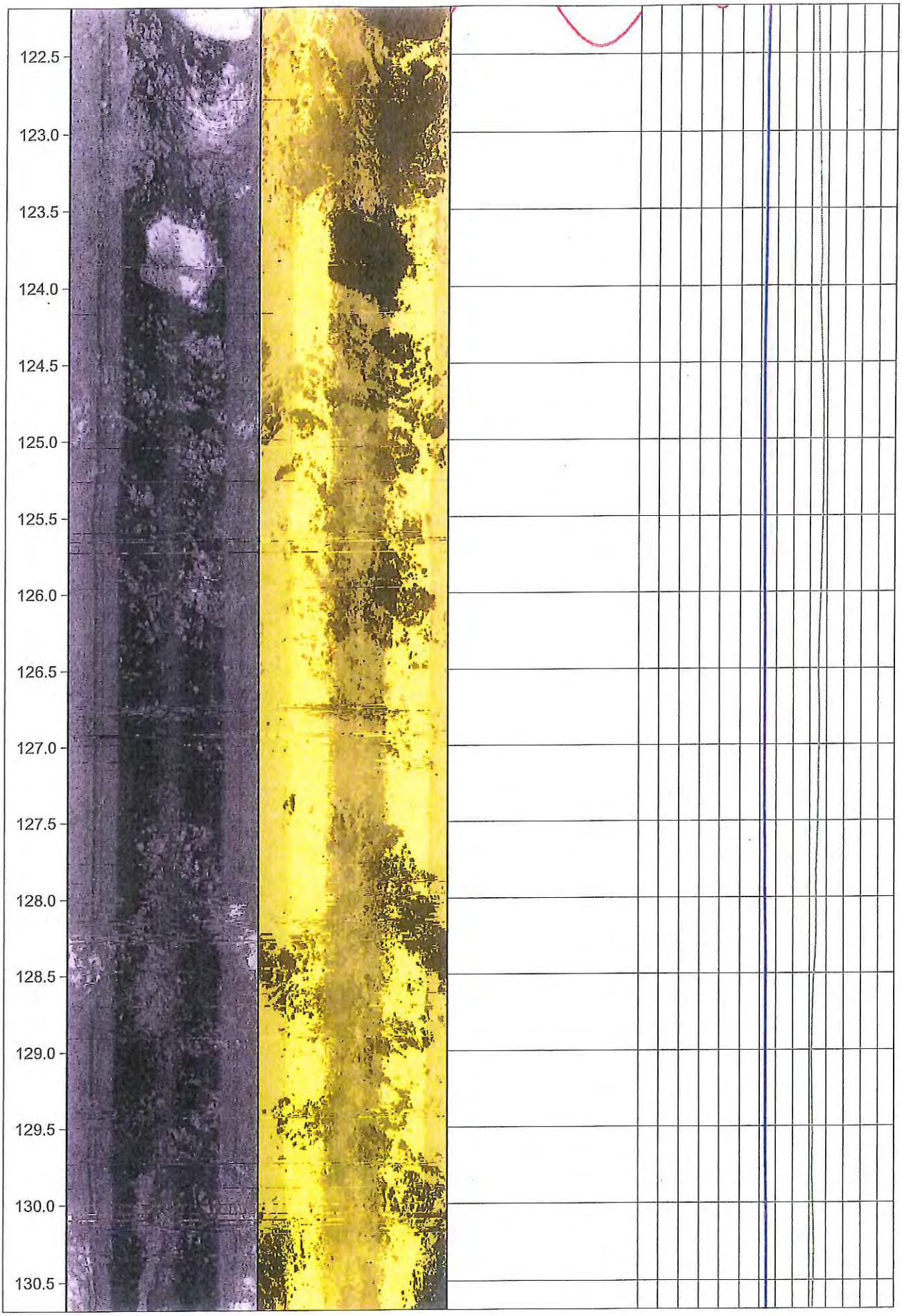
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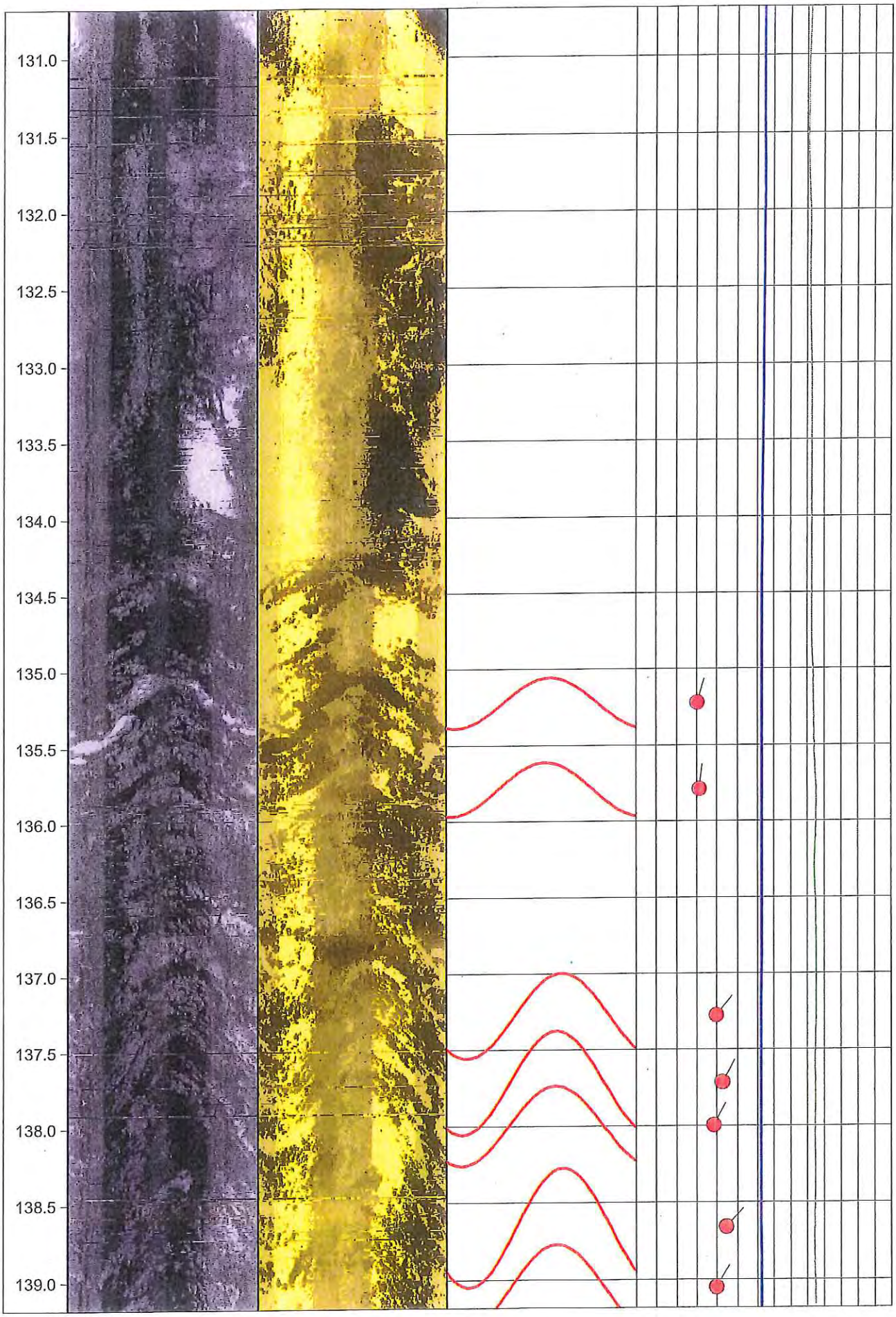
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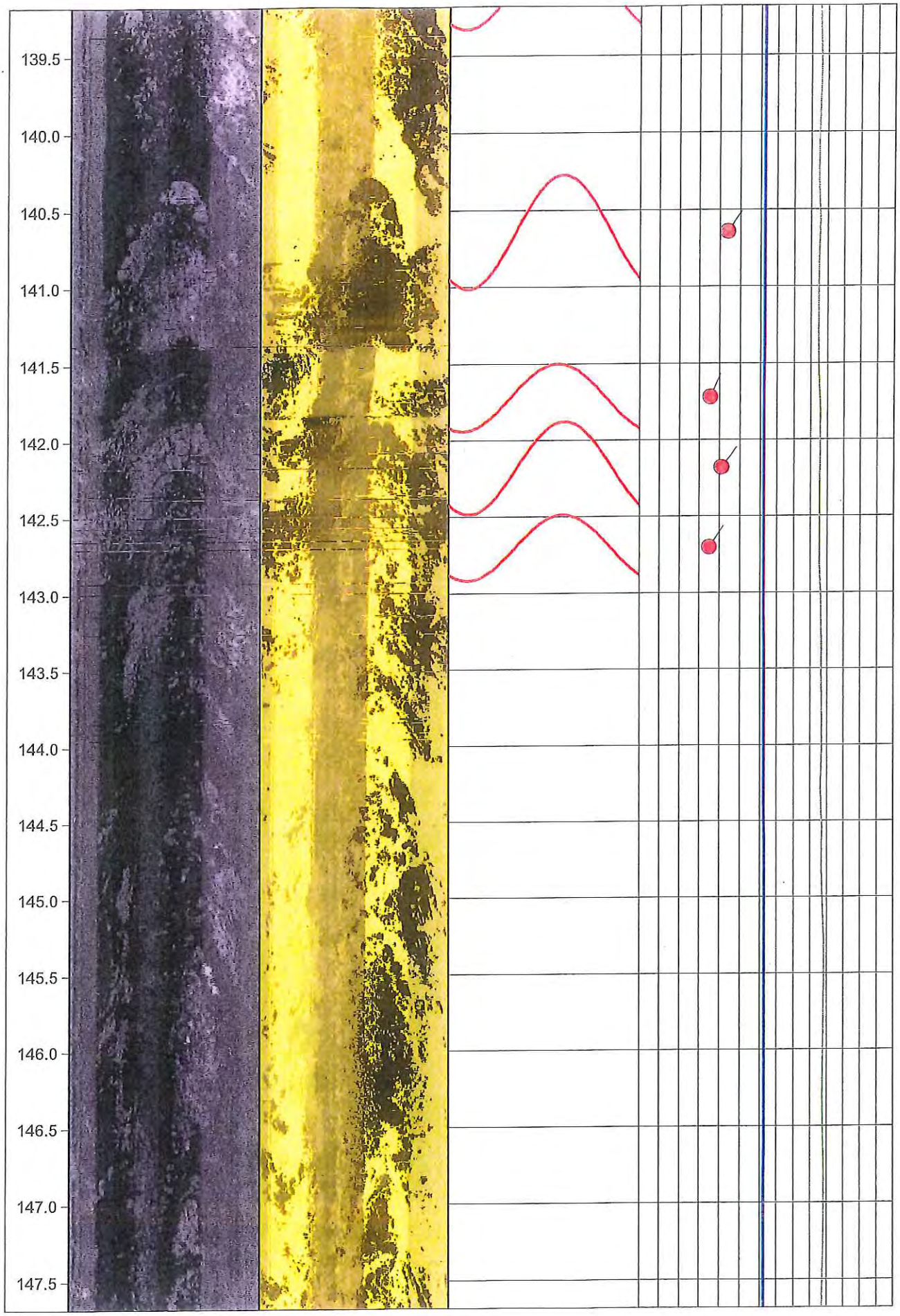
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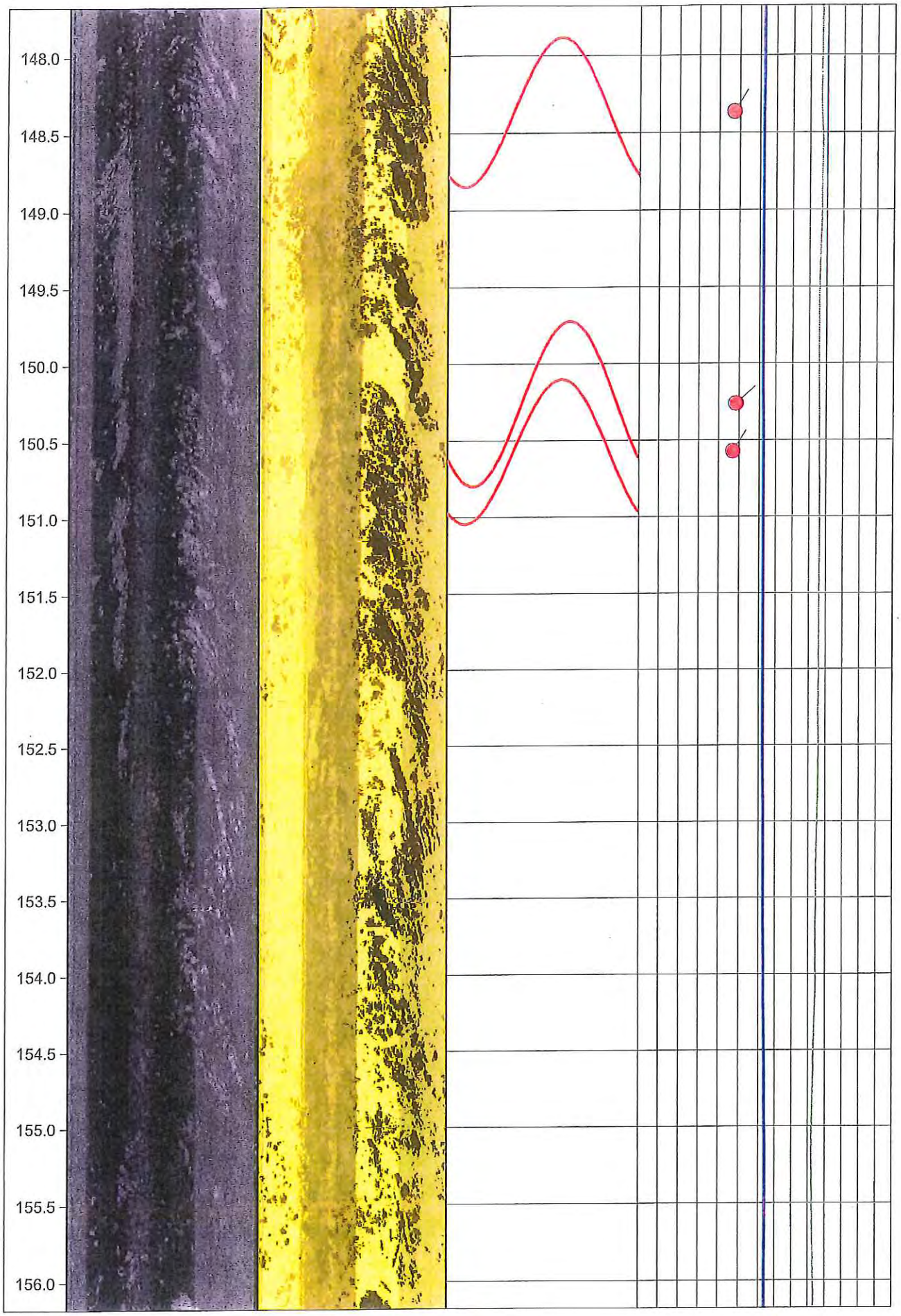
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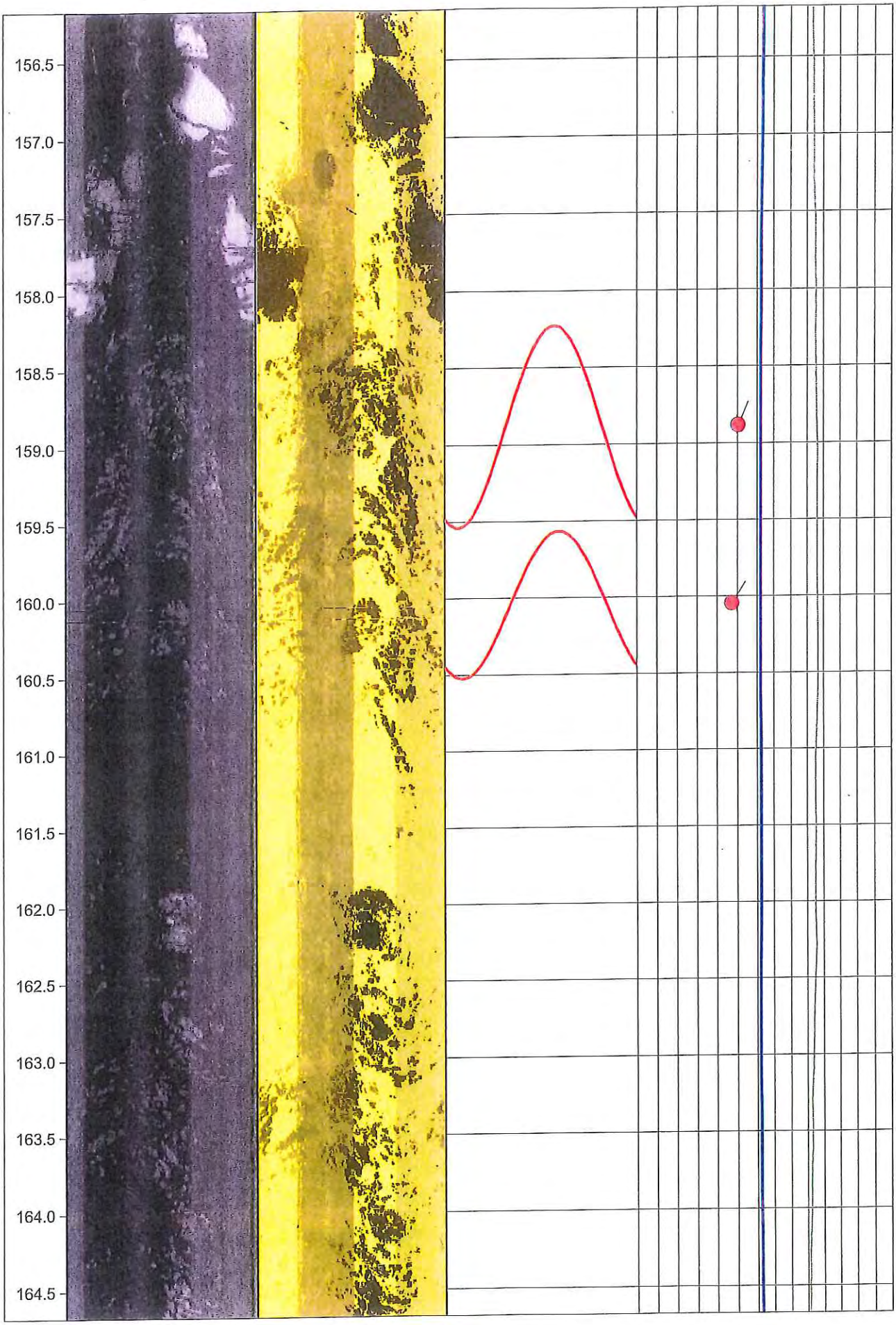
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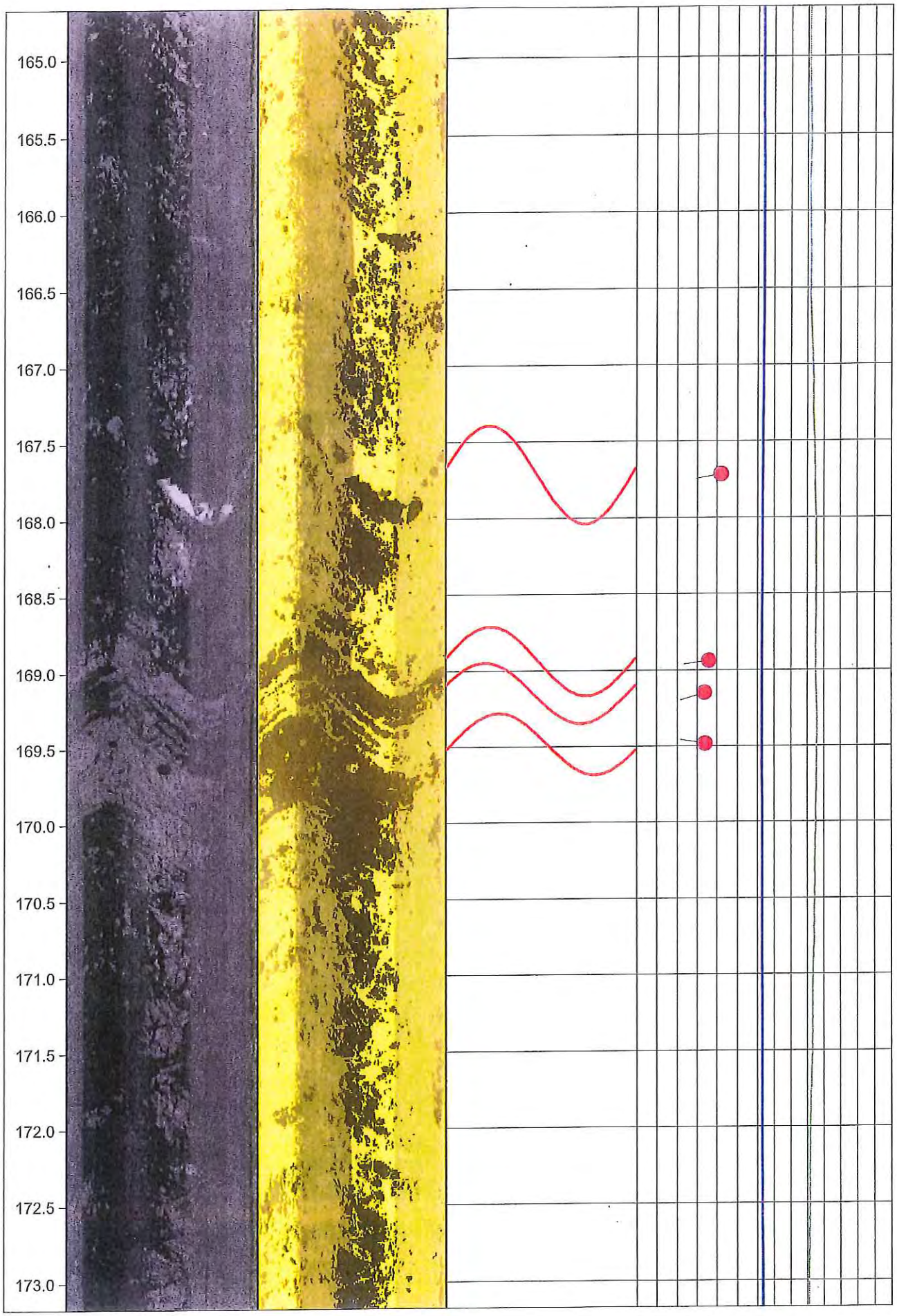
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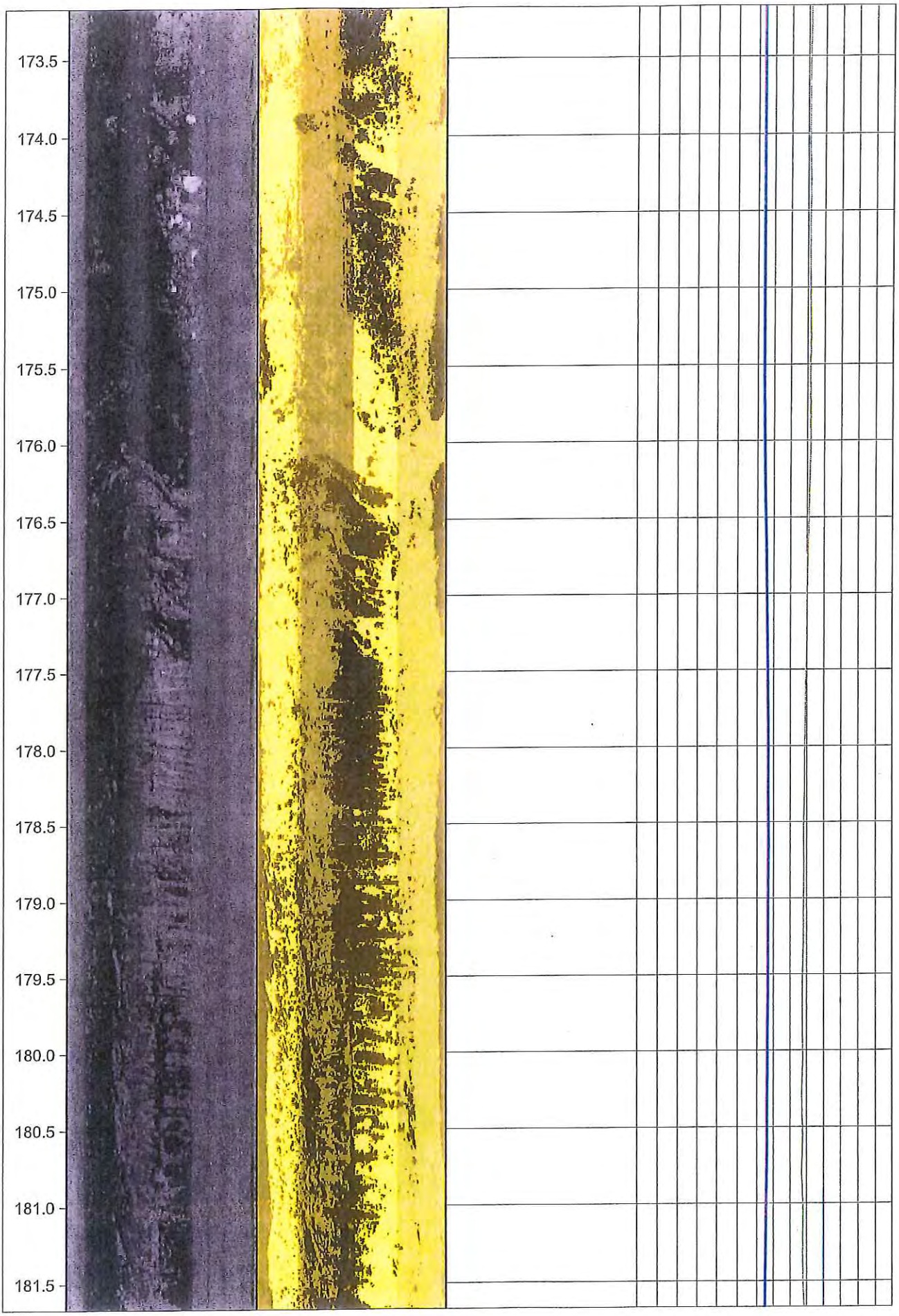
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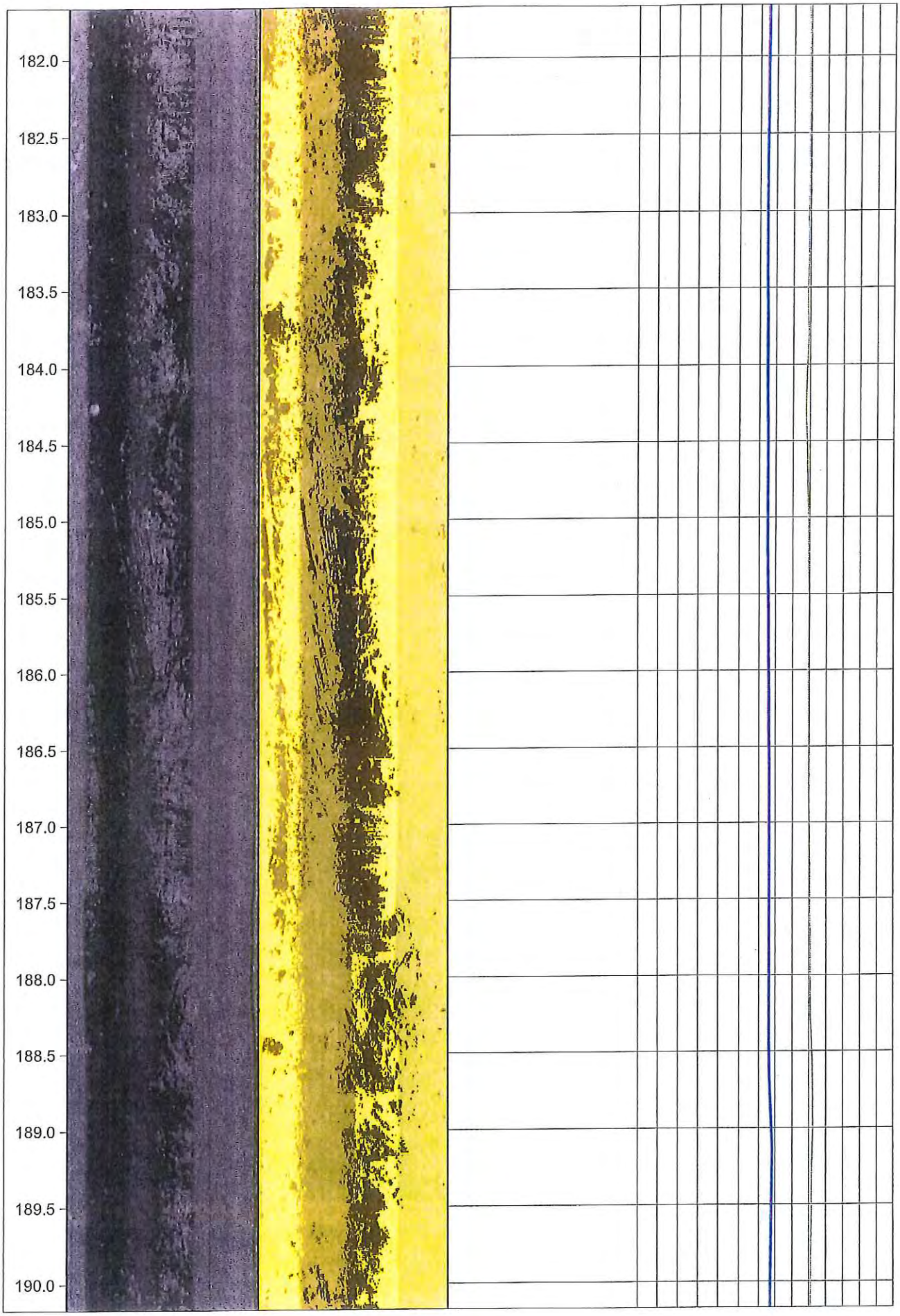
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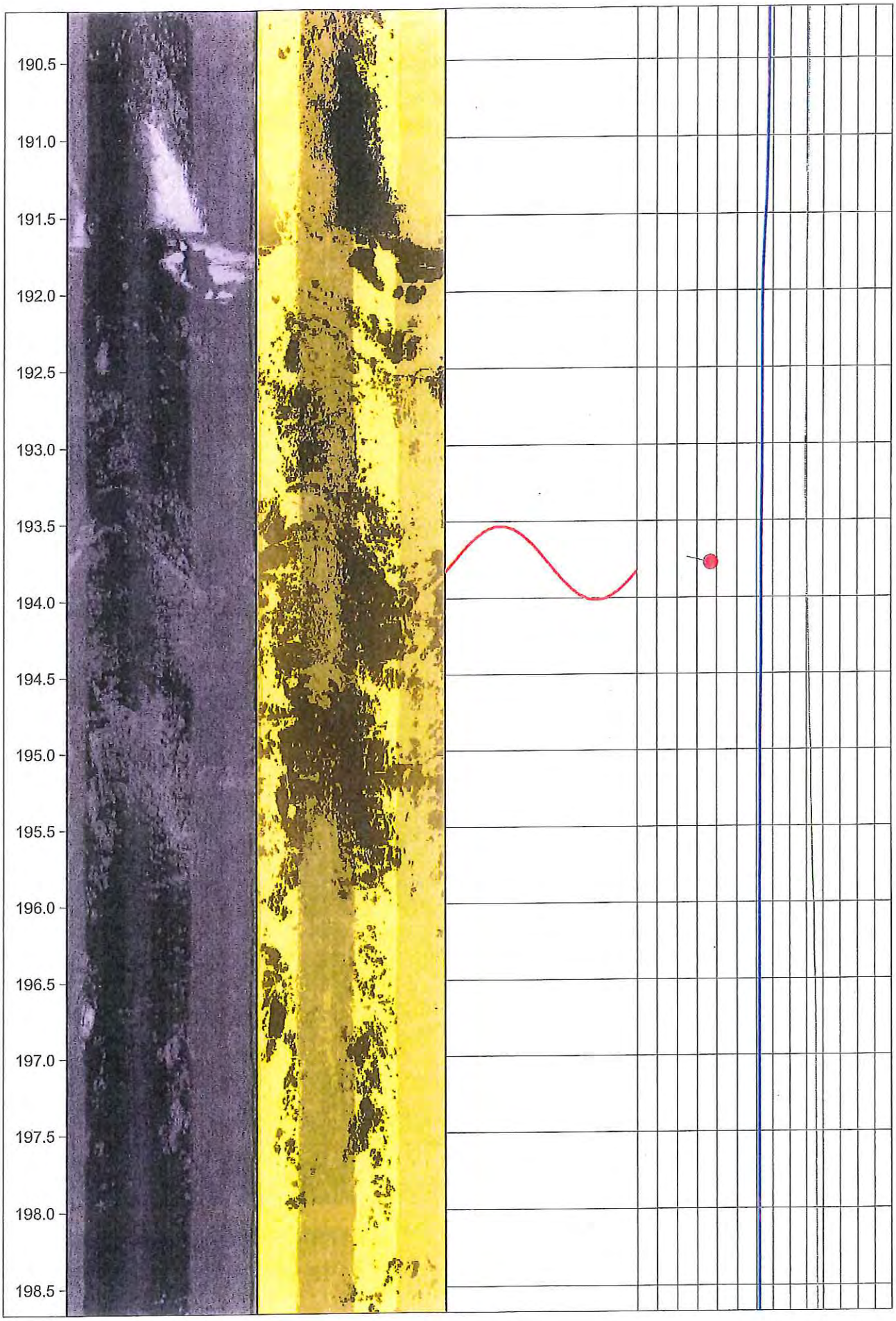
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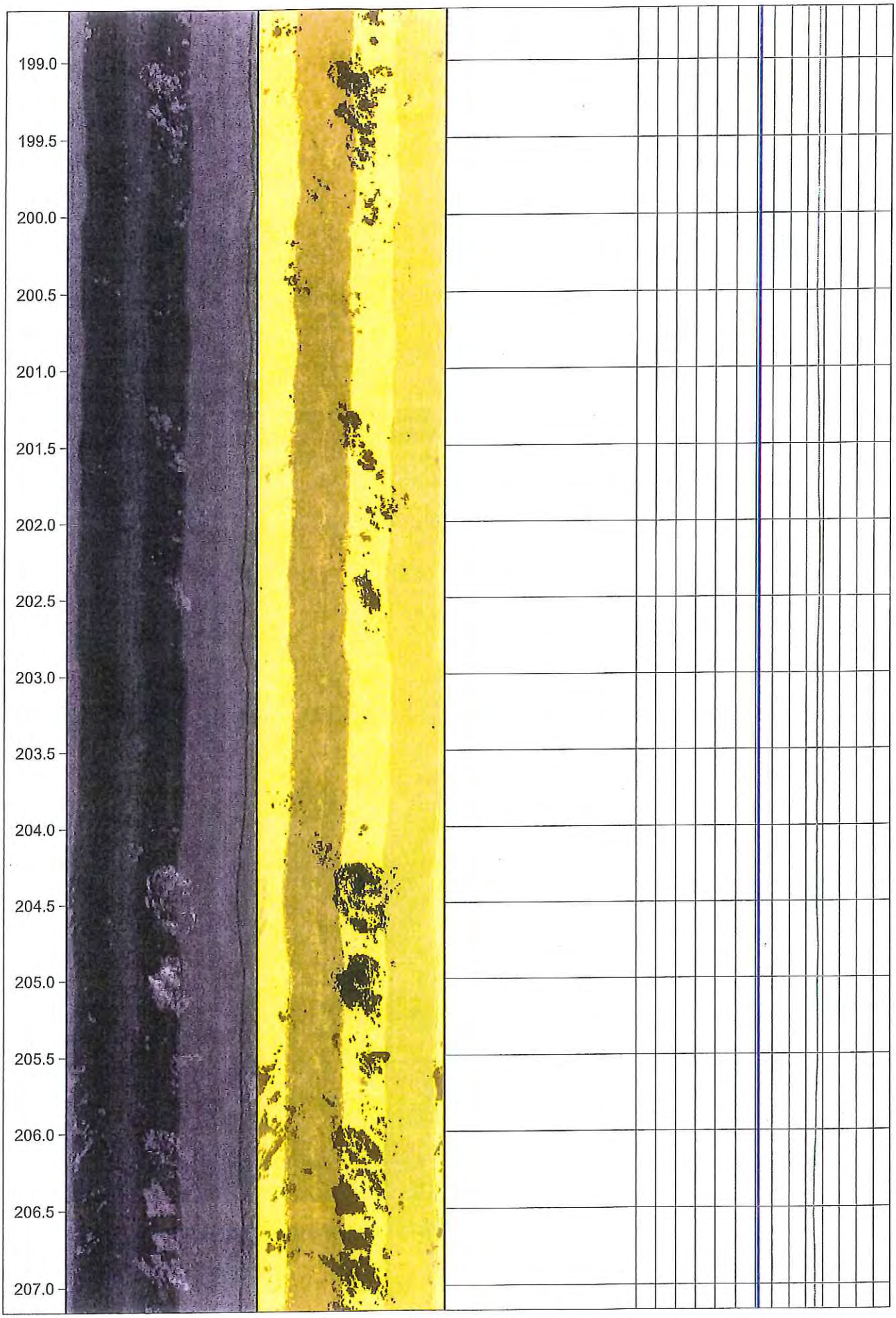
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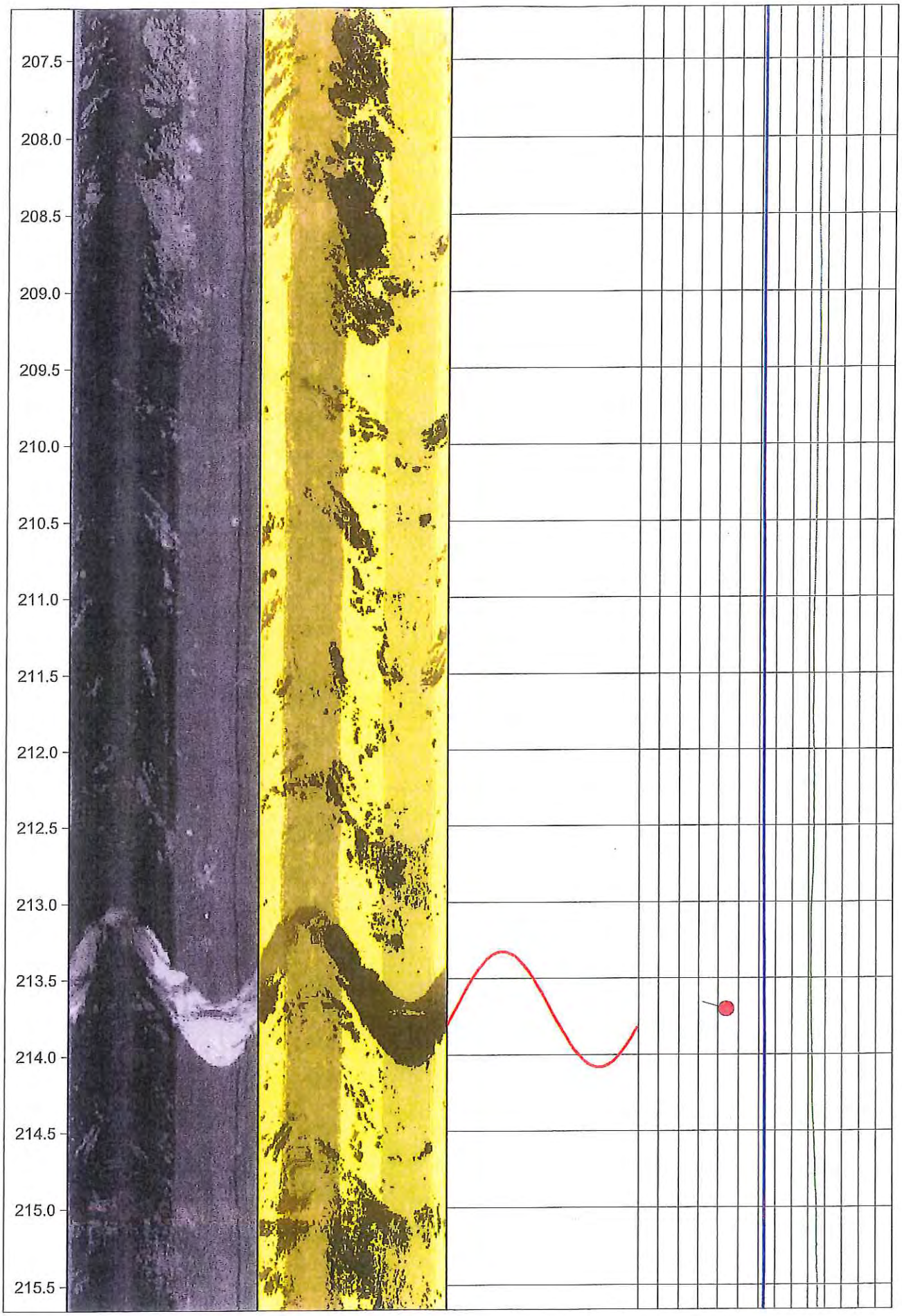
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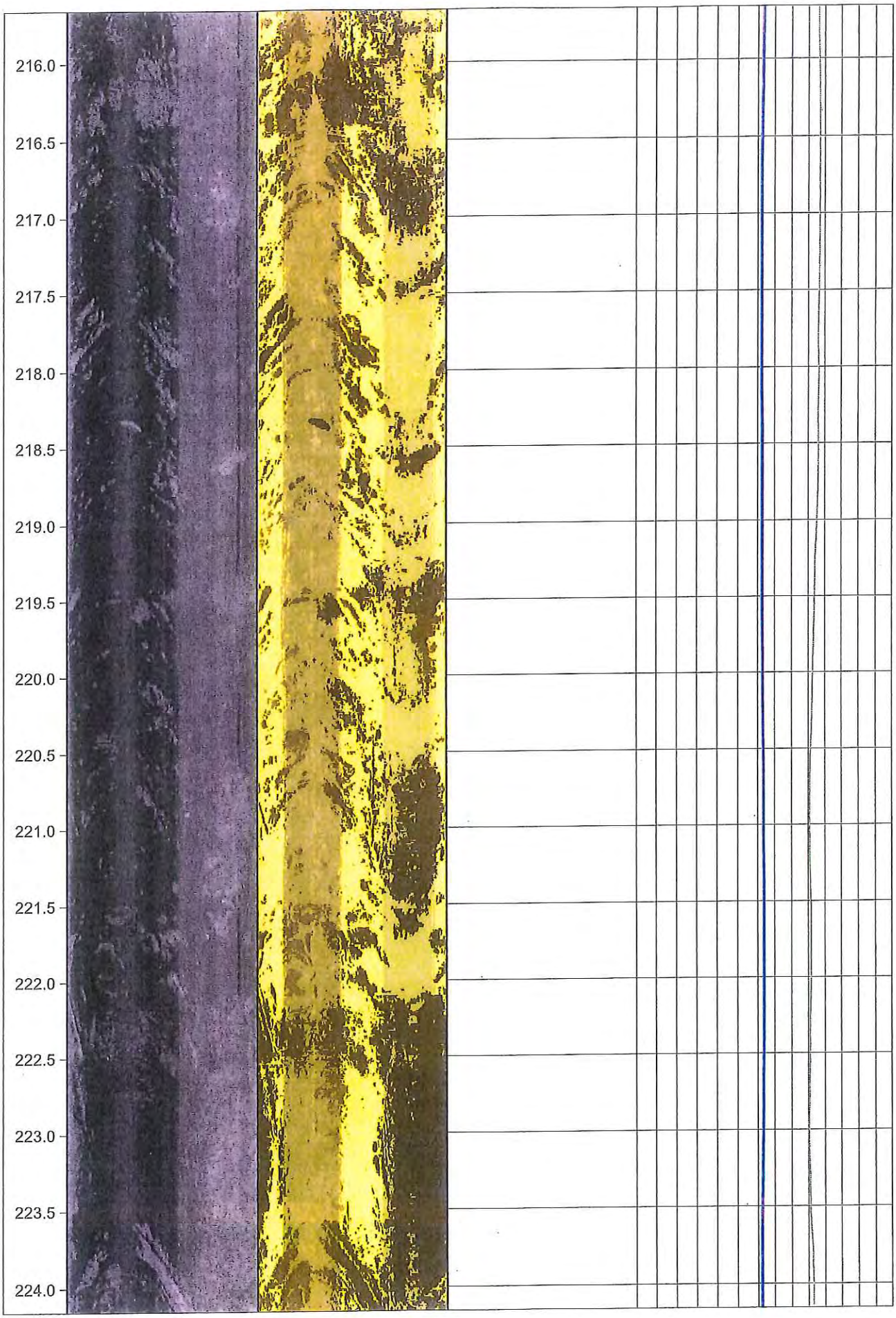
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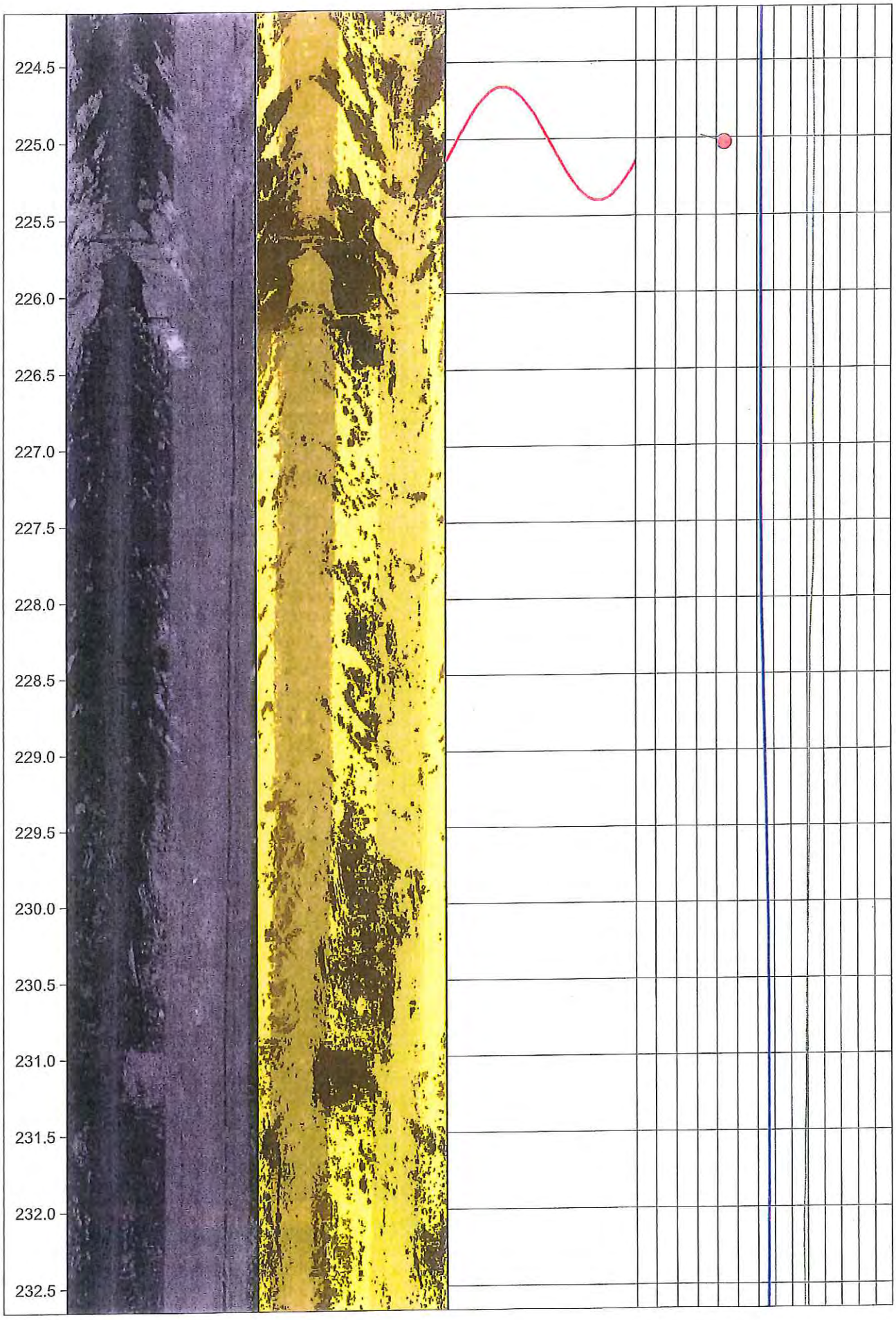
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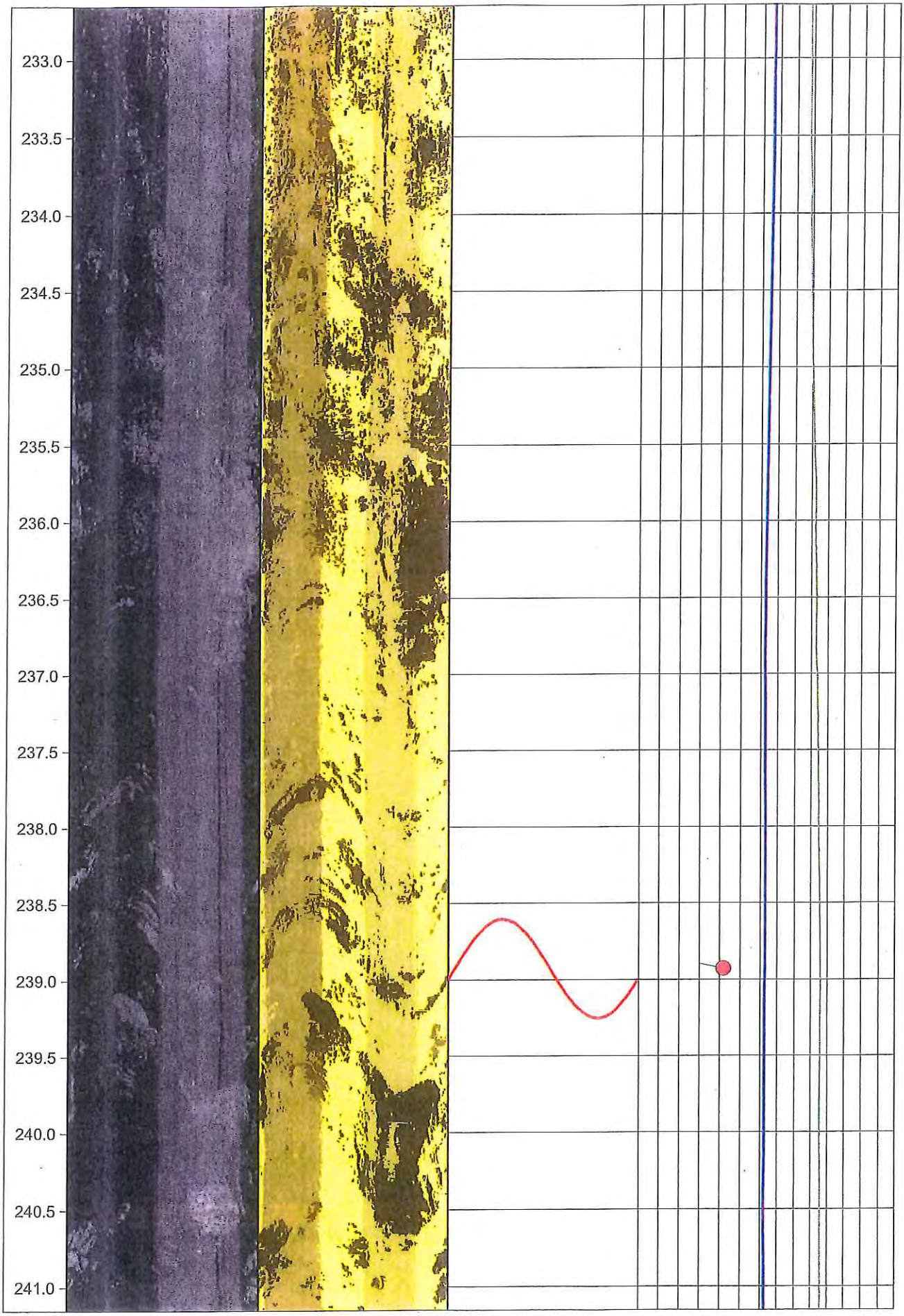
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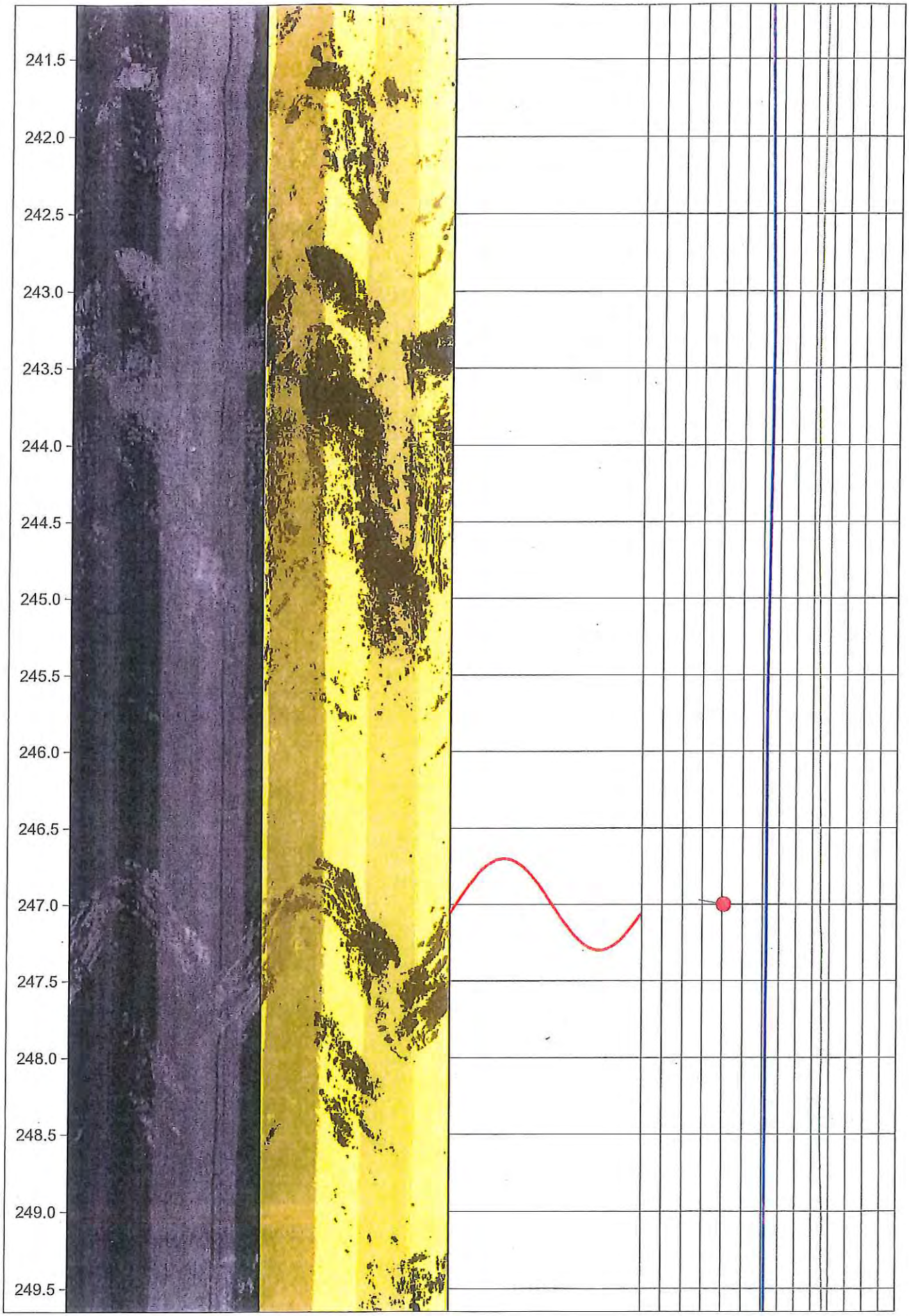
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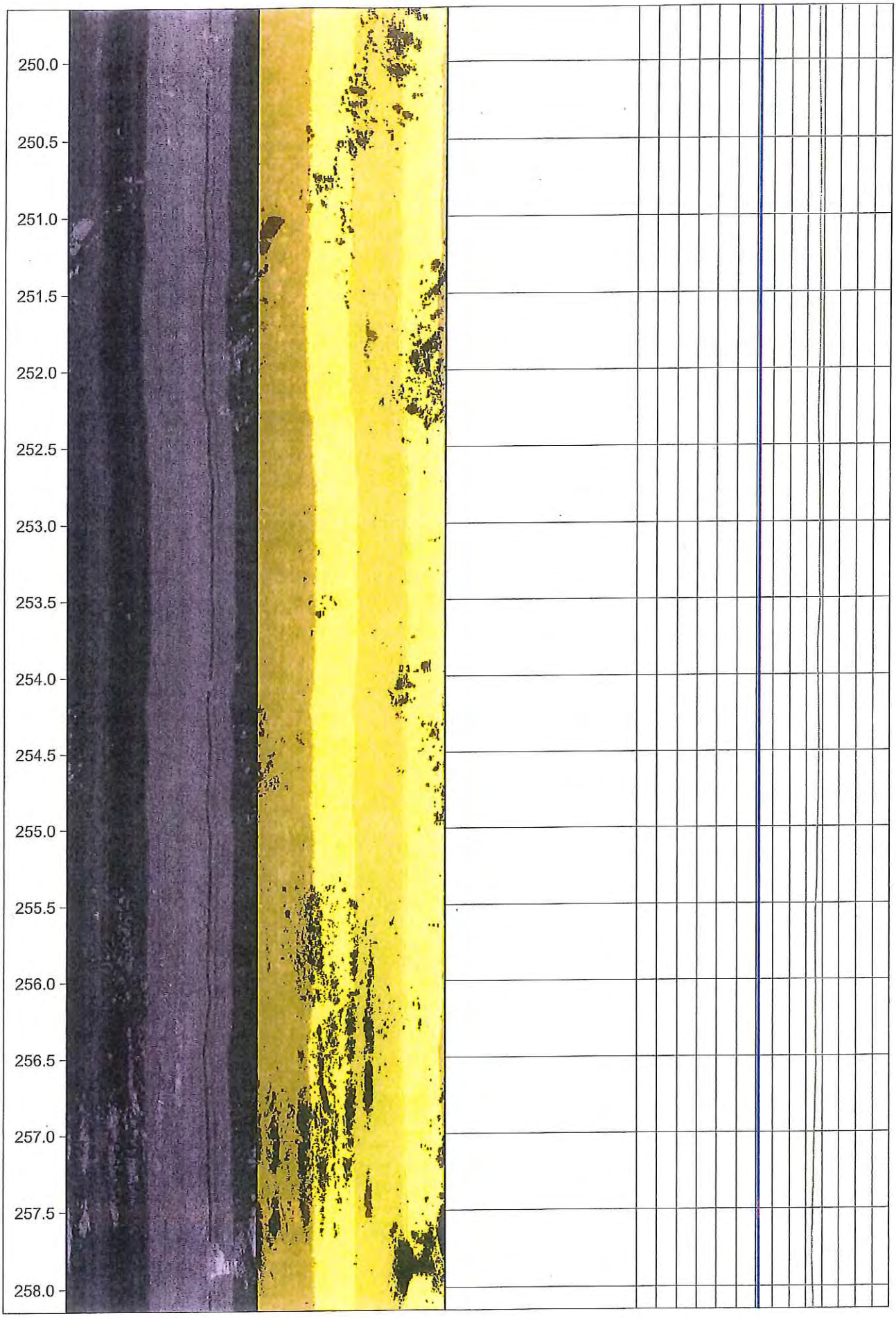
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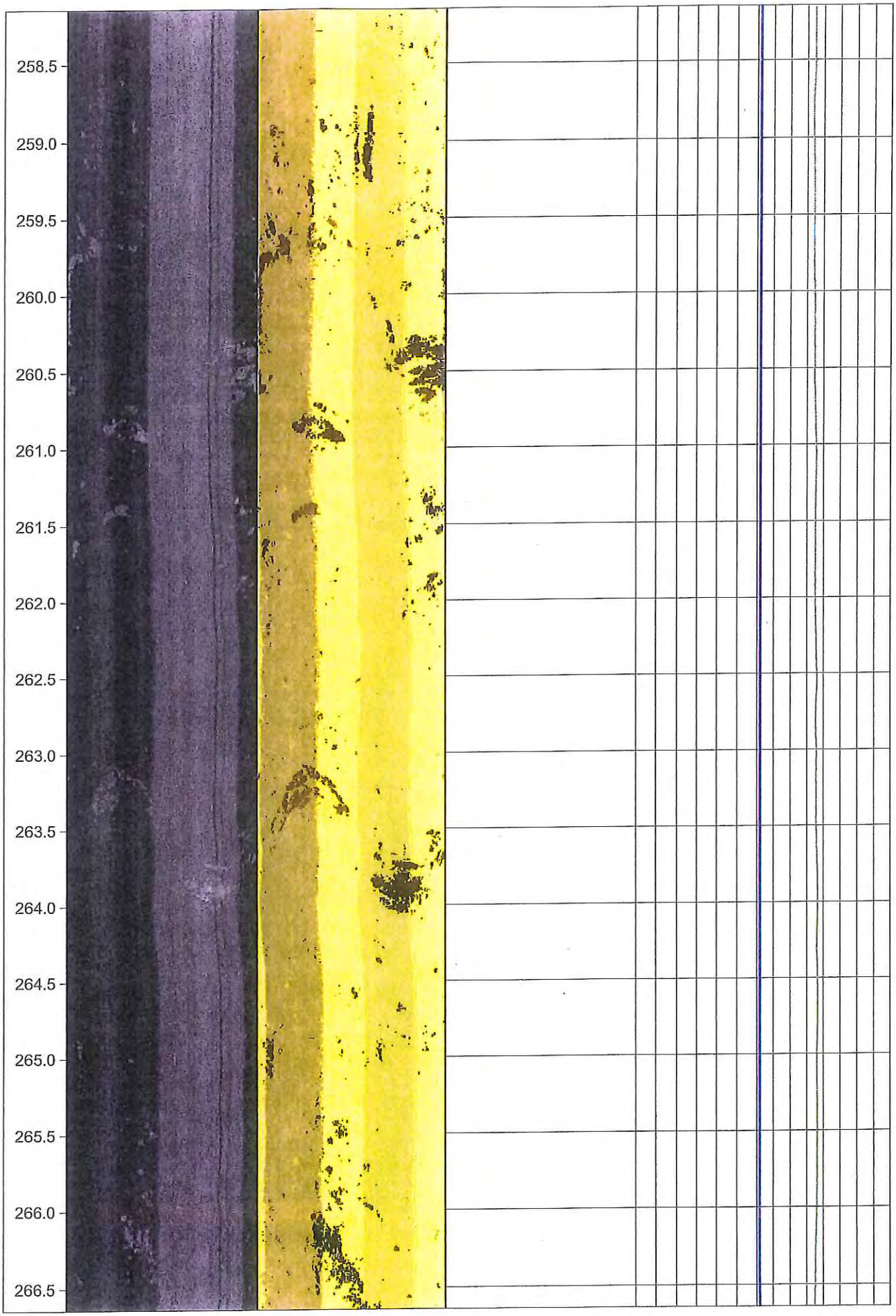
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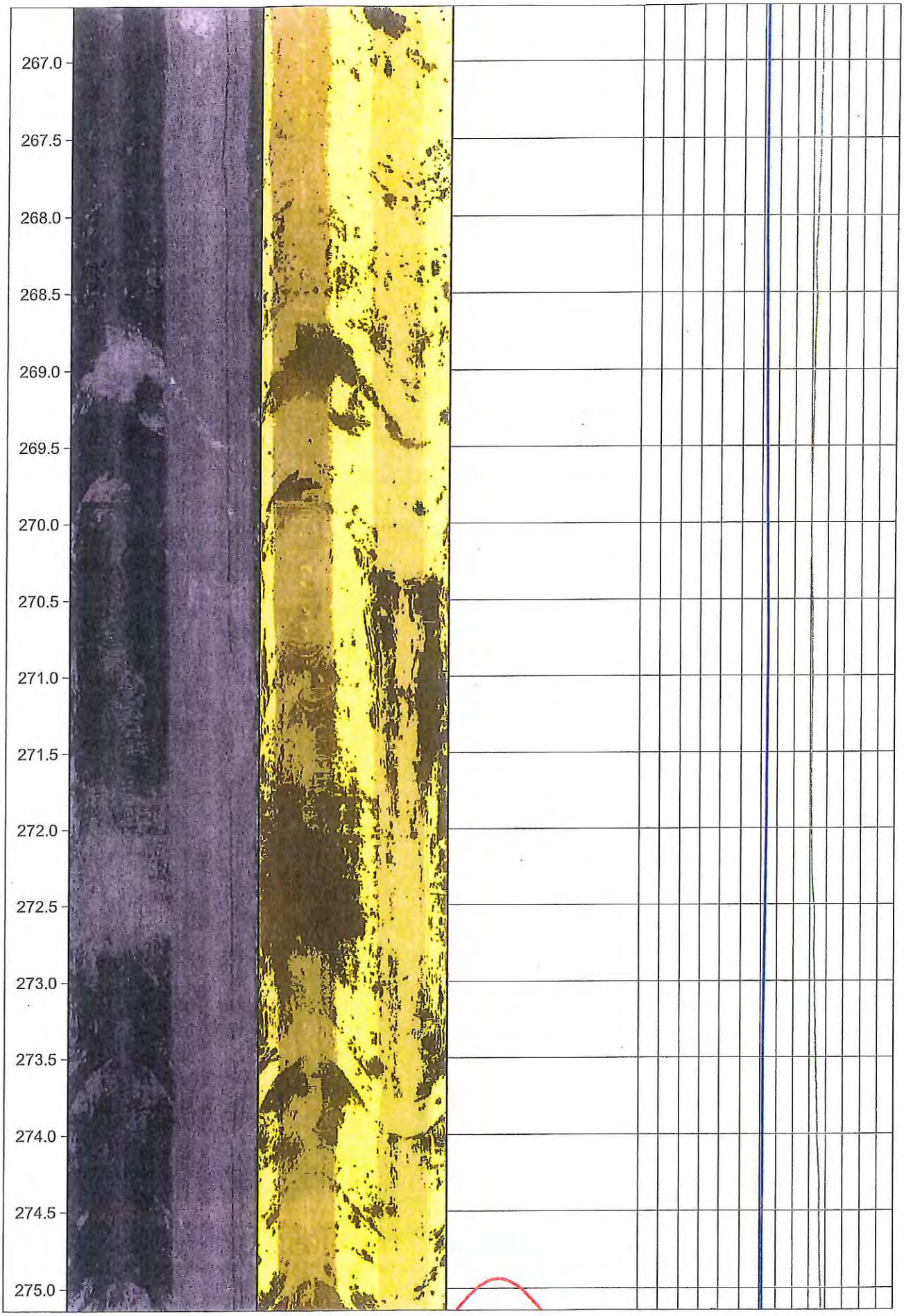
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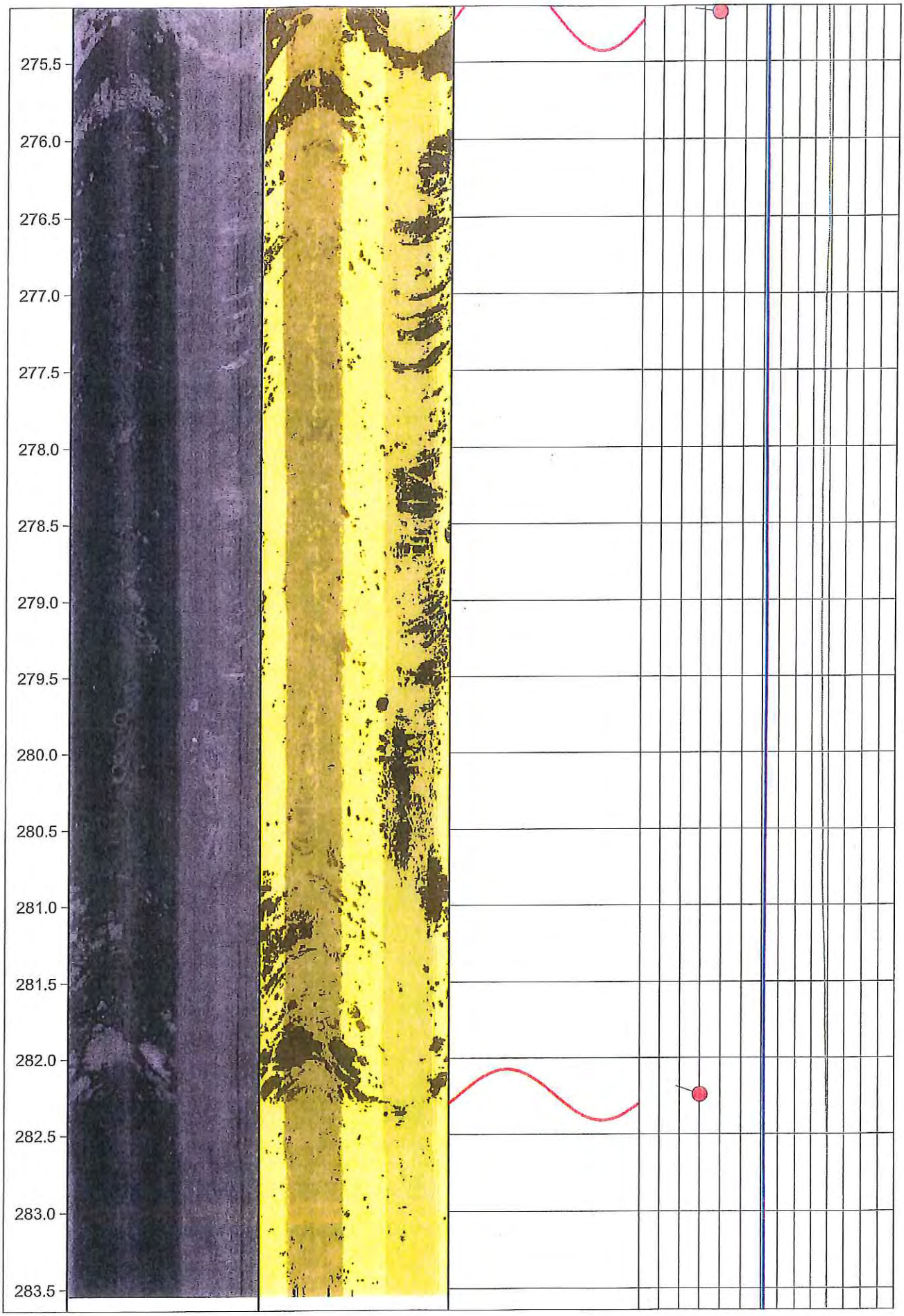
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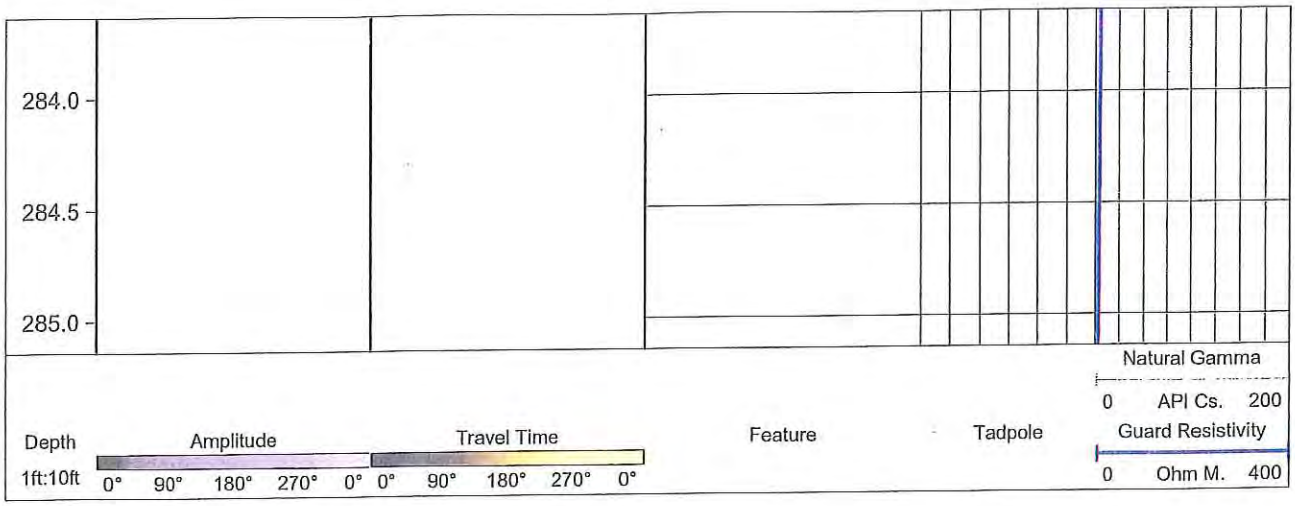
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Depth
1ft:10ft
Amplitude
0° 90° 180° 270° 0°
Travel Time
0° 90° 180° 270° 0°
Feature
Tadpole
Guard Resistivity
0 Ohm M. 400

LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
0					10:39 AM	12/10/2003	Started Drilling with Punch Core Bit
1				100%	7		**0' Soil** SILTY CLAY; brown
					10:46 AM		
2	2				11:39 AM		**1'10" Siltstone** brown, thinly bedded
3				11%	2		
4					11:41 AM		Switched to Conventional Core Bit
5	5				11:47 AM		
6							
7				16%	4		
8							
9					11:51 AM		
10	10				12:00 PM		**No Recovery**
11							
12				0%	3		
13							
14					12:03 PM		
15	15						Caving at 15' Switched to Rock Bit and Reamed to 30'
16							
17							
18							
19							
20							

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
20							Continued Reaming to 30'
21							
22							
23							
24							
25							
26							
27							
28							
29							
30	30				3:16 PM		Started Drilling with Conventional Core Bit **No Recovery**
31							
32				0%	8		
33							
34					3:24 PM		
35	35				3:31 PM		
36							
37				8%	3		
38							
39					3:34 PM		
40	40						**39' 7" Siltstone** olive, brown, firm, wavy bedding

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
40					3:45 PM		**No Recovery**
41							
42				0%			
43							
44					3:52 AM		
45	45				4:07 PM		**No Recovery**
46							
47				0%			
48							
49					4:09 PM		Swithced to Punch Core Bit
50	50				8:35 AM	12/11/2003	**50' 0" Sandstone**
				100%	20		yellow brown, medium grained, uncemented
51					8:55 AM		- iron staining, rock fragments to 1 3/4"
	51' 1"				9:09 AM		
52							**53' 1" Sandy Siltstone**
53				49%			olive brown, firm
							- @ 53' 3" Bedding Angle: 10°
54							- @ 54' 0.5" Fracture Angle: 28°
					9:20 AM		- @ 54' 6" Fracture Angle: 31°
55	55				9:30 AM		- iron staining
				100%	30		- @ 56' 8" Bedding Angle: 10°
56					10:00 AM		Switched to Conventional Core Bit
	56' 8"				10:21 AM		
57							
58				15%	24		
59							**59' Clay (CH)**
					10:45 AM		Shear Data: C[peak] = 0.93, Phi[peak] = 19, C[ult] = 0.93, Phi[ult] = 19
60	60						**59' 5.5" Sandstone**
							brown, medium grained, uncemented

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
60					10:50 AM		**No Recovery**
61							
62				0%	6		
63							
64					10:56 AM		
65	65				10:57 AM		
66							
67				23%	7		
68							**68' 10" Siltstone**
69					11:04 AM		dark gray, firm, thinly bedded - iron staining
70	70				11:11 AM		**No Recovery**
71							
72				0%	13		
73							
74					11:24 AM		
75	75				11:24 AM		**No Recovery**
76							
77				0%	10		
78							
79					11:34 AM		
80	80						

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
80					11:40 AM		
81							
82				33%	13		**83' 4" Sandstone** light gray, medium grained, hard, cemented - veins of calcite - @ 83' 8" Fracture Angle: 33° - @ 83' 11" Bedding Angle: 14°
83							
84					11:53 AM		**84' 2" Siltstone** light gray, with clay, minor staining
85	85				11:58 AM		
86							
87				15%	8		
88							
89					12:06 PM		**89' 3" Siltstone** dark gray, very firm, thinly bedded - @ 89' 7" Bedding Angle: 10°
90	90				12:10 PM		**No Recovery**
91							
92				0%	5		
93							
94					12:15 PM		
95	95				12:15 PM		**No Recovery**
96							
97				0%	15		
98							
99					12:30 PM		
100	100						

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
100					1:00 PM		
101							
102				10%	5		
103							
104					1:05 PM		**104' 6" Siltstone** dark gray, firm, thinly bedded
105	105				1:10 PM		
106							
107				48%	16		**107' 7" Sandy Siltstone** dark gray, firm, thinly bedded
108							
109					1:26 PM		- @ 109' 4" Bedding Angle: 44°
110	110				1:35 PM		
111							
112				15%	8		
113							
114					1:43 PM		**114' 3" Siltstone** medium gray, very firm, thinly bedded
115	115				1:50 PM		
116							
117				47%	13		- @ 117' 4" Bedding Angle: 17°
118							- @ 118' 0" Bedding Angle: 15°
119					2:03 PM		
120	120						

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
120					2:12 PM		
121							
122				43%	11		**122' 10" Siltstone**
123							medium to dark gary, thinly bedded
124							- @ 123' 1" Fracture Angle: 65° with 1/4" vertical offset
					2:23 PM		**123' 11.5" Siltstone with Clay**
125	125				2:34 PM		dark gray, firm. thinly bedded
126							
127				48%	11		
128							
129							- @ 129' 0" bedding Angle: 18°
					2:45 PM		
130	130				2:53 PM		
131							
132				18%	12		
133							**134' 1" Interlayered**
134							SILTSTONE AND SANDSTONE; medium to dark gary, fine grained, firm
					3:05 PM		- @ 134' 4" Bedding Angle: 75°
135	135				3:10 PM		
136							
137				38%	8		
138							**138' 1" Siltstone**
139							dark gray, firm, wavy bedding
					3:18 PM		
140	140						- @ 138' 10" Fracture Angle: 69°
							- @ 139 ' 7.5" Fracture Angle: 58°

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

LOGGED BY: HLL/DAO/SDP
DRILLING DATE: 12-10-03 through 12-11-03
CHECKED BY: JOT

PROJECT NO.: 1344.10
LOCATION: TRACT 62443

DRILLING METHOD: CONTINUOUS CORE
DRILLED BY: VALLEY WELL DRILLING
BACKFILLED WITH: N/A

TOTAL DEPTH: 150'
DEPTH TO WATER: N/A AFTER: N/A

Depth	Interval	Sample	Graphic Symbol	% Core Recovery	Time	Date	MATERIAL DESCRIPTION
140					3:30 PM		
141							
142				37%	10		
143							**143' 2" Siltstone**
144					3:40 PM		dark gray, firm, thinly bedded - @ 143' 8" Bedding Angle: 30°
145	145				3:50 PM		
146							
147				42%	10		- @ 148' 4" Fracture Angle: 58°
148							- @ 148' 0" Fracture Angle: 82°
149					4:00 PM		- @ 149' 2" Bedding Angle: 63°
150	150						Total Depth = 150' Caving at 15'
151							
152							
153							
154							
155							
156							
157							
158							
159							
160							

DRILL HOLE CH-B
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

CH-B

Depth: 39' - 140'

MESSENGER INVESTMENT SITE

CALABASAS, CALIFORNIA

CH-B

Depth: 140' - 150'

MESSENGER INVESTMENT SITE

CALABASAS, CALIFORNIA

FEATURE ORIENTATIONS

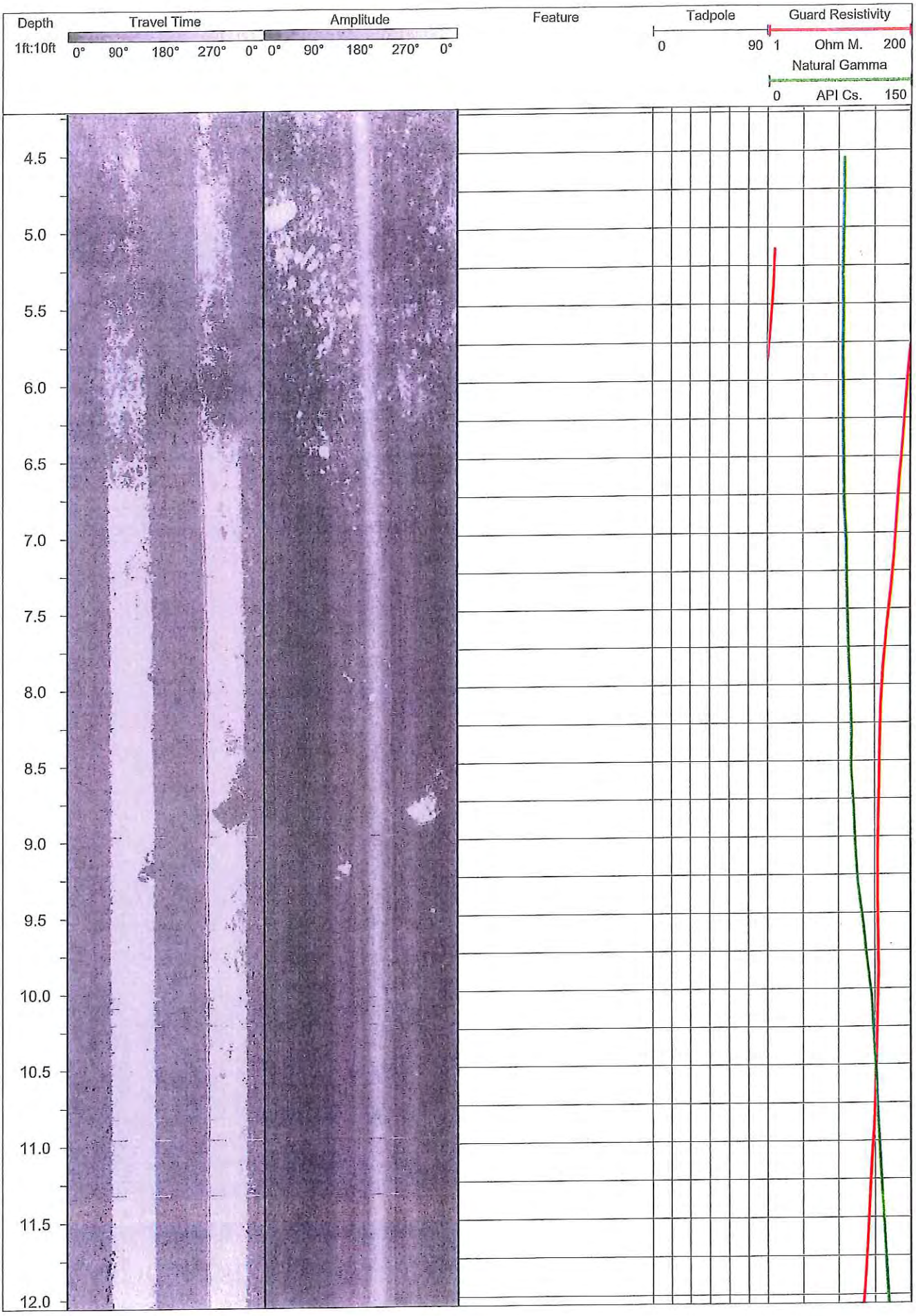
CLIENT: RJR ENGINEERING
PROJECT: Acoustic Televiewer Survey
BOREHOLE ID: CH-B

Depth, ft	Azimuth, degrees (a)	Dip, degrees (b)	Depth, ft	Azimuth, degrees (a)	Dip, degrees (b)
32.4	68	26	82.3	67	47
38.4	195	64	82.9	71	38
39.0	181	52	83.3	57	28
43.3	171	31	84.5	145	23
46.1	203	33	84.8	106	29
64.5	56	37	85.4	81	29
69.4	154	45	86.3	34	21
73.2	216	6	86.5	78	27
74.1	233	30	91.4	123	22
74.7	136	36	96.9	108	30
77.5	201	6	97.2	102	20
79.3	162	19	98.8	128	34
80.7	359	13	101.5	108	32
80.9	172	31	114.6	123	23
81.3	84	12	123.5	221	80
81.7	69	24	129.4	246	82
			130.6	254	74

(a) Azimuth is expressed in degrees and is the angle from north to east (i.e., clockwise).
(b) Dip is expressed in degrees. 0° means a horizontal feature and 90° is a vertical feature.

BOREHOLE GEOPHYSICS & HYDROPHYSICS
COLOG
A DIVISION OF LAYNE CHRISTENSEN COMPANY

11001 Etiwanda Avenue
Fontana, CA 92337
909-390-2833 909-390-6097 FAX


Depth
1ft:10ft
Travel Time
0° 90° 180° 270° 0°
Amplitude
0° 90° 180° 270° 0°
Feature
Tadpole
0 90
Guard Resistivity
1 Ohm M. 200
Natural Gamma
0 API Cs. 150
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5.0
5.5
6.0
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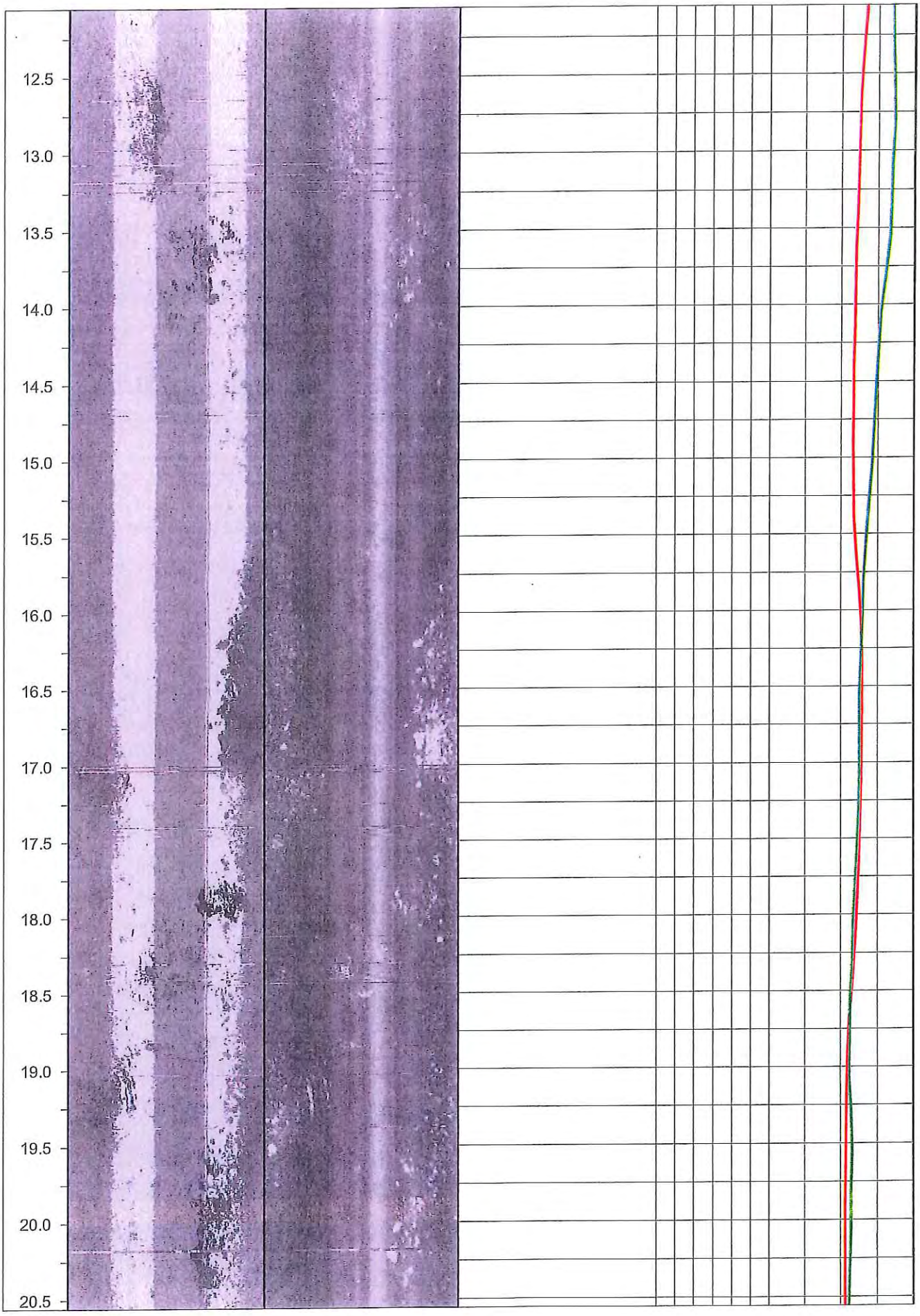
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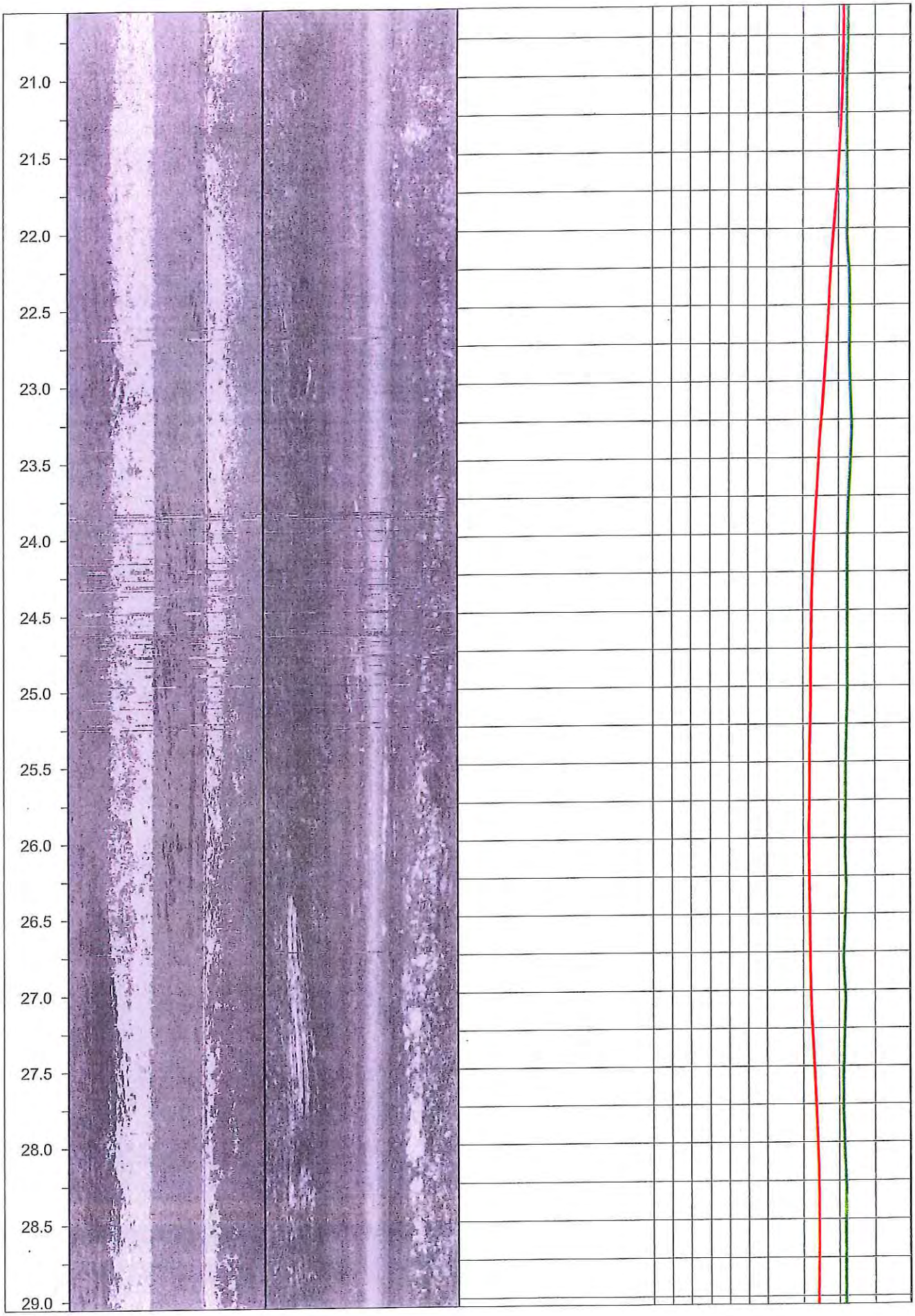
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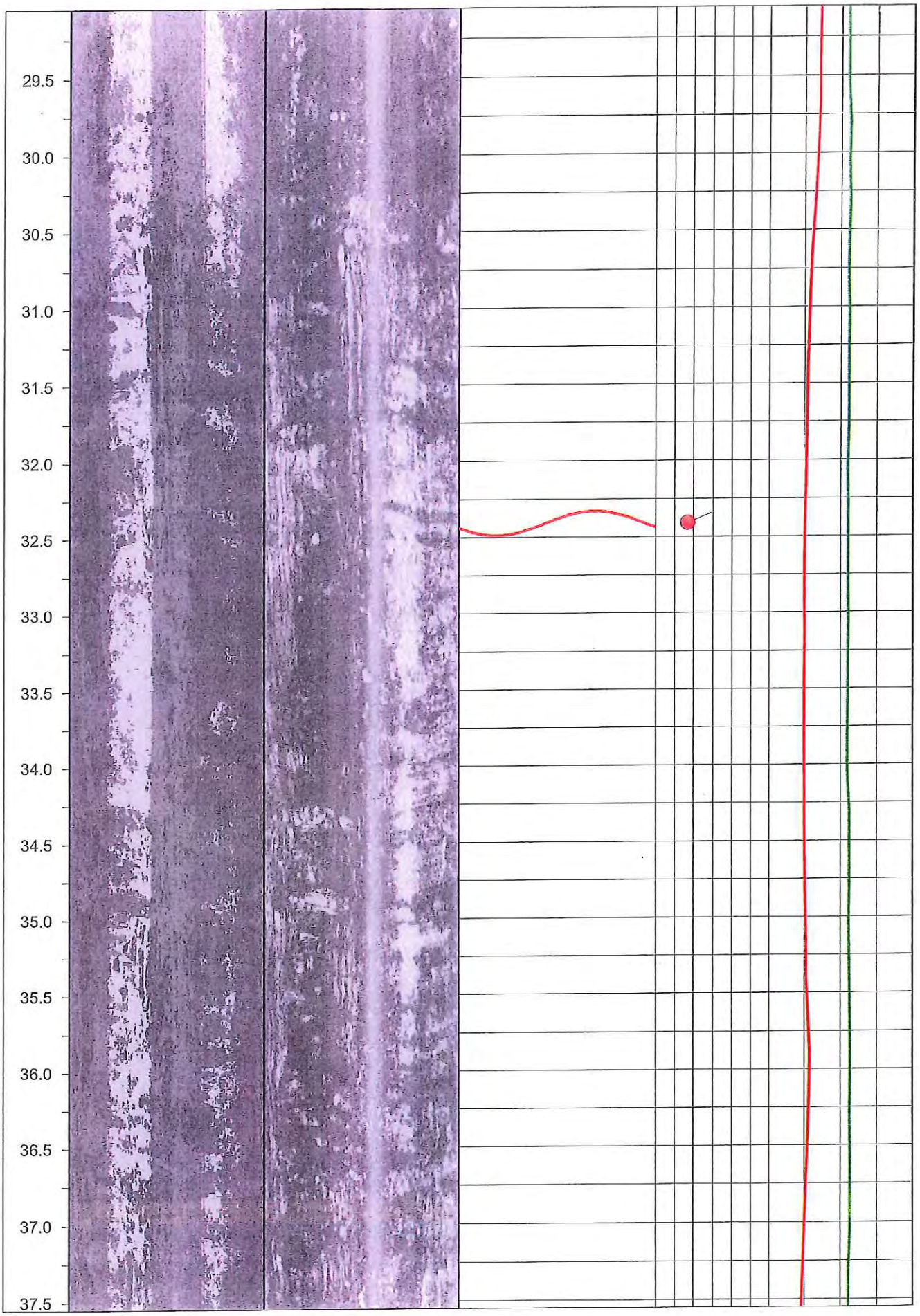
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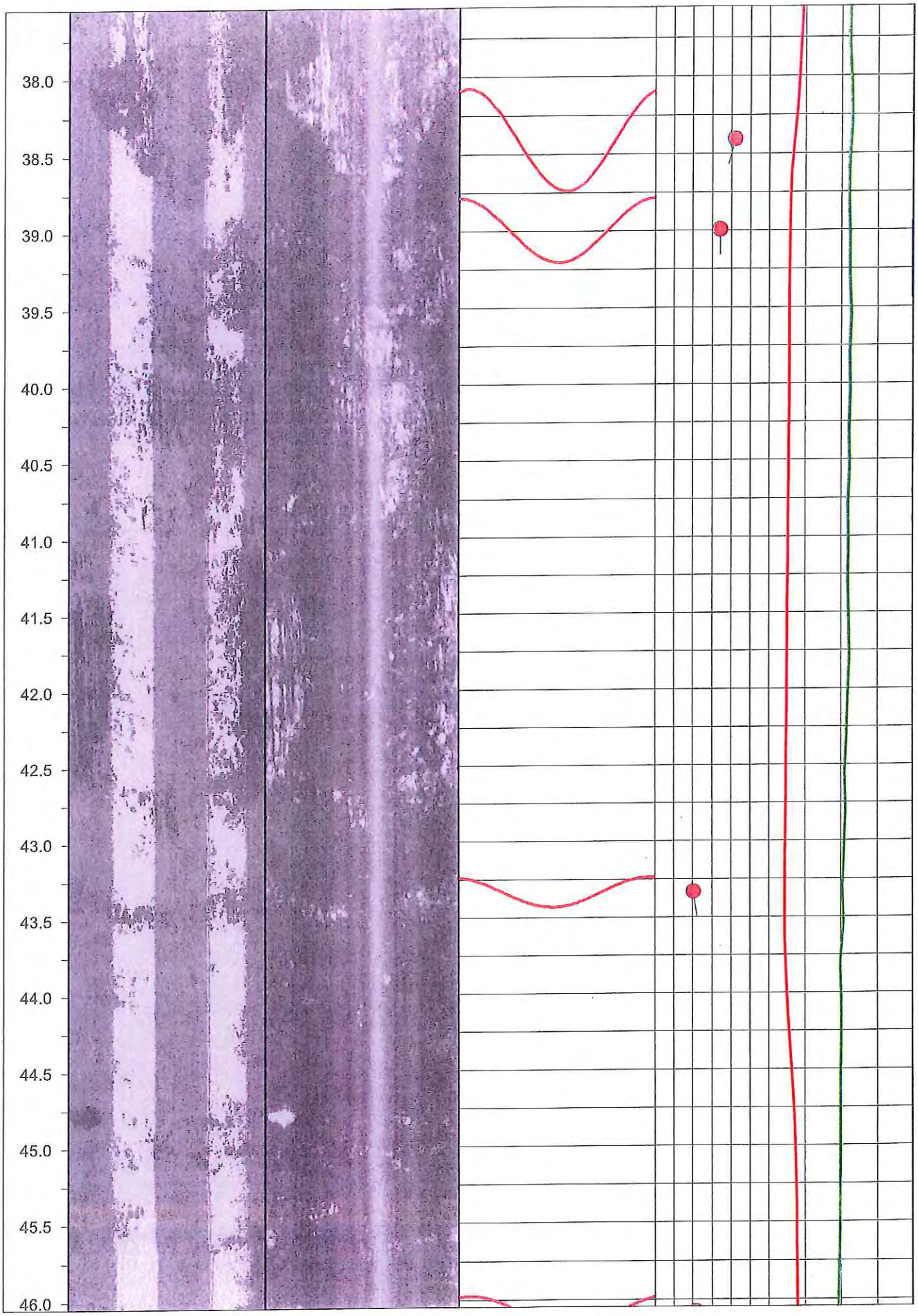
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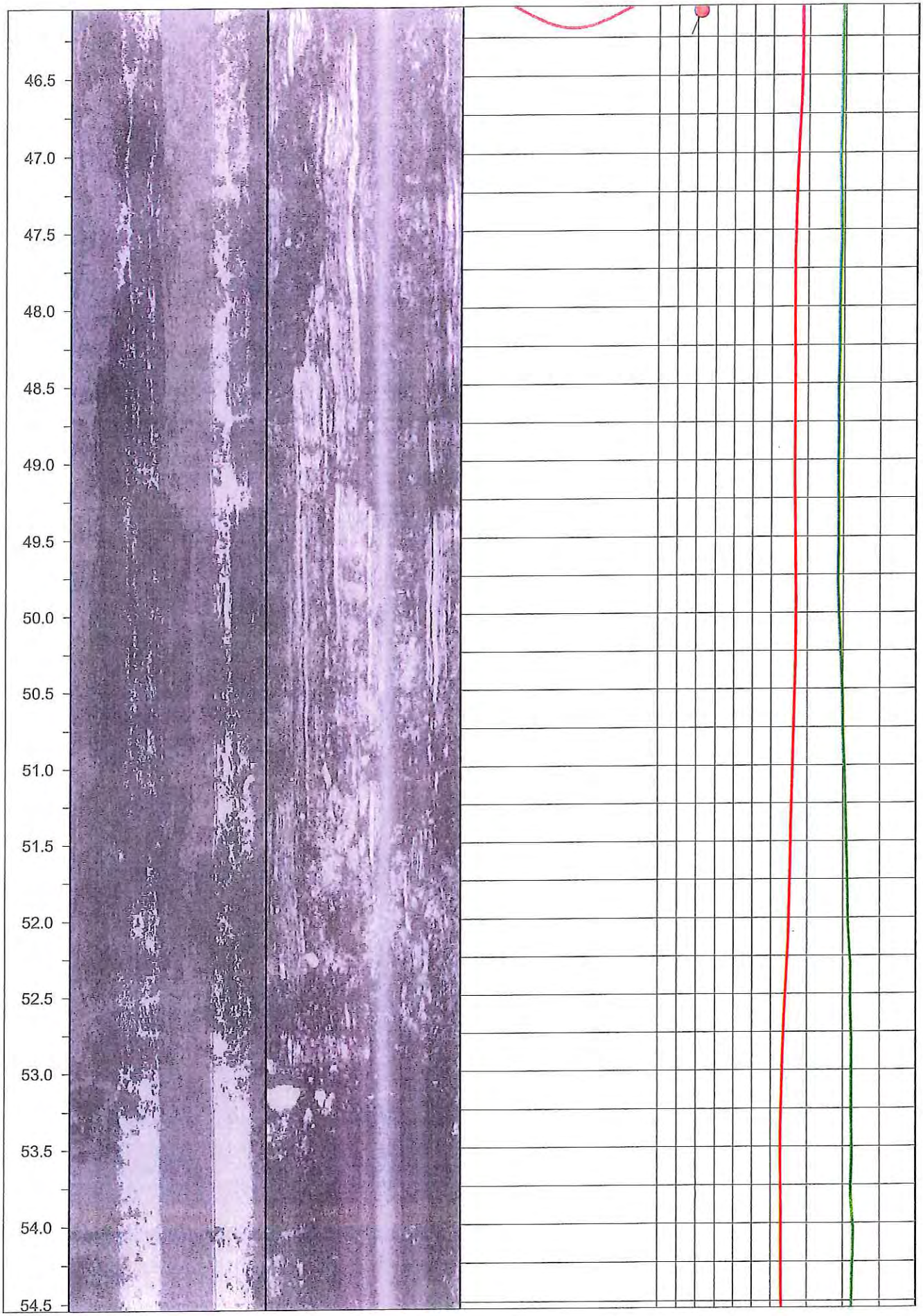
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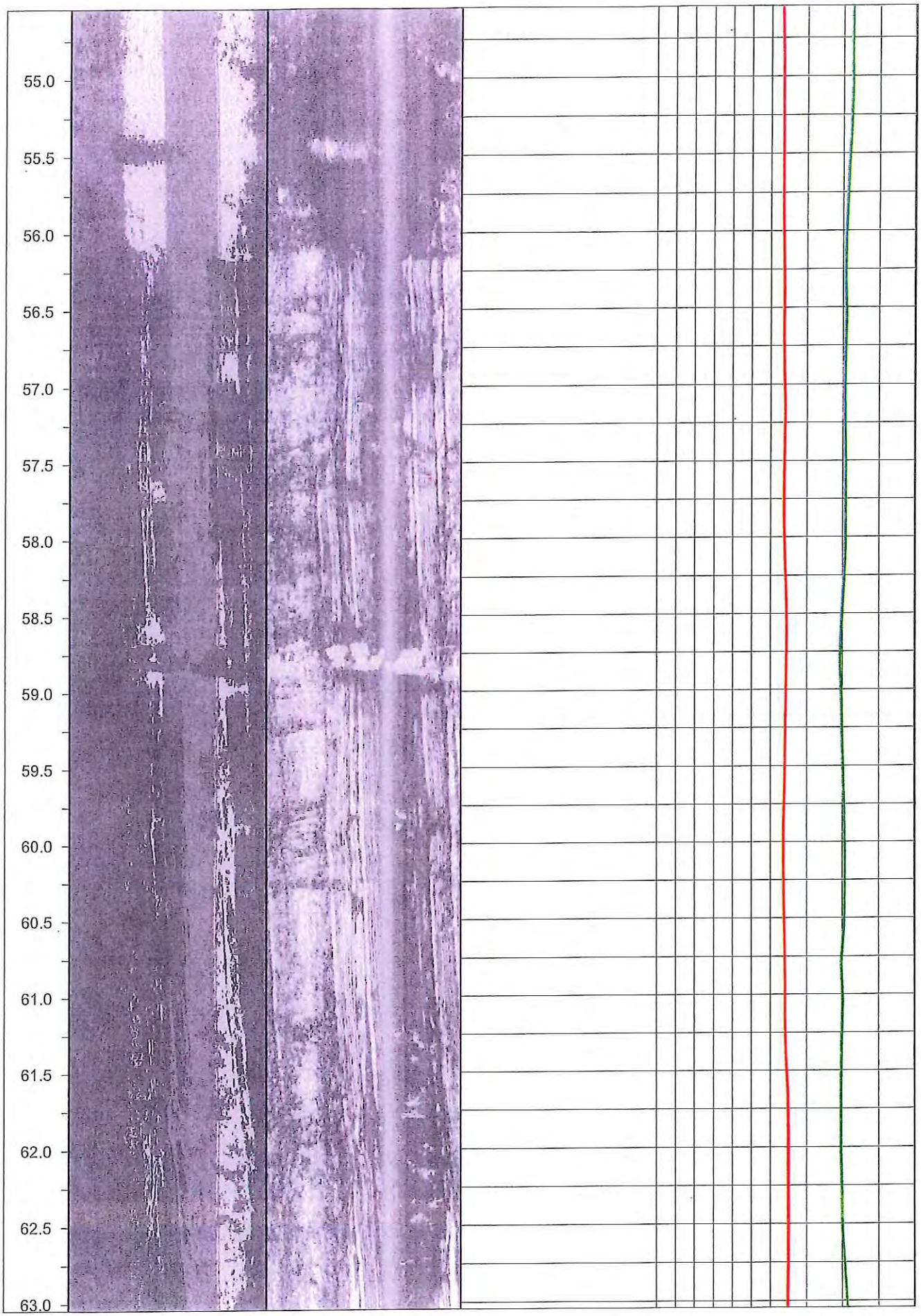
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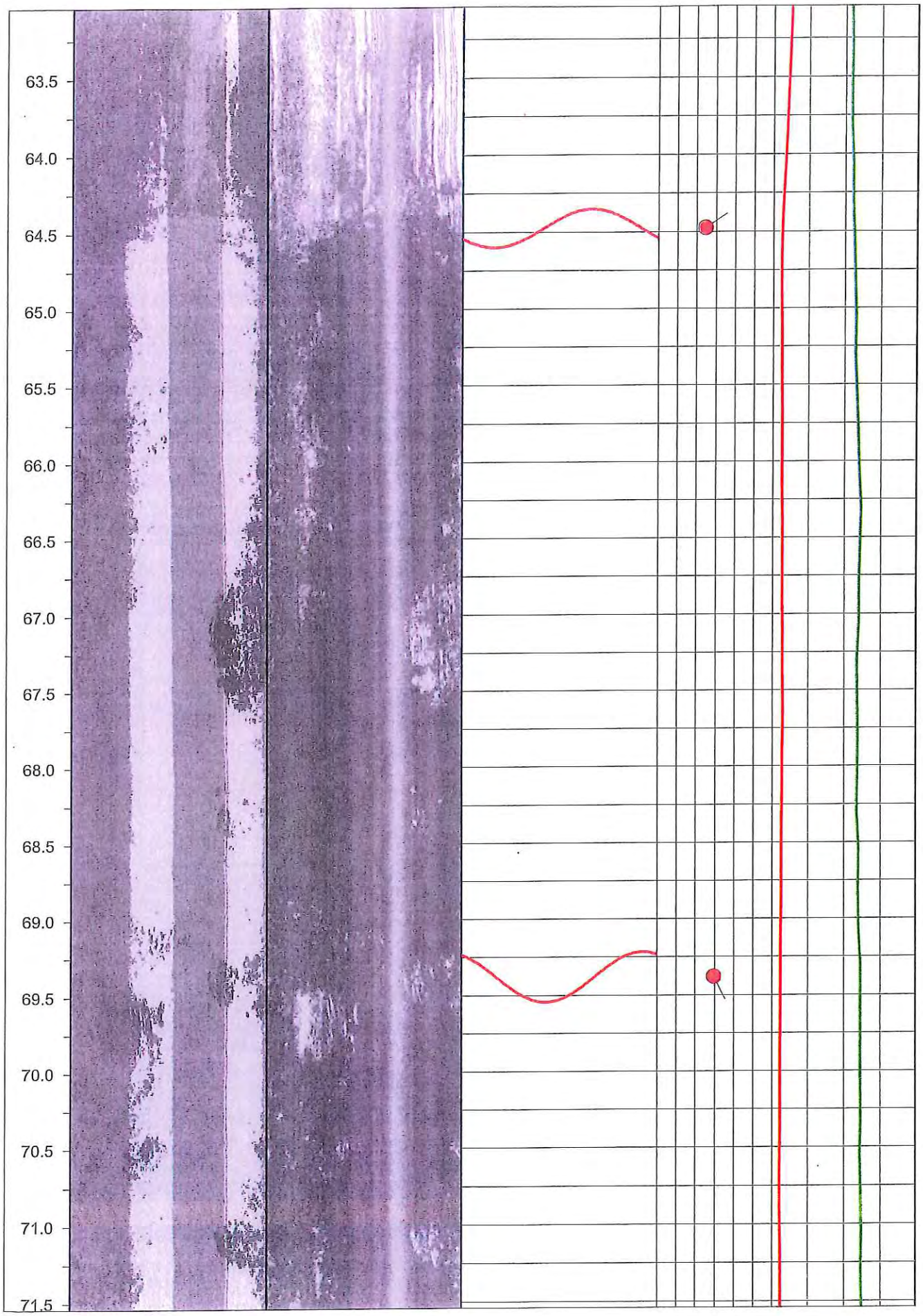
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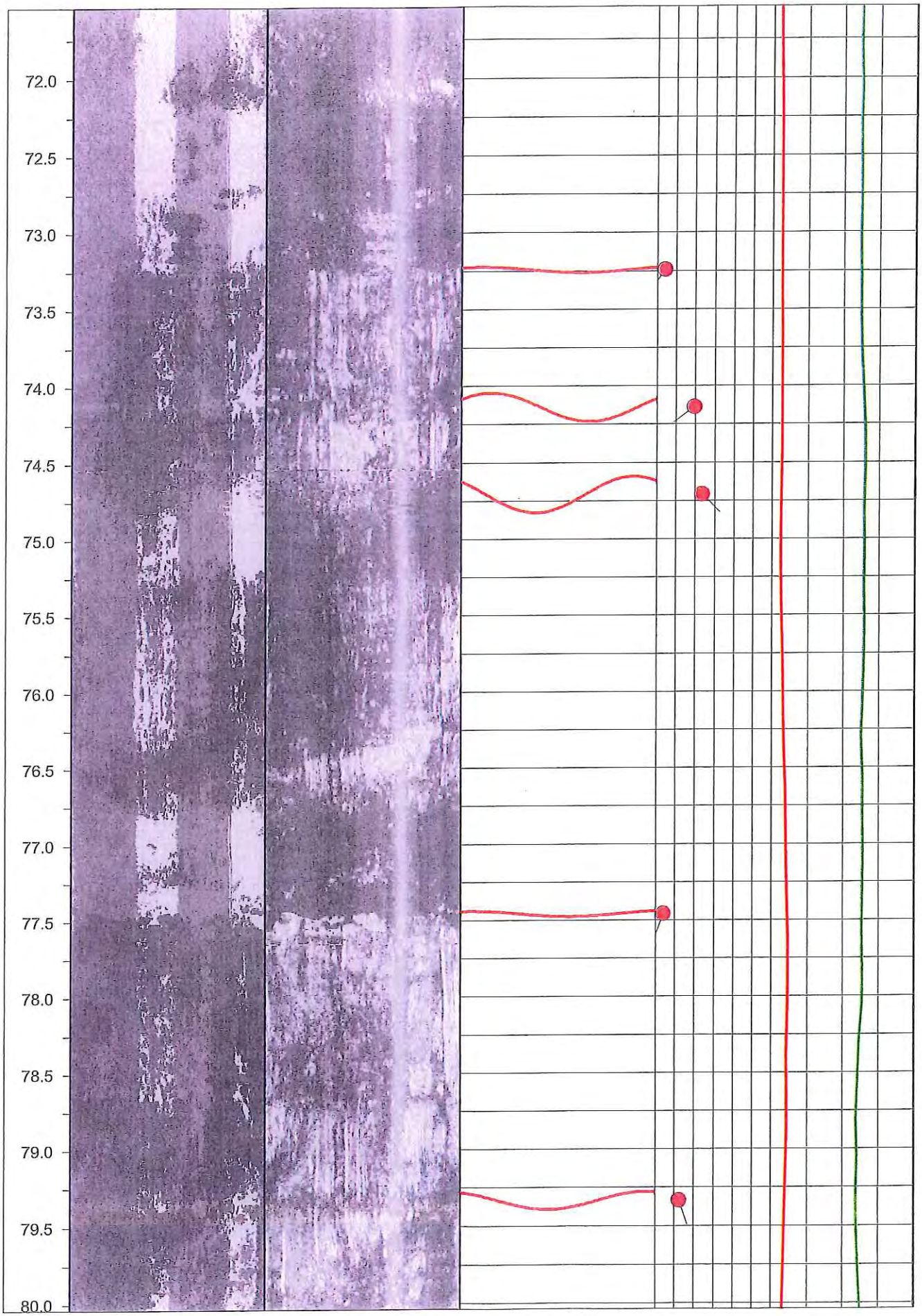
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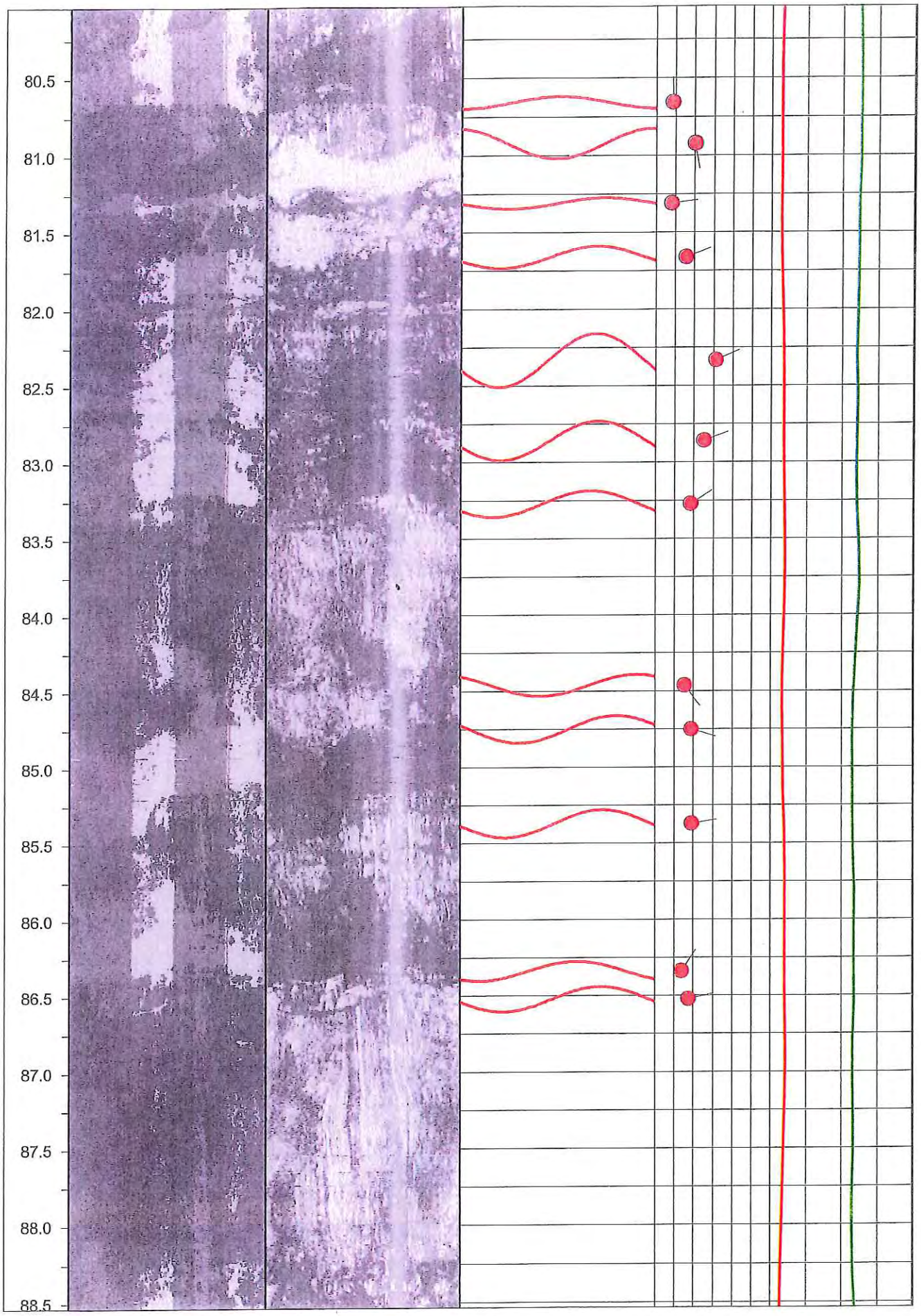
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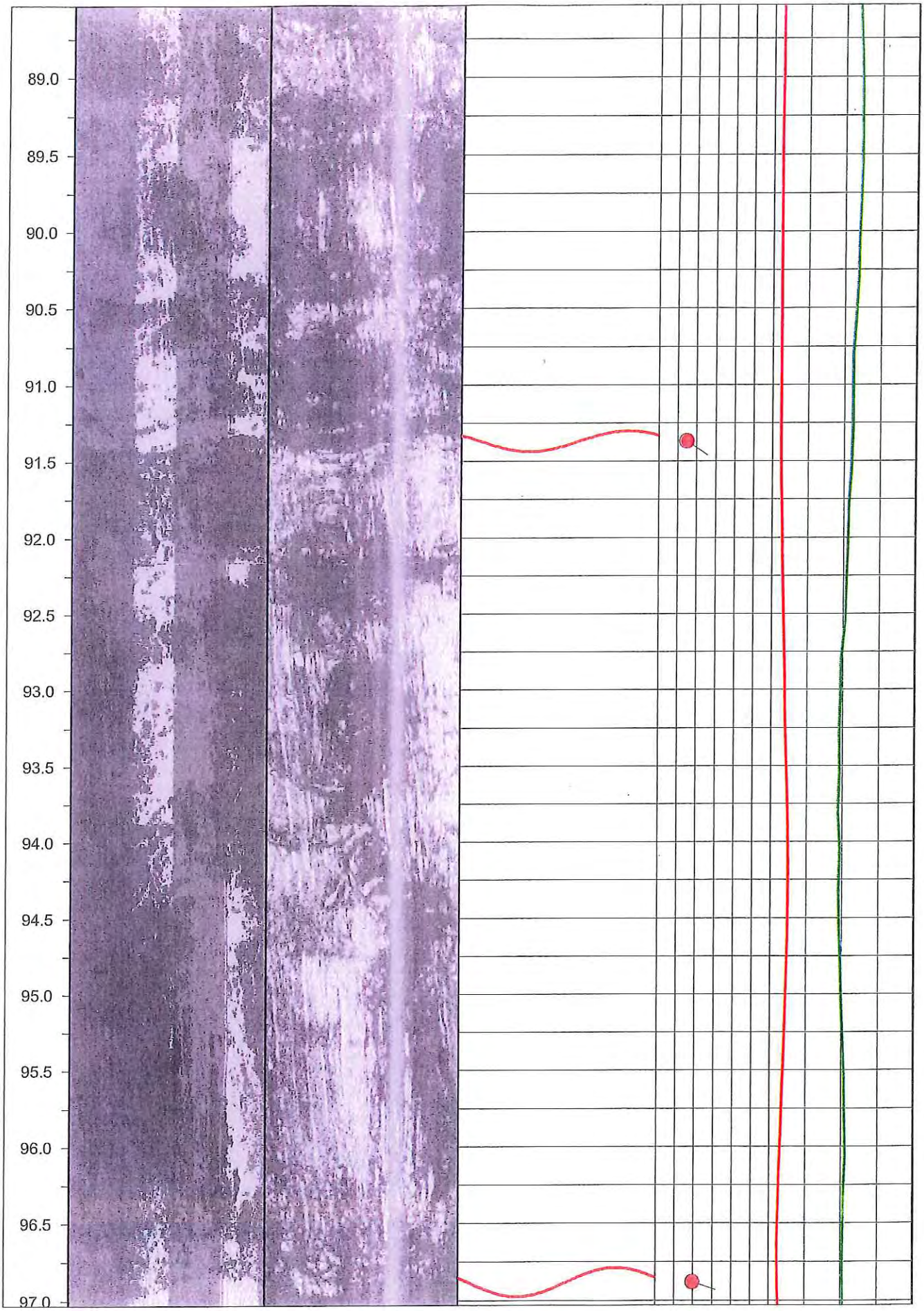
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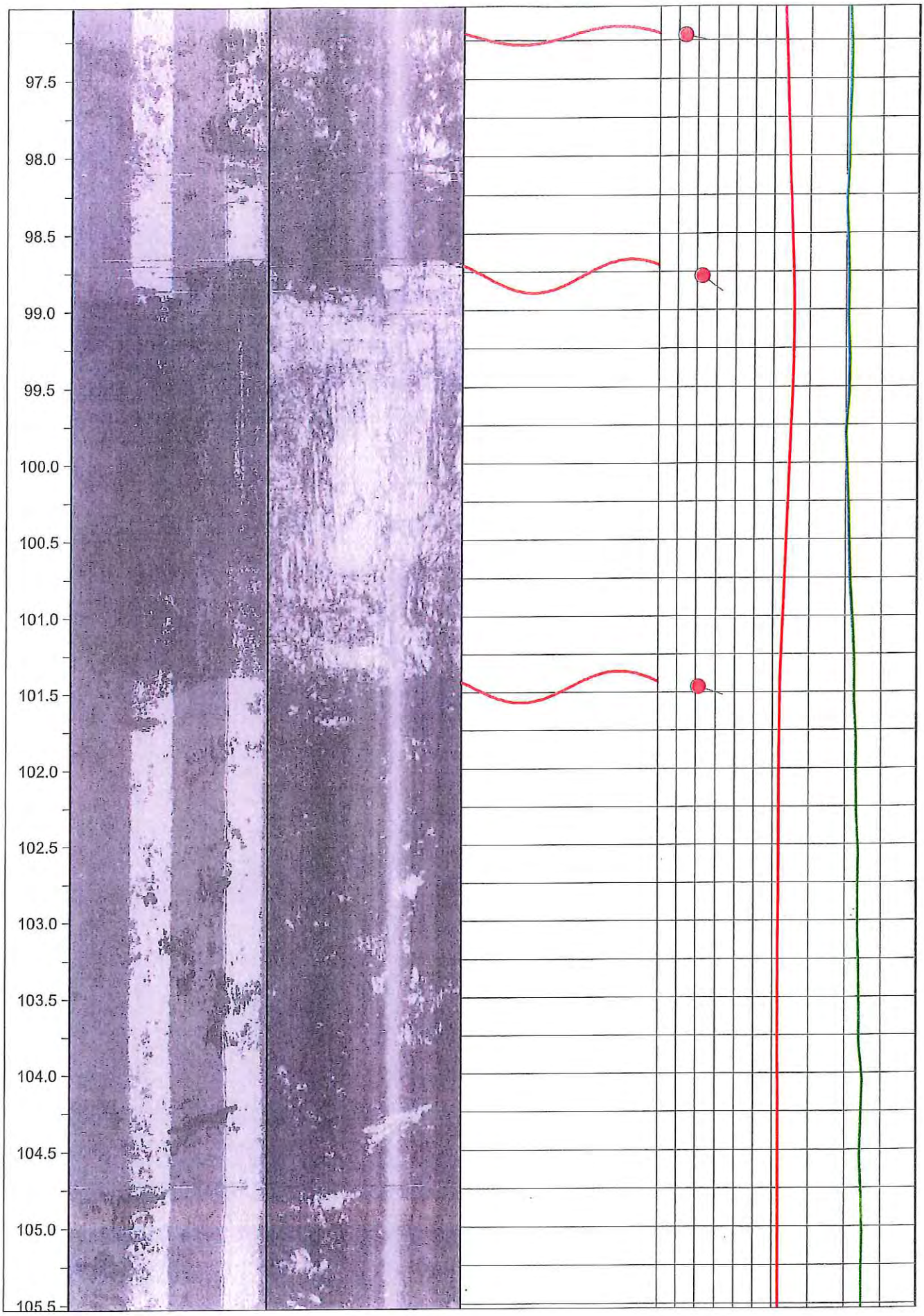
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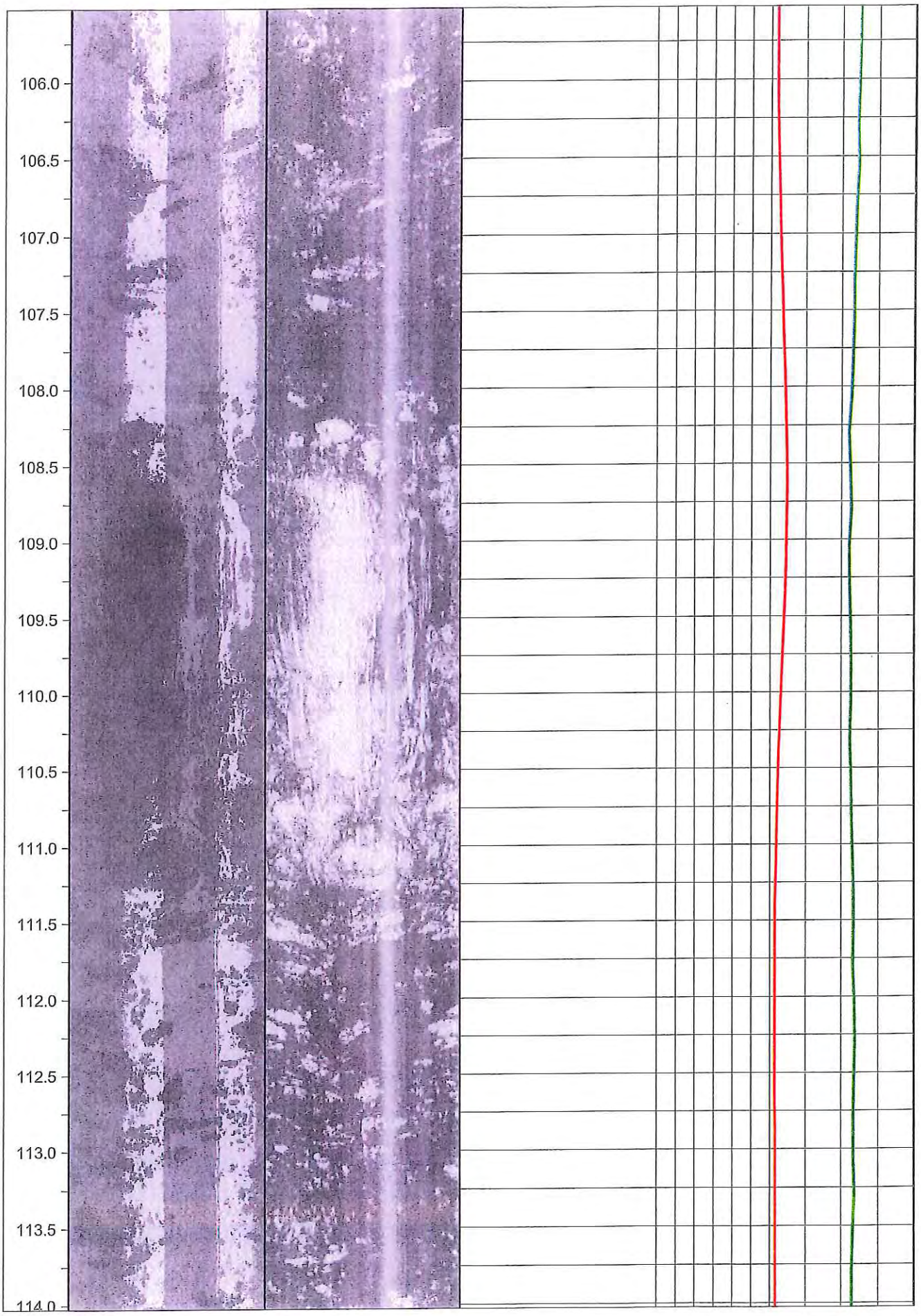
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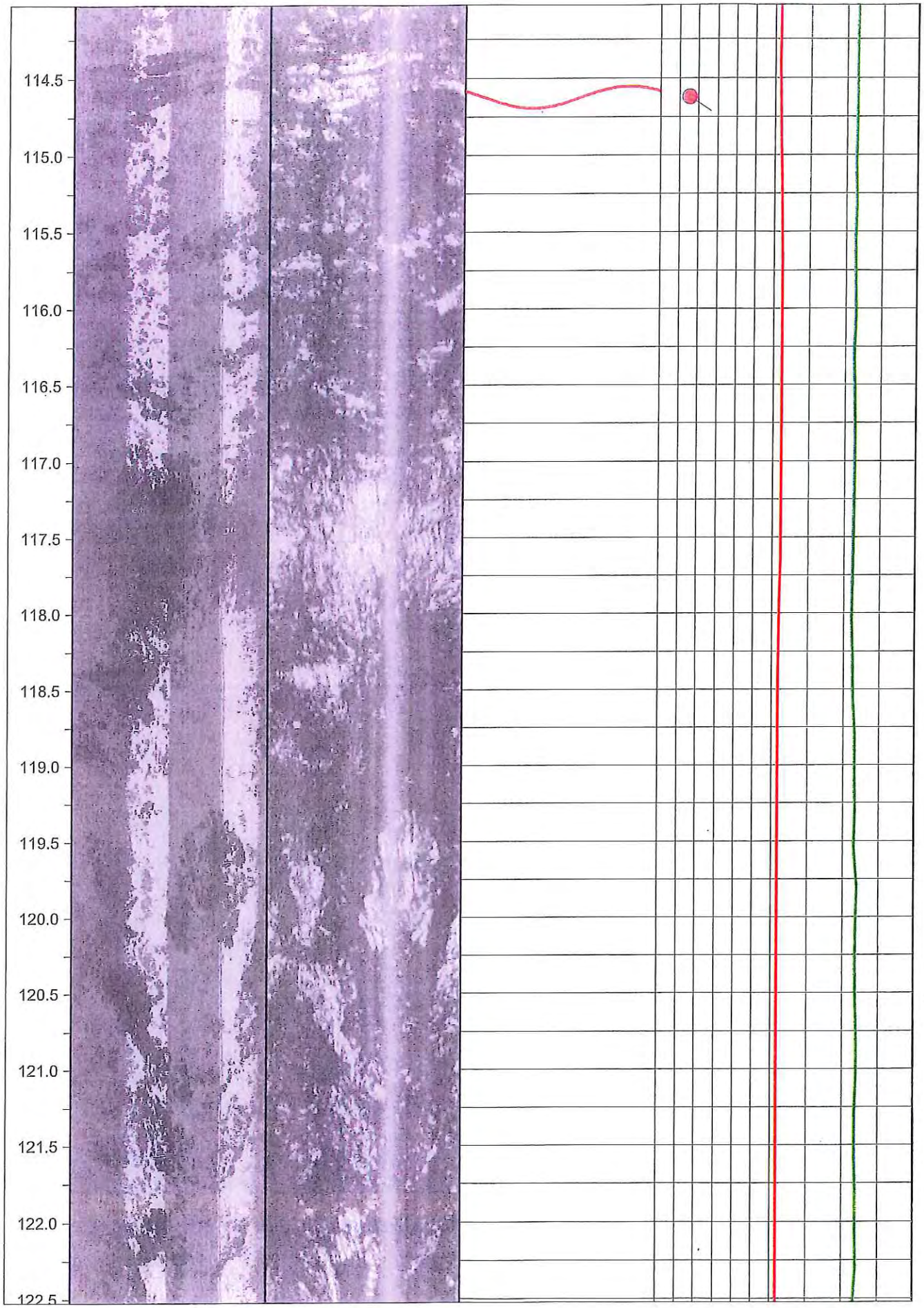
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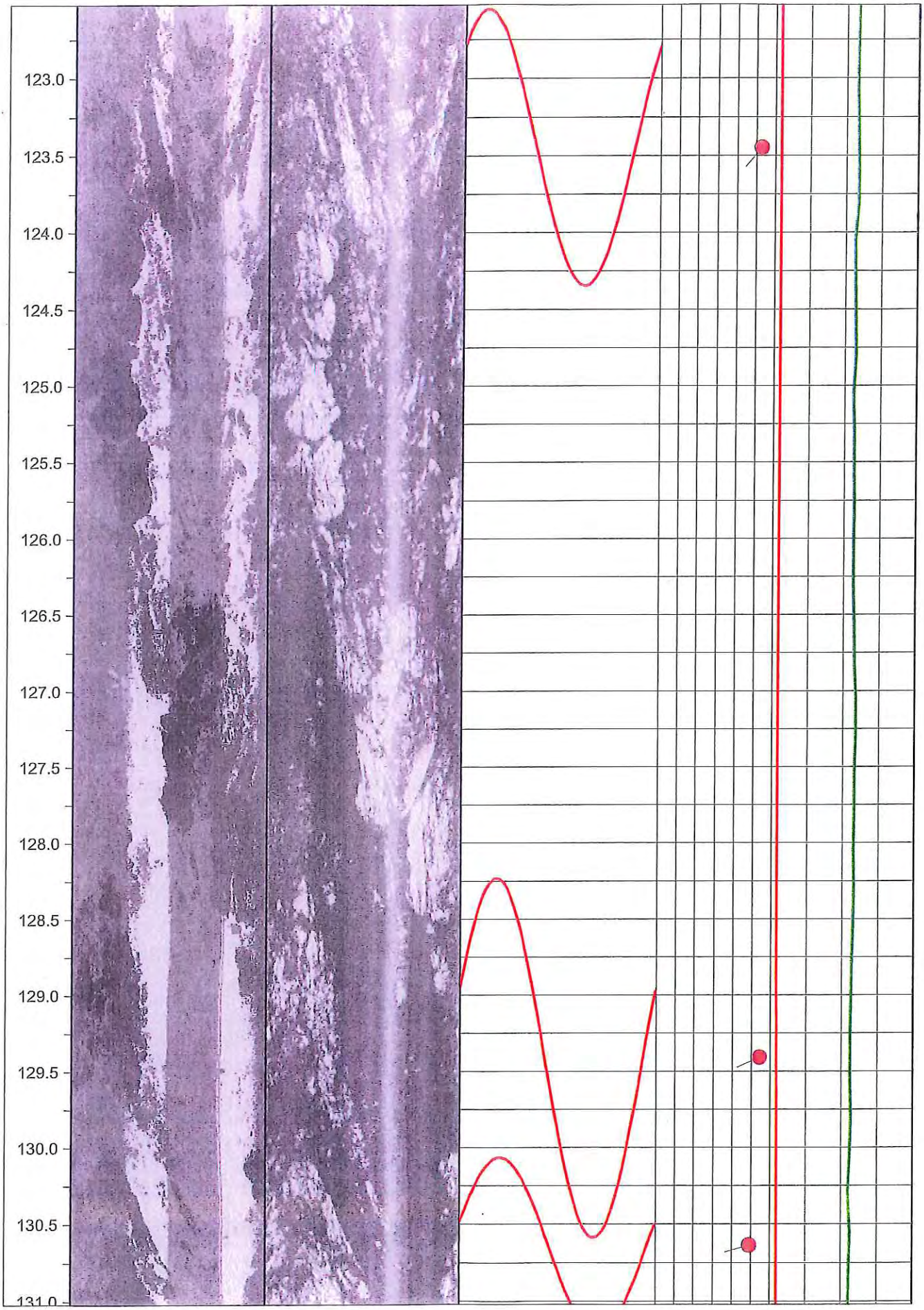
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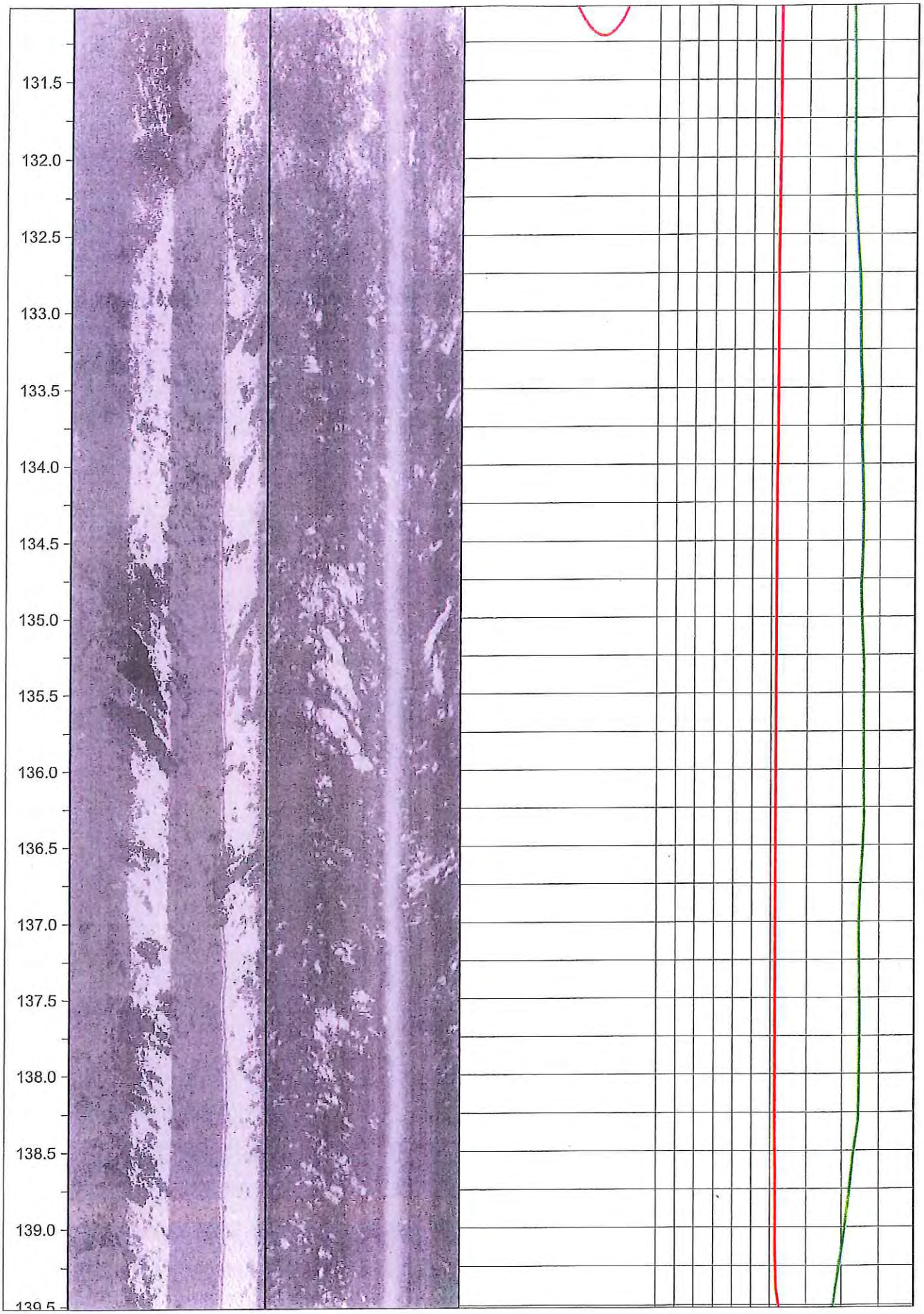
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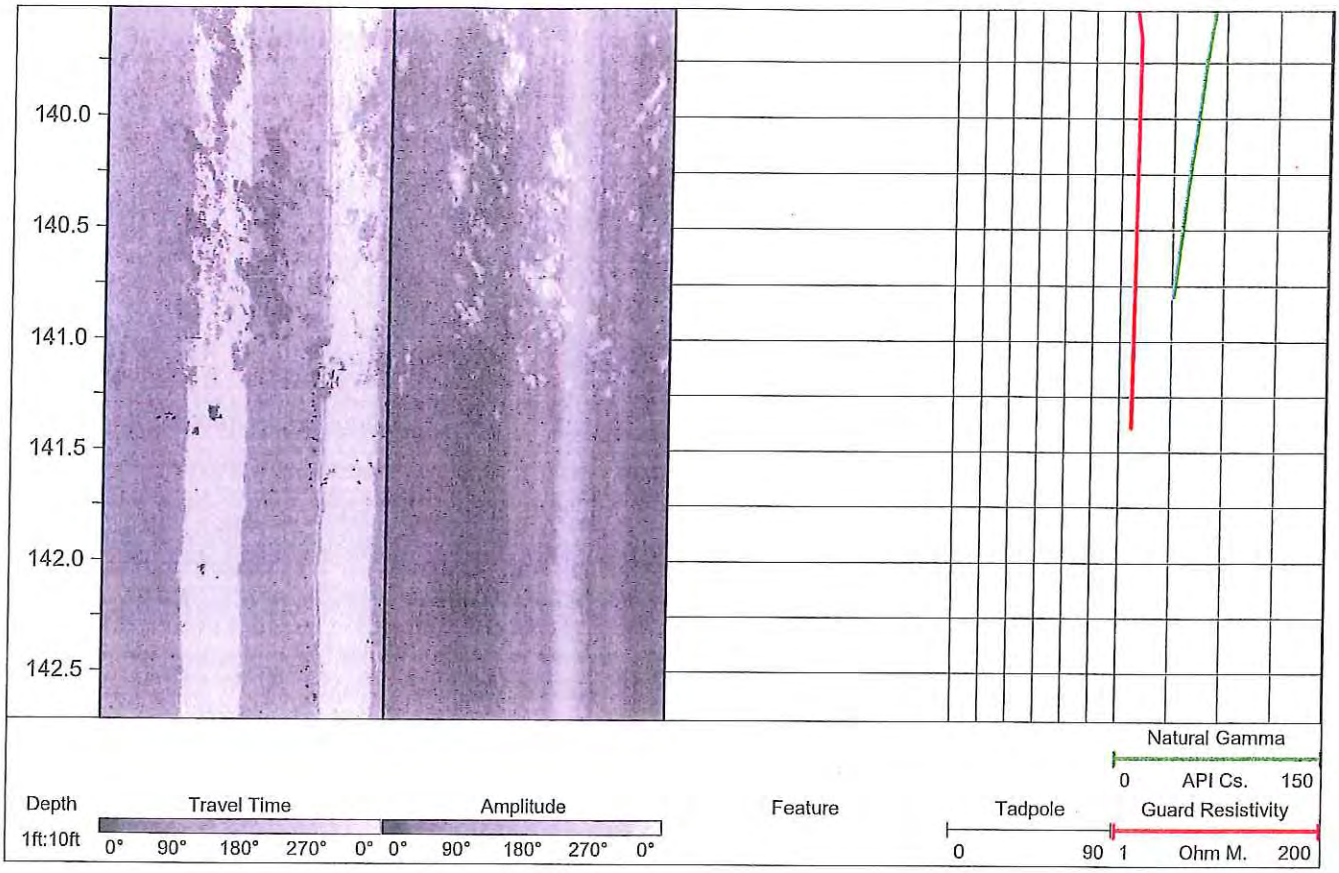
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142.0
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Natural Gamma
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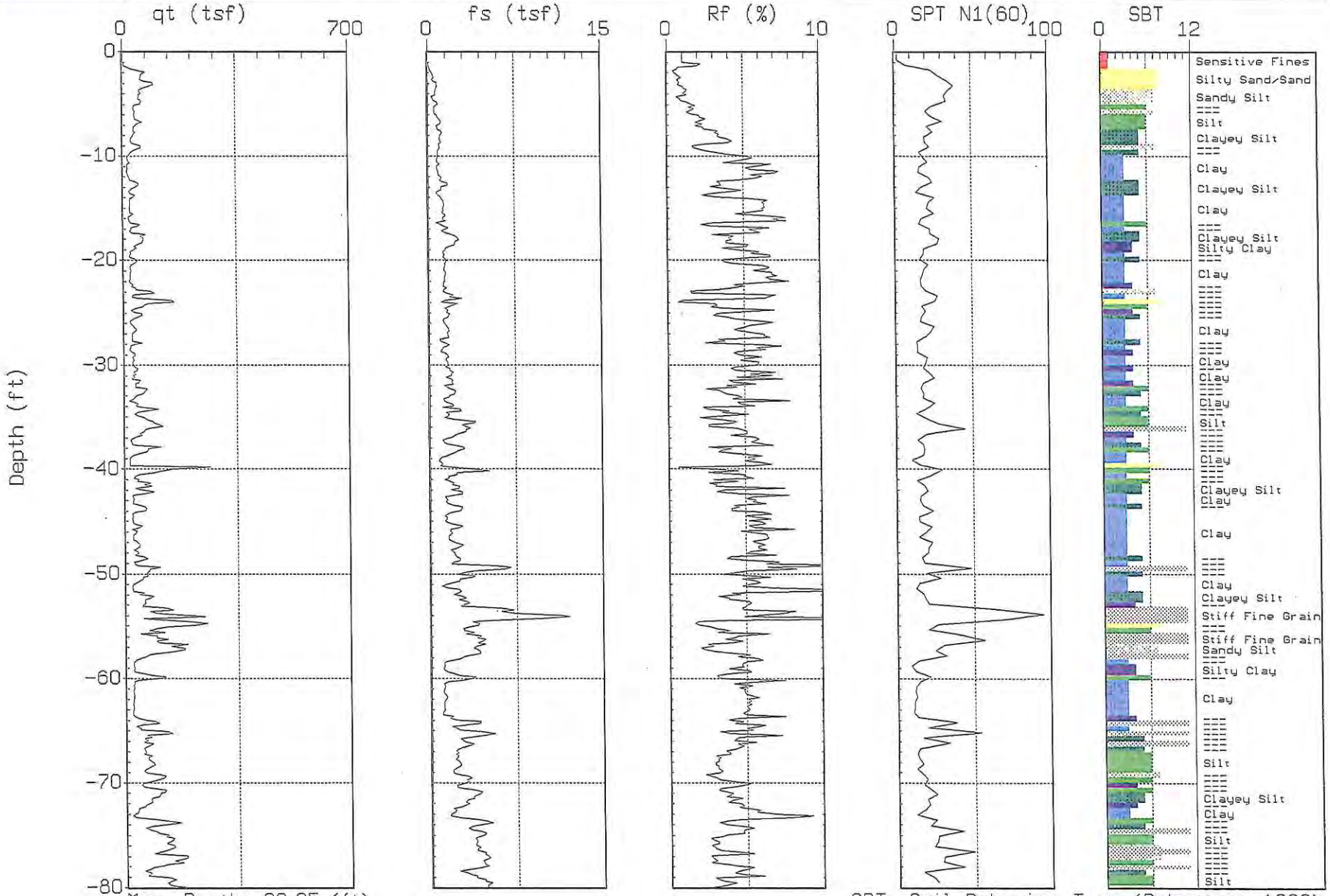
Depth
1ft:10ft
Travel Time
0° 90° 180° 270° 0°
Amplitude
0° 90° 180° 270° 0°
Feature
Tadpole
0 90
Guard Resistivity
1 Ohm M. 200

GREGG

RJR ENGINEERING

Site : MESSENGER INVEST
Location : CPT-01

Engineer : R.ANDERSON
Date : 08:25:04 08:46



Max. Depth: 80.05 (ft)
Depth Inc.: 0.164 (ft)

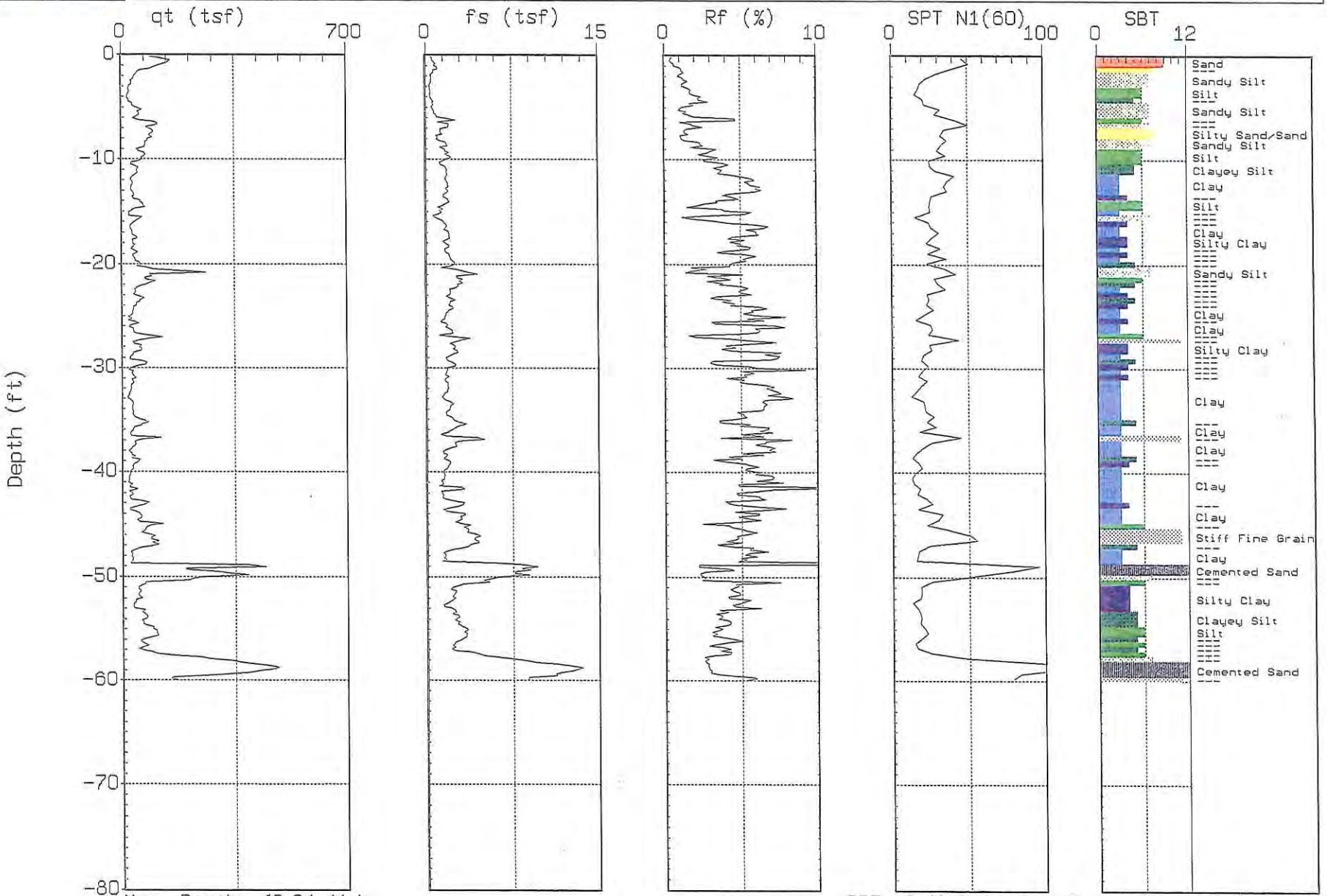
SBT: Soil Behavior Type (Robertson 1990)

GREGG

RJR ENGINEERING

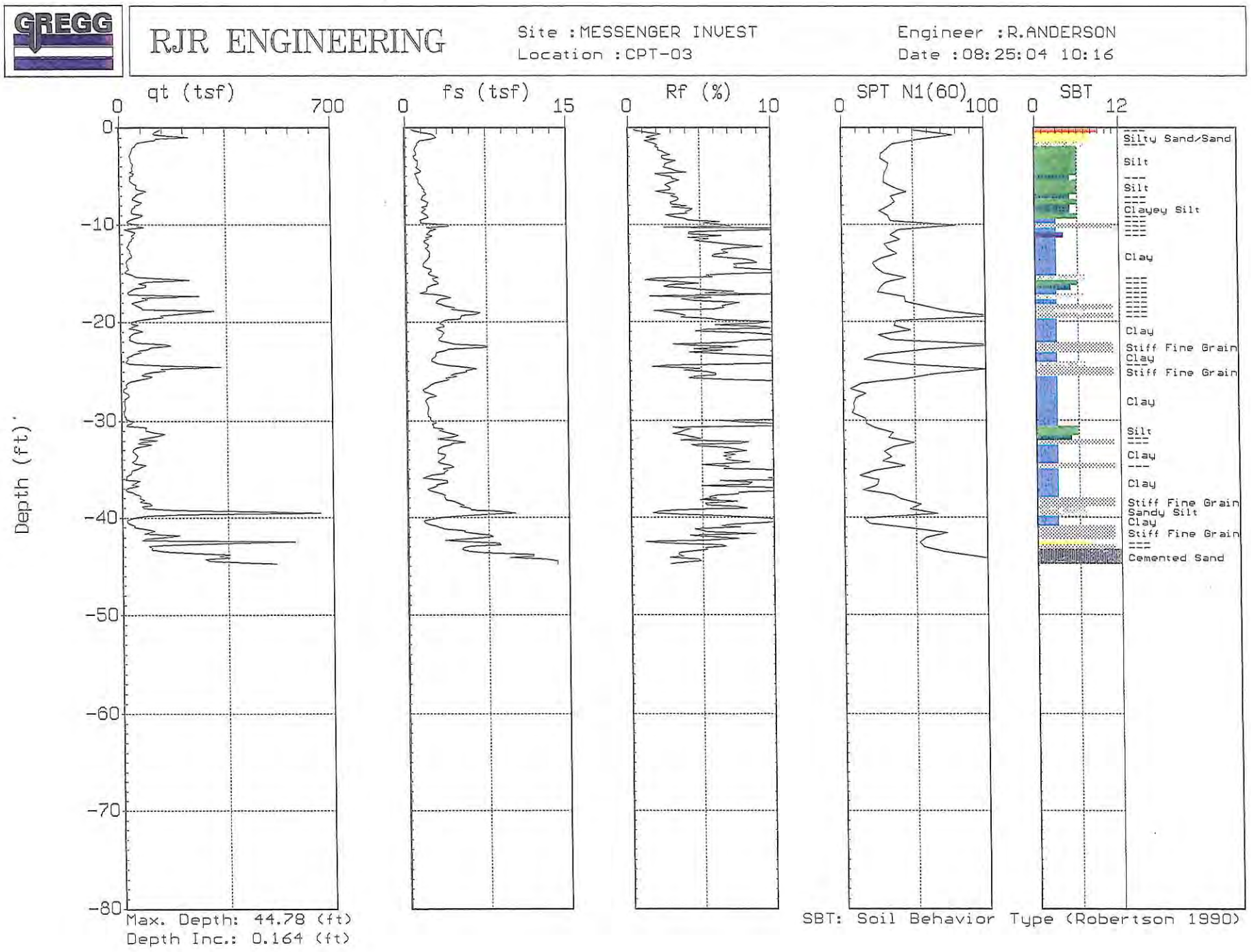
Site : MESSENGER INVEST
Location : CPT-02

Engineer : R.ANDERSON
Date : 08:25:04 09:38



Max. Depth: 60.04 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)


GREGG
RJR ENGINEERING
Site : MESSENGER INVEST
Location : CPT-03
Engineer : R.ANDERSON
Date : 08:25:04 10:16
qt (tsf)
0
700
fs (tsf)
0
15
Rf (%)
0
10
SPT N1(60)
0
100
SBT
0
12
Depth (ft)
0
-10
-20
-30
-40
-50
-60
-70
-80
Silty Sand/Sand
Silt
Silt
Clayey Silt
Clay
Clay
Stiff Fine Grain
Clay
Stiff Fine Grain
Clay
Silt
Clay
Clay
Stiff Fine Grain
Sandy Silt
Clay
Stiff Fine Grain
Cemented Sand
Max. Depth: 44.78 (ft)
Depth Inc.: 0.164 (ft)
SBT: Soil Behavior Type (Robertson 1990)

Cone Penetration Testing Procedure (CPT)

Gregg In Situ, Inc. carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*. The soundings are conducted using a 10 ton capacity cone with a tip area of 10 cm^2 and a friction sleeve area of 150 cm^2. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.85.

The cone takes measurements of cone bearing (q_c), sleeve friction (f_s) and dynamic pore water pressure (u_2) at 5-cm intervals during penetration to provide a nearly continuous hydrogeologic log. CPT data reduction and interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings are performed in accordance with revised (2002) ASTM standards (D 5778-95).

The cone also contains a porous filter element located directly behind the cone tip (u_2), *Figure CPT*. It consists of porous plastic and is 5.0mm thick. The filter element is used to obtain dynamic pore pressure as the cone is advanced as well as Pore Pressure Dissipation Tests (PPDT's) during appropriate pauses in penetration. It should be noted that prior to penetration, the element is fully saturated with silicon oil under vacuum pressure to ensure accurate and fast dissipation.

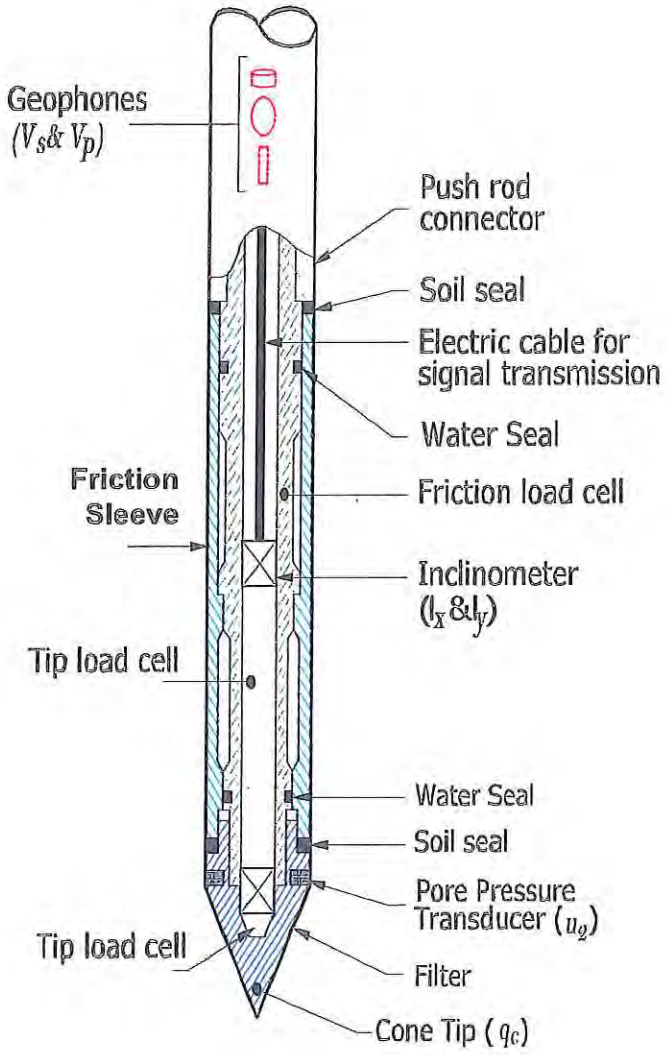


Figure CPT

When the soundings are complete, the test holes are grouted using a Gregg In Situ support rig. The grouting procedure consists of pushing a hollow CPT rod with a "knock out" plug to the termination depth of the test hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

Cone Penetration Test Data & Interpretation

Soil behavior type and stratigraphic interpretation is based on relationships between cone bearing (q_c), sleeve friction (f_s), and pore water pressure (u_2). The friction ratio (R_f) is a calculated parameter defined by $100f_s/q_c$ and is used to infer soil behavior type. Generally:

Cohesive soils (clays)

- High friction ratio (R_f) due to small cone bearing (q_c)
- Generate large excess pore water pressures (u_2)

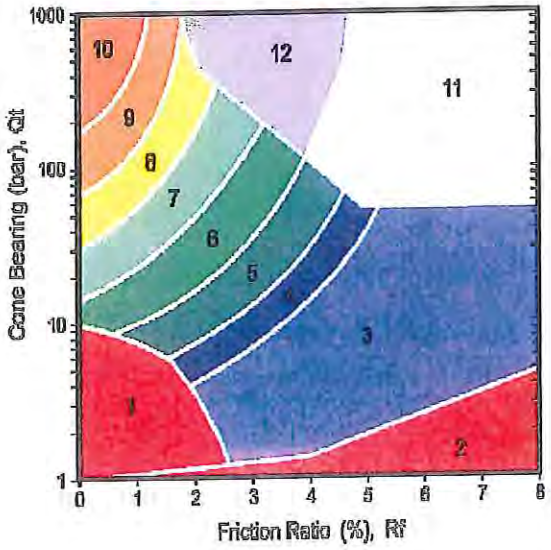
Cohesionless soils (sands)

- Low friction ratio (R_f) due to large cone bearing (q_c)
- Generate very little excess pore water pressures (u_2)

A complete set of baseline readings are taken prior to and at the completion of each sounding to determine temperature shifts and any zero load offsets. Corrections for temperature shifts and zero load offsets can be extremely important, especially when the recorded loads are relatively small. In sandy soils, however, these corrections are generally negligible.

The cone penetration test data collected from your site is presented in graphical form in Appendix CPT. The data includes CPT logs of measured soil parameters, computer calculations of interpreted soil behavior types (SBT), and additional geotechnical parameters. A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Soil interpretation for this project was conducted using recent correlations developed by Robertson et al, 1990, *Figure SBT*. Note that it is not always possible to clearly identify a soil type based solely on q_c, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the soil behavior type.



ZONE	Qt/N	SBT
1	2	Sensitive, fine grained
2	1	Organic materials
3	1	Clay
4	1.5	Silty clay to clay
5	2	Clayey silt to silty clay
6	2.5	Sandy silt to clayey silt
7	3	Silty sand to sandy silt
8	4	Sand to silty sand
9	5	Sand
10	6	Gravely sand to sand
11	1	Very stiff fine grained*
12	2	Sand to clayey sand*

*over consolidated or cemented

Figure SBT

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Copies of ASTM Standards are available through www.astm.org

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Gregg In Situ, Inc.
Interpretation Output - Release 1.22A Format: NLI Imperial
Run No: 04-0902-1104-3887
Job No: 04-233SH
Client: RJR ENGINEERING
Project: CPT Site Investigation
Site: MESSENGER INVEST.
Location: CPT-01
Oversight: R.ANDERSON
CPT Date: 04/25/08
CPT Time: 08:46
CPT File: 233C01.COR
Northing (m): 0.000000
Easting (m): 0.000000
Elevation (m): 0.000000

Water Table (m): 27.43 (ft): 90.0
Unit Weight of Water (default): 62.40 pcf
Averaging Increment (m): 0.30
Phi Method : Robertson and Campanella, 1983
Su Nkt used: 15.00 Su/P' (nc): 0.30
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Constant Unit Weight Used Throughout (pcf): 119.97
N160Ic Calculated using qc1n
N160cs Calculated using qc1ncs

Col-01 Depth (m)	Col-02 Depth (ft)	Col-03 Elev. (m)	Col-04 Elev. (ft)	Col-05 qc (tsf)	Col-06 qt (tsf)	Col-07 fs (tsf)	Col-08 Rf (%)	Col-09 u (ft)	Col-10 SBT (Zone)	Col-11 SBTn (Zone)	Col-12 SBT-BQ (Zone)	Col-13 SBT-BQn (Zone)	Col-14 Perm-k (cm/s)	Col-15 Unit Wt (pcf)	Col-16 T Stress (kPa)	Col-17 U Stress (tsf)	Col-18 E Stress (tsf)	Col-19 Cn	Col-20 N60 (b/ft)	Col-21 N1(60) (b/ft)	Col-22 N(60)Ic (b/ft)	Col-23 N1(60)Ic (b/ft)	Col-24 Qt	Col-25 Fr (%)	Col-26 Bq	Col-27 Ic	Col-28 FC (%)	Col-29 IcZone (Zone)	Col-30 Dr (%)	Col-31 Phi (deg)	Col-32 State Par	Col-33 Es/qt	Col-34 YoungE (tsf)	Col-35 Su (tsf)
0.150	0.492	-0.150	-0.492	2.00	2.01	0.02	1.00	0.07	1	6	-9999.0	6	1.0E-07	120.0	0.030	0.000	0.030	2.00	1.0	1.9	0.5	6.8	66.92	1.01	0.00	2.37	25.1	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	0.132
0.450	1.476	-0.450	-1.476	28.15	28.18	0.16	0.58	2.82	7	6	7	7	5.0E-04	120.0	0.089	0.000	0.089	2.00	9.0	18.0	5.2	17.9	317.12	0.58	0.01	1.80	8.1	6	65.1	46.0	-0.24	2.208	62.2	-9999.0
0.750	2.461	-0.750	-2.461	65.16	65.17	0.51	0.78	1.28	8	6	8	7	5.0E-03	120.0	0.148	0.000	0.148	2.00	15.6	31.2	11.5	30.7	440.44	0.78	0.00	1.67	5.6	6	81.8	48.0	-0.30	1.879	122.5	-9999.0
1.050	3.445	-1.050	-3.445	67.65	67.67	0.71	1.04	1.89	8	6	8	7	5.0E-03	120.0	0.207	0.000	0.207	2.00	16.2	32.4	12.5	28.2	326.40	1.05	0.00	1.80	8.2	6	78.1	48.0	-0.30	1.926	130.3	-9999.0
1.350	4.429	-1.350	-4.429	53.72	53.72	0.59	1.10	0.52	7	6	8	7	5.0E-04	120.0	0.266	0.000	0.266	1.94	17.1	33.3	10.4	20.7	201.15	1.11	0.00	1.93	11.2	6	67.8	46.0	-0.26	2.137	114.8	-9999.0
1.650	5.413	-1.650	-5.413	35.98	35.99	0.57	1.57	1.28	7	6	7	6	5.0E-04	120.0	0.325	0.000	0.325	1.75	11.5	20.2	7.8	13.9	109.81	1.59	0.00	2.20	19.0	5	53.5	42.0	-0.24	2.639	95.0	-9999.0
1.950	6.398	-1.950	-6.398	44.46	44.47	0.96	2.16	1.02	6	5	8	6	5.0E-05	120.0	0.384	0.000	0.384	1.61	17.0	27.5	9.8	16.2	114.85	2.18	0.00	2.25	20.7	5	57.2	42.0	-0.29	2.480	110.3	2.939
2.250	7.382	-2.250	-7.382	35.70	35.71	0.98	2.73	0.96	6	5	8	6	5.0E-05	120.0	0.443	0.000	0.443	1.50	13.7	20.6	8.5	13.0	79.63	2.77	0.00	2.41	27.0	5	48.8	42.0	-0.29	2.868	102.4	2.351
2.550	8.366	-2.550	-8.366	28.82	28.82	1.02	3.54	0.46	5	4	7	6	5.0E-06	120.0	0.502	0.000	0.502	1.41	13.8	19.5	7.4	10.7	56.42	3.60	0.00	2.58	34.3	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.888
2.850	9.350	-2.850	-9.350	38.58	38.59	0.89	2.30	0.84	6	5	8	6	5.0E-05	120.0	0.561	0.000	0.561	1.34	14.8	19.7	9.0	12.3	67.78	2.33	0.00	2.38	25.4	5	47.6	40.0	-0.24	2.929	113.0	2.535
3.150	10.335	-3.150	-10.335	16.33	16.33	0.83	5.05	0.73	3	3	6	5	5.0E-08	120.0	0.620	0.000	0.620	1.27	15.6	19.9	4.8	7.8	25.34	5.25	0.00	2.83	48.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.048
3.450	11.319	-3.450	-11.319	13.43	13.43	0.81	6.02	-0.14	3	3	6	5	5.0E-08	120.0	0.679	0.000	0.679	1.21	12.9	15.6	4.3	6.3	18.78	6.34	0.00	2.99	57.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	0.850
3.750	12.303	-3.750	-12.303	31.61	31.61	1.28	4.05	0.74	4	4	7	6	5.0E-07	120.0	0.738	0.000	0.738	1.16	20.2	23.5	8.2	11.4	41.83	4.15	0.00	2.61	35.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.058
4.050	13.287	-4.050	-13.287	28.32	28.32	0.95	3.36	0.24	5	4	7	6	5.0E-06	120.0	0.797	0.000	0.797	1.12	13.6	15.2	7.4	9.4	34.53	3.45	0.00	2.61	36.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.835
4.350	14.271	-4.350	-14.271	22.74	22.75	1.24	5.44	0.43	3	3	7	5	5.0E-08	120.0	0.856	0.000	0.856	1.08	21.8	23.5	6.8	7.9	25.57	5.66	0.00	2.85	49.2	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.459
4.650	15.256	-4.650	-15.256	22.75	22.73	1.30	5.74	-1.80	3	3	7	5	5.0E-08	120.0	0.915	0.000	0.915	1.05	21.8	22.8	6.9	7.6	23.83	5.98	-0.01	2.89	51.5	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.454
4.950	16.240	-4.950	-16.240	28.63	28.62	1.17	4.10	-0.64	4	4	7	5	5.0E-07	120.0	0.974	0.000	0.974	1.01	18.3	18.5	8.0	8.2	28.37	4.24	0.00	2.74	42.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.843
5.250	17.224	-5.250	-17.224	36.11	36.13	1.66	4.59	1.72	4	4	7	6	5.0E-07	120.0	1.033	0.000	1.033	0.98	23.1	22.7	9.9	9.7	33.96	4.72	0.00	2.71	41.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.340
5.550	18.208	-5.550	-18.208	53.37	53.37	2.28	4.27	0.24	5	4	8	6	5.0E-06	120.0	1.093	0.000	1.093	0.96	25.6	24.5	13.6	13.3	47.85	4.36	0.00	2.57	33.8	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.485
5.850	19.193	-5.850	-19.193	25.47	25.47	1.32	5.18	-0.38	3	3	7	5	5.0E-08	120.0	1.152	0.000	1.152	0.93	24.4	22.7	7.8	6.7	21.11	5.42	0.00	2.90	52.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.621
6.150	20.177	-6.150	-20.177	30.47	30.47	1.41	4.64	-0.21	4	3	7	5	5.0E-07	120.0	1.211	0.000	1.211	0.91	19.5	17.7	8.9	7.4	24.17	4.83	0.00	2.82	47.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.951
6.450	21.161	-6.450	-21.161	21.04	21.04	1.38	6.55	-0.69	3	3	7	5	5.0E-08	120.0	1.270	0.000	1.270	0.89	20.1	17.9	7.1	5.5	15.57	6.97	0.00	3.07	63.6	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.318
6.750	22.145	-6.750	-22.145	24.74	24.73	1.34	5.42	-0.87	3	3	7	5	5.0E-08	120.0	1.329	0.000	1.329	0.87	23.7	20.5	7.9	5.9	17.61	5.73	0.00	2.98	56.9	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.560
7.050	23.130	-7.050	-23.130	53.06	53.06	1.78	3.36	0.13	6	4	8	6	5.0E-05	120.0	1.388	0.000	1.388	0.85	20.3	17.3	13.3	11.5	37.23	3.45	0.00	2.53	32.3	5	43.8	38.0	-0.24	3.282	174.1	3.445
7.350	24.114	-7.350	-24.114	90.67	90.67	1.68	1.85	-0.27	7	5	9	6	5.0E-04	120.0	1.447	0.000	1.447	0.83	28.9	24.1	19.5	16.6	61.66	1.88	0.00	2.19	18.7	5	58.6	40.0	-0.20	2.561	232.2	-9999.0
7.650	25.098	-7.650	-25.098	40.15	40.16	1.60	3.97	1.03	5	4	8	5	5.0E-06	120.0	1.506	0.000	1.506	0.81	19.2	15.7	11.3	7.5	25.67	4.13	0.00	2.76	43.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.577
7.950	26.082	-7.950	-26.082	26.57	26.58	1.42	5.34	0.90	3	3	7	5	5.0E-08	120.0	1.565	0.000	1.565	0.80	25.5	20.3	8.6	5.4	15.98	5.68	0.00	3.01	58.9	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.667
8.250	27.067	-8.250	-27.067	27.97	27.98	1.51	5.39	0.73	3	3	7	5	5.0E-08	120.0	1.624	0.000	1.624	0.78	26.8	21.0	9.1	5.5	16.23	5.72	0.00	3.00	58.7	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.757
8.550	28.051	-8.550	-28.051	27.58	27.61	1.29	4.68	2.54	3	3	7	5	5.0E-08	120.0	1.683	0.000	1.683	0.77	26.4	20.4	8.8	5.1	15.40	4.99	0.01	2.98	57.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.729
8.850	29.035	-8.850	-29.035	28.38	28.40	1.40	4.92	2.44	3	3	7	5	5.0E-08	120.0	1.742	0.000	1.742	0.76	27.2	20.6	9.2	5.2	15.30	5.24	0.01	3.00	58.3	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.777
9.150	30.019	-9.150	-30.019	32.32	32.33	1.61	4.98	0.44	3	3	7	5	5.0E-08	120.0	1.801	0.000	1.801	0.75	31.0	23.1	10.2	5.6	16.95	5.27	0.00	2.97	56.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.035
9.450	31.004	-9.450	-31.004	33.09	33.10	1.86	5.61	0.66	3	3	7	5	5.0E-08	120.0	1.860	0.000	1.860	0.73	31.7	23.2	10.7	5.7	16.79	5.95	0.00	3.00	58.7	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.082
9.750	31.988	-9.750	-31.988	48.06	48.08	1.80	3.74	1.98	5	4	8	5	5.0E-06	120.0	1.919	0.000	1.919	0.72	23.0	16.6	13.6	7.1	24.05	3.90	0.00	2.76	44.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.077
10.050	32.972	-10.050	-32.972	38.86	38.87	1.68	4.33	1.09	4	3	8	5	5.0E-07	120.0	1.978	0.000	1.978	0.71	24.8	17.6	11.8	5.9	18.65	4.56	0.00	2.89	51.6	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.460
10.350	33.956	-10.350	-33.956	55.73	55.76	1.99	3.58	3.28	5	4	8	5	5.0E-06	120.0	2.037	0.000	2.037	0.70	26.7	18.7	15.4	7.6	26.37	3.71	0.00	2.72	41.6	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.582
10.650	34.941	-10.650	-34.941	56.86	56.88	2.04	3.58	1.34	5	4	8	5	5.0E-06	120.0	2.096	0.000	2.096	0.69	27.2	18.8	15.7	7.5	26.13	3.72	0.00	2.72	41.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.652
10.950	35.925	-10.950	-35.925	87.16	87.19	3.25	3.73	3.14	5	4	9	6	5.0E-06	120.0	2.156	0.000	2.156	0.68	41.7	28.4	22.6	10.7	39.45	3.83	0.00	2.60	35.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.669
11.250	36.909	-11.250	-36.909	33.27	33.31	1.71	5.12	4.17	3	3	7	5	5.0E-08	120.0	2.215	0.000	2.215	0.67	31.9	21.4	11.1	4.9	14.04	5.49	0.01	3.04	61.1	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.073
11.550	37.893	-11.550	-37.893	63.31	63.32	2.35	3.71	1.79	5	4	8	5	5.0E-06	120.0	2.274	0.000	2.274	0.66	30.3	20.1	17.5	7.8	26.85	3.85	0.00	2.73	41.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.070

Calabasas Holdings, LLC
Tract 62443

Col-01 Depth (m)	Col-02 Depth (ft)	Col-03 Elev. (m)	Col-04 Elev. (ft)	Col-05 qc (tsf)	Col-06 qt (tsf)	Col-07 fs (tsf)	Col-08 RF (%)	Col-09 u (ft)	Col-10 SBT (Zone)	Col-11 SBTn (Zone)	Col-12 SBT-BQ (Zone)	Col-13 SBT-BQn (Zone)	Col-14 Perm-k (cm/s)	Col-15 Unit Wt (pcf)	Col-16 T Stress (kPa)	Col-17 U Stress (tsf)	Col-18 E Stress (tsf)	Col-19 Cn	Col-20 N60 (b/ft)	Col-21 N1(60) (b/ft)	Col-22 N(60)Ic (b/ft)	Col-23 N1(60)Ic (b/ft)	Col-24 Qt	Col-25 Fr (%)	Col-26 Bq	Col-27 Ic	Col-28 FC (%)	Col-29 IcZone (Zone)	Col-30 Dr (%)	Col-31 Phi (deg)	Col-32 State Par	Col-33 Es/qt	Col-34 YoungE (tsf)	Col-35 Su (tsf)
11.850	38.877	-11.850	-38.877	21.75	21.75	1.15	5.28	0.36	3	3	7	4	5.0E-08	120.0	2.333	0.000	2.333	0.65	20.8	13.6	8.3	3.3	8.32	5.92	0.00	3.24	75.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.295
12.150	39.862	-12.150	-39.862	109.29	109.32	2.46	2.25	2.70	7	5	9	6	5.0E-04	120.0	2.392	0.000	2.392	0.65	34.9	22.6	24.3	16.1	44.71	2.30	0.00	2.27	21.5	5	56.7	38.0	-0.19	2.834	309.8	-9999.0
12.450	40.846	-12.450	-40.846	44.77	44.78	1.76	3.94	1.44	5	3	8	5	5.0E-06	120.0	2.451	0.000	2.451	0.64	21.4	13.7	13.6	5.5	17.27	4.16	0.00	2.89	51.6	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.822
12.750	41.830	-12.750	-41.830	62.47	62.50	2.39	3.82	3.04	5	4	8	5	5.0E-06	120.0	2.510	0.000	2.510	0.63	29.9	18.9	17.7	7.1	23.90	3.98	0.00	2.77	44.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.999
13.050	42.814	-13.050	-42.814	25.32	25.41	1.52	6.00	7.60	3	3	7	4	5.0E-08	120.0	2.569	0.000	2.569	0.62	24.3	15.2	9.7	3.6	8.89	6.67	0.02	3.25	76.6	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.523
13.350	43.799	-13.350	-43.799	48.73	48.79	2.25	4.62	5.93	4	3	8	5	5.0E-07	120.0	2.628	0.000	2.628	0.62	31.2	19.2	15.2	5.7	17.57	4.88	0.01	2.93	54.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.078
13.650	44.783	-13.650	-44.783	24.54	24.59	1.43	5.82	5.15	3	3	7	4	5.0E-08	120.0	2.687	0.000	2.687	0.61	23.6	14.4	9.6	3.3	8.15	6.54	0.02	3.27	78.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.460
13.950	45.767	-13.950	-45.767	35.57	35.62	2.04	5.73	4.70	3	3	7	5	5.0E-08	120.0	2.746	0.000	2.746	0.60	34.1	20.6	12.5	4.4	11.97	6.21	0.01	3.13	67.4	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.192
14.250	46.751	-14.250	-46.751	32.27	32.33	1.96	6.06	5.26	3	3	7	4	5.0E-08	120.0	2.805	0.000	2.805	0.60	31.0	18.5	11.9	4.0	10.52	6.64	0.01	3.19	72.0	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.968
14.550	47.736	-14.550	-47.736	35.66	35.72	2.08	5.83	5.68	3	3	7	4	5.0E-08	120.0	2.864	0.000	2.864	0.59	34.2	20.2	12.7	4.3	11.47	6.34	0.01	3.15	68.9	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.190
14.850	48.720	-14.850	-48.720	43.93	43.99	2.79	6.35	5.73	3	3	8	5	5.0E-08	120.0	2.923	0.000	2.923	0.58	42.1	24.6	15.2	5.1	14.05	6.80	0.01	3.10	65.4	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.738
15.150	49.704	-15.150	-49.704	77.28	77.32	4.39	5.68	4.05	11	3	8	5	1.0E-15	120.0	2.982	0.000	2.982	0.58	74.0	42.9	23.2	7.8	24.93	5.91	0.00	2.87	50.4	4	43.6	34.0	-0.38	-9999.0	-9999.0	-9999.0
15.450	50.688	-15.450	-50.688	38.27	38.37	2.14	5.57	9.24	3	3	7	4	5.0E-08	120.0	3.041	0.000	3.041	0.57	36.7	21.1	13.5	4.3	11.62	6.05	0.02	3.13	67.6	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.355
15.750	51.673	-15.750	-51.673	41.77	41.94	2.25	5.35	15.41	3	3	7	4	5.0E-08	120.0	3.100	0.000	3.100	0.57	40.2	22.8	14.4	4.5	12.53	5.78	0.03	3.09	64.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.589
16.050	52.657	-16.050	-52.657	61.62	61.66	2.87	4.66	4.04	4	3	8	5	5.0E-07	120.0	3.159	0.000	3.159	0.56	39.4	22.1	19.0	6.0	18.52	4.91	0.00	2.92	53.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.900
16.350	53.641	-16.350	-53.641	147.76	147.81	8.33	5.64	4.76	11	3	9	6	1.0E-15	120.0	3.219	0.000	3.219	0.56	141.6	78.9	40.1	12.7	44.92	5.76	0.00	2.69	39.8	4	61.1	38.0	-0.50	3.690	545.4	-9999.0
16.650	54.625	-16.650	-54.625	165.94	165.99	5.05	3.04	4.47	7	4	9	6	5.0E-04	120.0	3.278	0.000	3.278	0.55	53.0	29.3	37.2	21.0	49.64	3.10	0.00	2.29	22.0	5	64.2	38.0	-0.25	2.719	451.3	-9999.0
16.950	55.610	-16.950	-55.610	87.72	87.79	3.46	3.94	6.32	5	4	9	5	5.0E-06	120.0	3.337	0.000	3.337	0.55	42.0	23.0	24.7	7.5	25.31	4.09	0.01	2.76	43.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.630
17.250	56.594	-17.250	-56.594	139.90	139.91	4.26	3.04	0.48	6	4	9	6	5.0E-05	120.0	3.396	0.000	3.396	0.54	53.6	29.1	32.1	17.8	40.20	3.12	0.00	2.34	24.2	5	58.8	38.0	-0.23	2.952	413.0	9.101
17.550	57.578	-17.550	-57.578	101.83	101.84	3.61	3.55	0.58	6	4	9	5	5.0E-05	120.0	3.455	0.000	3.455	0.54	39.0	21.0	27.7	8.1	28.48	3.67	0.00	2.69	40.0	4	49.4	36.0	-0.21	-9999.0	-9999.0	6.559
17.850	58.562	-17.850	-58.562	25.25	25.66	1.26	4.90	37.12	3	3	6	3	5.0E-08	120.0	3.514	0.000	3.514	0.53	24.6	13.1	10.4	2.7	6.30	5.68	0.12	3.32	82.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.476
18.150	59.547	-18.150	-59.547	68.20	68.42	2.39	3.49	20.71	6	3	8	5	5.0E-05	120.0	3.573	0.000	3.573	0.53	26.2	13.9	20.2	5.6	18.15	3.68	0.02	2.84	48.5	4	37.5	32.0	-0.15	-9999.0	-9999.0	4.323
18.450	60.531	-18.450	-60.531	25.52	25.69	1.42	5.54	15.45	3	3	6	4	5.0E-08	120.0	3.632	0.000	3.632	0.52	24.6	12.9	10.8	2.7	6.07	6.45	0.05	3.37	86.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.470
18.750	61.515	-18.750	-61.515	22.86	23.15	1.19	5.14	26.88	3	3	6	3	5.0E-08	120.0	3.691	0.000	3.691	0.52	22.2	11.5	10.0	2.4	5.27	6.11	0.10	3.40	89.9	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.297
19.050	62.499	-19.050	-62.499	20.90	21.18	1.09	5.14	26.17	3	3	5	3	5.0E-08	120.0	3.750	0.000	3.750	0.52	20.3	10.5	9.6	2.2	4.65	6.25	0.11	3.45	94.4	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.162
19.350	63.483	-19.350	-63.483	29.14	29.38	1.43	4.85	22.12	3	3	6	4	5.0E-08	120.0	3.809	0.000	3.809	0.51	28.1	14.4	11.7	2.8	6.71	5.57	0.06	3.29	80.6	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.705
19.650	64.468	-19.650	-64.468	58.53	58.72	2.92	4.97	17.46	11	3	8	5	1.0E-15	120.0	3.868	0.000	3.868	0.51	56.2	28.6	19.3	4.9	14.18	5.32	0.02	3.03	60.3	3	32.0	32.0	-0.19	-9999.0	-9999.0	-9999.0
19.950	65.452	-19.950	-65.452	88.34	88.51	3.81	4.31	15.95	5	3	8	5	5.0E-06	120.0	3.927	0.000	3.927	0.50	42.4	21.4	26.1	6.6	21.54	4.51	0.01	2.84	48.5	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.639
20.250	66.436	-20.250	-66.436	61.85	62.37	2.81	4.51	47.84	5	3	7	5	5.0E-06	120.0	3.986	0.000	3.986	0.50	29.9	15.0	20.1	4.9	14.65	4.81	0.06	2.99	57.7	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.892
20.550	67.420	-20.550	-67.420	65.54	66.05	2.19	3.31	47.26	6	3	7	5	5.0E-05	120.0	4.045	0.000	4.045	0.50	25.3	12.7	20.0	4.8	15.33	3.52	0.05	2.89	51.3	4	34.7	32.0	-0.11	-9999.0	-9999.0	4.134
20.850	68.405	-20.850	-68.405	71.09	71.56	2.19	3.06	43.78	6	3	8	5	5.0E-05	120.0	4.104	0.000	4.104	0.50	27.4	13.7	21.1	5.1	16.43	3.25	0.05	2.84	48.5	4	36.8	32.0	-0.11	-9999.0	-9999.0	4.497
21.150	69.389	-21.150	-69.389	95.37	95.65	2.84	2.97	25.75	6	4	8	5	5.0E-05	120.0	4.163	0.000	4.163	0.50	36.6	18.3	26.5	6.4	21.97	3.10	0.02	2.73	42.1	4	44.9	34.0	-0.15	-9999.0	-9999.0	6.099
21.450	70.373	-21.450	-70.373	79.09	79.22	2.96	3.74	11.43	5	3	8	5	5.0E-06	120.0	4.222	0.000	4.222	0.50	37.9	19.0	23.7	5.6	17.76	3.95	0.01	2.87	50.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.000
21.750	71.357	-21.750	-71.357	89.82	89.82	3.56	3.96	0.61	5	3	9	5	5.0E-06	120.0	4.282	0.000	4.282	0.50	43.0	21.5	26.5	6.2	19.98	4.16	0.00	2.84	48.6	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.703
22.050	72.342	-22.050	-72.342	48.53	48.47	2.37	4.90	-5.25	4	3	8	4	5.0E-07	120.0	4.341	0.000	4.341	0.50	30.9	15.5	17.2	3.8	10.17	5.38	-0.01	3.14	68.6	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.942
22.350	73.326	-22.350	-73.326	73.88	73.98	3.20	4.33	9.28	5	3	8	5	5.0E-06	120.0	4.400	0.000	4.400	0.50	35.4	17.7	23.2	5.2	15.82	4.60	0.01	2.95	55.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.639
22.650	74.310	-22.650	-74.310	85.51	85.50	3.87	4.53	-1.16	11	3	9	5	1.0E-15	120.0	4.459	0.000	4.459	0.50	81.9	40.9	26.3	5.8	18.18	4.78	0.00	2.91	52.9	4	40.7	32.0	-0.21	-9999.0	-9999.0	-9999.0
22.950	75.294	-22.950	-75.294	130.11	130.43	3.96	3.04	30.20	6	4	9	5	5.0E-05	120.0	4.518	0.000	4.518	0.50	50.0	25.0	34.8	7.8	27.87	3.15	0.02	2.66	38.1	4	52.7	36.0	-0.18	-9999.0	-9999.0	8.394
23.250	76.279	-23.250	-76.279	121.33	121.38	4.13	3.40	4.89	6	4	9	5	5.0E-05	120.0	4.577	0.000	4.577	0.50	46.5	23.2	33.4	7.3	25.52	3.54	0.00	2.72	41.4	4	50.4	34.0	-0.19	-9999.0	-9999.0	7.787
23.550	77.263	-23.550	-77.263	164.03	164.31	4.65	2.83	25.59	7	4	9	6	5.0E-04	120.0	4.636	0.000	4.636	0.50	52.5	26.2	37.4	17.7	34.44	2.91	0.01	2.32	23.3	5	58.9	36.0	-0.20	3.200	525.8	-9999.0
23.850	78.247	-23.850	-78.247	76.24	76.24	3.51	4.61	-0.25	11	3	8	5	1.0E-15	120.0	4.695	0.000	4.695	0.50	73.0	36.5	24.4	5.1	15.24	4.91	0.00	2.98	57.2	3	36.7	32.0	-0.18	-9999.0	-9999.0	-9999.0
24.150	79.231	-24.150	-79.231	121.69	121.78	4.43	3.64	8.37	6	4	9	5	5.0E-05	120.0	4.754	0.000	4.754	0.50	46.7	23.3	34.1	7.2	24.62	3.79	0.01	2.75	43.1	4	50.0	34.0	-0.20	-9999.0	-9999.0	7.802

Gregg In Situ, Inc.
Interpretation Output - Release 1.22A Format: NLI Imperial
Run No: 04-0902-1104-3925
Job No: 04-233SH
Client: RJR ENGINEERING
Project: CPT Site Investigation
Site: MESSENGER INVEST.
Location: CPT-02
Oversight: R.ANDERSON
CPT Date: 04/25/08
CPT Time: 09:38
CPT File: 233C02.COR
Northing (m): 0.000000
Easting (m): 0.000000
Elevation (m): 0.000000

Water Table (m): 27.43 (ft): 90.0
Unit Weight of Water (default): 62.40 pcf
Averaging Increment (m): 0.30
Phi Method : Robertson and Campanella, 1983
Su Nkt used: 15.00 Su/P' (nc): 0.30
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Constant Unit Weight Used Throughout (pcf): 119.97
N160Ic Calculated using qc1n
N160cs Calculated using qc1ncs

Col-01 Depth (m)	Col-02 Depth (ft)	Col-03 Elev. (m)	Col-04 Elev. (ft)	Col-05 qc (tsf)	Col-06 qt (tsf)	Col-07 fs (tsf)	Col-08 Rf (%)	Col-09 u (ft)	Col-10 SBT (Zone)	Col-11 SBTn (Zone)	Col-12 SBT-BQ (Zone)	Col-13 SBT-BQn (Zone)	Col-14 Perm-k (cm/s)	Col-15 Unit Wt (pcf)	Col-16 T.Stress (kPa)	Col-17 U Stress (tsf)	Col-18 E Stress (tsf)	Col-19 Cn	Col-20 N60 (b/ft)	Col-21 N1(60) (b/ft)	Col-22 N(60)Ic (b/ft)	Col-23 N1(60)Ic (b/ft)	Col-24 Qt	Col-25 Fr (%)	Col-26 Bq	Col-27 Ic	Col-28 FC (%)	Col-29 IcZone (Zone)	Col-30 Dr (%)	Col-31 Phi (deg)	Col-32 State Par	Col-33 Es/qt	Col-34 YoungE (tsf)	Col-35 Su (tsf)	Col-36 OCR
0.150	0.492	-0.150	-0.492	126.83	126.90	0.65	0.51	6.77	9	-9999.0	9	-9999.0	5.0E-02	120.0	0.030	0.000	0.030	2.00	24.3	48.6	-9999.0	-9999.0	3000.00	0.51	0.00	-9999.0	-9999.0	0	95.0	50.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
0.450	1.476	-0.450	-1.476	64.98	65.01	0.70	1.08	2.60	8	6	8	7	5.0E-03	120.0	0.089	0.000	0.089	2.00	15.6	31.1	11.6	39.8	732.89	1.08	0.00	1.70	6.0	6	89.0	50.0	-0.39	-9999.0	-9999.0	-9999.0	-9999.0
0.750	2.461	-0.750	-2.461	32.05	32.06	0.41	1.28	0.61	7	6	7	7	5.0E-04	120.0	0.148	0.000	0.148	2.00	10.2	20.5	6.5	17.3	216.16	1.28	0.00	2.05	14.3	6	61.5	46.0	-0.29	2.319	74.4	-9999.0	-9999.0
1.050	3.445	-1.050	-3.445	21.53	21.53	0.39	1.80	0.66	6	5	7	6	5.0E-05	120.0	0.207	0.000	0.207	2.00	8.2	16.5	4.9	11.1	103.18	1.82	0.00	2.33	23.8	5	45.2	42.0	-0.25	3.057	65.8	1.422	10.0
1.350	4.429	-1.350	-4.429	28.50	28.51	0.54	1.91	0.72	6	5	7	6	5.0E-05	120.0	0.266	0.000	0.266	1.94	10.9	21.2	6.4	12.7	106.29	1.93	0.00	2.30	22.5	5	49.7	42.0	-0.27	2.824	80.5	1.883	10.0
1.650	5.413	-1.650	-5.413	53.89	53.91	0.74	1.37	1.78	7	6	8	6	5.0E-04	120.0	0.325	0.000	0.325	1.75	17.2	30.2	10.9	19.5	164.97	1.38	0.00	2.03	13.7	6	65.1	44.0	-0.27	2.209	119.1	-9999.0	-9999.0
1.950	6.398	-1.950	-6.398	82.51	82.52	1.89	2.29	1.49	7	6	9	7	5.0E-04	120.0	0.384	0.000	0.384	1.61	26.3	42.5	17.0	28.0	213.98	2.30	0.00	2.08	15.3	5	74.9	46.0	-0.37	1.986	163.9	-9999.0	-9999.0
2.250	7.382	-2.250	-7.382	92.89	92.91	1.20	1.29	1.79	8	6	9	7	5.0E-03	120.0	0.443	0.000	0.443	1.50	22.2	33.4	17.7	27.2	208.77	1.30	0.00	1.89	10.1	6	76.2	46.0	-0.29	1.959	182.0	-9999.0	-9999.0
2.550	8.366	-2.550	-8.366	76.31	76.33	1.45	1.90	1.63	7	6	8	6	5.0E-04	120.0	0.502	0.000	0.502	1.41	24.4	34.4	15.7	22.7	151.06	1.91	0.00	2.08	15.4	5	68.8	44.0	-0.30	2.114	161.4	-9999.0	-9999.0
2.850	9.350	-2.850	-9.350	63.75	63.78	1.89	2.96	2.58	6	5	8	6	5.0E-05	120.0	0.561	0.000	0.561	1.34	24.4	32.6	14.3	19.6	112.69	2.98	0.00	2.30	22.4	5	62.0	42.0	-0.35	2.300	146.7	4.215	10.0
3.150	10.335	-3.150	-10.335	46.19	46.19	1.50	3.24	0.68	6	5	8	6	5.0E-05	120.0	0.620	0.000	0.620	1.27	17.7	22.5	11.1	14.4	73.49	3.28	0.00	2.44	28.0	5	51.4	40.0	-0.32	2.740	126.6	3.038	10.0
3.450	11.319	-3.450	-11.319	42.39	42.40	1.78	4.21	1.02	5	4	8	6	5.0E-06	120.0	0.679	0.000	0.679	1.21	20.3	24.6	10.8	13.4	61.43	4.28	0.00	2.56	33.4	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.781	10.0
3.750	12.303	-3.750	-12.303	31.80	31.80	1.84	5.77	0.47	3	3	7	6	5.0E-08	120.0	0.738	0.000	0.738	1.16	30.5	35.5	8.7	12.1	42.08	5.91	0.00	2.72	41.3	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.071	10.0
4.050	13.287	-4.050	-13.287	35.14	35.14	1.72	4.90	0.22	3	4	8	6	5.0E-08	120.0	0.797	0.000	0.797	1.12	33.7	37.7	9.4	12.0	43.08	5.01	0.00	2.66	38.2	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.289	10.0
4.350	14.271	-4.350	-14.271	60.09	60.10	1.60	2.66	0.87	6	5	8	6	5.0E-05	120.0	0.856	0.000	0.856	1.08	23.0	24.9	13.8	15.3	69.19	2.70	0.00	2.35	24.3	5	54.3	40.0	-0.27	2.618	157.4	3.950	10.0
4.650	15.256	-4.650	-15.256	35.67	35.67	1.01	2.82	0.24	6	4	8	6	5.0E-05	120.0	0.915	0.000	0.915	1.05	13.7	14.3	9.0	9.6	37.97	2.90	0.00	2.54	32.7	5	38.4	38.0	-0.21	3.470	123.8	2.317	10.0
4.950	16.240	-4.950	-16.240	31.68	31.69	1.62	5.10	1.01	3	3	7	6	5.0E-08	120.0	0.974	0.000	0.974	1.01	30.3	30.7	9.0	9.3	31.52	5.26	0.00	2.77	44.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.048	10.0
5.250	17.224	-5.250	-17.224	37.22	37.22	1.94	5.22	0.85	3	3	8	6	5.0E-08	120.0	1.033	0.000	1.033	0.98	35.6	35.1	10.4	10.2	35.02	5.37	0.00	2.74	42.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.413	10.0
5.550	18.208	-5.550	-18.208	35.74	35.74	1.73	4.85	0.29	4	3	8	6	5.0E-07	120.0	1.093	0.000	1.093	0.96	22.8	21.8	10.0	9.3	31.71	5.00	0.00	2.75	43.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.310	10.0
5.850	19.193	-5.850	-19.193	40.12	40.13	2.02	5.05	0.60	3	3	8	6	5.0E-08	120.0	1.152	0.000	1.152	0.93	38.4	35.8	11.2	9.9	33.84	5.20	0.00	2.74	42.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.598	10.0
6.150	20.177	-6.150	-20.177	86.68	86.69	2.34	2.70	0.46	6	5	9	6	5.0E-05	120.0	1.211	0.000	1.211	0.91	33.2	30.2	19.5	18.1	70.60	2.74	0.00	2.29	22.2	5	59.8	40.0	-0.27	2.463	213.5	5.698	10.0
6.450	21.161	-6.450	-21.161	114.38	114.39	3.23	2.83	0.35	6	5	9	6	5.0E-05	120.0	1.270	0.000	1.270	0.89	43.8	38.9	25.0	22.7	89.09	2.86	0.00	2.23	20.1	5	67.1	42.0	-0.31	2.247	257.0	7.541	10.0
6.750	22.145	-6.750	-22.145	56.97	56.97	2.54	4.46	0.76	4	4	8	6	5.0E-07	120.0	1.329	0.000	1.329	0.87	36.4	31.6	15.0	11.5	41.88	4.57	0.00	2.64	37.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.710	10.0
7.050	23.130	-7.050	-23.130	51.11	51.11	2.08	4.08	0.02	5	4	8	6	5.0E-06	120.0	1.388	0.000	1.388	0.85	24.5	20.8	13.6	10.0	35.82	4.19	0.00	2.66	38.3	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.315	10.0
7.350	24.114	-7.350	-24.114	38.11	38.11	2.07	5.43	0.33	3	3	8	5	5.0E-08	120.0	1.447	0.000	1.447	0.83	36.5	30.3	11.3	7.9	25.34	5.65	0.00	2.86	49.3	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.444	10.0
7.650	25.098	-7.650	-25.098	28.51	28.52	1.52	5.33	0.54	3	3	7	5	5.0E-08	120.0	1.506	0.000	1.506	0.81	27.3	22.3	9.0	5.9	17.94	5.63	0.00	2.97	56.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.801	6.0
7.950	26.082	-7.950	-26.082	33.61	33.61	1.93	5.74	-0.06	3	3	7	5	5.0E-08	120.0	1.565	0.000	1.565	0.80	32.2	25.7	10.5	6.7	20.47	6.02	0.00	2.94	54.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.136	7.3
8.250	27.067	-8.250	-27.067	68.64	68.66	2.50	3.64	1.05	5	4	8	6	5.0E-06	120.0	1.624	0.000	1.624	0.78	32.9	25.8	17.0	13.6	41.28	3.73	0.00	2.50	30.8	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.469	10.0
8.550	28.051	-8.550	-28.051	51.08	51.10	2.44	4.77	1.20	4	3	8	5	5.0E-07	120.0	1.683	0.000	1.683	0.77	32.6	25.1	14.5	8.7	29.36	4.93	0.00	2.77	44.2	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.294	10.0
8.850	29.035	-8.850	-29.035	40.33	40.34	1.96	4.85	0.81	4	3	8	5	5.0E-07	120.0	1.742	0.000	1.742	0.76	25.8	19.5	12.1	6.9	22.15	5.07	0.00	2.87	50.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.573	8.3
9.150	30.019	-9.150	-30.019	38.17	38.18	1.98	5.19	0.75	3	3	8	5	5.0E-08	120.0	1.801	0.000	1.801	0.75	36.6	27.2	11.8	6.5	20.19	5.45	0.00	2.92	53.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.425	7.2
9.450	31.004	-9.450	-31.004	34.60	34.60	1.71	4.95	0.20	3	3	7	5	5.0E-08	120.0	1.860	0.000	1.860	0.73	33.1	24.3	10.9	5.8	17.60	5.23	0.00	2.95	55.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.183	5.8
9.750	31.988	-9.750	-31.988	25.24	25.25	1.78	7.05	0.96	3	3	7	5	5.0E-08	120.0	1.919	0.000	1.919	0.72	24.2	17.5	9.2	4.6	12.16	7.63	0.00	3.18	71.4	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.555	3.3
10.050	32.972	-10.050	-32.972	24.03	24.05	1.68	6.97	1.84	3	3	7	4	5.0E-08	120.0	1.978	0.000	1.978	0.71	23.0	16.4	8.9	4.3	11.16	7.60	0.01	3.21	73.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.472	3.0
10.350	33.956	-10.350	-33.956	31.96	31.96	1.89	5.92	0.36	3	3	7	5	5.0E-08	120.0	2.037	0.000	2.037	0.70	30.6	21.4	10.8	5.2	14.69	6.33	0.00	3.06	62.9	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.995	4.4
10.650	34.941	-10.650	-34.941	54.84	54.84	2.45	4.48	-0.09	4	3	8	5	5.0E-07	120.0	2.096	0.000	2.096	0.69	35.0	24.2	15.8	7.6	25.16	4.65	0.00	2.80	46.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.516	10.0
10.950	35.925	-10.950	-35.925	35.40	35.40	2.13	6.03	-0.77	3	3	8	5	5.0E-08	120.0	2.156	0.000	2.156	0.68	33.9	23.1	11.9	5.4	15.42	6.42	0.00	3.05	62.1	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.216	4.7

Calabasas Holdings, LLC
Tract 62443

Col-01 Depth (m)	Col-02 Depth (ft)	Col-03 Elev. (m)	Col-04 Elev. (ft)	Col-05 qc (tsf)	Col-06 qt (tsf)	Col-07 fs (tsf)	Col-08 Rf (%)	Col-09 u (ft)	Col-10 SBT (Zone)	Col-11 SBTn (Zone)	Col-12 SBT-BQ (Zone)	Col-13 SBT-BQn (Zone)	Col-14 Perm-k (cm/s)	Col-15 Unit Wt (pcf)	Col-16 T Stress (kPa)	Col-17 U Stress (tsf)	Col-18 E Stress (tsf)	Col-19 Cn	Col-20 N60 (b/ft)	Col-21 N1(60) (b/ft)	Col-22 N(60)Ic (b/ft)	Col-23 N1(60)Ic (b/ft)	Col-24 Qt	Col-25 Fr (%)	Col-26 Bq	Col-27 Ic	Col-28 FC (%)	Col-29 IcZone (Zone)	Col-30 Dr (%)	Col-31 Phi (deg)	Col-32 State Par	Col-33 Es/qt	Col-34 YoungE (tsf)	Col-35 Su (tsf)	Col-36 OCR
11.250	36.909	-11.250	-36.909	54.36	54.36	3.12	5.74	0.20	3	3	8	5	5.0E-08	120.0	2.215	0.000	2.215	0.67	52.1	35.0	16.5	7.5	23.55	5.98	0.00	2.90	51.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.476	9.2
11.550	37.893	-11.550	-37.893	28.03	28.03	1.85	6.59	-0.61	3	3	7	4	5.0E-08	120.0	2.274	0.000	2.274	0.66	26.8	17.8	10.3	4.3	11.33	7.17	0.00	3.18	71.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.717	3.0
11.850	38.877	-11.850	-38.877	40.83	40.83	1.79	4.38	-0.22	4	3	8	5	5.0E-07	120.0	2.333	0.000	2.333	0.65	26.1	17.1	12.7	5.4	16.50	4.65	0.00	2.94	54.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.566	5.3
12.150	39.862	-12.150	-39.862	26.89	26.90	1.59	5.89	0.41	3	3	7	4	5.0E-08	120.0	2.392	0.000	2.392	0.65	25.8	16.7	9.9	3.9	10.25	6.47	0.00	3.19	72.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.634	2.6
12.450	40.846	-12.450	-40.846	21.69	21.70	1.33	6.11	1.26	3	3	7	4	5.0E-08	120.0	2.451	0.000	2.451	0.64	20.8	13.3	8.6	3.3	7.86	6.89	0.00	3.30	80.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.283	1.8
12.750	41.830	-12.750	-41.830	27.90	27.92	1.93	6.91	1.57	3	3	7	4	5.0E-08	120.0	2.510	0.000	2.510	0.63	26.7	16.9	10.6	4.0	10.12	7.59	0.00	3.24	76.0	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.694	2.6
13.050	42.814	-13.050	-42.814	50.95	50.97	2.43	4.77	1.65	4	3	8	5	5.0E-07	120.0	2.569	0.000	2.569	0.62	32.5	20.3	15.7	6.1	18.84	5.02	0.00	2.92	53.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.227	6.5
13.350	43.799	-13.350	-43.799	41.44	41.47	2.40	5.79	2.84	3	3	8	5	5.0E-08	120.0	2.628	0.000	2.628	0.62	39.7	24.5	13.9	5.2	14.78	6.18	0.01	3.06	62.3	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.589	4.5
13.650	44.783	-13.650	-44.783	73.20	73.22	3.04	4.15	1.80	5	4	8	5	5.0E-06	120.0	2.687	0.000	2.687	0.61	35.1	21.4	20.7	7.7	26.25	4.31	0.00	2.76	44.0	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.702	10.0
13.950	45.767	-13.950	-45.767	76.81	76.85	3.94	5.13	3.14	11	3	8	5	1.0E-15	120.0	2.746	0.000	2.746	0.60	73.6	44.4	22.4	8.2	26.98	5.32	0.00	2.82	47.1	4	44.6	36.0	-0.33	-9999.0	-9999.0	-9999.0	-9999.0
14.250	46.751	-14.250	-46.751	89.48	89.51	3.90	4.36	2.29	11	4	9	6	1.0E-15	120.0	2.805	0.000	2.805	0.60	85.7	51.2	24.8	8.9	30.91	4.50	0.00	2.73	41.8	4	48.7	36.0	-0.28	4.248	380.3	-9999.0	-9999.0
14.550	47.736	-14.550	-47.736	28.93	28.99	1.63	5.62	5.16	3	3	7	4	5.0E-08	120.0	2.864	0.000	2.864	0.59	27.8	16.4	10.9	3.6	9.12	6.24	0.01	3.22	74.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.741	2.2
14.850	48.720	-14.850	-48.720	184.47	184.54	5.99	3.24	6.44	6	4	9	6	5.0E-05	120.0	2.923	0.000	2.923	0.58	70.7	41.4	40.9	24.4	62.13	3.30	0.00	2.26	21.1	5	68.8	40.0	-0.30	2.503	461.9	12.108	10.0
15.150	49.704	-15.150	-49.704	280.84	280.89	7.48	2.66	3.74	7	5	10	6	5.0E-04	120.0	2.982	0.000	2.982	0.58	89.7	51.9	57.8	34.2	93.18	2.69	0.00	2.08	15.2	5	80.6	42.0	-0.30	2.147	603.1	-9999.0	-9999.0
15.450	50.688	-15.450	-50.688	82.39	82.58	3.35	4.05	17.43	5	4	8	5	5.0E-06	120.0	3.041	0.000	3.041	0.57	39.5	22.7	23.2	7.7	26.15	4.21	0.02	2.76	43.7	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.302	10.0
15.750	51.673	-15.750	-51.673	49.86	50.05	2.30	4.60	16.91	4	3	8	5	5.0E-07	120.0	3.100	0.000	3.100	0.57	32.0	18.1	16.0	5.1	15.14	4.90	0.03	2.98	57.3	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.130	4.6
16.050	52.657	-16.050	-52.657	39.27	39.38	1.82	4.63	10.43	4	3	7	4	5.0E-07	120.0	3.159	0.000	3.159	0.56	25.1	14.1	13.5	4.1	11.46	5.03	0.02	3.08	64.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.415	3.1
16.350	53.641	-16.350	-53.641	66.73	66.95	2.46	3.68	20.92	5	3	8	5	5.0E-06	120.0	3.219	0.000	3.219	0.56	32.1	17.9	19.6	6.0	19.80	3.87	0.02	2.83	47.5	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.249	7.0
16.650	54.625	-16.650	-54.625	80.61	81.09	3.02	3.72	44.07	5	4	8	5	5.0E-06	120.0	3.278	0.000	3.278	0.55	38.8	21.4	22.9	7.0	23.74	3.88	0.04	2.77	44.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	5.187	9.3
16.950	55.610	-16.950	-55.610	88.35	88.90	3.16	3.56	50.12	6	4	8	5	5.0E-05	120.0	3.337	0.000	3.337	0.55	34.1	18.6	24.6	7.4	25.64	3.70	0.04	2.73	42.0	4	46.0	34.0	-0.19	-9999.0	-9999.0	5.704	10.0
17.250	56.594	-17.250	-56.594	62.88	63.50	2.27	3.58	56.97	5	3	7	5	5.0E-06	120.0	3.396	0.000	3.396	0.54	30.4	16.5	18.9	5.5	17.70	3.78	0.07	2.86	49.4	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	4.007	5.9
17.550	57.578	-17.550	-57.578	201.54	201.63	5.87	2.91	8.29	7	5	9	6	5.0E-04	120.0	3.455	0.000	3.455	0.54	64.4	34.6	44.0	24.2	57.36	2.96	0.00	2.22	19.8	5	69.0	40.0	-0.26	2.595	523.3	-9999.0	-9999.0
17.850	58.562	-17.850	-58.562	432.76	432.93	12.06	2.79	15.73	12	5	10	6	1.0E-15	120.0	3.514	0.000	3.514	0.53	207.3	110.6	86.5	47.2	122.21	2.81	0.00	2.01	13.1	6	90.6	42.0	-0.35	-9999.0	-9999.0	-9999.0	-9999.0

Gregg In Situ, Inc.
Interpretation Output - Releas 1.22A Format: NLI Imperial
Run No: 04-0902-1104-3958
Job No: 04-233SH
Client: RJR ENGINEERING
Project: CPT Site Investigation
Site: MESSENGER INVEST.
Location: CPT-03
Oversight: R.ANDERSON
CPT Date: 04/25/08
CPT Time: 10:16
CPT File: 233C03.COR
Northing (m): 0.000000
Easting (m): 0.000000
Elevation (m): 0.000000

Water Table (m): 27.43 (ft): 90.0
Unit Weight of Water (defaul 62.40 pcf
Averaging Increment (m): 0.30
Phi Method : Robertson and Campanella, 1983
Su Nkt used: 15.00 Su/P' (nc) 0.30
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Constant Unit Weight Used Throughout (pcf): 119.97
N160Ic Calculated using qc1n
N160cs Calculated using qc1ncs

Col-01	Col-02	Col-03	Col-04	Col-05	Col-06	Col-07	Col-08	Col-09	Col-10	Col-11	Col-12	Col-13	Col-14	Col-15	Col-16	Col-17	Col-18	Col-19	Col-20	Col-21	Col-22	Col-23	Col-24	Col-25	Col-26	Col-27	Col-28	Col-29	Col-30	Col-31	Col-32	Col-33	Col-34	Col-35	Col-36
Depth (m)	Depth (ft)	Elev. (m)	Elev. (ft)	qc (tsf)	qt (tsf)	fs (tsf)	Rf (%)	u (ft)	SBT (Zone)	SBTn (Zone)	SBT-BQ (Zone)	SBT-BQn (Zone)	Perm-k (cm/s)	Unit Wt (pcf)	T Stress (kPa)	U Stress (tsf)	E Stress (tsf)	Cn	N60 (b/ft)	N1(60) (b/ft)	N(60)Ic (b/ft)	N1(60)Ic (b/ft)	Qt	Fr (%)	Bq	Ic	FC (%)	IcZone (Zone)	Dr (%)	Phi (deg)	State Par	Es/qt	YoungE (tsf)	Su (tsf)	OCR
0.150	0.492	-0.150	-0.492	146.11	146.16	1.84	1.26	4.89	8	-9999.0	9	-9999.0	5.0E-03	120.0	0.030	0.000	0.030	2.00	35.0	70.0	-9999.0	-9999.0	3000.00	1.26	0.00	-9999.0	-9999.0	0	95.0	50.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
0.450	1.476	-0.450	-1.476	83.26	83.28	1.39	1.67	1.95	7	8	9	7	5.0E-04	120.0	0.089	0.000	0.089	2.00	26.6	53.2	-9999.0	-9999.0	939.09	1.67	0.00	-9999.0	-9999.0	0	95.0	50.0	-0.47	-9999.0	-9999.0	-9999.0	-9999.0
0.750	2.461	-0.750	-2.461	38.82	38.83	0.94	2.41	1.74	6	8	8	7	5.0E-05	120.0	0.148	0.000	0.148	2.00	14.9	29.8	-9999.0	-9999.0	262.04	2.42	0.00	-9999.0	-9999.0	0	67.0	46.0	-0.40	2.159	83.8	2.579	10.0
1.050	3.445	-1.050	-3.445	39.34	39.36	1.07	2.71	1.71	6	8	8	7	5.0E-05	120.0	0.207	0.000	0.207	2.00	15.1	30.2	-9999.0	-9999.0	189.42	2.73	0.00	-9999.0	-9999.0	0	62.5	44.0	-0.39	2.285	89.9	2.610	10.0
1.350	4.429	-1.350	-4.429	41.86	41.88	1.18	2.81	1.63	6	5	8	6	5.0E-05	120.0	0.266	0.000	0.266	1.94	16.0	31.1	9.4	18.7	156.58	2.83	0.00	2.29	22.3	5	60.7	44.0	-0.38	2.345	98.2	2.774	10.0
1.650	5.413	-1.650	-5.413	39.62	39.63	1.19	3.00	1.64	6	5	8	6	5.0E-05	120.0	0.325	0.000	0.325	1.75	15.2	26.6	9.2	16.4	121.02	3.02	0.00	2.36	24.8	5	56.2	42.0	-0.36	2.517	99.8	2.621	10.0
1.950	6.398	-1.950	-6.398	65.69	65.70	1.74	2.65	1.10	6	5	8	6	5.0E-05	120.0	0.384	0.000	0.384	1.61	25.2	40.6	14.2	23.4	170.15	2.66	0.00	2.20	18.9	5	68.3	44.0	-0.37	2.125	139.6	4.354	10.0
2.250	7.382	-2.250	-7.382	56.35	56.36	1.78	3.15	0.82	6	5	8	6	5.0E-05	120.0	0.443	0.000	0.443	1.50	21.6	32.4	12.8	19.7	126.25	3.18	0.00	2.32	23.2	5	61.9	44.0	-0.38	2.305	129.9	3.728	10.0
2.550	8.366	-2.550	-8.366	43.29	43.30	1.72	3.98	0.89	5	4	8	6	5.0E-06	120.0	0.502	0.000	0.502	1.41	20.7	29.3	10.6	15.3	85.27	4.02	0.00	2.49	30.2	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.853	10.0
2.850	9.350	-2.850	-9.350	44.65	44.65	1.68	3.75	0.43	5	4	8	6	5.0E-06	120.0	0.561	0.000	0.561	1.34	21.4	28.5	10.9	14.9	78.59	3.80	0.00	2.48	29.7	5	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.940	10.0
3.150	10.335	-3.150	-10.335	48.93	48.94	2.84	5.80	0.86	3	9	8	6	5.0E-08	120.0	0.620	0.000	0.620	1.27	46.9	59.5	-9999.0	-9999.0	77.92	5.87	0.00	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.221	10.0
3.450	11.319	-3.450	-11.319	39.28	39.28	1.98	5.04	0.13	3	4	8	6	5.0E-08	120.0	0.679	0.000	0.679	1.21	37.6	45.6	10.2	14.1	56.84	5.13	0.00	2.61	35.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.573	10.0
3.750	12.303	-3.750	-12.303	27.85	27.86	2.01	7.23	0.37	3	3	7	6	5.0E-08	120.0	0.738	0.000	0.738	1.16	26.7	31.1	8.1	11.2	36.74	7.42	0.00	2.83	47.6	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.808	10.0
4.050	13.287	-4.050	-13.287	30.60	30.61	2.10	6.85	0.31	3	3	7	6	5.0E-08	120.0	0.797	0.000	0.797	1.12	29.3	32.8	8.8	11.3	37.39	7.03	0.00	2.81	46.3	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	1.987	10.0
4.350	14.271	-4.350	-14.271	21.79	21.79	1.89	8.67	0.18	0	3	7	5	-9999.0	120.0	0.856	0.000	0.856	1.08	-9999.0	-9999.0	7.1	-9999.0	24.45	9.03	0.00	3.01	59.2	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
4.650	15.256	-4.650	-15.256	81.38	81.39	2.40	2.95	0.53	6	5	9	6	5.0E-05	120.0	0.915	0.000	0.915	1.05	31.2	32.6	18.3	19.6	87.91	2.99	0.00	2.30	22.4	5	62.0	42.0	-0.32	2.327	189.4	5.365	10.0
4.950	16.240	-4.950	-16.240	66.19	66.19	2.34	3.54	-0.51	6	4	8	6	5.0E-05	120.0	0.974	0.000	0.974	1.01	25.4	25.7	15.8	16.3	66.92	3.59	0.00	2.43	27.5	5	55.2	40.0	-0.33	2.603	172.3	4.347	10.0
5.250	17.224	-5.250	-17.224	82.71	82.71	2.81	3.40	-0.20	6	5	9	6	5.0E-05	120.0	1.033	0.000	1.033	0.98	31.7	31.2	19.1	19.2	79.03	3.44	0.00	2.36	24.6	5	60.7	42.0	-0.34	2.394	198.0	5.445	10.0
5.550	18.208	-5.550	-18.208	56.05	56.05	3.51	6.26	0.46	3	3	8	6	5.0E-08	120.0	1.093	0.000	1.093	0.96	53.7	51.4	15.2	14.2	50.31	6.38	0.00	2.69	39.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.664	10.0
5.850	19.193	-5.850	-19.193	182.94	182.99	5.64	3.08	4.47	7	8	9	6	5.0E-04	120.0	1.152	0.000	1.152	0.93	58.4	54.4	-9999.0	-9999.0	157.90	3.10	0.00	-9999.0	-9999.0	0	82.0	44.0	-0.40	1.918	351.0	-9999.0	-9999.0
6.150	20.177	-6.150	-20.177	41.87	41.88	3.27	7.81	1.16	3	3	8	6	5.0E-08	120.0	1.211	0.000	1.211	0.91	40.1	36.5	12.6	10.6	33.59	8.04	0.00	2.88	50.8	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.711	10.0
6.450	21.161	-6.450	-21.161	42.41	42.42	3.22	7.59	0.79	3	3	8	6	5.0E-08	120.0	1.270	0.000	1.270	0.89	40.6	36.1	12.8	10.2	32.41	7.82	0.00	2.88	50.9	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.743	10.0
6.750	22.145	-6.750	-22.145	88.72	88.77	4.88	5.50	5.22	11	9	9	6	1.0E-15	120.0	1.329	0.000	1.329	0.87	85.0	73.8	-9999.0	-9999.0	65.81	5.58	0.00	-9999.0	-9999.0	0	59.2	40.0	-0.56	2.512	223.0	-9999.0	-9999.0
7.050	23.130	-7.050	-23.130	49.72	49.72	3.05	6.13	0.39	3	3	8	6	5.0E-08	120.0	1.388	0.000	1.388	0.85	47.6	40.4	14.3	10.4	34.83	6.30	0.00	2.79	45.5	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.222	10.0
7.350	24.114	-7.350	-24.114	92.84	92.91	3.18	3.42	6.06	6	4	9	6	5.0E-05	120.0	1.447	0.000	1.447	0.83	35.6	29.6	21.6	18.4	63.21	3.47	0.00	2.37	25.3	5	59.3	40.0	-0.31	2.533	235.3	6.097	10.0
7.650	25.098	-7.650	-25.098	104.62	104.66	5.12	4.89	3.57	11	4	9	6	1.0E-15	120.0	1.506	0.000	1.506	0.81	100.2	81.7	25.4	21.1	68.50	4.97	0.00	2.46	29.1	5	62.1	40.0	-0.47	2.442	255.6	-9999.0	-9999.0
7.950	26.082	-7.950	-26.082	36.89	36.92	2.89	7.83	2.46	3	3	7	5	5.0E-08	120.0	1.565	0.000	1.565	0.80	35.4	28.3	12.0	7.7	22.59	8.18	0.01	3.00	58.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.357	8.6
8.250	27.067	-8.250	-27.067	13.55	13.57	1.93	14.25	1.29	0	-9999.0	6	4	-9999.0	120.0	1.624	0.000	1.624	0.78	-9999.0	-9999.0	-9999.0	-9999.0	7.35	-9999.0	0.01	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
8.550	28.051	-8.550	-28.051	10.48	10.48	1.85	17.61	0.48	0	-9999.0	6	4	-9999.0	120.0	1.683	0.000	1.683	0.77	-9999.0	-9999.0	-9999.0	-9999.0	5.23	-9999.0	0.00	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
8.850	29.035	-8.850	-29.035	9.03	9.04	1.91	21.14	0.87	0	-9999.0	5	3	-9999.0	120.0	1.742	0.000	1.742	0.76	-9999.0	-9999.0	-9999.0	-9999.0	4.19	-9999.0	0.01	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
9.150	30.019	-9.150	-30.019	21.37	21.37	2.30	10.77	0.16	0	-9999.0	7	4	-9999.0	120.0	1.801	0.000	1.801	0.75	-9999.0	-9999.0	-9999.0	-9999.0	10.86	-9999.0	0.00	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
9.450	31.004	-9.450	-31.004	100.88	100.91	3.49	3.46	1.91	6	4	9	6	5.0E-05	120.0	1.860	0.000	1.860	0.73	38.7	28.3	23.7	17.7	53.24	3.53	0.00	2.39	26.0	5	58.0	40.0	-0.29	2.667	269.2	6.603	10.0
9.750	31.988	-9.750	-31.988	80.53	80.55	4.08	5.06	1.37	11	4	9	6	1.0E-15	120.0	1.919	0.000	1.919	0.72	77.1	55.7	21.8	11.6	40.97	5.18	0.00	2.68	39.5	4	51.1	38.0	-0.40	3.533	284.5	-9999.0	-9999.0
10.050	32.972	-10.050	-32.972	46.11	46.17	3.04	6.58	5.20	3	3	8	5	5.0E-08	120.0	1.978	0.000	1.978	0.71	44.2	31.4	14.5	7.3	22.34	6.87	0.01	2.95	55.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.946	8.4
10.350	33.956	-10.350	-33.956	44.52	44.77	3.12	6.98	23.04	3	3	7	5	5.0E-08	120.0	2.037	0.000	2.037	0.70	42.9	30.0	14.4	7.1	20.97	7.31	0.04	2.99	58.0	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	2.849	7.6
10.650	34.941	-10.650	-34.941	47.13	47.24	3.65	7.73	10.56	3	3	8	5	5.0E-08	120.0	2.096	0.000	2.096	0.69	45.2	31.2	15.5	7.4	21.53	8.09	0.02	3.02	59.5	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.010	8.0
10.950	35.925	-10.950	-35.925	26.49	26.73	2.59	9.69	22.89	0	-9999.0	6	4	-9999.0	120.0	2.156	0.000	2.156	0.68	-9999.0	-9999.0	-9999.0	-9999.0	11.40	-9999.0	0.07	-9999.0	-9999.0	0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0

Calabasas Holdings, LLC
Tract 62443

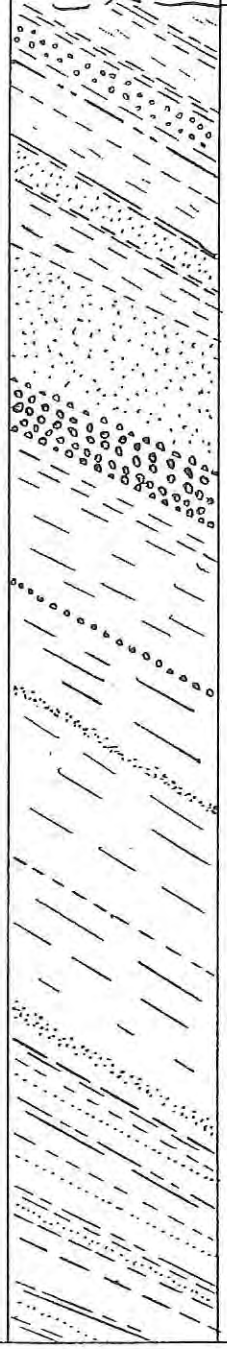
Col-01 Depth (m)	Col-02 Depth (ft)	Col-03 Elev. (m)	Col-04 Elev. (ft)	Col-05 qc (tsf)	Col-06 qt (tsf)	Col-07 fs (tsf)	Col-08 Rf (%)	Col-09 u (ft)	Col-10 SBT (Zone)	Col-11 SBTn (Zone)	Col-12 SBT-BQ (Zone)	Col-13 SBT-BQn (Zone)	Col-14 Perm-k (cm/s)	Col-15 Unit Wt (pcf)	Col-16 T.Stress (kPa)	Col-17 U Stress (tsf)	Col-18 E.Stress (tsf)	Col-19 Cn	Col-20 N60 (b/ft)	Col-21 N1(60) (b/ft)	Col-22 N(60)Ic (b/ft)	Col-23 N1(60)Ic (b/ft)	Col-24 Qt	Col-25 Fr (%)	Col-26 Bq	Col-27 Ic	Col-28 FC (%)	Col-29 IcZone (Zone)	Col-30 Dr (%)	Col-31 Phi (deg)	Col-32 State Par	Col-33 Es/qt	Col-34 YoungE (tsf)	Col-35 Su (tsf)	Col-36 OCR
11.250	36.909	-11.250	-36.909	27.55	27.80	2.36	8.47	23.13	0	3	6	4	-9999.0	120.0	2.215	0.000	2.215	0.67	-9999.0	-9999.0	10.7	-9999.0	11.55	9.21	0.07	3.25	77.0	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0
11.550	37.893	-11.550	-37.893	57.63	57.95	3.53	6.09	29.58	3	3	8	5	5.0E-08	120.0	2.274	0.000	2.274	0.66	55.5	36.8	17.7	7.8	24.49	6.33	0.04	2.90	52.1	4	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.712	9.8
11.850	38.877	-11.850	-38.877	152.76	153.05	5.79	3.79	26.21	12	4	9	6	1.0E-15	120.0	2.333	0.000	2.333	0.65	73.3	48.0	35.0	23.4	64.61	3.84	0.01	2.33	23.8	5	66.7	40.0	-0.34	2.456	376.0	-9999.0	-9999.0
12.150	39.862	-12.150	-39.862	167.86	167.97	4.77	2.84	9.43	7	5	9	6	5.0E-04	120.0	2.392	0.000	2.392	0.65	53.6	34.7	36.5	24.1	69.23	2.88	0.00	2.21	19.5	5	69.0	40.0	-0.28	2.401	403.3	-9999.0	-9999.0
12.450	40.846	-12.450	-40.846	49.99	50.37	2.91	5.77	35.70	3	3	7	5	5.0E-08	120.0	2.451	0.000	2.451	0.64	48.2	30.8	15.9	6.5	19.55	6.07	0.05	2.96	55.8	3	-9999.0	-9999.0	-9999.0	-9999.0	-9999.0	3.195	6.8
12.750	41.830	-12.750	-41.830	106.35	106.56	6.03	5.66	18.99	11	3	9	6	1.0E-15	120.0	2.510	0.000	2.510	0.63	102.0	64.4	29.3	11.9	41.45	5.79	0.01	2.71	41.2	4	55.3	38.0	-0.48	3.658	389.8	-9999.0	-9999.0
13.050	42.814	-13.050	-42.814	220.99	221.25	6.43	2.91	24.39	7	5	9	6	5.0E-04	120.0	2.569	0.000	2.569	0.62	70.6	44.1	46.9	29.9	85.13	2.94	0.01	2.16	17.5	5	75.9	42.0	-0.31	2.236	494.6	-9999.0	-9999.0
13.350	43.799	-13.350	-43.799	275.25	275.92	9.76	3.54	62.30	12	5	9	6	1.0E-15	120.0	2.628	0.000	2.628	0.62	132.1	81.5	58.8	37.1	103.99	3.57	0.02	2.17	17.9	5	81.9	42.0	-0.39	2.077	573.0	-9999.0	-9999.0

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-1 SHEET 1 OF 5

DATE OBSERVED 10/31/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 805.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	NE Wall Graphic Log	Description and Remarks
0					**COLLUVIUM (Qcol)** Randomly oriented bedrock (Tc) fragments in a dry, loose, silty clay matrix; numerous voids and roots.
5					**BEDROCK - CALABASAS FORMATION (Tc):** Very well bedded sequence of grey and light brown clay shales, siltstone and claystones with occasional brown and light brown, poorly cemented fine and medium-grained sandstones. Bedding Attitude: N20E, 29SE at 4 feet.
					Massive silty to clayey rusty brown fine sandstone, non-cemented, soft, slightly moist. (8 ft. to 10 ft.)
10					Massive, well cemented, very hard, fine to medium-grained sandstone. (10 ft. to 11 ft.) Bedding Attitude: N45E, 25SE at 11 feet.
					Massive silty clay to clayey silt, soft to slightly firm, light brownish grey; slightly moist. (11 ft. to 19 ft.)
15					Occasional very thin interbeds of rusty brown, non-cemented fine and medium-grained sandstone and some siltstones.
					Bedding Attitude: N35E, 31SE at 18 feet.
					Very tight kink fold at 19 feet. (SW wall)
20					Well bedded sequence of thin, brown, grey brown, and grey clay shales, siltstones and some rusty brown, fine-grained, poorly cemented sandstones. (20 ft. to 24 ft.)
					Small seep at 23 feet.
					Bedding Attitude: N20E, 25SE at 24 feet.
25					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-1 SHEET 2 OF 5

DATE OBSERVED 10/31/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 805.0 WORK ORDER No. 101735-HD

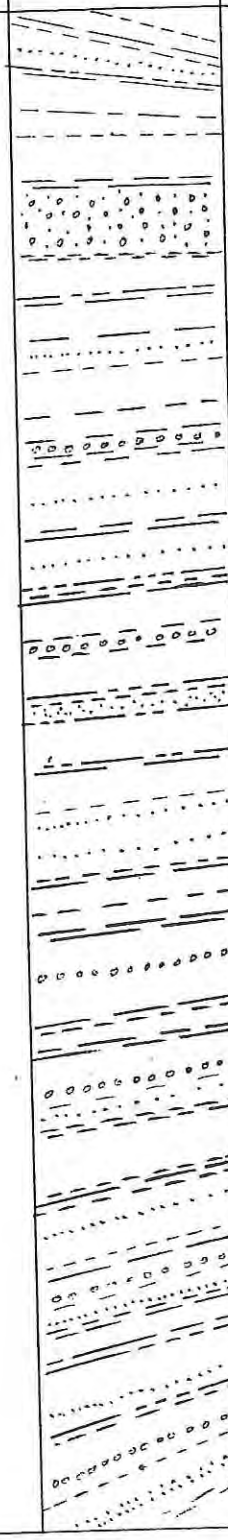
Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
25					Well bedded sequence of greenish grey, brown and reddish brown clay shales, siltstones and some fine-grained, poorly cemented sandstones.
					Bedding Attitude: N35W, 36NE at 27 feet; seep at 27 feet.
					Very hard, well cemented fine to medium-grained sandstone (1 ft. thick). (28 ft. to 29 ft.)
30					Seep at 30 feet.
					Interbedded sequence of light brown, grey, greenish grey and rusty brown clay shales, siltstone, claystone,s very fine sandstones and medium-grained sandstone (slightly cemented); (29 ft. to 44 ft.)
35					consistent bedding sequence; beds commonly 1 inch on less in thickness; moderately firm to slightly firm; slightly moist.
40					
45					Same sequence of well bedded claystones, sandstones siltstones and claystones but changing color to predominately grey.
50					Distinct color change to blue/grey at 49 ft. Bedding Attitude: E-W, 22N at 49 feet.

PLATE ___

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-1 SHEET 3 OF 5

DATE OBSERVED 10/31/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 805.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
50					Interbedded sequence of very firm blue grey siltstone and claystones with some grey, fine to medium-grained, moderately to well cemented sandstones. (49 ft. to 55 ft.)
55					Very fine-grained, hard, well cemented, grey sandstone. (55 ft. to 55.5 ft.)
					Well bedded sequence of firm, blue grey claystones, siltstones, and some slightly firm blue grey claystone with numerous thin, blue grey, hard claystones, siltstones and interbedded fine to medium-grained, well cemented sandstones; slightly moist. (55.5 ft. to 87 ft.)
60					
65					Same interbedded sequence.
70					Some with thin dark and light grey well cemented sandstones with blue grey claystones and siltstones with some clay shales.
					Some very thin (<1/8 inch thick), dark grey, polished surfaces along bedding planes.
75					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-1 SHEET 4 OF 5

DATE OBSERVED 10/31/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 805.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
75					Similar interbedded sequence of moderately firm to hard, blue grey, claystones, siltstones with moderately well cemented fine and medium-grained sandstones; beds commonly 1 inch thick or less;
80					Some very thin (<1/8 inch thick), dark grey, polished surfaces along bedding planes. Slightly moist.
85					Coring: Extremely hard, grey, siliceous siltstone 87 to 90 feet.
90					Similar sequence as above with occasional very thin, dark grey, polished surfaces along bedding planes. (90 ft. to 115 ft.)
95					
100					

PLATE ____

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-1 SHEET 5 OF 5

DATE OBSERVED 10/31/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 805.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
100					Continuous interbedded sequence of grey claystones, siltstones, and some light grey, fine-grained, slightly cemented sandstones to 115 feet;
105					beds commonly 1 inch± thick.
110					
115					Refusal = Total Depth 115 feet. Seeps at 24, 27, 30 feet. Severe caving at 27± feet. Drilled to 70 feet and immediately downhole logged to 55± feet. Drilling continued to 115 feet; caving at 27 feet± too severe to downhole log beyond 55± feet. Cored form 28± to 29± feet; and 87 to 90 feet.
120					
125					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-2 SHEET 1 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 1175.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
0					**COLLUVIUM (Qcol):** Very dark brown to black silty clay with occasional bedrock (Tm) fragments randomly oriented; dry to slightly moist; loose to moderately firm; numerous roots and krotovina (0 ft. to 10 ft.)
5					
10					Gradational change to brown silty to sandy clay matrix with abundant randomly oriented bedrock (Tm) fragments; moderately firm to firm; slightly moist (10 ft. to 15).
15					Undulating contact with underlying Qls at 15± feet. **LANDSLIDE DEBRIS (Qls):** Heterogeneous mixture of light brown, reddish brown and tan fine and medium-grained sands with brown and grey clays; some randomly oriented blocks of well bedded claystone and sandstone bedrock fragments; moist; punky; mottled; fractured; some zones of relatively well bedded light brown, reddish brown and tan claystones, siltstones, fragments non-cemented sandstones and clay shales with some diatomaceous shales (15 ft. to 42 ft.).
20					
25					

PLATE ____

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-2 SHEET 2 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 1175.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log SE Wall	Description and Remarks
25					Similar mixture of fractured claystones, clay shales and poorly cemented sandstones; some blocks fractured and disoriented; moist.
30					
35					Very plastic soft grey clay with abundant well developed slicks; clay zone approximately 1 inch thick with a shallow dip west at 37 feet.
40					Slide plane zone form 40 to 42 feet; 6 to 8 inch thick zones of very plastic grey clay with abundant slicks; approximately slide plane zone attitude N30E, 30SE; seep at 40 to 42 feet.
					BEDROCK - MODELO FORMATION (Tm): Well bedded sequence of light brown, reddish brown, tan, and light grey claystones, clay shales, siltstones and some fine to medium-grained, poorly cemented sandstones; very firm, slightly moist; (42 to 49 feet).
45					Bedding Attitude: N70W, 35SW at 47 feet.
50					Distinctive color change to blue/grey claystones, siltstone (49 feet). Bedding Attitude: N30W, 15SW at 49 feet.

PLATE ____

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-2 SHEET 3 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 1175.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
50					Predominately massive, blue grey, hard, claystones with some blue grey, slightly firm, clay shales; slightly moist (49 to 55 feet).
55					Light brown, poorly cemented, medium-grained sandstone at 2± inch thick at 55 feet; Bedding Attitude: N30W, 5±SW.
					Blue grey claystones and siltstones to 58 feet.
					BEDROCK - CALABASAS FORMATION? (Tc): Distinct lithologic change to predominately poorly to moderately cemented, light brown, reddish brown, and tan, fine to medium-grained sandstones; (58 to 68 feet);
60					
65					
					some interbeds of blue grey claystones and siltstones predominately poorly to moderately cemented, light brown and tan, fine to medium sandstones (68 to 77 feet).
70					
75					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-2 SHEET 4 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 1175.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
75					Some minor interbeds of hard, blue grey claystones and siltstones (77 to 78 feet). Predominately massive, moderately cemented, light brown, rusty brown, and tan, fine to medium-grained sandstone (78 to 88 feet).
80					Some minor blue grey claystone interbeds.
85					Refusal = Total Depth 85 feet. Coring at 85 feet for 90 minutes. Drilled to 60 feet and immediately downhole logged; drilling continued to 85 feet; caving to severe at 40 to 42± feet to downhole log form 60 to 85 feet. Seeps to 40 to 42 feet.
90					
95					
100					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-3 SHEET 1 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 970.0 WORK ORDER No. 101735-HD

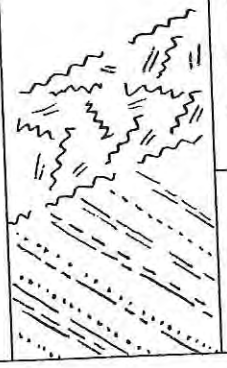
Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log NE Wall	Description and Remarks
0					**COLLUVIUM (Qcol):** (0 to 4 feet) Very dark brown, slightly moist sandy to silty clay with abundant scattered bedrock (Tc - siltstones) fragments; numerous pores and root.
					LANDSLIDE DEBRIS (Qls): (4 to 20) Chaotic mixture of bedrock (Tc) fragments randomly oriented in a punky, moist to wet, silty to sandy clay matrix;
5					some pods and lenses of possible altered ash;
10					distinct lack of continuous structure;
					clasts vary from a few inches to 12± inch in diameter and predominately consist of thin bedded sequences of soft to hard, light brown to greyish brown and grey siltstones, claystones with some fine to medium-grained, poorly cemented sandstones of Tc.
15					
					Seep at 19 feet.
20					Slide plane zone 20 to 22 feet = disturbed zone of highly sheared plastic grey clays with abundant slickensides; seeps throughout; side plane (approx.) N45E, 24NW at 21.5± feet.
					BEDROCK - CALABASAS FORMATION (Tc): Firm, well bedded sequence of brown, light brown, tan and grey claystones, siltstones with some thin (1/8± inch) sandstone interbeds. Bedding Attitude: N45E, 32SE at 24 feet.
25					

PLATE ___

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-3 SHEET 2 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 970.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
25					Continuous well bedded sequence of predominately hard, light brown, tan, grey brown claystones; siltstones and some interbeds of poorly cemented sandstones; beds commonly less than 1 inch thick (25 to 40 feet.
30					Bedding Attitude: N15W, 57NE at 31 feet.
					Bedding Attitude: N30W, 60NE at 34 feet.
35					Minor seep.
					Similar sequence as above.
40					Bedding Attitude4: N20E, 48SE at 41 feet.
					Distinct color change to blue grey; some lithologic sequence of this bedded claystones, siltstones and occasional fine sandstones.
45					
					Bedding Attitude: N60W, 32NE at 49 feet.
50					

PLATE ____

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-3 SHEET 3 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 970.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
50					Similar sequence of blue grey, thin bedded, claystones, siltstones and clay shales with some light grey, poorly cemented, fine-grained sandstone interbeds (50 to 58 feet).
55					Bedding Attitude: N30W, 57NE at 58 feet; small seep.
60					Seep. Similar interbedded sequence as above.
65					Bedding Attitude: N39W, 85NE at 69 feet.
70					Predominately blue grey, hard claystones and siltstones with some moderately cemented, light grey fine sandstones.
75					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-3 SHEET 4 OF 4

DATE OBSERVED 11/1/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 970.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
75					Continuous well bedded sequence of blue grey, firm claystones, siltstones and occasional light grey, poorly to moderately cemented fine-grained sandstones (75 to 80 feet).
80					Total Depth 80 feet. Seeps at 19 feet; 21 to 22 feet, 61 feet. Caving at 21 to 25 feet, and 29 to 35 feet.
85					
90					
95					
100					

PLATE

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-4 SHEET 1 OF 2

DATE OBSERVED 11/2/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 768.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
0					**ARTIFICIAL FILL (Af):** Very loose, dry, brown, silty to sandy clay with small bedrock (Tc) fragments.
					ALLUVIUM (Qal): Moist, brown to dark brown clayey to silty fine and medium-grained sand; soft; occasional pebble and cobble; (3 to 14 feet).
5					
10					Light brown, clayey sands very moist.
					Significant water at 14 feet.
15	R/B	Push			
20	RB	Push			Major groundwater flow towards the southwest; saturated fine and medium-grained, light brown to tan sands.
					BEDROCK - CALABASAS FORMATION (Tc): Firm interbedded sequence of light brown, moderately cemented sandstones with claystones and siltstones, well bedded sequence of light brown, tan, reddish brown claystones, siltstones and fine sandstones; approximately bedding in rings is vertical.
25					

PLATE ____

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. HD-4 SHEET 2 OF 2

DATE OBSERVED 11/2/95 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY DG GROUND ELEVATION 768.0 WORK ORDER No. 101735-HD

Depth ft.	Sample	Blows/ft.	% Moisture	Graphic Log	Description and Remarks
25	R/B	2			Total Depth 26 feet. Unable to progress due to excessive water at 14 feet and 22 feet.
30					
35					
40					
45					
50					

PLATE

PACIFIC SOILS ENGINEERING, INC.
10653 PROGRESS WAY, P.O. BOX 2249, CYPRESS, CALIFORNIA 90630
TELEPHONE: (714) 220-0770, FAX: (714) 220-9589
(Corporate Headquarters)

f. 1e as
Les Virgenes Cen - Ed.

THE BALDWIN COMPANY
1100 Business Center Circle
Thousand Oaks, CA 91320

August 25, 1995

Work Order 101735-DB

Attention: Mr. Nikolai Gorely

Subject: **GEOLOGIC INVESTIGATION**
of a Hypothetical Large Landslide,
Calabasas Promenade Commercial Development Site
Tentative Parcel Map 22131
CITY OF CALABASAS, CALIFORNIA

References: (see Appendix I)

Gentlemen:

Pursuant to the request of the City of Calabasas' geotechnical consultant, Leighton and Associates, PSE present herein the results of an investigation performed to determine if a hypothetical, large, deep-seated landslide exists on the subject property. The City's reviewer requested that a deep boring be excavated in order to determine the presence or absence the landslide.

The location and depth of this boring and various geologic assumptions were discussed and agreed upon by the reviewer and this firm at meetings held prior to the field investigation.

These assumptions were as follows:

1. Based upon the deep boring CH-1 by West Coast Soils on the Pam Azar portion of the site, no deep-seated landslide is present in the vicinity of the Azar/Baldwin property line (near borings WC-3, WC-4 and CH-1).

2. The boring location is positioned to detect a deep-seated landslide which possibly moved northerly and/or northwesterly.

LOG OF BORING
DB-1 (cont'd.)

DIP AMOUNT	GRAPHIC LOG	DEPTH	SAMPLE METHOD	% RECOVERY	TIME	DESCRIPTION
					8/1/85	
			PITCHER TUBE	100%		Sandstone: Light grey, fine-grained, poorly cemented; some claystone
45°					10:20	Well-bedded sequence of dark grey claystones, siltstones interbeds and poorly cemented light grey sandstones; some soft sediment deformation structures present;
60°		75	PITCHER TUBE	44%		
					10:40	Similar interbedded sequence with 4"± thick very hard light grey siliceous siltstone at 79'±.
			PITCHER TUBE	25%		
40°		80			11:15	Sample loss at 80' probably due to loose sands; possible water in this zone.
			PITCHER TUBE	56%		Similar interbedded sequence as above with well-developed soft sediment deformation structures (load casts, rip-up clasts, etc.).
					11:30	
			PITCHER TUBE	83%		Some polished surfaces along bedding planes.
		85			12:00	Sandstone: Light grey; non-cemented 6"± thick, fine-grained.
90°			PITCHER TUBE	58%		Bedding vertical at 87'±.
20°					12:45	Same lithologies and structure with moderate soft sediment deformation structures developed.
90°		90	PITCHER TUBE	83%		
					1:15	Bedding vertical from 90'± to 92' and well-developed.
60°			PITCHER TUBE	42%		Very well-bedded with lithologies as above.
		95			1:50	Some polished surfaces along bedding planes.
35°			PITCHER TUBE	61%		Same as above with light grey, poorly cemented medium-grained.
15°						
50°					2:15	Sandstone 6"+ thick at 97'±; some soft sediment deformation structures,
			DRILLED		3:00	very difficult drilling; very had grey siltstone at 98'±.
		100	CORE	51%		Very well-bedded sequence of dark grey claystone, siltstone and light grey, fine-grained, poorly cemented sandstones.
15°						**Some surfaces along bedding between claystones appear polished.**
					4:00	Sandstone: Medium-grained, well-cemented, light grey at 104'± 4"+ thick.
		105			8/2/85	
			CORE	33%	7:10	Very well-bedded sequence of very firm, dark grey to grey claystones and siltstones with light grey, fine-grained, poorly cemented sandstones; beds usually less than ¼" thick; some polished surfaces along bedding planes; soft sediment deformation structures well-developed.
		110				
					8:45	Loss of core between 114' and 119' probably due to loose sands; possible water in this zone (refer to E-Logs).
		115	CORE	0%		
					9:26	Well-bedded sequence of dark grey claystones, siltstones and light grey, poorly cemented, fine-grained sandstone; beds commonly less than ¼" thick.
		120	PITCHER TUBE	(REAMED) 39%		
65°					11:00	Sandstone: Light grey, poorly cemented, fine- to medium-grained 2"+ thick
15°						
25°			PITCHER TUBE	42%		
		125			12:00	Similar sequence of interbedded, dark grey to grey claystones, siltstones and light grey, fine-grained, poorly cemented sandstones with well-developed soft sediment deformation structures.
70°			PITCHER TUBE	28%		
30°					1:00	
90°			PITCHER TUBE	56%		
30°		130			1:50	Same as above with some polished surfaces along bedding planes.
			PITCHER TUBE	50%		
90°					2:40	Well-bedded sequence of dark grey to grey claystones, siltstones and light grey, poorly cemented, fine-grained sandstones; bedding vertical from 131'. to 137'.
		135	PITCHER TUBE	100%		
90°					3:50	
					8/3/85	
			PITCHER TUBE	(REAMED) 100%	7:00	Majority of the recovery consists of slough due to reaming of hole; very
60°		140			7:50	hard, grey siliceous siltstone approximately 4"+ thick at 140'±.

LOG OF BORING
DB-1 (cont'd.)

DIP AMOUNT	GRAPHIC LOG	DEPTH	SAMPLE METHOD	% RECOVERY	TIME	DESCRIPTION
65°					8/7/95	
50°		215	CORE	(REAMED) 50%		Well-bedded sequence of dark grey, hard, claystones and siltstones with some light grey, moderately cemented, fine- to medium-grained sandstones; beds commonly ¼" to ½" in thickness; faint soft sediment deformation present as micro-folds.
90°						
40°		220			1:15	
90°						
90°		225	CORE	33%		Same interbedded sequence as above; loss of core probably due to sandstones washing out and vertical nature of bedding; very tight micro-fold at 228'±.
		230				Continuous lithology and structure from 228' to 242' and similar to interbedded sequence described above.
90°					2:40	
		235	CORE	50%		
60°		240				
60°					3:40	**Pebbly Sandstone: Light grey, well-cemented, 6"+ thick**
		245	CORE	12%		Same interbedded sequence of dark grey, hard claystones and siltstones with minor moderately cemented light grey sandstones; beds ¼" to ½" thick; continuous lithology and structure to 253'.
50°		250				
					5:44	Core Depth: 253'
					8/8/95	
		255	DRILLED			Section overdrilled to accommodate slough after flushing.
		260				Hole Depth: 260'

LOG OF BORING
DB-1 (cont'd.)

DIP AMOUNT	GRAPHIC LOG	DEPTH	SAMPLE METHOD	% RECOVERY	TIME	DESCRIPTION
			PITCHER TUBE	61%	8/3/95	Sandstone: Light grey, poorly cemented, fine- to medium-grained; bedding indiscernible (massive); continues the same lithology from 140'± to 147.5'±.
					8:11	
		145	PITCHER TUBE	33%		
90°					8:48	
80°			PITCHER TUBE	100%		
60°					9:27	Sandstone: Light grey, poorly cemented, fine-grained, 12"± thick
45°		150				
10°			PITCHER TUBE	100%		Well-bedded sequence of claystone, siltstone, and light grey, fine-grained, poorly cemented sandstone; some polished surfaces at 150'± along bedding planes; soft sediment deformation structures moderately well-developed; well-bedded sequence of claystones, siltstones and sandstones as above; beds ¼" thick.
60°					10:50	
70°						
90°			PITCHER TUBE	100%		
		155			11:40	
80°						
15°			PITCHER TUBE	100%		
40°						
25°					1:00	Sandstone: Light grey, medium-grained, poorly cemented, 1'± thick,
25°		160	PITCHER TUBE	100%	2:00	Same interbedded sequence as above with some polished surfaces along bedding planes; well-cemented, fine-grained sandstone 2"± thick at 160.5±.
			CORE	33%		Interbedded sequence of very hard, dark grey to grey claystones, siltstones and light grey, fine-grained, poorly cemented sandstones; beds usually less than ¼"± thick and uniform; occasional dark grey to grey, fine-grained, well-cemented sandstone interbeds 3"± thick.
30°		165				
					3:30	
			DRILLED		8/4/95	
		170				
40°			CORE	56%		Interbedded sequence of claystones, siltstones and fine sandstones as above.
					8:45	Sandstone: Light grey, fine- to medium-grained, poorly cemented.
		175	CORE	20%		Uniform, interbedded sequence of very hard, dark grey claystones, siltstones with minor light grey, poorly to moderately cemented, fine-grained sandstones; beds ¼"± thick.
		180				
40°						
35°					10:20	Predominately light grey, medium-grained, moderately cemented sandstones with minor, dark grey, hard claystones and siltstones.
		185	CORE	0%		Based on cuttings and drilling rate, core loss from 184' to 189' probably due to loose sands.
					11:40	
50°		190	CORE	1%		Pebbly Sandstone: Light grey, very well-cemented; coarse-grained matrix with subrounded quartz pebbles less than 1/8" in diameter.
					1:50	
30°					8/7/95	
		195	CORE	28%		Sandstone: 189' to 199'; extremely hard, well-cemented, light grey; massive; some evidence of poorly developed graded bedding; uniform to 199'±; some amorphous calcite along thin fractures (two)
75°		200				Predominantly dark grey, very hard claystones and siltstones with minor light grey, moderately cemented, light grey sandstones; beds ¼" to ½" thick; some sandstone interbeds are well-cemented.
90°					9:50	
		205	CORE	25%		Well-bedded sequence of dark grey, hard claystones and siltstones; ¼" to ½" in thickness; 203' to 213'; some evidence of slight soft sediment deformation in the form of micro-folds; minor interbeds of light grey, moderately cemented sandstones.
90°						
		210			11:09	

LOG OF BORING
DB–1 (REVISED)

DIP AMOUNT	GRAPHIC LOG	DEPTH	SAMPLE METHOD	% RECOVERY	TIME	DESCRIPTION
			DRILLED		7/31/95 9:45	**LANDSLIDE DEBRIS (Qls):** 5'± cut for pad; 5' drilled to accommodate drilling apparatus.
		5	PITCHER TUBE	74%		Silty Clay: Dark brown to black; dry, occasional root and bedrock fragment.
			CORE	0%		Heterogeneous mixture of silty clay, fine sand and angular bedrock fragments; tan to light brown; dry; resistant cobble at bottom.
		10			10:48	
		15	CORE	0%		
		20			11:00	Crudely interbedded brownish grey siltstone and claystone with pads, lenses, and beds of reddish brown, fine- to medium-grained, non-cemented sandstone.
			PITCHER TUBE	72%		Coarse Sand: Light brown; loose.
						CALABASAS FORMATION (Tcl): **See boring log of HD–3 for additional descrription from 20' to 30'**
		25	PITCHER TUBE	100%	11:30	
			PITCHER TUBE	80% (6" SLOUGH)	12:00	
40°		30	PITCHER TUBE	100%	12:12	
45°			PITCHER TUBE	100%	12:30	Interbedded sequence of thin (¼"±) claystones, siltstones and fine sandstones; claystones/siltstones are light brown to grey brown to 31'± then gradually changes to dark and medium grey; fine sandstones are non-cemented and reddish brown to tan sometimes occurring as pods and lenses.
45°		35	PITCHER TUBE	100%	12:50	Similar dark grey color and lithologies but with moderately well developed soft sediment deformation structures (rip-up clasts, kink folds, etc.).
			PITCHER TUBE	67%	1:40	Sandstone: Light grey, medium-grained, non-cemented.
40°		40	PITCHER TUBE	83%	2:15	Similar interbedded thin dark grey claystones and siltstones with light grey, fine-grained, non-cemented sandstones; some soft sediment deformation structures.
60°						Sandstone: Light grey, medium-grained, non-cemented.
55°		45	PITCHER TUBE	83%	2:50	Well interbedded sequence as above with dark grey to grey claystones, siltstones and occasional light grey non-cemented, fine-grained sandstones; beds commonly less than ¼" thick; dip approximately 50°± (consistent); well developed soft sediment deformation structures (rip-up clasts, pods, lenses, small offsets) from 50' to 53'.
			PITCHER TUBE	100%	3:30	
			PITCHER TUBE	100%	8/1/95 6:30	
53°		50	PITCHER TUBE	83%	7:20	
30°		55	PITCHER TUBE	72%	8:06	Same interbedded sequence of dark grey to grey claystones, siltstones with light grey, fine-grained, non-cemented sandstones (50 percent).
			PITCHER TUBE	50%	8:30	Some soft sediment sedimentary structures present with a pronounced micro-fold at 63'±.
55°		60	PITCHER TUBE	67%	8:51	
6°						
18°		65	PITCHER TUBE	72%	9:13	Well-bedded sequence as above from 65' to 70'.
25°			PITCHER TUBE	83%	9:28	
45°		70	PITCHER TUBE	67%	9:55	

PACIFIC SOILS ENGINEERING, INC.
10653 PROGRESS WAY, P.O. BOX 2249 CYPRESS, CA 90630
TELEPHONE: (714) 220-0770, FAX: (714) 220-9589
(Corporate Headquarters)

THE BALDWIN COMPANY
31416 Agoura Road
Suite 160
Westlake, CA 91361

November 24, 1993

Work Order 101735-TP

Attention: Mr. Nikolai Gorely

Subject: **PRELIMINARY GEOLOGIC/SOILS ENGINEERING INVESTIGATION AND PRELIMINARY GRADING PLAN REVIEW**
Tentative Tract 51593, City of Calabasas
COUNTY OF LOS ANGELES, CALIFORNIA

Gentlemen:

In accordance with your request, we have completed our Geotechnical Investigation of the subject site. The attached report presents the results of our investigation, conclusions and recommendations for site grading and development of the project.

The proposed construction is feasible from a geotechnical engineering standpoint, provided the grading and foundation plans take into account the appropriate geotechnical engineering recommendations contained herein.

The following are the most significant geotechnical consideration for the project development.

- Provisions for adequate discharge of the subdrain systems.
- Obtaining agency approval for 1½:1 fill slopes.
- Based on a discussion with you and Bob Burns, this report does not take into consideration subjacent future proposed development and associated geotechnical impact.
- Upon a brief review of a response report by the geotechnical consultants for the subjacent property, it is evident that there is significant and different geologic interpretations that concern your property.

The opportunity to be of service is appreciated. If you have any questions, please call.

Very truly yours,

By: Steven E. Strickler

STEVEN E. STRICKLER,
Civil Engineer, R.C.E. 43021

SIDNEY B. NEBLETT
President, C.E.G. 252

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-1 SHEET 1 OF 1

DATE OBSERVED 9/2/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 790.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Clayey silt, brown, dry, soft, porous, voids, roots, scattered siltstone fragments, massive
5						@ 5.0 ft., becoming damp, continuous lithology
10	R	PUSH		88.5	24.9	@ 10.0 ft., becoming moist, continuous lithology
						ALLUVIUM (Qal): Clayey silt, dark brown, moist, soft to firm, porous, occasional roots, massive
15						@ 16.0 ft., becoming silty sand, moist, loose, porous
						@ 17.0 ft., change to clayey silt/silty clay as above at surface
20	R	PUSH		84.0	25.4	
25						

PLATE A-1

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-1 SHEET 2 OF

DATE OBSERVED 9/2/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 790.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., continuous lithology, moist, soft
						@ 29.0 ft., water
30	R	PUSH		84.0	25.9	
						CALABASAS FORMATION (Tc): Clayey siltstone with occasional interbedded fine grained sandstone, moist, soft to moderately hard, highly weathered
35						
						Total Depth 37.0 ft. Water at 29.0 ft., Caving at 29.0 ft.
40						
45						
50						

PLATE A-1

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-2 SHEET 1 OF

DATE OBSERVED 9/3/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 795.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL Af):** Clayey silt, gray-brown, damp, firm, abundant scattered siltstone fragments to 4", roots, voids, porous
5						
10	R B	1		81.6	34.6	@ 9.0 ft., alternating near horizontal layers of tan-brown and dark brown clayey silt, approximately 4" to 6" thick
15						@ 15.0 ft., Af fill lifts increase in thickness to 8" to 12"
						@ 18.0 ft., clayey silt, dark brown, damp, loose to moderately dense, sharp, distinct contact with next fill lift below
20	R	PUSH/ 6" TAP		94.0	23.1	@ 20.0 ft., sandy silt, light yellow-tan, damp, firm to moderately dense
						CALABASAS FORMATION (Tc): Interbedded very fine grained sandstone and siltstone, light yellow-tan, gray-brown, damp to moist, firm to moderately hard, moderately well bedded
						@ 22.0 ft., Attitude: N50W, 36NE - approximate bedding
25						@ 24.0 ft., becoming moderately folded, vague bedding

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-2 SHEET 2 OF

DATE OBSERVED 9/3/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 795.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 26.0 ft., Attitude: N30W, 24SW - approximate bedding
						@ 28.0 ft., Attitude: N75E, 34NW - approximate bedding
30	R	6"PUSH 6"TAP		97.6	24.2	
						@ 32.0 ft., Attitude: N10E, 17SE - approximate bedding
35						@ 35.0 ft., very hard
						Total Depth 35.5 ft.
						No Water, No Caving
40						
45						
50						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-3 SHEET 1 OF 1

DATE OBSERVED 9/3/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 795.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Mixtures of clayey silt and sandy silt, tan to yellow-brown, damp to moist, locally wet, moderately dense, abundant rock fragments, massive, locally porous
5						
10	R	PUSH6" TAP6"		78.4	37.9	
						@ 12.0 ft., clayey silt/silty clay, dark brown, moist, firm to stiff, abundant rock fragments, pieces of brick
15						@ 16.0 ft., predominantly silty sand, gray-brown, damp, loose, mostly rock fragments in silty sand matrix
						ALLUVIUM (Qal): Clayey silt/silty clay, dark brown, damp to moist, firm to stiff, occasional rock fragments, root casts, minor carbonates, moderately porous, voids, massive
20	R	1		86.4	21.0	
						@ 21.0 ft., slight color change to gray-brown, slight increase in amount of rock fragments
25						@ 24.0 ft., slight color change to reddish brown

PLATE A-3

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-3 SHEET 2 OF 2

DATE OBSERVED 9/3/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 795.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., increasing amount of rock casts and rootlets, some shrink/swell polished surfaces, very weak columnar structure.
						CALABASAS FORMATION (Tc): Interbedded very fine to fine grained sandstone and siltstone, yellow-tan, gray-brown, and red-brown, damp, very hard, very well bedded, beds average 1" to 6" thick
						@ 28.0 ft., Attitude: N9W, 59NE - bedding
						@ 29.0 ft., bedding becomes folded/overturned
30	R	4		101.8	21.2	@ 30.0 ft., Attitude: NS, Vertical - bedding
						@ 33.0 ft., Attitude: N25E, 67NW - bedding
35						
						@ 37.0 ft., Attitude: N20E, 64NW - bedding
40	R	4		99.8	25.4	Total Depth 40.0 ft. No Water, No Caving
45						
50						

PLATE A-3

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-4 SHEET 1 OF 2

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 785.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Sandy silt, gray-brown, dry to damp, moderately dense, scattered siltstone fragments, roots, massive
10	R	PUSH		87.7	25.6	**ALLUVIUM (Qal):** Clayey silt, dark gray-brown, damp to moist, soft to firm, occasional scattered pebbles, occasional roots, massive, voids, porous, root casts
15						@ 15.0 ft., moist, soft, porous, slight color change to gray-brown, increasing clay content
20	R	PUSH		89.9	29.5	
25						@ 23.0 ft., gradational change to clayey sandy silt, yellow-brown, moist, firm, abundant scattered pebbles and gravel, porous, voids

PLATE A-4

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-4 SHEET 2 OF .

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 785.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						
						@ 29.0 ft., undulatory distinct contact with silty clay, reddish brown, moist, soft, clean (very few pebbles)
30	R	PUSH		105.3	20.0	
						▽ moderate seep
						CALABASAS FORMATION (Tc):
						Unobserved due standing water at 33.0 ft., surface logged - interbedded very fine grained sandstone and siltstone, yellow-brown, damp, moderately hard
35						
40	R	3		103.7	23.7	Total Depth 40.0 ft.
						Water at 33.0 ft., Caving at 33.0 ft.
45						
50						

PLATE A-4

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-5 SHEET 1 OF 4

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1110.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**SOIL/COLLUVIUM (Qcol):** Sandy silt, clay, dry to damp, firm, porous, roots
						CALABASAS FORMATION (Tc): Laminated siltstone interlaminated very fine grained sandstone, yellow-tan, damp, moderately hard, highly weathered, moderately folded, sheared along bedding
5						@ 7.0 ft., Attitude: N15W, 44SW - bedding
10	R	1		102.5	21.0	@ 11.0 ft., sandstone and siltstone units becoming thicker, sandstone up to 4" to 6", laminated siltstone up to 8" to 10" becoming tightly folded, well bedded @ 11.0 ft., Attitude: N20E, 19NW - bedding
15						@ 15.0 ft., Attitude: N30E, 72SE - fold axis @ 15.0 ft., Attitude: N63W, 24SW - bedding @ 15.0 ft., Attitude: EW, 24S - bedding
20	R	2		110.4	15.4	@ 21.0 ft., Attitude: N85E, 22SE - bedding
25						@ 24.0 ft., units are slightly folded, very well bedded, approximately 4" thick siliceous siltstone bed, occasional gypsum

PLATE A-5

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-5 SHEET 2 OF

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1110.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						along bedding @ 24.0 ft., Attitude: N10E, 4-5NW - approximate bedding @ 25.0 ft., siltstone and sandstone units are generally 2" to 4" thick
30	R	3		107.7	16.8	@ 30.0 ft., Attitude: N45W, 33SW - bedding
						@ 31.0 ft., water bleeding from approximately 6" thick fine to medium grained sandstone bed, units are gently folded, polished along bedding
						@ 33.0 ft., Attitude: N40W, 61NE - bedding
35						@ 35.0 ft., tight fold
						@ 36.0 ft., Attitude: N15W, 17NE - bedding
						@ 39.0 ft., Attitude: N70E, 18SE - bedding
40	R	3		110.6	16.4	@ 40.0 ft., water seep from sandstone bed
						@ 41.0 ft., Attitude: EW, 18S - bedding lubricated bedding planes slabbing off
45						
						@ 48.0 ft., Attitude: EW, 11S - bedding
50						@ 49.0 ft., contact with blue-gray clayey siltstone very thin laminations of light gray-white very very fine grained sand, very

PLATE A-5

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-5 SHEET 3 OF 4

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1110.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50	R	6		114.5	14.4	well bedded, damp to moist, moderately hard to hard
55						@ 55.0 ft., continuous lithology since above at 49.0 ft.
60	R	8		118.4	11.7	@ 60.0 ft., moderate water seep @ 60.0 ft., Attitude: N20W, 70SW - bedding Unsafe below SURFACE LOG
65						
	B					
70	R	10		111.8	17.3	@ 70.0 ft., continuous lithology since 49.0 ft.
75						

PLATE A-5

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-5 SHEET 4 OF 4

DATE OBSERVED 9/7/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1110.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						
80	R	19		112.6	15.6	@ 80.0 ft., predominantly blue-gray very fine grained sandstone and siltstone
85						
90	R	26/11"		110.1	17.7	@ 90.0 ft., continuous lithology since 49.0 ft.
95						Total Depth 95.0 ft. Water at 31.0, 40.0 and at depth Caving at 31.0, 40.0, 60.0 and at depth
100						

PLATE A-5

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-6 SHEET 1 OF 4

DATE OBSERVED 9/8/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1070.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						SOIL/COLLUVIUM (Qcol): Clayey silt with some sand, dark brown, dry to damp, stiff, roots, scattered siltstone fragments, voids, porous
5						LANDSLIDE DEBRIS (Qls): Predominantly clayey silt, brown, red-brown, tan-gray with occasional pockets of very fine to fine grained sand, damp, moderately dense/firm, occasional siliceous siltstone fragments and scattered pebbles, pockets of dark brown clayey silt mixed in, chaotic
10	R	2		73.8	40.6	
						@ 12.0 ft., undulatory/continuous contact with tightly folded bedrock @ 12.0 ft., Attitude: EW, 37N - contact/rupture surface
15						@ 15.0 ft., Attitude: N80W, 42NE - contact/rupture surface
20	R B	2		108.2	19.3	@ 18.0 ft., thin, approximately 1/2" to 4", interbedded siltstone and sandstone, moist, moderately hard, moderately well bedded, tightly folded, no cement, very few pebbles, colors: siltstone; blue-gray, tan, deep red, orange-tan; sandstone; very fine to fine grained light yellow-tan, tan-brown, occasional minor polished surfaces in siltstone @ 18.0 ft., Attitude: N40E, 40SE - bedding @ 22.0 ft., Attitude: N15E, 38SE - bedding
25						

PLATE A-6

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-6 SHEET 2 OF 4

DATE OBSERVED 9/8/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1070.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., continuous lithology since above at 18.0 ft., well bedded, only moderately folded @ 25.0 ft., Attitude: N22E, 45SE - bedding @ 26.5 ft., occasional sandstone beds are wet, not enough to bleed down walls
30	R	2		111.2	17.4	@ 30.0 ft., Attitude: N5W, 38NE - bedding @ 32.0 ft., becoming folded
35						@ 35.0 ft., continuous lithology since above at 18.0 ft. @ 35.0 ft., Attitude: N67E, 19SE - bedding @ 36.0 ft., another fine grained sandstone bed is wet, not enough to bleed down wall @ 39.0 ft., Attitude: N64E, 37SE - bedding
40	R	2		104.3	21.5	@ 40.0 ft., beginning to fold @ 43.0 ft., Attitude: N24W, 29NE - bedding
45						@ 45.0 ft., occasional gypsum crystals along bedding, occasional silver-blue clayey siltstone beds, yellow-tan very fine to fine grained sandstone beds are less numerous and thinner, approximately 2" maximum @ 47.0 ft., becoming moderately folded, increasing sandstone beds
50						

PLATE A-6

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-6 SHEET 3 OF 4

DATE OBSERVED 9/8/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1070.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50	R	4		106.7	19.3	@ 50.0 ft., continuous brown clay seam, 2" to 6" thick, not highly sheared but does truncate siltstone and sandstone above @ 50.0 ft., Attitude: N15E, 22NW - rupture surface **CALABASAS FORMATION (Tc):** Below the feature at 50.0 ft. a series of very tight, very complex folding begins, very large light yellowish white fine grained sandstone bed is truncated by the feature, near vertical bedding parallels sandstone @ 53.0 ft., Attitude: EW, 74N - bedding
55						@ 56.0 ft., Attitude: N68W, 77NE - bedding bedding has been folded into antiform @ 57.0 ft., large sandstone bed daylights out of boring
60	R	13		116.4	11.7	@ 60.0 ft., thin laminations of very fine grained sandstone between siltstone is beginning to fail off the walls
65						@ 65.0 ft., Attitude: EW, 82N - bedding
						@ 67.0 ft., fine to medium grained sandstone, light yellow-tan, moist to wet, uncemented, friable, severe caving, unsafe below **SURFACE LOG**
70						@ 70.0 ft., continuous lithology since 67.0 ft.
75						

PLATE A-6

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-6 SHEET 4 OF

DATE OBSERVED 9/8/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 1070.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						
80	R B	30/7"		91.0	35.1	@ 80.0 ft., medium grained sandstone interbedded gray siltstone, moist, moderately hard to hard
85						
90	R	30/9"		105.1	18.5	@ 90.0 ft., interbedded green-gray siltstone and yellow-tan medium grained sandstone, damp, moderately hard to hard, very well bedded
95						Total Depth 95.0 ft., Logged to 67.0 ft. Water at 67.0 ft., Caving at 67.0 ft.
100						

PLATE A-6

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-7 SHEET 1 OF 1

DATE OBSERVED 9/8/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 800.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ALLUVIUM (Qal):** Silty clay/clayey silt, dark brown, damp at surface, moist with depth, soft to firm, voids, porous, roots
5						
						@ 8.0 ft., cobbles, becoming wet
10	R	PUSH		104.2	17.9	**CALABASAS FORMATION (Tc):** Interbedded very fine grained sandstone and siltstone, yellow-tan, silver-blue, gray-tan, damp, moderate seep at contact, highly weathered to 14.0 ft.
						@ 14.0 ft., becoming harder, continuous lithology
15						@ 16.0 ft., Attitude: N35E, 62NW - bedding
20	R	8		119.0	13.7	Total Depth 20.0 ft. Water and Caving at 9.0 ft.
25						

PLATE A-7

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-8 SHEET 1 OF 4

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 940.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						Pad cut approximately 4.0 ft. into hillside LANDSLIDE DEBRIS (Qls): Clayey silt, dark brown, damp, firm, roots, krotovinas, voids, porous
						@ 4.0 ft., gray siltstone and yellow-orange sandstone, damp, soft to moderately hard, chaotic
5						@ 7.0 ft., Attitude: N75E, 56NW - bedding
10	R	1		103.6	19.5	@ 10.0 ft., variable 2" to 6" thick dark brown very fine grained sandy siltstone bed, not sheared, bedding below is folded and steeply dipping CALABASAS FORMATION (Tc): Interbedded, laminated blue-gray siltstone and yellow-tan sandstone, damp to moist, moderately hard, top 4.0 ft. highly weathered, krotovinas, roots, voids, porous @ 10.0 ft., Attitude: N45E, 51NW - bedding
						@ 14.0 ft., Attitude: N35W, 71NE - bedding
15						@ 15.0 ft., bearing N60E - fold axis trend, units are very well bedded and conform to fold axis, occasional shearing or polished surfaces on siltstone
						@ 18.0 ft., Attitude: N20W, 45NE - bedding
						@ 19.0 ft., a series of tight folds
20	R	2		111.5	16.8	@ 20.0 ft., Attitude: N55W, 28NE - bedding
						@ 24.0 ft., bedding is folded into a series of gentle "s" shaped curves with locally steep and shallow dips, occasional gypsum
25						

PLATE A-8

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-8 SHEET 2 OF 4

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 940.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						along bedding @ 25.0 ft., Attitude: N30W, 80NE - bedding
						@ 28.0 ft., fine grained sandstone, tan-brown, moist, moderately hard, interbedded thin siltstone, gray, damp to moist, moderately hard, very well bedded @ 28.0 ft., Attitude: N20W, 46NE - bedding
30	R	6		115.0	11.3	@ 30.0 ft., sides of sandstone bed are truncated by fault @ 30.0 ft., Attitude: N10W, 43NE - bedding on sandstone @ 30.0 ft., Attitude: N10W, 50NE - bedding outside fault @ 30.0 ft., Attitude: N55W, 82NE - fault
						@ 34.0 ft., fault daylights out of boring along base of sandstone, bedrock is now harder, moderately hard to hard, very well bedded
35						@ 35.0 ft., Attitude: N25W, 39NE - bedding
40	R	6		117.6	14.0	@ 40.0 ft., Attitude: N15W, 50NE - bedding
						@ 42.0 ft., several very small faultlets are grouped together and disappear into a yellow-orange sand, offset 1/2" to 1" @ 42.5 ft., bedrock units daylighting into boring consist of yellow-orange fine grained sand, gray-brown siltstone in a mottled somewhat slurried mixture, these units conform with surrounding very well bedded siltstone and sandstone in strike and dip
45						@ 46.0 ft., the zone above at 42.5 ft., daylights out of boring, soft sediment deformation or turbidite deformation
						@ 47.0 ft., Attitude: N30W, 59NE - bedding
50						

PLATE A-8

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-8 SHEET 3 OF

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 940.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50	R	10		116.9	5.4	@ 50.0 ft., fine to medium grained sandstone, yellow-orange, moist, moderately hard, massive, clean (no rocks)
						@ 52.0 ft., Attitude: N25W, 58NE - bedding
55						@ 55.0 ft., another typical interbedded sequence of laminated siltstone, blue-gray and gray-brown and very fine to fine grained sandstone, yellow-tan, moist, moderately hard to hard, very well bedded @ 55.0 ft., Attitude: N18W, 62NE - bedding @ 56.0 ft., very well cemented, very hard, medium grained sandstone, blue-gray, approximately 1' thick
60	R	30/7"		118.7	13.0	@ 60.0 ft., bedrock units are predominantly sandstone with occasional siltstone beds, localized fractures in sandstone intercept siltstone and fall off the wall, moist to wet, very minor seepage does not bleed down wall @ 60.0 ft., Attitude: N10W, 60NE - bedding
						@ 64.0 ft., very strong seepage from all sides of boring, caving, unsafe below
65						SURFACE LOG
70						@ 70.0 ft., continuous lithology since 60.0 ft.
75						

PLATE A-8

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-8 SHEET 4 OF 4

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 940.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 76.0 ft., moderate water seep
						@ 78.0 ft., blue-gray, fine to medium grained sandstone, moist, hard (hard drilling) to total depth (too hard to sample)
80						
85						@ 85.0 ft., continuous lithology since 78.0 ft.
90						Total Depth 90.0 ft. Water at 64.0, 76.0 ft. Caving at 70.0 ft.
95						
100						

PLATE A-8

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-9 SHEET 1 OF 3

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 895.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**CALABASAS FORMATION (Tc):** Fine to medium grained sandstone, yellow-white, dry, moderately well cemented, hard, interbedded laminated siltstone, gray-brown, red-brown
						@ 4.0 ft., Attitude: N25E, 65NW - bedding
5						
						@ 9.0 ft., Attitude: N55E, 84NW - bedding
10	R	4/6"		113.4	5.2	@ 10.0 ft., sandstone:siltstone = 80:20, moderately folded, minor shearing along bedding
						@ 14.0 ft., bedrock consists of thick beds of sandstones with 4" to 10" thick beds of siltstone spaced 3' to 4' apart
15	B					@ 14.0 ft., Attitude: N30E, 48NW - bedding
						@ 17.0 ft., bedding is moderately folded, siltstone is sheared along bedding
						@ 19.0 ft., predominantly laminated siltstone with thin 2" beds of very fine to fine grained sandstone, damp, moderately hard, well bedded
20	R	3		112.4	16.3	@ 20.0 ft., Attitude: N15W, 45SW - bedding
						@ 23.0 ft., predominantly sandstone and siltstone as above at 14.0 ft.
25						

PLATE A-9

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-9 SHEET 2 OF 3

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 895.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., Attitude: N20W, 50SW - bedding
						@ 29.0 ft., Attitude: N15W, 55SW - bedding
30	R	5		115.9	11.2	
						@ 33.0 ft., small fault zone, up to 1" offset maximum @ 33.0 ft., Attitude: N65E, 80NW - vertical: fault @ 34.0 ft., still predominantly sandstone with occasional interbeds of laminated siltstone
35						
40	R	5		109.7	18.1	@ 40.0 ft., Attitude: N17W, 42SW - bedding
						@ 43.0 ft., zone of very tight folding, siltstone is moderately sheared/polished along bedding
45						
						@ 46.0 ft., blue-gray siltstone, damp, moderately hard to hard, sheared, folded, occasional gypsum crystals, still predominantly sandstone @ 47.0 ft., Attitude: N50W, 62SW - bedding
						@ 49.0 ft., sandstone beds are now moist to wet, common gypsum along bedding, isolated blue-white sandstone pod, very
50						

PLATE A-9

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-9 SHEET 3 OF 3

DATE OBSERVED 9/9/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 895.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						hard, very well cemented, units are well bedded
						@ 52.0 ft., water seeping from fine to medium grained sandstone, yellow-orange, poorly cemented, friable
						@ 53.0 ft., Attitude: N35W, 54SW - bedding
55						@ 55.0 ft., all sandstone beds bleeding water, well cemented, hard to very hard, massive
						@ 57.0 ft., siltstone, blue-gray, moist, hard, sheared along bedding, approximately 2' thick
						@ 58.0 ft., Attitude: N5W, 56SW - bedding
						@ 59.0 ft., sandstone, yellow-tan, moist to wet, very hard, moderately well to well cemented, massive to total depth
60						@ 60.0 ft., very well cemented, very hard
65						Total Depth 64.5 ft., Refusal Water at 52.0 ft., No Caving
70						
75						

PLATE A-9

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-10 SHEET 1 OF

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 820.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**CALABASAS FORMATION (Tc):** Interbedded/laminated very fine grained sandstone and siltstone, yellow-tan and gray-brown, damp, moderately hard, very well bedded, fractured, krotovinas, roots in top 5'
5						@ 5.0 ft., Attitude: N50W, 52NE - bedding
						@ 7.0 ft., very slight undulations in bedding orientation, wavy folds
						@ 9.0 ft., Attitude: N60W, 41NE - bedding
10	R	3		111.3	19.0	
						@ 13.0 ft., occasional dark gray clayey siltstone beds, damp to moist, moderately hard to hard, very well bedded, slightly fractured
						@ 14.0 ft., Attitude: N45W, 41NE - bedding
15						
						@ 16.0 ft., occasional polished surfaces on siltstone bedding planes from folding
						@ 16.0 ft., Attitude: N55W, 59NE - bedding
						@ 19.0 ft., bedding rotates and is overturned
20	R	3		112.3	16.8	@ 20.0 ft., Attitude: N63W, 77SW - bedding
						@ 24.0 ft., bedding rotates back
25						

PLATE A-10

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-10 SHEET 2 OF

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 820.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., Attitude: N65W, 67NE - bedding
						@ 27.0 ft., isolated sandstone beds bleeding water
30	R	4		116.0	15.0	
						@ 31.0 ft., occasional gypsum crystals along bedding
						@ 32.0 ft., Attitude: N55W, 62NE - bedding
35						
						@ 37.0 ft., minor kink folds
						@ 39.0 ft., folds as above at 37.0 ft., becoming tighter
40	R	6		119.5	14.1	@ 40.0 ft., clayey siltstone with very fine grained sandstone laminations, dark gray, moist, hard, well bedded
						@ 41.0 ft., Attitude: N35E, 37NW - bedding
45						@ 45.0 ft., Attitude: N15W, 55SW - bedding
						@ 46.0 ft., bedding rolls over and is tightly folded
50						

PLATE A-10

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-10 SHEET 3 OF 4

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 820.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50	R	11		118.3	14.3	@ 50.0 ft., very complex folding (soft sediment deformation) occasional polished surfaces along bedding at hinge points of fold axes
						@ 52.0 ft., extremely diverse bedding attitudes, very tight, complex folds
55						
						@ 57.0 ft., hissing sound from walls, air, no smell
						@ 57.0 ft., Attitude: N45W, 65NE - bedding
						@ 57.0 ft., bedding becomes regular again, very small wet spots on wall
60	R	16		125.1	10.1	@ 60.0 ft., water seeping from fine grained sandstone
						@ 61.0 ft., Attitude: N50W, 65NE - bedding
						@ 62.0 ft., bedding rolls over again
65						@ 65.0 ft., Attitude: N20W, 60SW - bedding
						@ 67.0 ft., continuous lithology since above at 40.0 ft.
70	R	34		128.4	11.8	@ 70.0 ft., Attitude: N15W, 58SW - bedding
75						

PLATE A-10

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-10 SHEET 4 OF

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 820.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 75.0 ft., Attitude: N10E, 62NW - bedding
80	R	37/10"		118.5	10.4	@ 80.0 ft., Attitude: N5E, 62NW - bedding
						@ 83.0 ft., water seep
85						@ 85.0 ft., Attitude: N7E, 64NW - bedding
						@ 87.0 ft., small seep
90	R	40/6"		120.6	11.9	@ 90.0 ft., Attitude: N5W, 66SW - bedding
						continuous lithology since above at 40.0 ft.
95						Total Depth 95.0 ft. Water at 27.0, 60.0, 83.0, and 87.0 ft. No Caving
100						

PLATE A-10

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-11 SHEET 1 OF

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						CALABASAS FORMATION (Tc): Interbedded laminated clayey siltstone and very fine grained sandstone, gray, gray-brown, gray-white, moist, soft to moderately hard, roots, krotovinas, moderately to highly weathered in top 7', occasional carbonate pods
5						
10	R	PUSH6" TAP6"		106.0	19.5	@ 10.0 ft., Attitude: N20W, 32NE - bedding fresh tiger stripe bedrock - alternating orange-brown oxidized sandstone and blue-gray clayey siltstone, moist, moderately hard, occasional silicious siltstone, very hard
15						@ 15.0 ft., Attitude: N20W, 31NE - bedding
						@ 18.0 ft., first tight folding (soft sed.), fractured
						@ 19.0 ft., bedding beginning to roll over
20	R	2		113.7	16.1	@ 20.0 ft., Attitude: N50W, 25SW - bedding
						@ 21.5 ft., approximately 4" to 6" thick silicious siltstone bed, very hard, fractured, broken
25						

PLATE A-11

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-11 SHEET 2 OF

DATE OBSERVED 9/13/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., occasional gypsum crystals along bedding and fracture planes @ 25.0 ft., Attitude: N40W, 13SW - bedding
30						@ 30.0 ft., large approximately 16" to 18" diameter silicious concretionary fine grained sandstone block plucked from boring wall, small seep from 18" thick sandstone bed, bedding is tightly folded @ 30.0 ft., Attitude: N15E, 34SE - bedding
35						@ 34.0 ft., small seep from sandstone bed, localized zones of very hard, very well cemented silicious sandstone
						@ 38.0 ft., small seep from fractured siltstone superjacent, minor spalling, intense folding, very tight, color change to blue-gray clayey and very fine grained sandy siltstone
40	R	4		117.6	13.5	@ 40.0 ft., 18" to 24" thick medium grained sandstone, blue-gray, wet to saturated, bleeding water, well cemented, massive @ 40.0 ft., Attitude: N45E, 44SE - bedding
						@ 42.0 ft., subjacent siltstone bed is fractured, filled with water, polished surfaces sliding off, becoming unsafe, pressure lines visible on boring wall
45						
	R	10		121.2	13.3	Total Depth 50.0 ft. Water at 30.0, 34.0, 38.0, and 40.0 ft., Caving at 42.0 ft.
50						

PLATE A-11

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-12 SHEET 1 OF

DATE OBSERVED 9/14/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 800.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Sandy silt with clay, light brown to dark brown, dry to damp, loose, brick and other debris
5						@ 5.0 ft., continuous lithology
10	R B	PUSH		80.4	27.2	
						ALLUVIUM (Qal): Clayey silt, dark brown, damp to moist, soft, porous, voids, massive
15						
20	R B	PUSH		83.8	31.1	@ 20.0 ft., lithology as above at 12.0 ft.
25						

PLATE A-12

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-12 SHEET 2 OF 3

DATE OBSERVED 9/14/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 800.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						
30	R B	3		81.9	26.0	@ 30.0 ft., clayey silt/silty clay, dark brown, moist, soft, porous
35						@ 35.0 ft., moderately fast water seep CALABASAS FORMATION (Tc): Clayey siltstone, dark brown, wet, firm
40	R	PUSH		84.0	33.6	@ 40.0 ft. to total depth, silts and clays draining into bottom of boring, saturated, occasionally pours out of bucket
45						unable to advance boring due to water, caving and muddy conditions
50						

PLATE A-12

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-12 SHEET 3 OF 3

DATE OBSERVED 9/14/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 800.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
50						
						Total Depth 52.0 ft. Water at 35.0 ft., Caving at 37.0 ft.
55						
60						
65						
70						
75						

PLATE A-12

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-13 SHEET 1 OF

DATE OBSERVED 9/15/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 850.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ALLUVIUM (Qal):** Predominantly clayey silt, gray-brown, brown, moist, very soft, scattered silicious siltstone fragments, porous, rootlets, voids
5	R B	PUSH		78.8	34.4	
						CALABASAS FORMATION (Tc): Clayey siltstone/silty claystone, tan-brown, gray-brown, moist to wet, very soft, extremely weathered, massive
10	R	PUSH		67.5	34.5	
15						@ 15.0 ft., continuous lithology, very soft, wet, massive, occasional discontinuous lenses of light gray-white silty clay, occasional scattered pebbles of siltstone
20	R B	PUSH		74.4	44.2	
						@ 21.0 ft., moderate water seep from very highly weathered clayey siltstone, dark red-brown, wet, very soft, locally very poorly bedded, generally massive, bedding where discernible is polished/sheared
						@ 23.0 ft., becoming moderately hard
25						@ 24.0 ft., gradational change to siltstone, black, damp, very hard, poorly bedded, locally moderately to well bedded, moderate

PLATE A-13

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-13 SHEET 2 OF

DATE OBSERVED 9/15/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 850.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
25						petroliferous odor, fractured, blocky, somewhat polished
						@ 26.0 ft., Attitude: N10W, 60NE - bedding
	B					@ 28.0 ft., Attitude: N10W, 66NE - bedding
30						@ 30.0 ft., continuous lithology since above at 24.0 ft.
35						Total Depth 36.0 ft. Water at 21.0 ft., No Caving
40						
45						
50						

PLATE A-13

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-14 SHEET 1 OF

DATE OBSERVED 9/15/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ALLUVIUM (Qal):** Silty clay/clayey silt, gray-brown, brown, moist, soft, massive, common scattered subangular silicious siltstone fragments, occasional sandstone fragments, roots upper 2' to 4', abundant voids, moderately very porous
10	R	PUSH		76.2	31.8	@ 10.0 ft., continuous lithology as above at surface
20	R	PUSH		73.2	53.7	@ 20.0 ft., continuous lithology as above at surface, increasing moisture: wet, increasing percentage of rock fragments, very soft
25						

PLATE A-14

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-14 SHEET 2 OF 2

DATE OBSERVED 9/15/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., (still unsuitable) silty clay, gray-brown, moist to wet, very soft, porous, voids
30	R	PUSH		91.5	24.9	**CALABASAS FORMATION (Tc):** Clayey silt, gray-brown, yellow-brown, extremely weathered, moist to wet, very soft, massive
						@ 32.0 ft., visible bedding, still highly weathered, soft
35						@ 34.0 ft., fresh bedrock, interbedded laminated siltstone and very fine to fine grained sandstone, gray, yellow-tan, orange-brown, moist to wet, moderately hard, well bedded @ 35.0 ft., Attitude: N7W, 50NE - bedding @ 36.0 ft., moderate water seep @ 37.0 ft., Attitude: N5W, 72NE - bedding
40	R	3		109.2	19.7	Total Depth 40.0 ft. Water at 36.0 ft., Minor Caving at 36.0 ft.
45						
50						

PLATE A-14

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-15 SHEET 1 OF

DATE OBSERVED 9/15/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ALLUVIUM (Qal):** Silty clay, brown, green-brown, wet, very soft, sticky, massive
5						@ 5.0 ft., water
						CALABASAS FORMATION (Tc):
						@ 7.0 ft., clayey siltstone, blue-gray, wet, very soft, sticky
10	R	PUSH	(NO	RETURNS)		
15	R B	PUSH		97.0	25.5	
						@ 17.0 ft., fine to medium grained sandstone with some silt, blue-gray, wet, moderately hard, moderately well cemented, massive
20						@ 20.0 ft., becoming hard, moderately well to well cemented
	R	3/6"		107.3	16.6	Total Depth 22.0 ft. Water at 5.0 ft., Caving at 5.0 ft.
25						

PLATE A-15

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-16 SHEET 1 OF

DATE OBSERVED 9/16/93 METHOD OF DRILLING 30" Bucket Auger

LOGGED BY TJM GROUND ELEVATION 840.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ALLUVIUM/ARTIFICIAL FILL (Qal/Af):** Clayey silt with some sand, gray-tan, damp, soft, abundant scattered subangular silicious siltstone fragments up to 6", massive
5	R	1		97.0	10.4	
						CALABASAS FORMATION (Tc): Clayey siltstone, tan-brown, moist, soft to moderately hard, abundant carbonates, highly weathered, massive
10	R	2		96.8	25.1	@ 10.0 ft., moderately hard, poorly to moderately bedded, abundant carbonates, folded
15	R	3		94.5	25.6	@ 16.0 ft., predominantly clayey siltstone, red-brown, gray-brown, damp to moist, moderately hard to hard, moderately well bedded, fractured, abundant carbonates @ 16.0 ft., Attitude: N35W, 44NE - bedding
						@ 19.0 ft., siltstone, dark olive-gray, damp, hard
20						Total Depth 19.0 ft. No Water, No Caving
25						

PLATE A-16

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-1 SHEET 1 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Clayey silt to lean clay, olive-brown, moist, stiff
5	R	12/19	ML/ CL	85.8	26.9	
10	R	8/14		83.3	30.1	
15	R	12/17		86.2	28.3	
20	R	5/7	CL	70.8	35.9	**ALLUVIUM (Qal):** Lean to medium clay, dark brown, moist to very moist, soft
25						

PLATE A-17

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-1 SHEET 2 OF .

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25	R	9/16	ML/ CL	78.8	31.6	@ 25.0 ft., clayey siltstone fragments in a clayey silt matrix, brown/reddish brown, moist, moderately dense, stiff
30	R	21/23	ML/ CL	77.4	34.8	@ 30.0 ft., clayey silt, reddish brown/brown, moist, stiff to hard, abundant siltstone, shale and sandstone fragments
35	R	18/17		113.9	10.1	
40	R	16/30		90.9	25.0	
45	R	11/19	ML/ CL	94.8	21.2	CALABASAS FORMATION (Tc): Siltstone/sandstone/shale, light gray to green-gray with red to orange-rust, moist, very stiff, weathered material to 5 feet.
50						

PLATE A-17

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-1 SHEET 3 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
50	R	14/29		101.0	21.7	@ 50.0 ft. bedrock becomes hard
55	R	35/38		114.8	15.3	
60	R	21/56		113.0	16.7	
65	R	22/53		114.9	14.6	
						Total Depth 66.0 ft. No Water
70						
75						

PLATE A-17

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-2 SHEET 1 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 820830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**ARTIFICIAL FILL (Af):** Clayey silt to lean clay, tan/light gray/orange-rust, slightly moist, stiff, numerous shale fragments
5	R	14/14		86.5	22.8	@ 5.0 ft., olive-brown/green-gray/orange-rust, moist to very moist, stiff
10	R	11/32		87.2	26.4	
15	R	7/11		82.8	30.2	
20	R	8/14		84.9	30.1	@ 20.0 ft., very moist, soft
						@ 22.0 to 24.5 ft., difficult drilling
25						

PLATE A-18

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-2 SHEET 2 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 820830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
25	R	9/12		84.9	31.1	
30	R	19/27		80.4	33.3	**ALLUVIUM (Qal):** Organic clay, black to dark green-gray, very moist to wet, firm to stiff
35	R	9/14		84.2	30.5	@ 35.0 ft., clayey silt to lean clay, brown, moist, firm to stiff, numerous siltstone and sandstone fragments
40	R	8/9		77.9	34.2	
45	R	10/14		83.9	32.2	
50						

PLATE A-18

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-2 SHEET 3 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 820830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50	R	8/12		86.9	32.1	@ 50.0 ft., moist to very moist
55	R	21/50	ML/ CL	101.7	21.2	**CALABASAS FORMATION (Tc):** Siltstone/sandstone/shale interbedded, green-gray/reddish tan, moist to very moist, stiff to hard, weathered material 1 ft. @56.0 ft. water along unweathered contact surface
60	R	18/21		93.4	28.2	
65	R	19/33		96.8	25.6	
70	R	18/27		98.4	23.1	
75						

PLATE A-18

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. BHS-2 SHEET 4 OF

DATE OBSERVED 10/19/93 METHOD OF DRILLING 140# with 30" fall

LOGGED BY FAD GROUND ELEVATION 820830.0 WORK ORDER No. 101735

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75	R	30/50		103.1	20.9	@ 75.0 ft., 3/4" lense of black fat clay, below is siltstone to silty sandstone, gray, moist, hard
80	R	55/50		111.0	13.0	Total Depth 80.0 ft. Water at 56.0 ft.
85						
90						
95						
100						

PLATE A-18

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-D SHEET 1 OF

DATE OBSERVED 5/31/90 METHOD OF DRILLING 24" Bucket Auger

LOGGED BY LWW GROUND ELEVATION 990.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						SOIL: Clayey silt, brown, dry, loose
						WEATHERED LANDSLIDE (Qls): Mottled rust-brown to light gray siltstone, fractured, discontinuous, slightly moist, medium dense
5						LANDSLIDE DEBRIS (Qls): Light tan-gray calcareous sandstone, dense, hard
						@ 6.8 ft., Attitude: N15E, 82NW - fault, 0.8 ft. of offset
10						@ 9.3 ft., gray siltstone interbedded with interlaminated brown to rust-brown silty sandstone, fractured, scattered white calcareous nodules, sandstone contains siltstone ripup clasts
15						@ 17.0 ft., Attitude: N70E, 64SE - shear, belling of wall in friable sandstone to 18", highly sheared/polished gray siltstone, shear forms boundary of belling @ 17.9 ft., gray siltstone interlaminated with light brown silty fine grained sandstone interbedded with medium grained friable sandstone, moist, dense, below 18.0 ft. scattered white calcareous nodules
20						@ 21.0 ft., mottled light brown, fine to medium grained sandstone with discontinuous gray siltstone laminations, moist, dense @ 22.0 ft., Attitude: N30E, 20SE - bedding, scattered roots @ 23.0 ft., Attitude: N7W, 17SW - bedding, undulatory laminated gray siltstone
25						@ 24.7 ft., bluish gray siltstone interbedded/interlaminated light

PLATE A-1

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-D SHEET 2 OF 2

DATE OBSERVED 5/31/90 METHOD OF DRILLING 24" Bucket Auger

LOGGED BY LWW GROUND ELEVATION 990.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						brown to rust-brown fine to medium sandstone, moist, medium dense to dense, scattered grayish white calcareous nodules
						@ 27.0 ft., brown silty claystone, scattered gray siltstone fragments, moist, medium dense
						@ 28.0 ft., light brown, medium grained, friable sandstone interlaminated/interbedded with gray siltstone
30						@ 29.4 ft., Attitude: N50W, 50SW - bedding @ 29.4 ft., Attitude: N10E, 32SE - bedding @ 29.4 ft., Attitude: N10W, 15-30NE - bedding
35						
40						
						CALABASAS FORMATION (Tc): Interbedded laminated blue-gray siltstone and fine grained yellow-brown sandstone, damp, very hard, very well cemented
45						Total Depth 45.0 ft. Water at 42.0 and 45.0 ft., Refusal at 45.0 ft. 5/30/90 water at 42.0 ft. 5/31/90 water at 39.0 ft.
50						

PLATE A-19

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-E SHEET 1 OF

DATE OBSERVED 6/4/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**LANDSLIDE DEBRIS (Qls):** Light yellow-gray, highly disturbed, fragmented, disoriented clast in a fine grained matrix, soft, dry
5						
10						
15						@ 14.0 ft., Attitude: N15E, 35SE - discontinuous bedding
20						@ 20.0 ft., Attitude: N15E, 60SE - discontinuous bedding
25						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-E SHEET 2 OF

DATE OBSERVED 6/4/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., soft, friable clays
						@ 27.0 ft., hard concretion with clay, bedding nondescript
						@ 28.0 ft., gray clay, bedding poorly defined
30						
						@ 32.0 ft., Attitude: E-W, 22N - bedding, poorly defined
35						
						@ 36.0 ft., interbedded clays and sands, sands are dominant lithology (60%), clays are laminated with intercalated 1/16" to 1/2" layers of very fine sand, sands are fine to medium grained and well sorted @ 36.0 ft., Attitude: N45W, 24NE - bedding @ 38.0 ft., Attitude: N15W, 35NE - bedding, highly contorted gray clay bed, bedding goes around boring
40						@ 40.0 ft., Attitude: N5W, 18NE - bedding, distinct interbeds of sand and clay around boring
						@ 42.0 ft., moist, some slicks in clay layers
						@ 43.0 ft., boring belled, slicks continuous around boring, parallel bedding and are also undulatory
45						@ 45.0 ft., Attitude: N80E, 30NW - bedding
50						

PLATE A-2c

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-E SHEET 3 OF

DATE OBSERVED 6/4/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						@ 51.0 ft., Attitude: N12W, 33NE - bedding, around boring
55						@ 55.0 ft., Attitude: N55W, 35NE - slicks
						@ 57.0 ft., Attitude: N8W, 15NE - slick zone, belled out, water seepage
60						
65						@ 66.0 ft., boring belled, water seepage @ 66.0 ft., Attitude: N35W, 25SW - slicks, 1' wide, dangerous to go beyond 66.0 ft. due to caving
70						@ 70.0 ft., base of slide CALABASAS FORMATION (Tc): @ 70.0 ft., no caving to bottom of boring
						@ 73.0 ft., ring sample 25 blows - 8 inches, 50 blows - 10 inches
75						

PLATE A-2C

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-E SHEET 4 OF

DATE OBSERVED 6/4/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 79.0 ft., ring sample 25 blows - 12 inches
80						
85						Total Depth 83.5 ft. - Refusal Water at 57.0 and 66.0 ft., Caving at 66.0 ft. - Unsafe below
90						
95						
100						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-F SHEET 1 OF

DATE OBSERVED 6/5/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1125.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
0						**SOIL:** Silty clays, dark brown, friable, contains rootlets, mix of rock fragments (1" to 3" diameter), bedding is not continuous
						@ 3.0 ft., creep zone, mix of soil and small rock fragments, discordant boundary with underlying unit
5						**CALABASAS FORMATION (Tc):** Interbedded laminated silty clays intercalated with 1/6" to 1/4" very fine sand and interbedded with fine to medium grained, well sorted sands; sands-light gray-brown, clay-medium gray-brown, fracturing present and usually rust stained
						@ 7.0 ft., Attitude: N50E, 17NW - fracture
						@ 8.0 ft., Attitude: N15W, 16SW - bedding continuous around boring
10						
						@ 11.0 ft., Attitude: E-W, 78S - joint, normal faults, conjegate set, 6" offset N87E, 67SE; N50E, 67NW
						@ 12.0 ft., medium grained sand beds, 3" to 6" thick, clays 6" to 18" thick
						@ 13.0 ft., Attitude: N-S, 20W - bedding continuous around boring, minor slicks parallel bedding
						@ 14.0 ft., soft sediment rollup
15						
						@ 17.0 ft., Attitude: N-S, 20W - bedding
						@ 17.0 ft., interbedded coarse tan sand and blue-gray laminated clay; sands 6" to 2.5' beds, clay 2' beds, beds offset by fractures
						@ 19.0 ft., Attitude: N70E, 21SE - soft sediment distortion of beds fractures: N70E, 30NW
20						
						@ 23.0 ft., Attitude: N-S, 15W - bedding continuous around boring
						@ 24.0 ft., primarily thin laminated clay
25						

PLATE A-21

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-F SHEET 2 OF 2

DATE OBSERVED 6/5/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1125.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						
						@ 27.0 ft., Attitude: N40W, 13SW - bedding
						@ 28.0 ft., 1" rust zone
30						
						@ 32.0 ft., Attitude: N45W, 16SW - bedding
						@ 34.0 ft., primarily coarse sands 3' to 5' beds with 6" to 12" clay interbeds, sands light brown to reddish brown, friable
35						
40						@ 40.0 ft., Attitude: N10W, 15SW - bedding, clay horizon around boring
						@ 43.0 ft., Attitude: N-S, 14W - bedding, clay horizon around boring
45						
50						Total Depth 48.0 ft., Refusal No Water, No Caving

PLATE A-21

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-G SHEET 1 OF

DATE OBSERVED 6/6/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1065.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**CALABASAS FORMATION (Tc):** Fine to medium sands with limited interbeds of silty laminated clays, soft, loose
5						@ 5.0 ft., Attitude: N80W, 8NE - bedding, well bedded sandstone
10						@ 12.0 ft., concretionary sands, hard drilling
15						
20						@ 21.0 ft., slightly cemented sands
25						@ 24.0 ft., interbedded laminated clays intercalated with very fine 1/6" to 1/2" thick sands interbedded with fine to medium sands,

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-G SHEET 2 OF

DATE OBSERVED 6/6/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1065.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						clay is the dominant lithology (60%) @ 24.0 ft., Attitude: N10W, 23SW - bedding
						@ 28.0 ft., Attitude: N-S, 12W - bedding, some slicks
30						
						@ 34.0 ft., Attitude: N45E, Vertical - fault on north side of boring @ 34.5 ft., Attitude: N20E, 35NW - bedding, slicks present along bedding
35						
						@ 37.0 ft., Attitude: E-W, 25N - bedding, interbedded clays and sands, slicks parallel bedding
40						@ 40.0 ft., Attitude: N28E, Vertical - fault, west side down, 3' wide
						@ 43.0 ft., Attitude: N28E, Vertical - fault still prominant
45						
						@ 47.0 ft., Attitude: N40E, 27NW - bedding, fault on north side of boring
50						

PLATE A-2.

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-G SHEET 3 OF

DATE OBSERVED 6/6/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1065.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						@ 52.0 ft., Attitude: N35E, 17NW - bedding, slicks
55						
60						@ 59.0 ft., Attitude: N10W, 27SW - bedding, beds contorted on south side of boring, north side faulted
65						@ 63.0 ft., Attitude: N40E, 46NW - bedding @ 66.0 ft., same lithology as above however, color changed to blue-gray @ 68.0 ft., Attitude: N65E, 51NW - bedding
70						@ 72.0 ft., Attitude: E-W, Vertical - fault on south side of boring
75						

PLATE A-22

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-G SHEET 4 OF

DATE OBSERVED 6/6/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1065.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
75						@ 76.0 ft., Attitude: N35E, 56NW - bedding
						@ 78.0 ft., Attitude: N60E, Vertical - fault, 1' wide
80						
						@ 82.0 ft., Attitude: N30E, 34NW - bedding
85						
						@ 87.0 ft., Attitude: N-S, 34W - bedding
90						@ 90.0 ft., slight water seepage
						@ 91.0 ft., Attitude: N10E, 33NW - bedding
95						
						@ 96.0 ft., Attitude: N10W, 25SW - bedding
100						

PLATE A-22

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-G SHEET 5 OF 5

DATE OBSERVED 6/6/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY DHG GROUND ELEVATION 1065.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
100						@ 101.0 ft., Attitude: N20E, 27NW - bedding
105						@ 107.0 ft., Attitude: N10E, 23-33NW - bedding
110						Total Depth 110.0 ft. Water at 90.0 ft., No Caving
115						
120						
125						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-H SHEET 1 OF

DATE OBSERVED 6/7/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 850.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**SOIL:** Black silty clay, contains organic material and rootlets
5						**COLLUVIUM (Qcol):** Clayey sand, mottled light yellowish brown to medium yellow-brown, friable, loose, contains discontinuous veinlets of caliche, no definitive bedding, contorted discontinuous horizons present, has pullaparts filled with sands, contains rootlets
10						
15						
20						
25						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-H SHEET 2 OF

DATE OBSERVED 6/7/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 850.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						**CALABASAS FORMATION (Tc):** Interbedded clays and sands, clay dominant lithology, fine laminated (1/16" to 1"), plastic, within the clays are thin laminae (1/16" to1") and lenses of silt and very fine sand, slicks are common, parallel bedding, minor in scope and are associated with black clay laminae and thin siltstone; above 47.0 ft., the lithology is oxidized a medium yellow-brown, especially the sands, some clay layers are unoxidized blue-gray, below 47.0 ft., all sediments are blue-gray
30						@ 30.0 ft., Attitude: N30W, 22SW - bedding
						@ 32.0 ft., Attitude: N10-35W, 25SW-60SW - slicks
						@ 34.0 ft., Attitude: N5W, dip changes across hole from 24to 84SW - bedding
35						@ 35.0 ft., Attitude: N-S, bearing of motion 12 south
40						@ 41.0 ft., Attitude: N45W, 35SW - bedding @ 41.5 ft., Attitude: N45W, 33SW - slicks parallel bedding
45						@ 45.0 ft., Attitude: N15W, 30SW - bedding, slicks parallel bedding
						@ 47.0 ft., major color change to blue-gray
50						

PLATE A-23

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-H SHEET 3 OF

DATE OBSERVED 6/7/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 850.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						@ 50.0 ft., Attitude: N15W, 24SW - bedding, slicks parallel bedding
						@ 51.0 ft., interbedded silty clays and medium, friable sands; sand beds 2" to 6" thick, clays 1' to 2' thick, minor slicks present, slicks associated with black clay laminae 1/4" to 1" thick, blue-gray, water seepage from sands
						@ 51.0 ft., Attitude: N20W, 18SW - bedding, slicks parallel beds
55						
60						@ 60.0 ft., Attitude: N12W, 28SW - bedding
						@ 63.0 ft., Attitude: N13W, 30SW - bedding, slicks parallel bedding
65						@ 65.0 ft., Attitude: N5W, 47SW - slicks
						@ 66.0 ft., interbedded medium to coarse grained, friable sand and laminated clays, sand and clay beds 1' to 2' thick, water seep from sands
						@ 69.0 ft., Attitude: N12W, 25SW - bedding, slicks parallel bedding
70						
						@ 73.0 ft., bedding N10W, 30SW - slick parallel bedding
75						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-H SHEET 4 OF 4

DATE OBSERVED 6/7/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 850.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 75.0 ft., Attitude: N45W, 33SW - slicks, 1' wide zone
80						
85						Total Depth 84.0 ft. Water at 51.0 and 66.0 ft., Minor Caving
90						
95						
100						

PLATE A-23

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-I SHEET 1 OF 4

DATE OBSERVED 6/8/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**SOIL:** Dark brown silty clay, contains rootlets
						COLLUVIUM (Qcol): Clayey sand, light yellow-brown, contains some carbonate nodules, rust pods, rounded pebbles and Modelo fragments, no bedding present
5						
10						**LANDSLIDE DEBRIS (Qls):** Interbedded laminated clays and thin fine sands, light yellow-brown, bedding broken and discontinuous, general orientation of beds N-S, 30W
						@ 12.0 ft., laminated clays on one side of boring, sands on the other, vertical piercement of sand from a lenticular bed at a depth of 17.0 ft. and extends up to 12.0 ft.
15						
						@ 17.0 ft., interbedded laminated clays and thin fine sands, contains medium grained sand beds 6" to 8" thick, light yellow-brown
20						@ 20.0 ft., chaotic beds, tight folds, rollups, isolated balls of sand
						@ 24.0 ft., Attitude: N65E, 84NW - bedding around boring
25						

PLATE A-24

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-I SHEET 2 OF

DATE OBSERVED 6/8/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 25.0 ft., 1' medium grained sand bed
						@ 29.0 ft., Attitude: N70E, 68NW - bedding, 1.5' concretionary sand, undulating
30						
35						@ 36.0 ft., interbedded laminated clays and thin, fine grained sands, some clays, unoxidized, blue-gray, all sands oxidize to light gray-brown, contains layers and lenses of medium grained sand, slicks are common @ 36.0 ft., Attitude: N60E, 53NW - bedding, around boring, undulating @ 37.0 ft., Attitude: N55E, 45NW - slicks @ 39.0 ft., piercement of sand into clay
40						@ 41.0 ft., Attitude: N45E, 40NW - bedding terminated by slick, N10E, 60NW
						@ 43.0 ft., 1' heavy plastic clay zone @ 43.0 ft., Attitude: N20W, 25NE - slick @ 43.0 ft., Attitude: N60E, 43NW - slick
45						@ 45.0 ft., Attitude: N10W, 30NE - slicks
						@ 46.0 ft., Attitude: N20W, 32NE - bedding offset by slick N75W, 45SW
						@ 49.0 ft., Attitude: N70W, 45NE base of landslide
50						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-I SHEET 3 OF 4

DATE OBSERVED 6/8/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						**CALABASAS FORMATION (Tc):** This interval starts with a plastic clay that changes in character downward. The base is an unconformable surface containing pebbles and boulders @ 50.0 ft., blue-gray plastic clay oxidizing to medium red-brown in basal 4', discontinuous powdery calcite veins and blebs in lower 2'
55						
						@ 58.0 ft., top of interval has 4" horizon containing charcoal chips, pebbles and grit, remainder of interval consists of scattered pebbles to boulders (1/2" to 8"), rounded, in a clay/sand matrix, pebbles of granite, sandstone, bottom of channel discordant with beds below, water seepage
60						@ 60.0 ft., Attitude: N68W, 23SW - bedding @ 61.0 ft., laminated clay with intercalated very fine sand laminae interbedded with thin fine sands, blue-gray @ 61.0 ft., Attitude: N65W, 24SW - slicks @ 63.0 ft., Attitude: N65W, 27SW - bedding @ 64.0 ft., Attitude: N57W, 18SW - bedding
65						@ 66.0 ft., Attitude: N27W, 33SW - slick
70						@ 69.0 ft., Attitude: N35W, 18SW - bedding, 1' medium grained sand bed
						@ 73.0 ft., Attitude: N85E, 15SE - slick zone, boring belled, beds turned over in folding, bulbous slicks, water seepage, caving below 73.0 ft., boring has solid walls but dangerous to proceed below caving zone
75						

PLATE A-24

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-I SHEET 4 OF

DATE OBSERVED 6/8/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 1020.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						
80						
85						Total Depth 85.0 ft. Water at 58.0 and 73.0 ft., Caving at 73.0 to 75.0 ft.
90						
95						
100						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-M SHEET 1 OF 4

DATE OBSERVED 6/18/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 895.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**SOIL:** Dark brown silty clay, contains rootlets
						CALABASAS FORMATION (Tc): Interbedded clays and sand, medium yellow-brown, clays dominate lithology (60%), clays - laminated, intercalated with thin (1/6"to 1/2") beds of fine sand and silt, 6" to 24" beds, sands - fine to medium grained, well sorted, friable, 2" to 6" beds, interval is loose, gypsum present
5						@ 4.0 ft., Attitude: N78W, 78NE - bedding
						@ 8.0 ft., Attitude: N556W, 63NE - bedding
10						@ 10.0 ft., Attitude: N47W, 53NE - bedding, undulating
15						@ 15.0 ft., Attitude: N55W, 57NE - bedding
20						@ 20.0 ft., Attitude: bedding - N50W, dip changes from 5 to 54NE across boring, local fold
25						@ 24.0 ft., chevron fold, axial trend N50W, no plunge, fold extends from a depth of 20.0 to 24.0 ft.

PLATE A-25

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-M SHEET 2 OF

DATE OBSERVED 6/18/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 895.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						
						@ 27.0 ft., same lithology as above, color change to medium gray-brown, slightly more consolidated @ 27.0 ft., Attitude: N38W, 77NE - bedding @ 27.0 ft., Attitude: N40W, 85SW - slicks
						@ 29.0 ft., Attitude: N50W, 83SW - slicks, parallel bedding, abundant gypsum
30						@ 30.0 ft., Attitude: N54W, Vertical - bedding, undulating, slicks parallel to bedding, gypsum along bedding and fractures
35						@ 37.0 ft., Attitude: N42W, 78NE - bedding
40						@ 40.0 ft., Attitude: N47W, 84NE - bedding
45						@ 45.0 ft., continuous lithology, color change to blue-gray, upper 5' is transition from oxidized to unoxidized @ 45.0 ft., Attitude: N49W, 74NE - bedding
50						

PLATE A-2.5

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-M SHEET 3 OF

DATE OBSERVED 6/18/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 895.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Sym.	Unit Dry Weight (lbs/ft3)	Moisture (%)	Description and Remarks
50						@ 50.0 ft., Attitude: N52W, 88SW - bedding, clays are greasy @ 50.0 ft., Attitude: N45W, 33SW - slicks
						@ 54.0 ft,. Attitude: N50W, 78NE - bedding @ 54.0 ft., Attitude: N57W, 87NE - slicks
55						
						@ 58.0 ft., Attitude: N54W, Vertical - bedding (south side of boring) @ 58.0 ft., Attitude: N30W, 20SW - (north side of boring) highly variable slicks associated with folding @ 59.0 ft., Attitude: E-W, 43S - slicks, water seepage @ 60.0 ft., Attitude: N5E, 57SE - slicks, planar
60						
						@ 62.0 ft., Attitude: N17W, 15SW - bedding
						@ 63.0 ft., slicks - N25W, 50SW; N85W, 35SW; N50W, 37SW - 1' contorted bed
65						@ 65.0 ft., water seepage @ 65.0 ft., Attitude: N7E, 25NW - bedding, discontinuous due to shear @ 65.0 ft., Attitude: N73W, 58SW - shear @ 67.0 ft., Attitude: N74W, 43SW - slick, planar
						@ 69.0 ft., Attitude: N40W, 25SW - bedding @ 69.0 ft., Attitude: N-S, 58W - slick
70						@ 70.0 ft., Attitude: N-S, 25W - bedding @ 70.0 ft., Attitude: N20E, 78NW - slicks
						@ 74.0 ft., Attitude: N5E, 20NW - bedding
75						

PLATE A-2

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-M SHEET 4 OF

DATE OBSERVED 6/18/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 895.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 75.0 ft., Attitude: N-S, 22W - bedding, 1' sand bed, medium to coarse grained, seeping water @ 75.0 ft., Attitude: N75W, 57SW - slick @ 78.0 ft., Attitude: N10W, 44SW - bedding
80						
85						Total Depth 85.0 ft. Water at 59.0, 65.0 and 75.0 ft., No Caving
90						
95						
100						

PLATE A-25

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-N SHEET 1 OF

DATE OBSERVED 6/19/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 890.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
0						**SOIL:** Dark brown sandy clay
						CALABASAS FORMATION (Tc): Fine to medium grained, friable, light brown sand interbedded with orange-brown to gray clayey siltstone, sand dominant lithology (80%)
5						@ 6.0 ft., Attitude: N67E, 68SE - bedding
						@ 8.0 ft., Attitude: N20E, 85NW - bedding
10						
15						@ 16.0 ft., Attitude: N29E, 74SE - bedding
						@ 17.0 ft., Attitude: N25E, 77NW - bedding
						@ 18.0 ft., Attitude: N20E, 65NW - bedding
20						
25						

PLATE A-21

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-N SHEET 2 OF

DATE OBSERVED 6/19/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 890.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
25						@ 26.0 ft., Attitude: N14E, 54NW - bedding
						@ 28.0 ft., Attitude: N53E, 60NW - bedding
						@ 29.0 ft., Attitude: N10E, 50NW - bedding, 1' concretionary medium to coarse grained sandstone
30						
						@ 34.0 ft., Attitude: N-S, 53W - bedding
35						@ 36.0 ft., interbedded sands and clays, light to medium brown, sand dominant lithology (60%); sand-well sorted, fine to medium grained, poorly consolidated, beds 4" to 24" thick; clay-laminated, slightly silty, blue-gray when unoxidized, contains thin lenses and beds (1/16" to 1/2") of very fine grained sand @ 37.0 ft., Attitude: N18E, 59NW - bedding @ 38.0 to 42.0 ft., Attitude: N50E, 71SE - fault, reverse movement east side up
40						
						@ 43.0 ft., Attitude: N5E, 59NW - bedding, discontinuous
45						@ 45.0 ft., piercement structure, clay into sand, may be fault continuation from depth 38.0 to 42.0 ft.
						@ 48.0 ft., Attitude: N55E, 63NW - bedding, folded, variable thickness, nodular @ 49.0 ft., Attitude: N10E, 48SE - joint, blocky sandstone
50						

PLATE A-26

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-N SHEET 3 OF

DATE OBSERVED 6/19/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 890.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
50						@ 52.0 to 59.0 ft., clay dike of variable thickness, possibly a fault @ 52.0 ft., Attitude: N50E, 84SE - dike
55						@ 55.0 ft., Attitude: N50E, 84SE - dike, concretion at side of boring @ 56.0 ft., Attitude: N10E, 55NW - bedding, dike pierced bedding
60						@ 59.0 ft., Attitude: N20E, 50NW - bedding, dike starts to dip west @ 60.0 ft., Attitude: N30E, 55NW - bedding, bed folded, gypsum present
65						@ 63.0 to 64.0 ft., concretions in sandstone @ 65.0 ft., Attitude: N30E, 55-65NW - bedding, increase in density of material and increase in gypsum (1/4" to 1/2" selenite crystals)
70						@ 70.0 ft., sediments blue-gray on one side of boring and medium gray-brown on the other, tight folds, probably fault: N20-40E, near vertical; extends to a depth of 82.0 ft.
75						

PLATE A-2c

PACIFIC SOILS ENGINEERING, INC.

LOG OF BORING No. PSE-N SHEET 4 OF 4

DATE OBSERVED 6/19/90 METHOD OF DRILLING 36" Bucket Auger

LOGGED BY VF GROUND ELEVATION 890.0 WORK ORDER No. 101718

Depth (ft.)	Sample	Blows/ft.	Group Syb.	Unit Dry Weight (lbs/ft^3)	Moisture (%)	Description and Remarks
75						@ 75.0 ft., bedding is crenulated
						@ 76.0 ft., Attitude: N20E, 62NW - bedding
80						
						@ 83.0 ft., continuous lithology, color change to blue-gray
						@ 83.0 ft., Attitude: N38E, 65NW - bedding
85						@ 85.0 ft., Attitude: N30E, 48NW - bedding
						@ 88.0 ft., Attitude: N50E, 74SE - shear
						@ 89.0 ft., Attitude: N25E, 54NW - bedding
						@ 89.0 ft., Attitude: N5E, 60NW - slicks
90						
95						Total Depth 95.0 ft.
						No Water, No Caving
100						

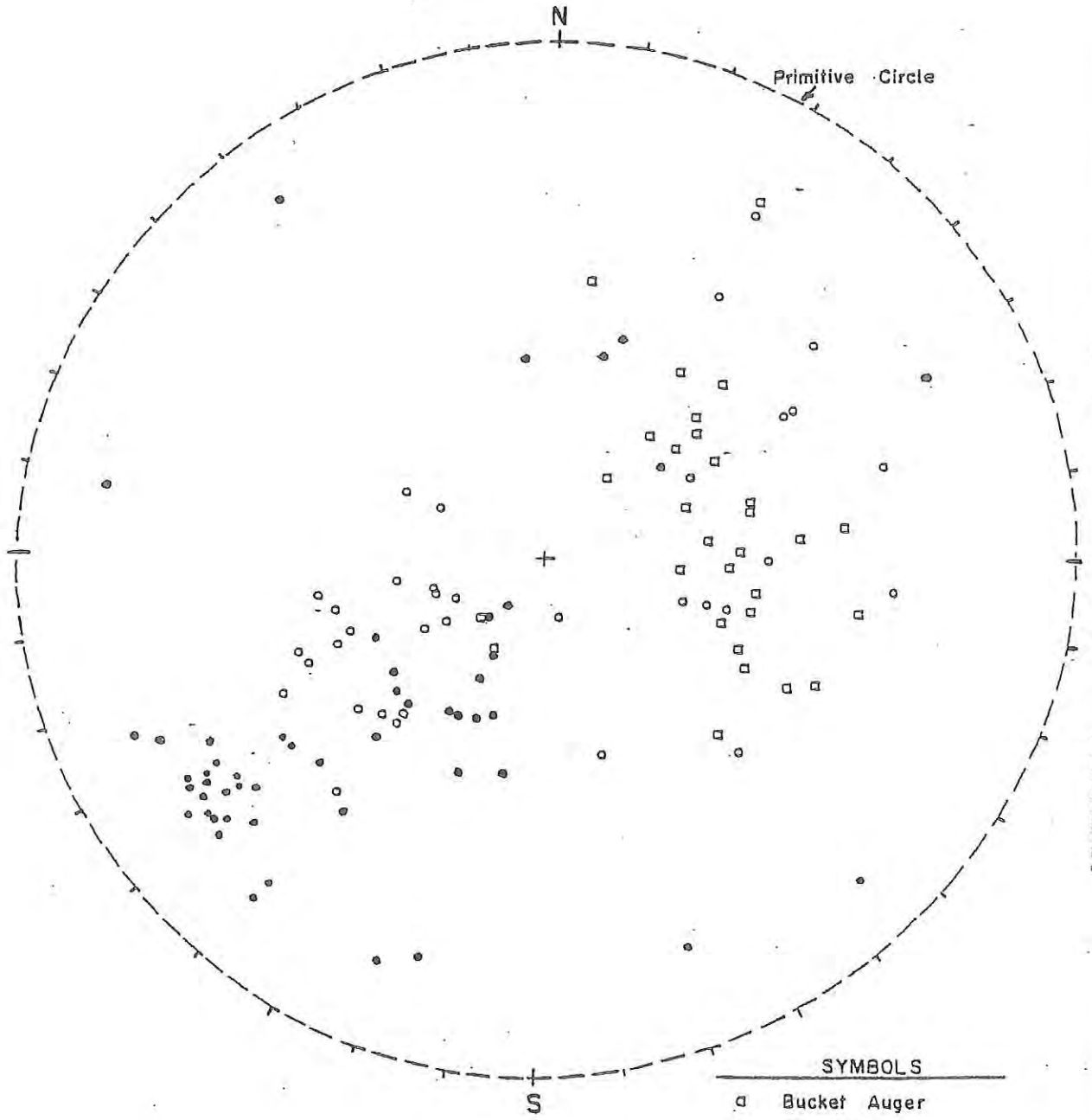
PLATE A-24

WEST COAST SOILS
A DIVISION OF L. LISTON & ASSOCIATES, INC.
31238 Via Colinas, Unit E • (818) 991-7148
Westlake Village, CA 91362 • (805) 497-1244

PROJECT PAZAR - CALABASAS PROM.
ADDRESS
DRAWN CHECKED
DATE 3-92 JOB NO. 2003-88

STEREONET PLOT

SHEET TITLE



STATISTICAL ANALYSIS OF POLES TO BEDDING PLANES.

Dipmeter dip azimuth and inclination resolution to Strike and Dip

Depth measured from ground surface elevation; Approx. 803 feet

DEPTH (Feet)	STRIKE	DIP	DEPTH (Feet)	STRIKE	DIP
32			196	N. 51 W.	18.5 NE
36			200	N. 69 W.	81 NE
40			204	N. 34 W.	78 NE
44			208	N. 33 W.	78 NE
48			212	N. 33 W.	75 NE
52	N. 68 W.	15 NE	216	N. 37 W.	73 NE
56	N. 60 W.	23 NE	220	N. 38 W.	73 NE
60	N. 64 W.	30.5 NE	224	N. 30 W.	73 NE
64	N. 64 W.	25 NE	228	N. 39 W.	79 NE
68	N. 71 W.	47.5 NE	232	N. 40 W.	77 NE
72	N. 38 W.	32 SW	236	N. 38 W.	75 NE
76	N. 69 W.	38 NE	240	N. 44 W.	74.5 NE
80	N. 63 W.	39 NE	244	N. 41 W.	77 NE
84	N. 70 W.	50 NE	248	N. 39 W.	79 NE
88	N. 81 W.	47.5 NE	252	N. 64 W.	78 NE
92	N. 74 W.	37 NE	256		
96	N. 61 W.	40 NE	260	N. 26 W.	79 NE
100	N. 49 W.	43 NE	264	N. 35 W.	76 NE
104	N. 39 W.	40.5 NE	268		
108	N. 44 W.	43 NE	272		
112	N. 49 W.	43 NE	276		
116	N. 53 W.	65 NE			
120	N. 50 W.	64 NE			
124	N. 84 E.	42 SE			
128	N. 84 W.	44 SW			
132	N. 74 W.	78 NE			
136	N. 9 E.	81 SE			
140	N. 25 W	81 NE			
144	N. 51 W.	82 NE			
148	N. 37 W.	82 NE			
152	N. 61 W.	80 NE			
156	N. 35 W.	76 NE			
160	N. 42 W.	80 NE			
164	N. 37 E.	82 SE			
168	N. 45 E.	83 NW			
172	N. 36 W.	74 NE			
176	N. 68 E.	79 NW			
180	N. 44 W.	61 NE			
184	N. 38 W.	63 NE			
188	N. 36 W.	74 NE			
192	N. 54 W.	14 NE			

PRELIMINARY GEOLOGIC AND SOILS

ENGINEERING INVESTIGATION

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11 JANUARY 1989 JOB NUMBER: 2003-88

PROJECT: PROPOSED COMMERCIAL DEVELOPMENT

LOCATION: 4522 LAS VIRGENES CANYON ROAD

CALABASAS, COUNTY OF LOS ANGELES, CA

CLIENT: PAM AZAR & ASSOCIATES

4365 OCEANVIEW DRIVE

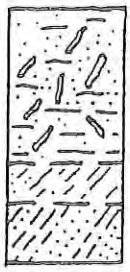
MALIBU, CALIFORNIA 90265

31238 VIA COLINAS, UNIT E
WESTLAKE VILLAGE, CA 91362
(818) 991-7148 (805) 497-1244

January 4, 1988
WCS2003-88

TABLE I

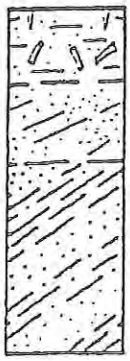
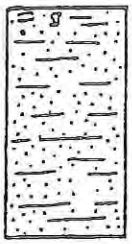
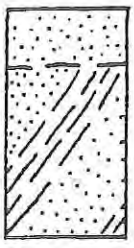
Log of Test Pits

Pit No.	Depth (Feet)		Description
1	0.0 - 4.0		SOIL: Clayey Silt, medium brown, firm, slightly moist, containing some rock fragments to 6"
	4.0 - 5.0		WEATHERED BEDROCK: Clayey Silt, medium brown, firm, slightly moist, some remnant bedding
	5.0 - 6.5		BEDROCK: Interbedded Sandstone, Siltstone and Shale, mottled gray to orange-brown, moderately hard, slightly fractured, slightly weathered, thinly bedded; bedding planes are tightly folded
			End at 6.5 feet; No Water; No Caving; No Fill
			BEDDING: N15E; 40NW @ 5' N60W; 73SW
2	0.0 - 2.0		SOIL: Silty Clay, light brown, firm, dry, containing some rock fragments and desiccation cracks
	2.0 - 4.0		WEATHERED BEDROCK: Clayey Silt, medium brown, firm, slightly moist, some remnant bedding
	4.0 - 7.0		BEDROCK: Interbedded Siltstone, Mudstone, Shale and Siliceous Shale, mottled gray to orange-brown, hard, moderately fractured, fractures closely spaced, thinly bedded except siliceous shale bed approximately 6" thick. Some caliche coatings were noted on bedding plane surfaces
			End at 7 feet; No Water; No Caving; No Fill
			BEDDING: N2W; 46SW N5W; 42SW

January 4, 1988
WCS2003-88

TABLE I

Log of Test Pits

Pit No.	Depth (Feet)		Description
3	0.0 - 2.0		SOIL: Clayey Silt, light brown, firm, dry, containing some rock fragments and desiccation cracks
	2.0 - 4.0		WEATHERED BEDROCK: Clayey Silt, medium brown, firm, slightly moist, some remnant bedding
	4.0 - 9.0		BEDROCK: Interbedded Siltstone, Mudstone, Shale and Sandstone, mottled gray to orange-brown, hard, moderately fractured, slightly weathered
			End at 9 feet; No Water; No Caving; No Fill
			BEDDING: N10E; 36NW
4	0.0 - 12.0		ALLUVIUM: 0-8': Clayey Sand, brown, dry to slightly moist, becomes moist with depth, medium dense, porous; some brick and trash noted in upper 6"; 8-12': Clayey Sand, orange to brown, medium dense to dense, slightly porous; few boulders at 10' depth
			End at 12 feet; No Water; No Caving; No Fill
5	0.0 - 3.0		SOIL: Silty Sand, light brown, medium dense, dry, porous
	3.0 - 12.0		BEDROCK: Interbedded Sandstone and Mudstone; Sandstone - orange; Mudstone - gray; moderately hard, slightly fractured, slightly weathered
			End at 12 feet; No Water; No Caving; No Fill
			BEDDING: N43E; 60NW

January 4, 1988
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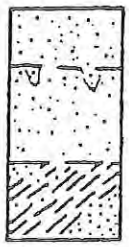
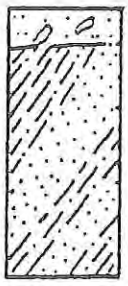
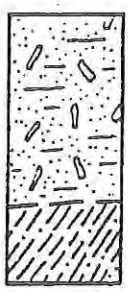
TABLE I

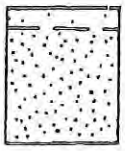
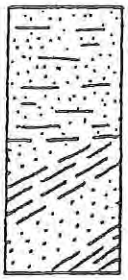
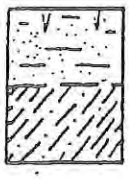
Log of Test Pits

Pit No.	Depth (Feet)		Description
6	0.0 - 1.5		SOIL: Silty Sand, light brown, medium dense, dry, porous, contains some Sandstone rock fragments to 6"
	1.5 - 4.0		WEATHERED BEDROCK: Silty Sand, light tan, soft to hard, dry, contains some soil infillin
	4.0 - 6.0		BEDROCK: Interbedded Sandstone, Siltstone and Mudstone, moderately hard, thinly bedded, slightly fractured, slightly weathered
			End at 6 feet; No Water; No Caving; No Fill
			BEDDING: N43E; 56NW
7	0.0 - 1.0		SOIL: Silty Sand, light brown, medium dense, dry, porous, contains some Sandstone rock fragments to 6"
	1.0 - 7.0		BEDROCK: Interbedded Sandstone, Siltstone, and Mudstone, moderately hard, thinly bedded, slightly fractured, slightly weathered
			End at 7 feet; No Water; No Caving; No Fill
			BEDDING: N23W; 53NE
8	0.0 - 5.0		SOIL: Clayey Silt, medium brown, firm, dry, porous, contains some Sandstone rock fragments to 4"
	5.0 - 7.0		BEDROCK: Interbedded Mudstone, Siltstone and Shale, mottled gray to orange, moderately hard, thinly bedded, slightly weathered, moderately fractured; some caliche coating on bedding and fracture surfaces
			End at 7 feet; No Water; No Caving; No Fill
			BEDDING: N55W; 62SW

January 4, 1988
WCS2003-88

TABLE I

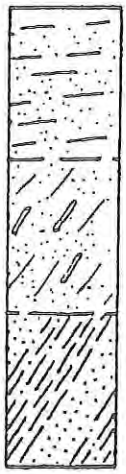
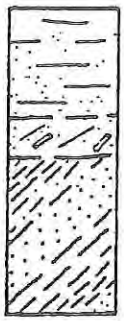
Log of Test Pits

Pit No.	Depth (Feet)		Description
9	0.0 - 1.0		SOIL: Silty Sand, medium brown, medium dense, slightly moist, porous
	1.0 - 7.0		BEDROCK: Sandstone, white to light orange, hard, slightly weathered, massive
			End at 7 feet; No Water; No Caving; No Fill
10	0.0 - 7.0		SOIL: Clayey Sand, medium brown, moderately dense, slightly moist, porous
	7.0 - 14.0		BEDROCK: Interbedded Sandstone and Mudstone, mottled orange to gray, moderately hard to hard; some mudstone lenses within sandstone
			End at 14 feet; No Water; No Caving; No Fill
			BEDDING: N26E; 34SE
11	0.0 - 4.0		SOIL: Clayey Silt, mottled brown to light brown, firm, porous; some desiccaion cracks in upper 1½ feet
	4.0 - 8.0		BEDROCK: Interbedded Mudstone, Siltstone and Shale, mottled gray to orange, moderately hard, moderately fractured, weathered; bedding slightly contorted
			End at 8 feet; No Water; No Caving; No Fill
			BEDDING: N40W; 50NE

January 4, 1988
WCS2003-88

TABLE I

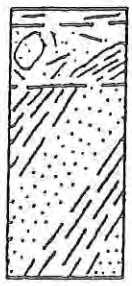
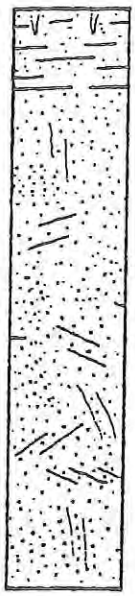
Log of Test Pits

Pit No.	Depth (Feet)		Description
12	0.0 - 4.0		SOIL: Clayey Silt, medium brown, slightly firm, slightly moist, porous
	4.0 - 8.0		WEATHERED BEDROCK: Clayey Silt containing bedrock fragments, firm, slightly moist, some remnant bedding
	8.0 - 12.0		BEDROCK: Interbedded Sandstone, Siltstone and Mudstone, mottled gray to medium brown, hard, slightly weathered, slightly fractured, thinly bedded
			End at 12 feet; No Water; No Caving; No Fill
			BEDDING: N40W; 66SW
13	0.0 - 3.0		SOIL: Clayey Silt, medium brown, slightly firm, slightly moist, porous
	3.0 - 4.0		WEATHERED BEDROCK: Clayey Silt containing bedrock fragments, firm, slightly moist, some remnant bedding
	4.0 - 8.0		BEDROCK: Interbedded Mudstone, Siltstone, Sandstone and Siliceous Shale, mottled gray to orange-brown, hard, moderately fractured, moderately weathered; bottom 1 foot of test pit in red sandstone
			End at 8 feet; No Water; No Caving; No Fill
			BEDDING: N35W; 26NE

January 4, 1988
WCS2003-88

TABLE I

Log of Test Pits

Pit No.	Depth (Feet)		Description
14	0.0 - 0.5		SOIL: Clayey Silt, medium brown, slightly firm, slightly moist, porous
	0.5 - 2.0		FAILURE DEBRIS: Mixture of Sandstone and Mudstone, mottled gray to orange-brown, loose to slightly firm, dry
	2.0 - 7.0		BEDROCK: Interbedded Sandstone and Mudstone, mottled gray and orange, moderately hard, moderately fractured; Sandstone - thickly bedded; Mudstone - thinly bedded
			End at 7 feet; No Water; No Caving; No Fill
			BEDDING: N30W; 55SW
15	0.0 - 2.0		SOIL: Clayey Silt, buff to light brown, moderately firm, porous, desiccation cracks noted in upper 1 foot
	2.0 - 15.0		LANDSLIDE DEBRIS: Mixture of Silty Sand and Clayey Sand, mottled gray, red, and light tan, slightly moist, firm; depth of 11 feet change to silty sand, orange, dense dry; contains some randomly oriented rock fragments
			End at 15 feet; No Water; No Caving; No Fill

BORING LOG NUMBER 1

Drilling Date 11/21/88 Elevation

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				1		FILL: Silty Clay, medium to dark brown, slightly firm, moist, contains numerous rock fragments
5.0	1	25.3	83.0	5		ALLUVIUM: Clayey Silt, light brown to tan, firm to very firm, moist, contains numerous rock fragments to 1"
.0	Push4"	28.5	77.3	10		
15.0	1	30.7	81.1	15		
						- - color change to medium brown at 18 feet
20.0	2	29.2	80.9	20		(CONTINUED)

PLATE A-1

BORING LOG NUMBER 2

Drilling Date 11/21/88 Elevation

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions: 88' to north telephone pole at end of ridge to north on N35W
				1		FILL: Clayey Silt, medium brown, very firm, dry to slightly moist
						- - - Silty Sand, tan to orange-brown, dense, dry to slightly moist
5.0	Rush6" / 1	10.3	96.0	5		ALLUVIUM: Clayey Silt, brown, slightly firm to firm
						- - - Silty Sand, brown to orange-brown, dense slightly moist
10.0	2	8.8	100.6	10		
				15		
20.0	1	7.3	107.1	20		(CONTINUED)

BORING LOG NUMBER 2 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR -- 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
						(ALLUVIUM CONTINUES)
				21		
				25		
						- - - Silty Sand, mottled gray, orange, white, dense, moist
						- - - Silty Sand, orange-brown, dense, moist
30.0	2	18.5	101.4	30		
						- - - increase in moisture
				35		- - - some cobbles to 6" in length
36.0	Push8" / 1	21.1	104.6			- - - Clayey Silt and Clayey Sand, medium brown to orange-brown, firm, very moist
						- - - cobbles up to 12" in length in clayey silt/ clayey sand matrix - water seepage at 38'
				40		(CONTINUED)

BORING LOG NUMBER 2 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR -- 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				41		(ALLUVIUM CONTINUES)
				45		End at 42 feet Water at 38 feet Caving at 36 feet after drilled to 42 feet Fill to 4 feet

BORING LOG NUMBER 3

Drilling Date 11/21/88 Elevation

Project WCS/AZAR - - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				1		ALLUVIUM: Silty Clay, brown, slightly firm to firm, moist, upper 2 feet contains cobbles to 12"
						- - - Clayey Sand, medium brown to light brown, dense, moist, slightly porous
5.0	2	10.6	111.2	5		
						- - - gradational to Silty Clay, mottled brown to orange-brown, firm, moist
				10		- - - layer of cobbles and gravel
						WEATHERED BEDROCK: Clayey Silt and Clayey Sand mixture, mottled gray, orange-brown, dense, moist, some remnant bedding; contact with alluvium dips 3° downslope
14.0	3	21.6	102.7			
				15		BEDROCK: Interbedded Siltstone, Mudstone and Shale, mottled gray, orange and brown, moderately hard, moderately fractured, slightly weathered, thinly bedded
				20		(CONTINUED)

BORING LOG NUMBER 3 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				21		(BEDROCK CONTINUES)
				25		End at 22 feet No Water No Caving No Fill BEDDING: N28E; 56NW @ 19 feet

BORING LOG NUMBER 4

Drilling Date 11/22/88 Elevation

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions: 92' westerly along ridgeline from fence
				1		SOIL: Silty Clay, medium to light brown, firm, dry to slightly moist
				5		BEDROCK: Interbedded Sandstone, Siltstone, Mudstone and Shale, mottled gray to orange-brown, moderately hard, moderately fractured, moderately weathered, thinly bedded; contorted bedding BEDDING @ 3': N15W; 44SW BEDDING @ 8': N55W; 48SW
				10		
				15		BEDDING @ 14': N45W; 51SW
20.0	3	10.3	115.9	20		BEDDING @ 20': N13W; 44SW (CONTINUED)

BORING LOG NUMBER 4 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
						(BEDROCK CONTINUES)
				21		
						synform fold axis 27°, N85W; bedding is contorted; north side of fold N30W; 41SW; south side of fold, N25E; 45NW
				25		2" fine grained sandstone bed
						BEDDING @ 27½': N52W; 22SW
				30		
						BEDDING @ 32': N44W; 43SW
						8" siliceous siltstone bed
				35		
						BEDDING @ 37': N2W; 41SW
				40		(CONTINUED)

PLATE A-9

BORING LOG NUMBER 4 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
						(BEDROCK CONTINUES)
				41		BEDDING @ 42": N5W; 35SW
				45		BEDDING @ 45': N5E; 30NW color change to gray
				50		BEDDING @ 49': N50W; 34SW polished bedding plane surface - no slickensides BEDDING @ 52': N20W; 32SW BEDDING @ 53': N40W; 36SW
				55		BEDDING @ 56': N40W; 41SW very minor seep along bedding planes
60.0	40	13.1	116.9	60		End at 60 feet Slight water at 58 feet No Caving No Fill

BORING LOG NUMBER 5

Drilling Date 11/24/88 Elevation

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description
						Surface Conditions: 84' east of fence, N36E from telephone pole on sw edge of ridge
				1		SOIL: Silty Clay, medium brown, firm, dry to slightly moist
				5		BEDROCK: Interbedded Siltstone, Sandstone, Mudstone and Shale, mottled gray to orange-brown, moderately hard, moderately fractured, slightly to moderately weathered, thinly bedded, contorted bedding BEDDING @ 5': N6W; 60SW 6" white sandstone beds occur as lense within mudstone
				10		BEDDING @ 10': N28E; 48NW 6" siliceous siltstone bed interbedded sandstone and mudstone; Sandstone is fine grained, tan; mudstone is gray
				15		BEDDING @ 15': N45E; 52NW
				20		BEDDING @ 20': N10E; 45NW (CONTINUED)

PLATE A-11

BORING LOG NUMBER 5 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
						(BEDROCK CONTINUES)
				21		
				25		BEDDING @ 25': N5W; 52SW gypsum crystals noted along bedding planes
				30		BEDDING @ 30': N15E; 45NW
						BEDDING @ 34': N3E; 39NW
				35		sandstone bed, white to orange-brown, moderately hard
						BEDDING @ 38': N10E; 63NW 1" gray mudstone bed sandstone bed, white to orange-brown, moderately hard
				40		BEDDING @ 40': N25E; 60NW (CONTINUED)

PLATE A-12

BORING LOG NUMBER 5 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				41		(BEDROCK CONTINUES)
						6" gray mudstone bed
						sandstone bed, white to orange, moderately hard
						BEDDING @ 44': N20E; 40NW
				45		interbedded sandstone and mudstone, mottled orange-brown to gray, moderately hard, moderately fractured, slightly weathered
				50		End at 50 feet No Water No Caving No Fill

PLATE A-13

BORING LOG NUMBER 6

Drilling Date 11/23/88 Elevation

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				1		ALLUVIUM: Clayey Silt, medium brown, firm, dry, becomes slightly moist with depth
5.0	Push8"/1	15.3	106.7	5		
						color change to light brown to orange-brown
10.0	Push6"/1	12.1	107.8	10		gradational to silty clay
						some cobbles in sandy silt matrix
				15		
						BEDROCK: Interbedded Siltstone, Sandstone and Mudstone, mottled gray to orange-brown, moderately hard, slightly fractured, moderately weathered
						BEDDING @ 17': N60W; 77SW
						BEDDING @ 20': N81W; 56SW
				20		(CONTINUED)

PLATE A-14

BORING LOG NUMBER 6 (CONTINUED)

Drilling Date _____ Elevation _____

Project WCS/AZAR - 2003-88

Sample Depth ft.	Blows per ft.	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	Graphic Log	Description Surface Conditions
				21		(BEDROCK CONTINUES)
						½" white bentonite bed, discontinuous around boring
						BEDDING @ 22': N63W; 24NE
						BEDDING @ 24': N47W; 20NE
						interbedded sandstone and mutstone, mottled gray to orange-brown, moderately hard, slightly fractured, moderately weathered
				25		BEDDING @ 26': N62W; 54SW
				30		End at 30 feet No Water No Caving No Fill

PLATE A-15

ADDENDUM LETTER #7

RESPONSE TO THE CITY OF CALABASAS

GEOLOGIC AND GEOTECHNICAL REVIEW

REVISED TENTATIVE TRACT NUMBER 22131

MARCH 5, 1992 PROJECT NUMBER 2003-88

PROJECT: CALABASAS PROMENADE

LOCATION: LAS VIRGENES CANYON ROAD

CALABASAS, CALIFORNIA

COUNTY OF LOS ANGELES

CLIENT: PAZAR AND ASSOCIATES

31238 VIA COLINAS, UNIT E
WESTLAKE VILLAGE, CA 91362
(818) 991-7148 (805) 497-1244

EXPLORATION DRILL HOLE LOG

HOLE No. CH-

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME
LOCATED: Approx. 32', N80W from existing water well.							
Set Casing 0 - 27'		25					1/2
Core Run Start 27.4'				27.4			
SANDSTONE, light brown to light gray, medium grained, moderately hard.					90	48	10:45 10
27.9 SILTSTONE, light gray, moderately hard. BEDDING - 30°		30		29.4			10:55
29.6 SANDSTONE, light brown to light gray, medium grained.							11:09
30.4 SILTSTONE, soft, gray.					100	100	
30.8 SANDSTONE, light brown to light gray, moderately hard, medium to coarse grained.							12
							11:21
				34.4			11:30
		35					
					89	76	19
37.8 SILTSTONE, ½" thick, soft, sheared. BEDDING - 30°							
							11:49
				39.5			11:58
SANDSTONE, light gray, moderately hard.		40					
43.6 SILTSTONE, light gray, moderately hard. BEDDING - 30°							

NOTE: Bedding measured from horizontal assuming rock core is vertical.

EXPLORATION DRILL HOLE LOG

HOLE No. CH-

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME
LOCATED: Approx. 32', N80W from existing water well.							
Set Casing 0 - 27'		25					1/2
Core Run Start 27.4'				27.4			10:45
SANDSTONE, light brown to light gray, medium grained, moderately hard.					90	48	10
27.9 SILTSTONE, light gray, moderately hard. BEDDING - 30°		30		29.4			10:55
29.6 SANDSTONE, light brown to light gray, medium grained.							11:09
30.4 SILTSTONE, soft, gray.					100	100	
30.8 SANDSTONE, light brown to light gray, moderately hard, medium to coarse grained.							12
							11:21
				34.4			11:30
		35					
					89	76	19
37.8 SILTSTONE, ½" thick, soft, sheared. BEDDING - 30°							
							11:49
				39.5			11:58
SANDSTONE, light gray, moderately hard.		40					
43.6 SILTSTONE, light gray, moderately hard. BEDDING - 30°							

NOTE: Bedding measured from horizontal assuming rock core is vertical.

EXPLORATION DRILL HOLE LOG

HOLE No. CH-

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	RQD (%) AFTER DEERE	TIME
							11:58
SILTSTONE, light gray, moderately hard, few shears along bedding - 30-35°				44.5	100	100	17 12:15
		45					12:23
46.9 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 30°					96	66	23
48.6 INTERLAYERED SANDSTONE and Siltstone, light gray, thinly bedded, few bedding plane surfaces polished.				49.5			12:46 12:57
		50					
52.2 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 25°					98	82	23 1:20
				54.5			1:27
54.9 Polished BEDDING PLANE - 45° SANDSTONE, light gray, moderately hard, medium grained, contains few thin siltstone layers.		55			98	98	20 1:47
							1:57
		60		59.6			
62.1 - 62.5 SILTSTONE, gray, sheared. BEDDING - 38°							

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME
							11:58
SILTSTONE, light gray, moderately hard, few shears along bedding - 30-35°				44.5	100	100	17 12:15
		45					12:23
46.9 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 30°					96	66	23
							12:46
48.6 INTERLAYERED SANDSTONE and Siltstone, light gray, thinly bedded, few bedding plane surfaces polished.				49.5			12:57
		50					
					98	82	23
52.2 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 25°							1:20
				54.5			1:27
54.9 Polished BEDDING PLANE - 45° SANDSTONE, light gray, moderately hard, medium grained, contains few thin siltstone layers.		55					
					98	98	20
							1:47
							1:57
		60		59.6			
62.1 - 62.5 SILTSTONE, gray, sheared. BEDDING - 38°							

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME
							1:57
62.5 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 30°		64		64.6	100	94	21 1:18
		65			93	93	1:28 24 1:52
67.7 SILTSTONE, gray, moderately hard, thinly bedded. BEDDING - 45°				68.9			
68.9 BEDDING - 45°		70			100	100	2:57 16
69.6 SANDSTONE, gray, moderately hard, medium grained. BEDDING DIPS OPPOSITE - 50°				71.7			3:13
71.2 SILTSTONE, gray, moderately hard, thinly bedded. BEDDING - 55°							3:22
73.0 SANDSTONE					100	100	14
73.9 SANDSTONE offset with clay filler		75					3:36
				76.7			3:44
77.2 - 77.4 SILTSTONE BED BEDDING - 60°							
					98	94	16
79.5 INTERLAYERED siltstone and sandstone, gray, moderately hard, thinly bedded. BEDDING - 40°		80					4:00
				81.7			4:10

1/23/92

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME
							1:57 1/23/92
62.5 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 30°		64		64.6	100	94	21 1:18
		65					1:28
					93	93	24
67.7 SILTSTONE, gray, moderately hard, thinly bedded. BEDDING - 45°				68.9			1:52
68.9 BEDDING - 45°							2:57
		70			100	100	16
69.6 SANDSTONE, gray, moderately hard, medium grained. BEDDING DIPS OPPOSITE - 50°				71.7			3:13
71.2 SILTSTONE, gray, moderately hard, thinly bedded. BEDDING - 55°							3:22
73.0 SANDSTONE					100	100	14
73.9 SANDSTONE offset with clay filler		75					
				76.7			3:36
77.2 - 77.4 SILTSTONE BED BEDDING - 60°							3:44
					98	94	16
79.5 INTERLAYERED siltstone and sandstone, gray, moderately hard, thinly bedded. BEDDING - 40°		80					4:00
				81.7			4:10

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME	
							4:10	1/23/92
82.3 SANDSTONE, light gray, moderately hard, moderately fractured, medium grained fractures filled with white material (caliche?).		83			94	94	21	
85.0 - 85.7 COARSE-grained		85						
85.7 INTERLAYERD siltstone and sandstone, moderately hard. BEDDING DIPS OPPOSITE - 45°				86.7			4:31	
							7:39	1/24/92
1.9 Feet of previous day drill cuttings.					86	47	46	First Run
		90		91.6			8:25	
							9:03	Pull Stem
92.1 SANDSTONE, gray, hard, medium grained, unfractured; massive					98	98	21	
94.2 INTERLAYERED sandstone and siltstone, thinly bedded. BEDDING - 40°		95						
95.6 SANDSTONE, gray, hard, medium grained, massive.				96.6			9:24	
							9:34	
98.3 - 99.3 WHITE (caliche?) BANDING DIPS - 40°					100	100	23	
99.6 COARSE-grained		100						
100.8 SANDSTONE, gray, medium to coarse grained; moderately hard. STEEP FRACTURES - 80°				101.6			9:57	
							10:08	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME	
							4:10	1/23/92
82.3 SANDSTONE, light gray, moderately hard, moderately fractured, medium grained fractures filled with white material (caliche?).		83			94	94	21	
85.0 - 85.7 COARSE-grained		85						
85.7 INTERLAYERD siltstone and sandstone, moderately hard. BEDDING DIPS OPPOSITE - 45°				86.7			4:31	
1.9 Feet of previous day drill cuttings.					86	47	7:39 46 8:25	1/24/92 First Run
		90		91.6				
92.1 SANDSTONE, gray, hard, medium grained, unfractured; massive					98	98	9:03 21	Pull Stem
94.2 INTERLAYERED sandstone and siltstone, thinly bedded. BEDDING - 40°								
		95					9:24	
95.6 SANDSTONE, gray, hard, medium grained, massive.				96.6				
98.3 - 99.3 WHITE (caliche?) BANDING DIPS - 40°					100	100	9:34 23	
99.6 COARSE-grained								
		100						
100.8 SANDSTONE, gray, medium to coarse grained; moderately hard. STEEP FRACTURES - 80°				101.6			9:57	
							10:08	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME	
							10:08	1/24/92
103.6 INTERLAYERED siltstone and sandstone, gray, moderately hard, thinly bedded. BEDDING - 40°		103			100	84	17	
105.6 SOME small offsets in bedding, siltstone bedding is wavy		105		106.7			10:25	
106.7 SANDSTONE, gray, medium to coarse grained, massive							10:32	
108.8 - 108.9 SILTSTONE bed. BEDDING - 45°								
SANDSTONE		110			100	100	24	
110.6 - 110.7 SILTSTONE bed, dips different direction - 70°							10:56	
110.7 SANDSTONE, light gray, fine-grained, hard. BEDDING - 70°				111.7			11:07	
					96	96	10	
							11:17	
114.0 INTERBEDDED sandstone and siltstone, gray, thinly bedded, moderately hard.				114.0			11:28	
115.3 SANDSTONE, light gray, medium grained, massive. Siltstone bed at 116.2 dips 60°		115			100	100	14	
							11:42	
				118.0			11:53	
					100	100	12	
		120						
120.9 - 121.5 WHITE calcified zone dips 40°							12:05	
				121.7			12:13	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)		ROD (%) AFTER BEERE	TIME	
								10:08	1/24/92
103.6 INTERLAYERED siltstone and sandstone, gray, moderately hard, thinly bedded. BEDDING - 40°		103			100		84	17	
105.6 SOME small offsets in bedding siltstone bedding is wavy		105		106.7				10:25	
106.7 SANDSTONE, gray, medium to coarse grained, massive								10:32	
108.8 - 108.9 SILTSTONE bed. BEDDING - 45°									
SANDSTONE		110			100		100	24	
110.6 - 110.7 SILTSTONE bed, dips different direction - 70°									
110.7 SANDSTONE, light gray, fine-grained, hard. BEDDING - 70°				111.7				10:56	
					96		96	11:07	
								10	
								11:17	
114.0 INTERBEDDED sandstone and siltstone, gray, thinly bedded, moderately hard.				114.0				11:28	
		115							
115.3 SANDSTONE, light gray, medium grained, massive. Siltstone bed at 116.2 dips 60°					100		100	14	
								11:42	
				118.0				11:53	
					100		100	12	
		120							
120.9 - 121.5 WHITE calcified zone dips 40°								12:05	
				121.7				12:13	

EXPLORATION DRILL HOLE LOG

HOLE No. B-7

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 46' FINAL 44' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
CLAYEY SAND, light brown, dense, moist, contains rock fragments		41						
		42						
		43						
GROUND WATER FINAL (1:30 AM)		44						
		45		34				
GROUND WATER INITIAL (9:30 AM)		46						
		47						
		48						
		49						
SILTY CLAY, medium brown, STIFF TO HARD, MOIST.		50		50/6"				
		51						
		52						
		53						
		54						
		55						
		56						
		57						
SILTY CLAY, medium brown, STIFF TO HARD, MOIST.		58						
		59						
		60						

EXPLORATION DRILL HOLE LOG

HOLE No. B-7

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 46' FINAL 44' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
INTERBEDDED SILTSTONE, mudstone, and shale, layered orange, brown and gray, moderately hard, contorted, thinly bedded. WEATHERED BEDROCK/BEDROCK		65		70/6"				
INTERBEDDED SILTSTONE & MUDSTONE, layered gray and blac siltstone is gray, mudstone is black, moderately hard, contorted, thinly bedded. BEDROCK		70		100/3"				
Thinly bedded, moderately hard to hard.		75		100/2"				
Siltstone and sandstone, gray, HARD, THINLY BEDDED.		80		100/3"				

EXPLORATION DRILL HOLE LOG

HOLE No. B-7

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 46' FINAL 44' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
INTERBEDDED SILTSTONE and sandstone, layered light gray to dark gray, hard, thinly BEDDED.		85		70/6"				
INTERBEDDED SILTSTONE and sandstone, layered light gray to dark gray, hard. THINLY BEDDED.		90		70/5"				
INTERBEDDED SILTSTONE and sandstone, layered light gra to dark gray, hard thinly BEDDED		95		95/6"				
END AT 100 FEET Water at 46 feet depth		100		100/4"				

EXPLORATION DRILL HOLE LOG

HOLE No. B-3

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 42' FINAL 40' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT *	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
SILTY CLAY, light brown, firm to stiff, slightly moist. FILL		1 2 3 4						
SANDY CLAY: Medium brown, stiff, slightly moist, porous. ALLUVIUM		5 6 7 8 9 10		36				
		10 11 12 13 14		49				
SANDY CLAY, medium brown, stiff, slightly moist. porous.		15 16 17 18		65				
SILTY SAND, medium brown, dense, slightly moist. Slightly porous		19 20		48				

* Adjusted for effected vertical overburden pressure

EXPLORATION DRILL HOLE LOG

HOLE No. B-8

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 42' FINAL 40' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
SILTY SAND, medium brown, dense, slightly moist, porous.		21						
		22						
		23						
		24						
SANDY CLAY, medium brown, firm, moist, porous		25		63				
		26						
		27						
		28						
		29						
SANDY CLAY, medium brown, firm, moist, slightly porous		30		35				
		31						
		32						
		33						
		34						
SANDY CLAY, medium brown, firm, wet, slightly porous.		35		46				
		36						
		37						
		38						
SANDY CLAY, medium brown, firm wet.		39						
		40		40				

EXPLORATION DRILL HOLE LOG

HOLE No. B-3

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 42' FINAL 40' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
FINAL GROUND WATER (11:00 AM, 12-24-91)		41						
INITIAL GROUND WATER (2:30 PM, 12-23-91)		42						
		43						
		44						
		45						
		46						
		47						
		48						
INTERBEDDED SILTSTONE, sandstone, and shale, layered gray, light gray, and orange brown, moderately hard, thinly bedded, contorted. BEDROCK		49						
		50		60/5"				
		51						
		52						
		53						
		54						
		55						
		56						
		57						
		58						
SANDSTONE, gray, hard, massive, medium grained.		59						
		60		70/2"				

EXPLORATION DRILL HOLE LOG

HOLE No. B-3

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 42' FINAL 40' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
INTERBEDDED SILTSTONE, sandstone and shale, layered gray to light gray, moderately hard, thinly BEDDED.		61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80		100/4"				
INTERBEDDED SILTSTONE, sandstone, and shale (as before)				70/6"				

EXPLORATION DRILL HOLE LOG

HOLE No. B-8

PROJECT Pazar & Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 42' FINAL 40' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
INTERBEDDED SILTSTONE, sandstone and shale, layered light gray to gray, moderately hard to hard. THINLY BEDDED.		81						
		82						
		83						
		84						
		85						
		86						
		87						
		88						
		89						
		90		50/4"				
		91						
		92						
		93						
		94						
		95						
		96						
		97						
		98						
END AT 100 FEET GROUNDWATER AT 42 FEET DEPTH		99						
		100		50/4"				

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SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (FT)	USCS SOIL CLASSIFICATION	MATERIAL DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (PSF)	VOID RATIO (e)	SATURATION (S)	GRAIN SIZE ANALYSIS (% PASSING)								ATTERBERG LIMITS			COMP CURVE		DIRECT SHEAR (F-S /ULT.)		RING SHEAR (Residual)*		EXPANSION INDEX	COMPRESSION/SWELL (PSF)						
								3/4"	No. 4	No. 10	No. 40	No. 200	CF (<5 µm)	Cu	Cc	LL	PL	PI	MAX. DD (PSF)	OMC (%)	PHI (DEG)	C (KSF)	PHI (DEG)	C (KSF)		500	1000	2000	4000	8000	RB 500
CH-A	126	SC						100	100	98	72	31	9.1	108	8.3	40	19	21					19	0.41								
CH-B	70	SC						100	100	99	68	33	20.8	2.1	80.0	44	26	18					14	0.38								
CH-B	59	CH																			20	0.54									
DH-1	15-20	SC																	115	14	39	0.52									
DH-1	USP	SC						100	99	82	39	17	7.5	62.0	3.2	53	23	30													
DH-1	49	SC						100	99	80	38	13	7.8	58.8	3.4	63	26	37													
DH-3	58	CL						100	100	100	99	92	-	-	-	42	19	23					20	1.18							
DH-5	30	SW-SC						100	99	99	96	84	-	-	-																
DH-5	SP	SW-SC						100	100	90	33	7	4.2	9.3	1.2																
DH-5	42	SW-SC						100	100	85	36	12	6.6	22.4	2.1	77	32	45					10	1.04							
DH-A	10			10	96	0.73	122														35	0.22									
	20			15	96	0.73	122																								
	30			17	112	0.48	132																								
	40			17	88	0.88	117																								
	60			18	104	0.59	127																								
DH-B	10			18	102	0.63	126																								
	20			11	119	0.40	136																								
	30			23	107	0.55	129																								
	40			15	106	0.56	129																								
	60			16	106	0.57	128																								
DH-C	10			19	98	0.70	123																								
	20			15	109	0.51	130																								
	30			5	100	0.66	124																								
	40			4	107	0.55	129																								
	60			5	100	0.65	125																								

PROJECT: CALABASAS HOLDINGS / LAS VIRGENES ROAD

PROJECT No.: 1344.20

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SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (FT)	USCS SOIL CLASSIFICATION	MATERIAL DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (PSF)	VOID RATIO (e)	SATURATION (S)	GRAIN SIZE ANALYSIS (% PASSING)								ATTERBERG LIMITS			COMP CURVE		DIRECT SHEAR (F-S /ULT.)		RING SHEAR (Residual)*		EXPANSION INDEX	COMPRESSION/SWELL (PSF)						
								3/4"	No. 4	No. 10	No. 40	No. 200	CF (<5 µm)	Cu	Cc	LL	PL	PI	MAX. DD (PSF)	OMC (%)	PHI (DEG)	C (KSF)	PHI (DEG)	C (KSF)		500	1000	2000	4000	8000	RB 500
DH-A	15-30	SC						100	94	86	62	34		80.0	2.1	42	20	22													
	70	CL						100	100	95	81	54				29	17	12													
DH-B	30-40	SC						90	78	72	54	27				22															
DH-C	5-15	SC						100	92	85	63	25		41.0	4.1	31	15	16							16						
	25-35	SC						100	99	98	59	7																			

PROJECT: CALABASAS HOLDINGS / LAS VIRGENES ROAD

PROJECT No.: 1344.20

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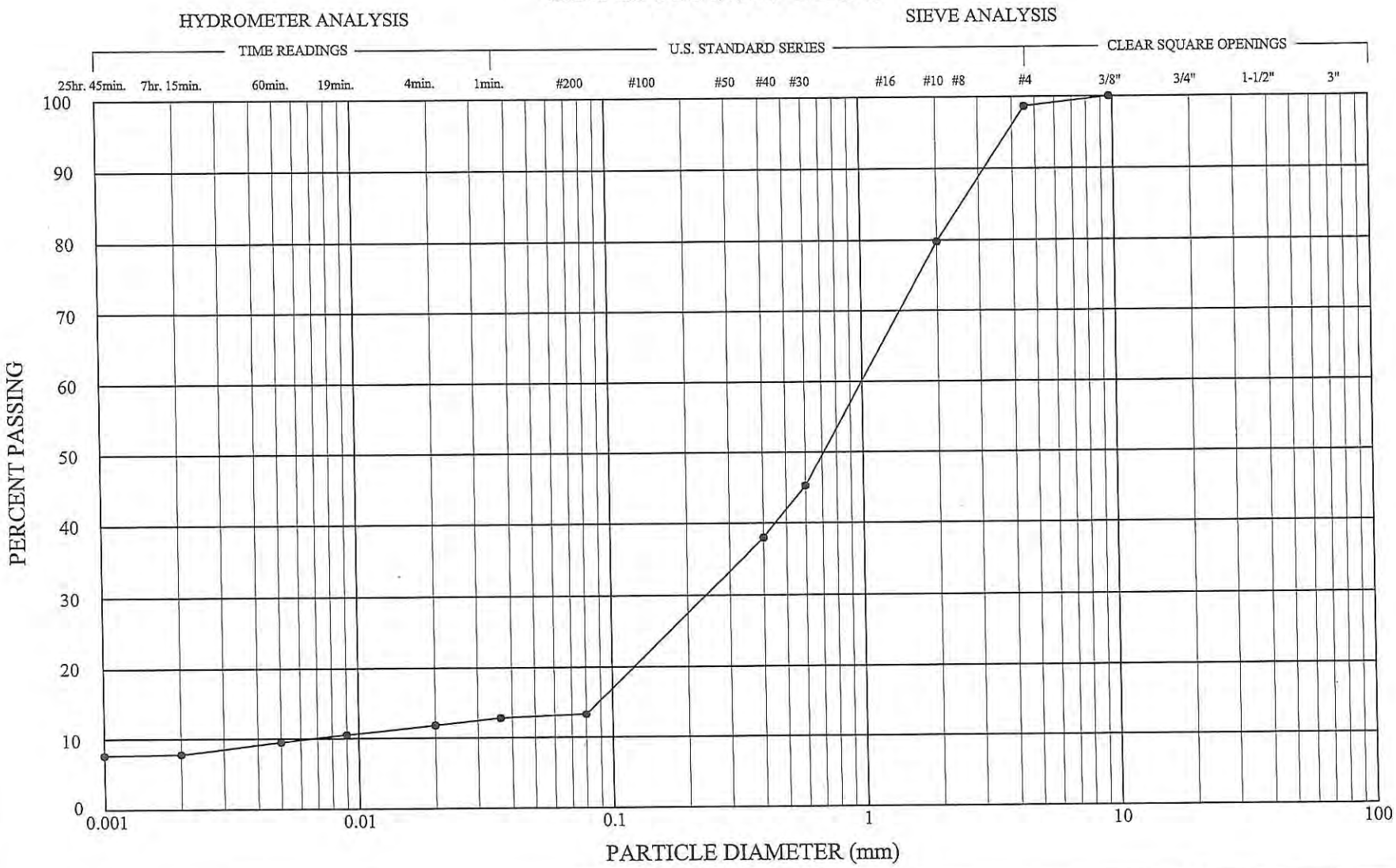
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-1**	DEPTH: **49'**	METHOD: **ASTM D421**	%PASSING#200: **13.3**	U.S.C.S. **SC**
DESCRIPTION: **MEDIUM GRAY CLAYEY SAND**		PLASTICITY INDEX(PI): **37**	LIQUID LIMIT(LL): **63**	ACTIVITY:	Cc: **3.38**	Cu: **58.82**

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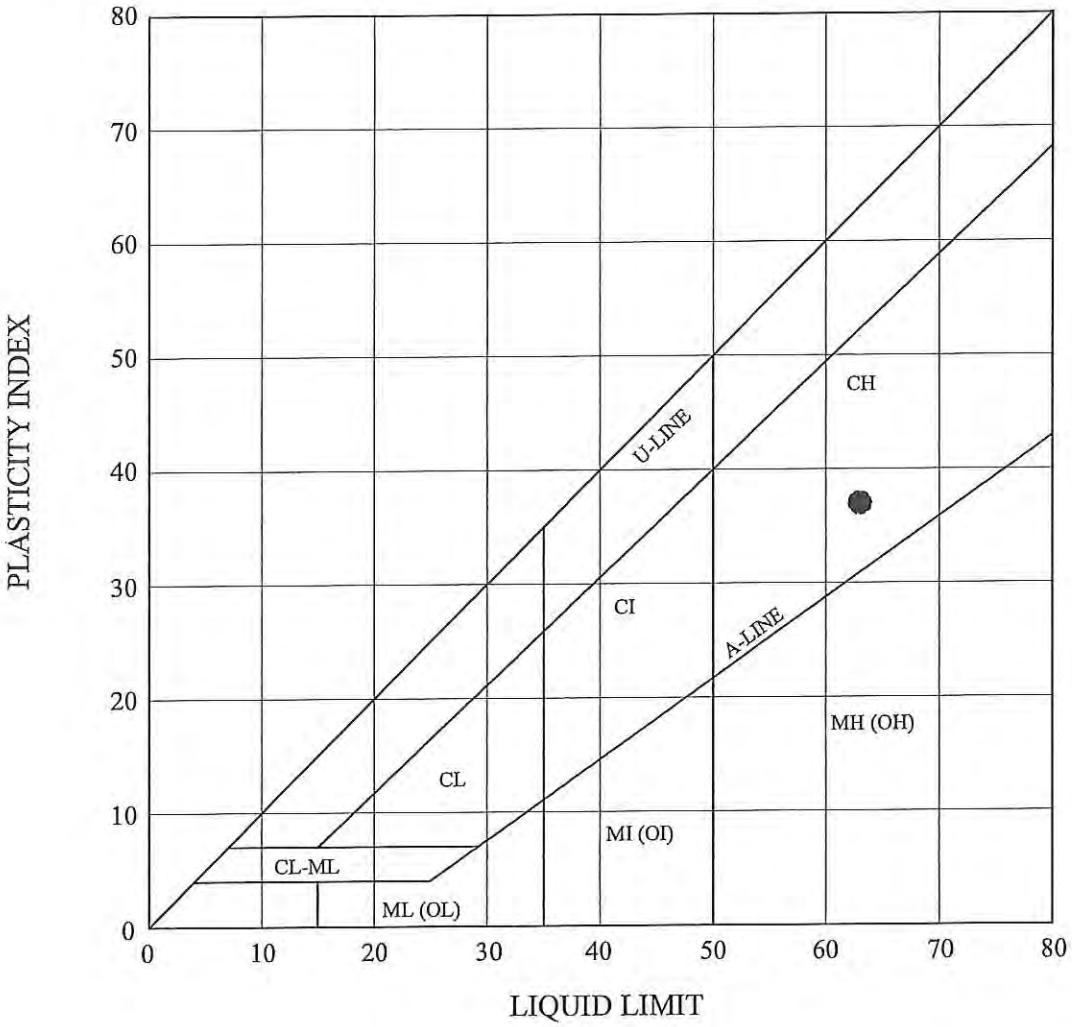
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-1	DEPTH: 49'	METHOD: ASTM D4318
PL: 26	LL: 63	PI: 37
DESCRIPTION: MEDIUM GRAY CLAYEY SAND (SIEVED THROUGH #40)		

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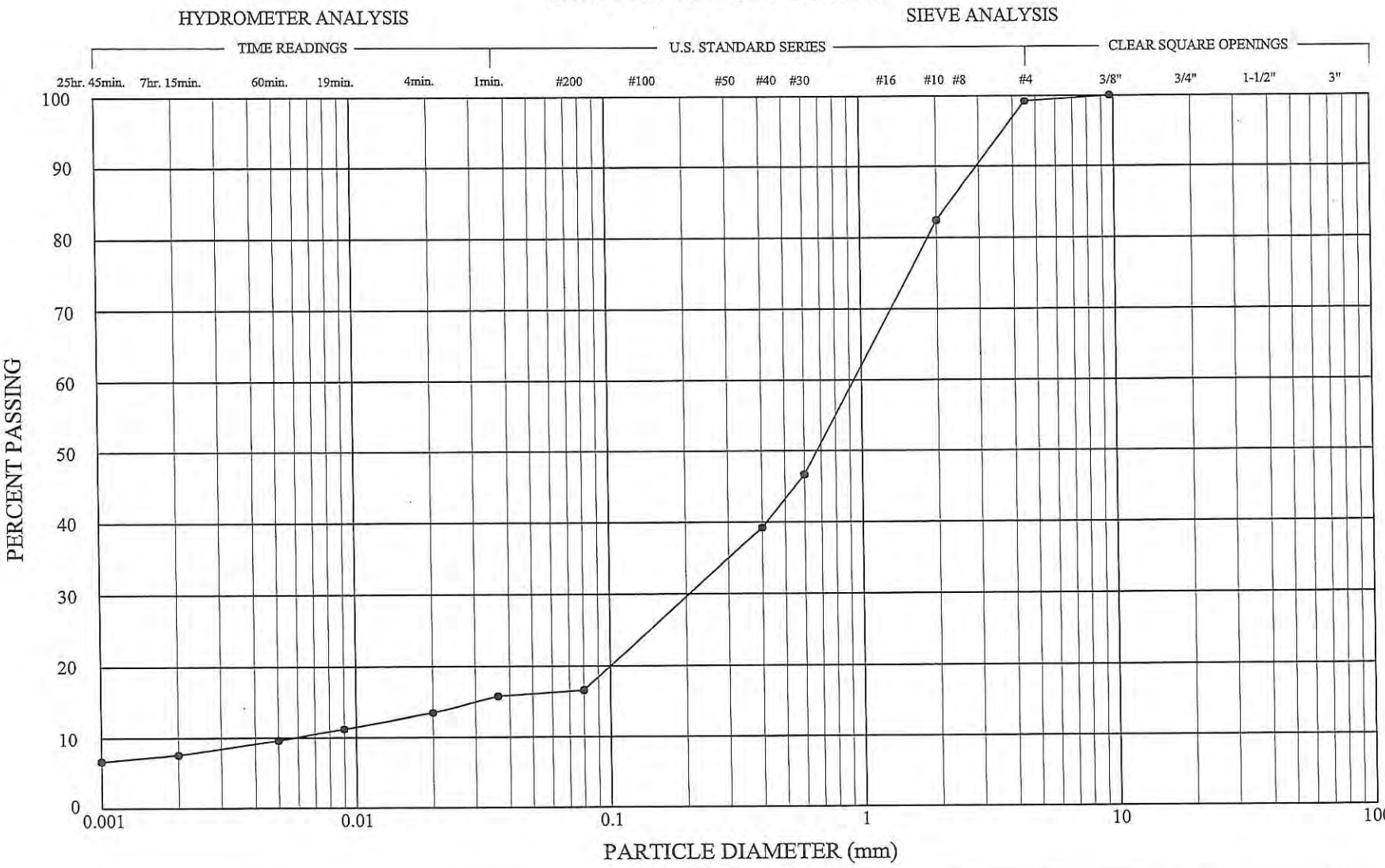
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-1**	DEPTH: **UPPER SLIDE PLANE**	METHOD: **ASTM D421**	%PASSING#200: **16.6**	U.S.C.S. **SC**		
DESCRIPTION: **LIGHT BROWN CLAYEY SAND**		PLASTICITY INDEX(PI): **30**	LIQUID LIMIT(LL): **53**	ACTIVITY:		Cc: **3.16**	Cu: **62**	

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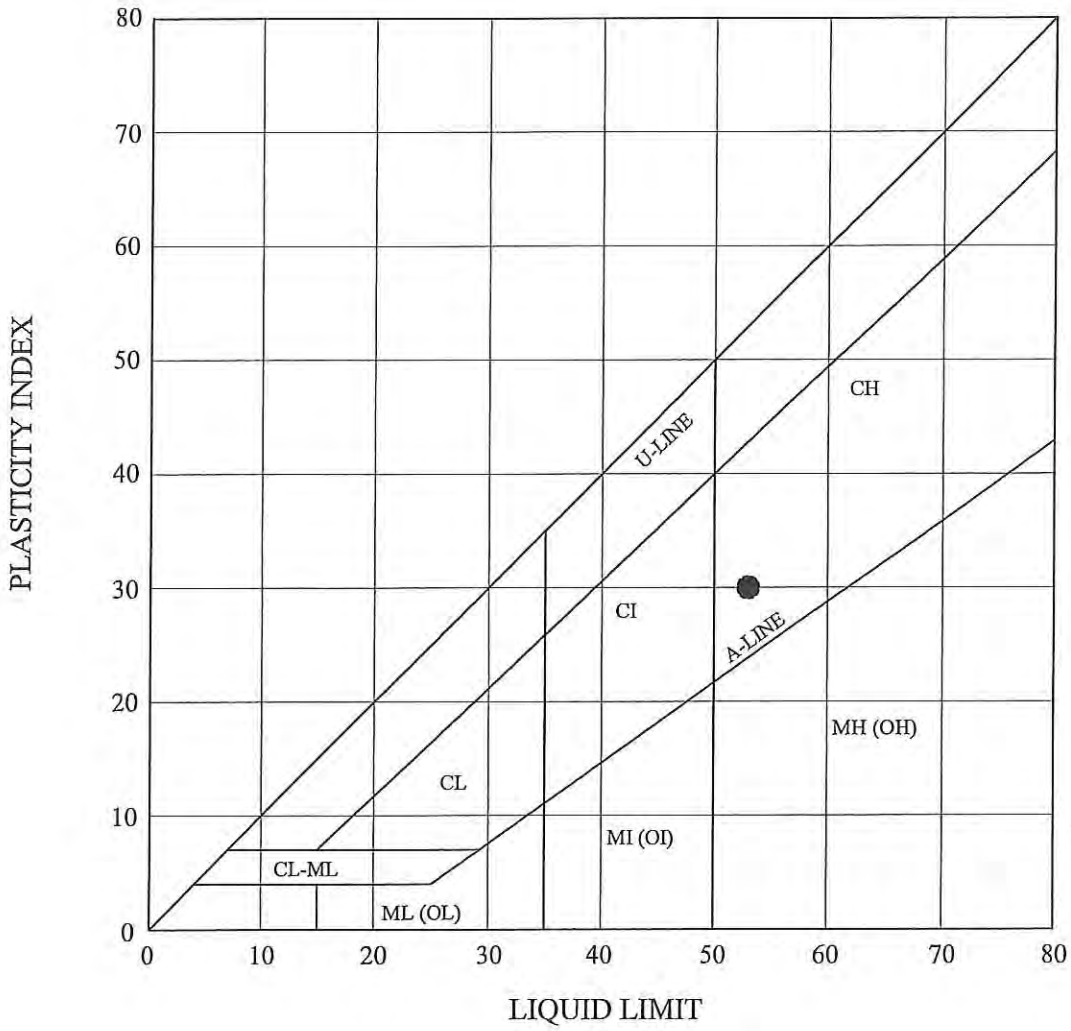
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-1	DEPTH: UPPER SLIDE PLANE	METHOD: ASTM D4318
PL: 23	LL: 53	PI: 30
DESCRIPTION: LIGHT BROWN GRAY CLAYEY SAND (SIEVED THROUGH #40)		

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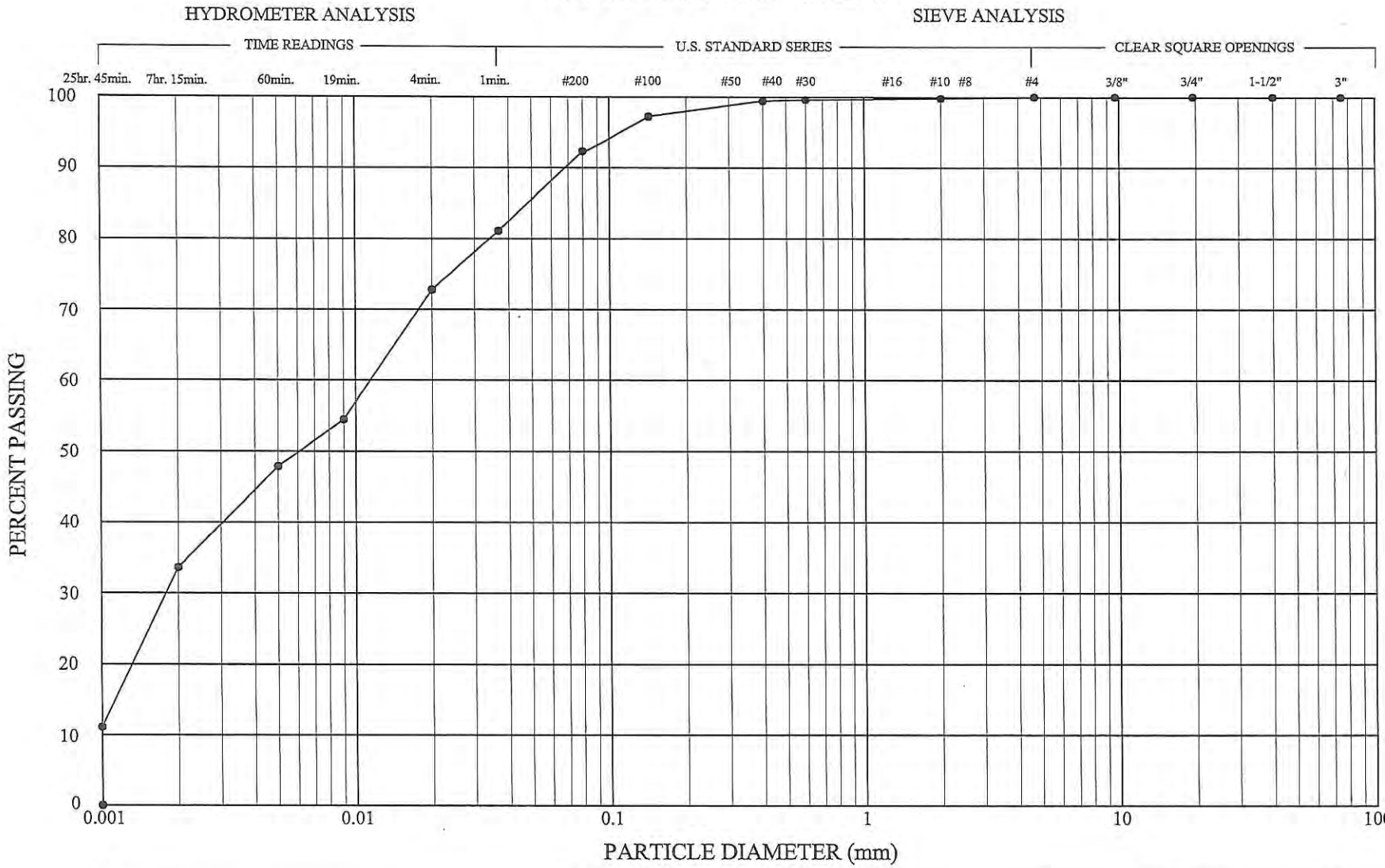
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-3**	DEPTH: **58'**	METHOD: **ASTM D421**	%PASSING#200: **92.3 %**	U.S.C.S. **CL**	
DESCRIPTION: **ANOXIC SILTSTONE**		PLASTICITY INDEX(PI): **23**	LIQUID LIMIT(LL): **42**	ACTIVITY:	Cc: -	Cu: -	

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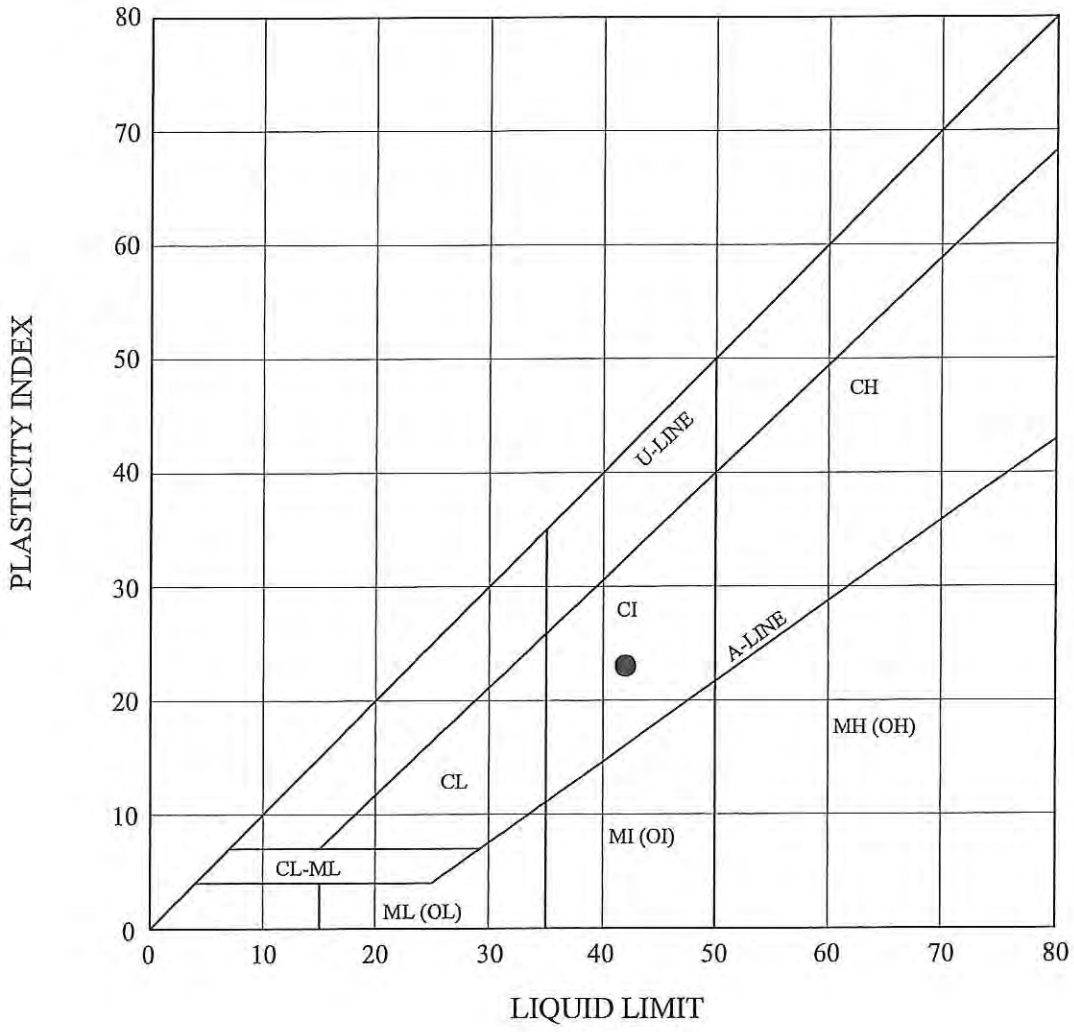
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-3	DEPTH: 58'	METHOD: ASTM D4318
PL: 19	LL: 42	PI: 23
DESCRIPTION: ANOXIC SILTSTONE (SIEVED THROUGH #40)		

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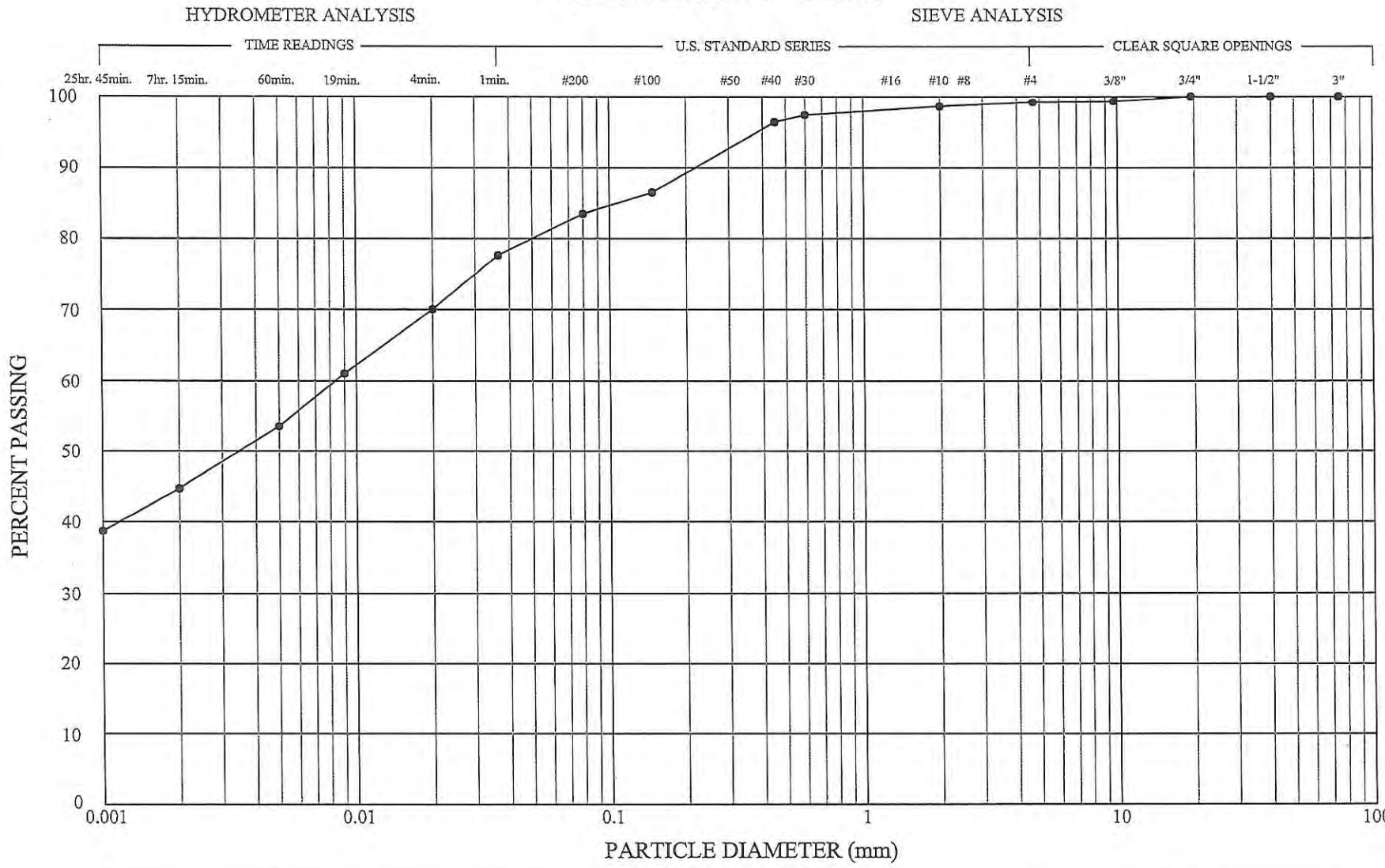
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-5**	DEPTH: **30'**	METHOD: **ASTM D421**	%PASSING#200: **83.5**	U.S.C.S. -
DESCRIPTION: **SILTY SAND**	PLASTICITY INDEX(PI):	LIQUID LIMIT(LL):	ACTIVITY:	Cc: -	Cu: -	

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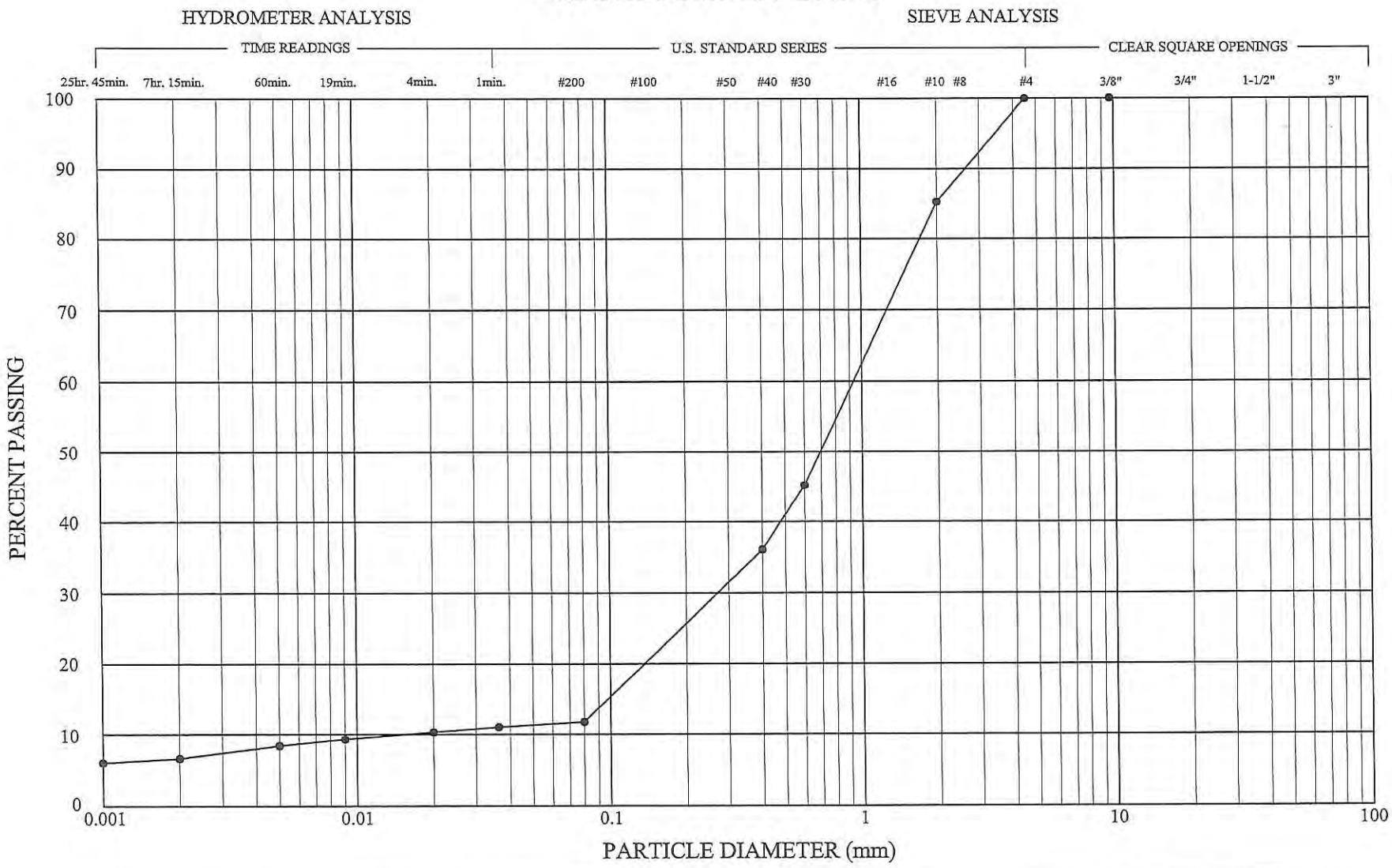
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-5**	DEPTH: **42'**	METHOD: **ASTM D421**	%PASSING#200: **11.7**	U.S.C.S. **SW-SC**
DESCRIPTION: **MEDIUM GRAY SILTY CLAY**	PLASTICITY INDEX(PI): **45**	LIQUID LIMIT(LL): **77**	ACTIVITY:	Cc: **2.07**	Cu: **22.4**	

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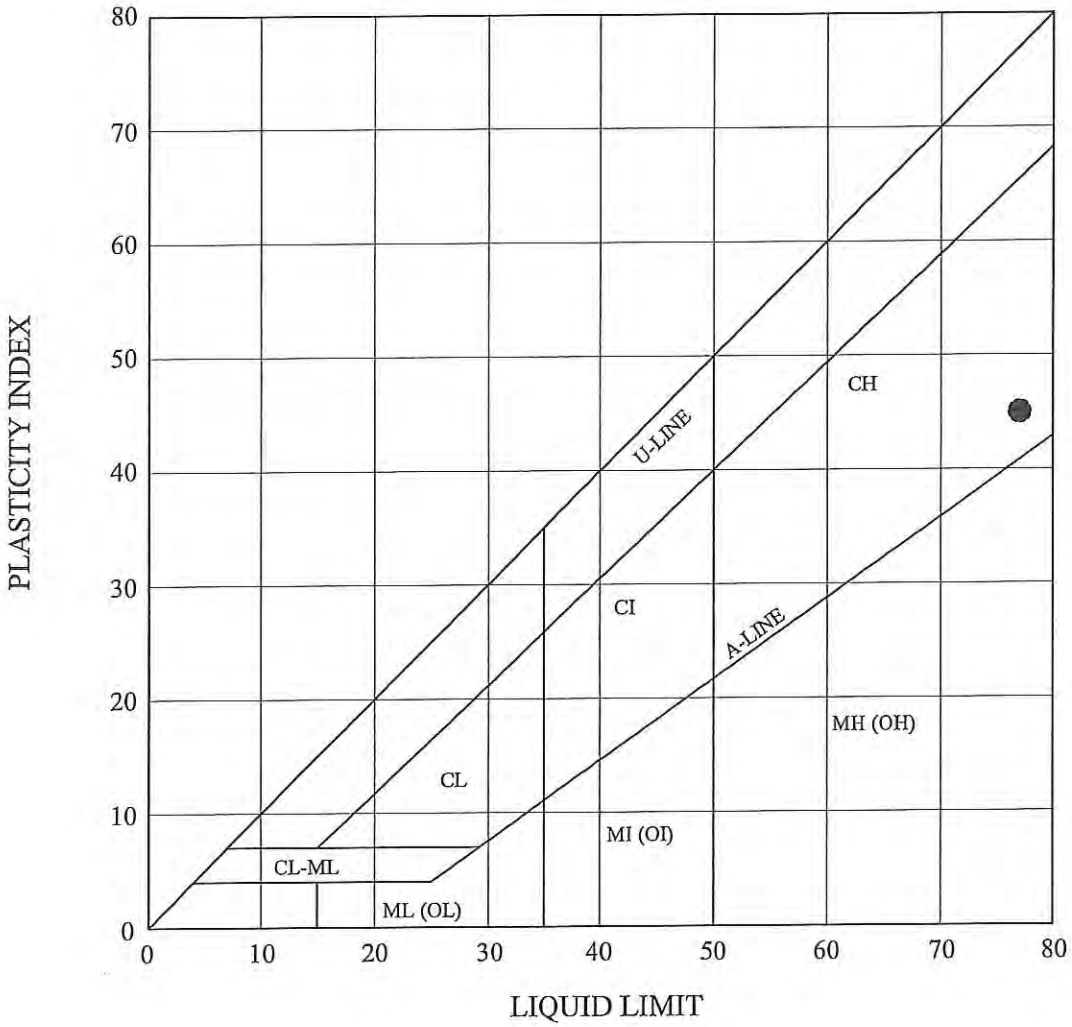
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-5	DEPTH: 42'	METHOD: ASTM D4318
PL: 32	LL: 77	PI: 45
DESCRIPTION: LIGHT BROWN GRAY SILTY CLAY (SIEVED THROUGH #40)		

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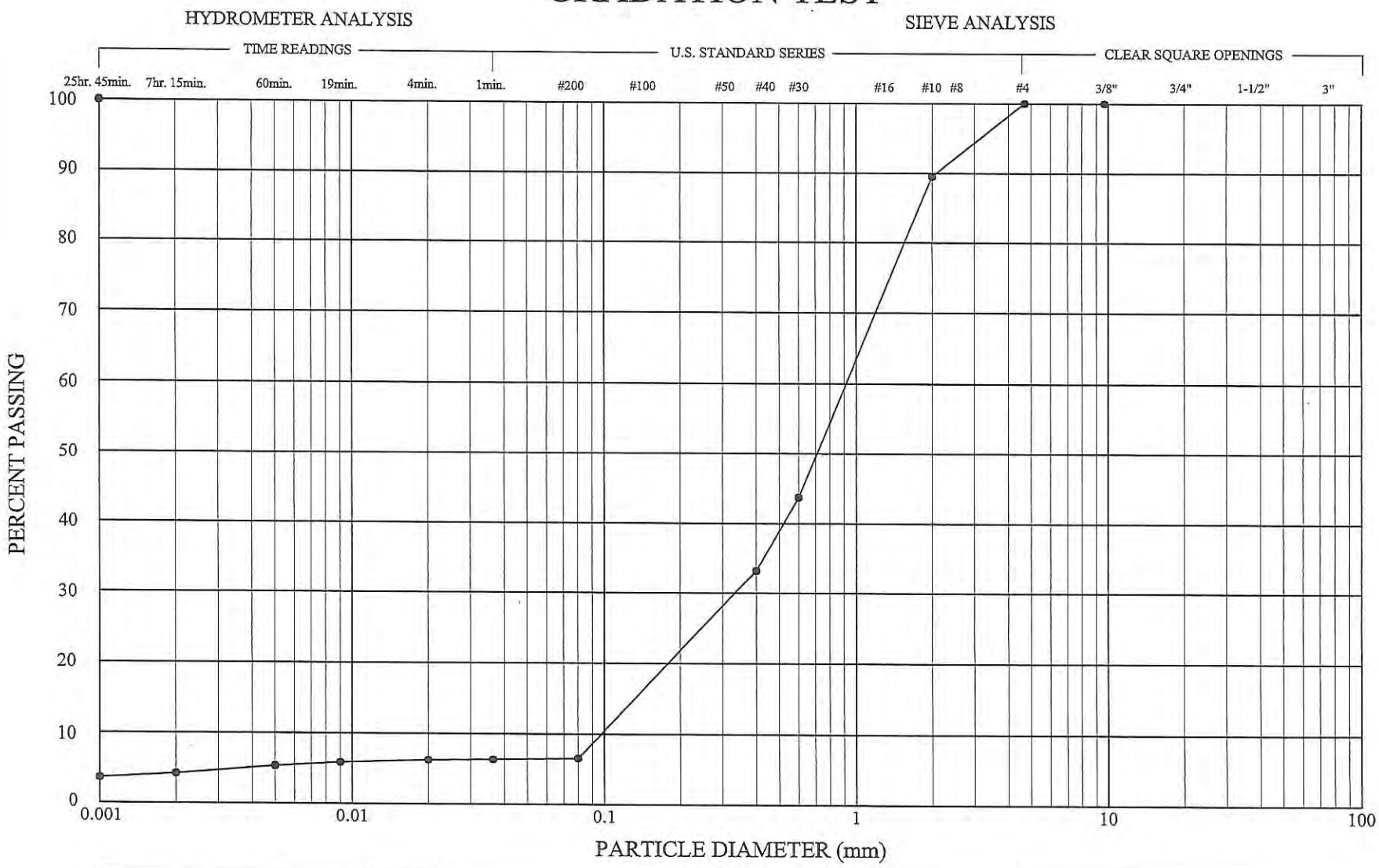
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-5**	DEPTH: **SLIDE PLANE**	METHOD: **ASTM D421**	%PASSING#200: **6.5**	U.S.C.S. **SW-SC**
DESCRIPTION: **LIGHT BROWN SILTY CLAY**	PLASTICITY INDEX(PI):	LIQUID LIMIT(LL):	ACTIVITY:	Cc: **1.23**	Cu: **9.27**	

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SOIL-WATER CONTENT & DRY DENSITY TEST RESULTS

Test No.	Hole No.	Depth	No. of Rings	Wt of Rings & Wet Sample	Wt. Dish & Wet Sample	Wt. of Dish & Dry Sample	Wt. of Dish	Wt of Rings	Wt of Sample	Wt. per Ring	Wet Density	Wt. of Water	Sample Dry Wt.	Water Content (%)	Dry Density (pcf)	Void Ratio (e)	Saturation (S)	Saturated Unit Weight	Comments
1	DH-A	10	1	171.7	325.1	313.1	198.6	44.5	127.2	127.2	105.6	12.0	114.5	10	95.6	0.73	38.0	121.9	
2		20	1	176.7	330.9	313.9	199.8	44.5	132.2	132.2	109.7	17.0	114.1	15	95.5	0.73	54.0	121.9	
3		30	1	201.8	355.6	332.9	199.5	44.5	157.3	157.3	130.6	22.7	133.4	17	111.6	0.48	93.5	131.9	
4		40	1	168.6	327.1	309.5	205.5	44.5	124.1	124.1	103.0	17.6	104.0	17	88.1	0.88	51.1	117.3	
5		60	1	192.0	355.1	332.6	207.9	44.5	147.5	147.5	122.4	22.5	124.7	18	103.7	0.59	80.4	127.0	
6	DH-B	10	1	189.2	344.8	322.5	199.7	44.5	144.7	144.7	120.1	22.3	122.8	18	101.6	0.63	76.8	125.7	
7		20	1	202.8	356.0	340.6	198.8	44.5	158.3	158.3	131.4	15.4	141.8	11	118.5	0.40	72.8	136.2	
8		30	1	202.5	364.2	335.4	208.2	44.5	158.0	158.0	131.1	28.8	127.2	23	106.9	0.55	109.8	129.0	
9		40	1	191.8	348.0	328.8	202.5	44.5	147.3	147.3	122.3	19.2	126.3	15	106.1	0.56	72.2	128.5	
10		60	1	192.6	345.7	325.1	199.7	44.5	148.1	148.1	122.9	20.6	125.4	16	105.6	0.57	76.9	128.1	
11	DH-C	10	1	184.8	337.5	314.9	198.8	44.5	140.3	140.3	116.4	22.6	116.1	19	97.5	0.70	74.1	123.1	
12		20	1	195.5	354.5	335.3	205.6	44.5	151.0	151.0	125.3	19.2	129.7	15	109.2	0.51	76.2	130.4	
13		30	1	170.4	326.3	320.3	199.8	44.5	125.9	125.9	104.5	6.0	120.5	5	99.5	0.66	20.0	124.4	
14		40	1	177.7	332.2	327.3	199.5	44.5	133.2	133.2	110.6	4.9	127.8	4	106.5	0.55	18.4	128.7	
15		60	1	171.0	332.4	326.8	208.0	44.5	126.5	126.5	105.0	5.6	118.8	5	100.3	0.65	19.2	124.8	

Project: Calabasas Holdings/Las Virgenes Road

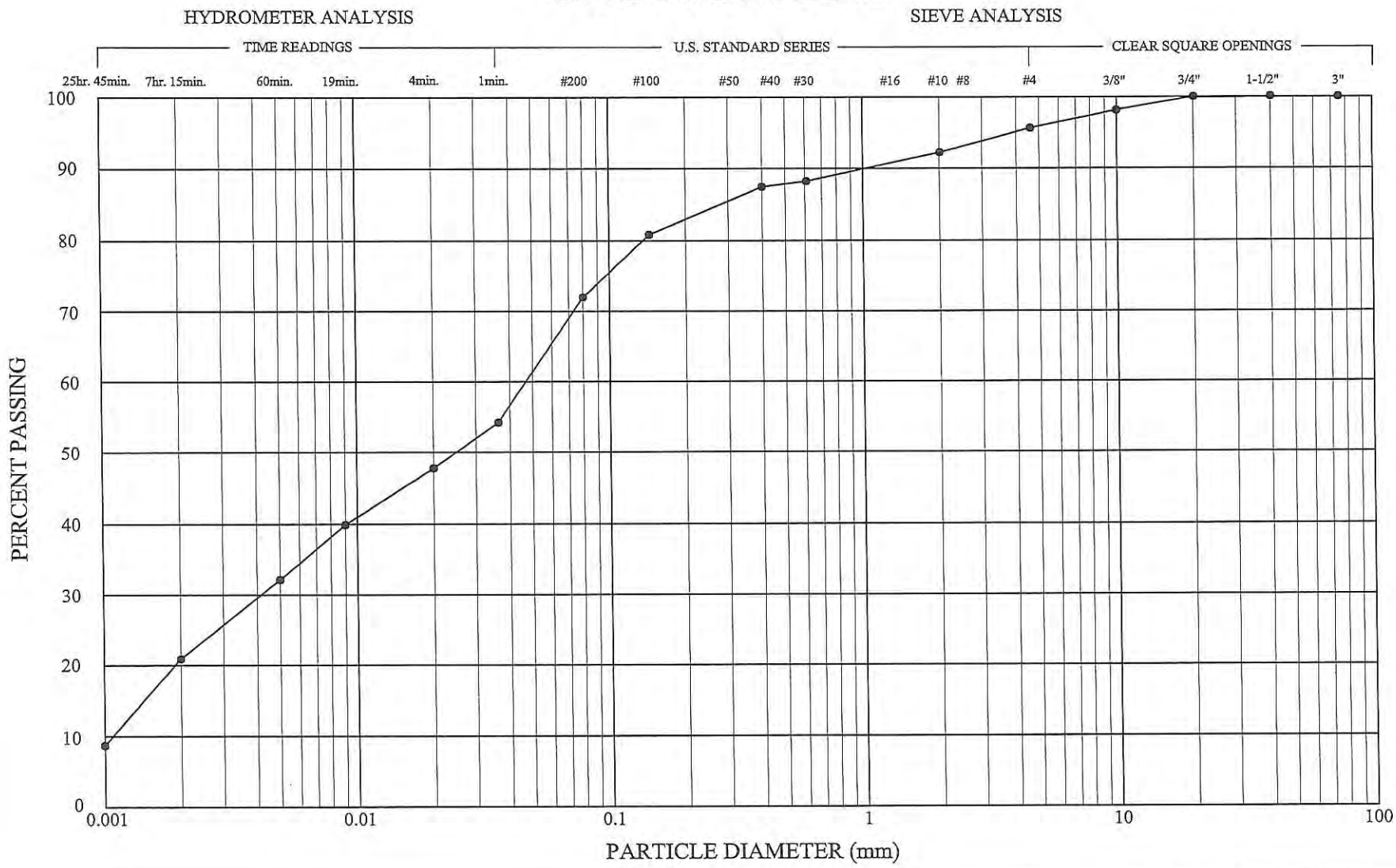
Project No.: 1344.20

Date: 12/13/05

Tested By: RT

Assumed S.G.: 2.65

GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/ LAS VIRGENES ROAD	SAMPLE: DH-A	DEPTH: 15-30'	METHOD: ASTM D421	%PASSING#200: 72 %	U.S.C.S. CL	
DESCRIPTION: SANDY CLAY		PLASTICITY INDEX(PI): 22	LIQUID LIMIT(LL): 42	ACTIVITY:	Cc: 0.22	Cu: 42.7	

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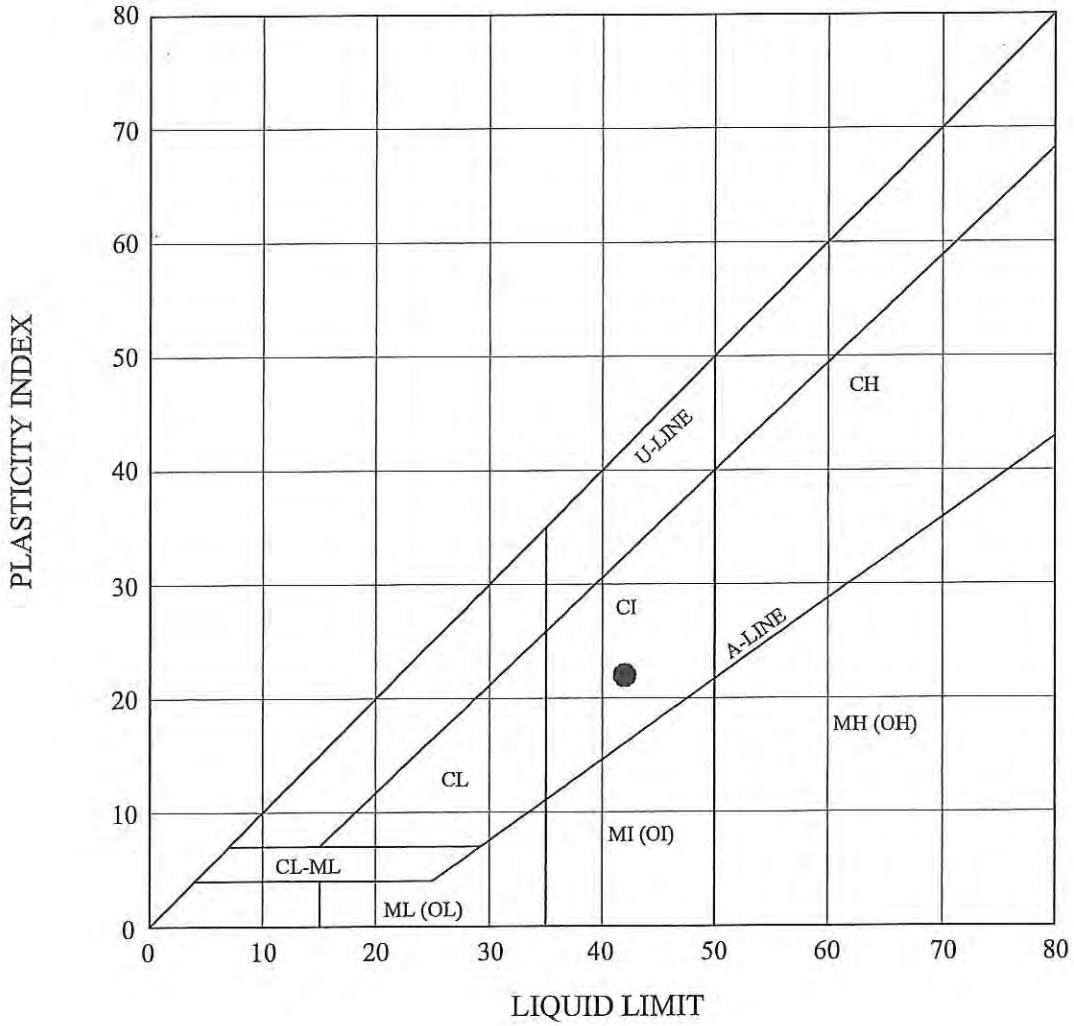
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-A	DEPTH: 15-30'	METHOD: ASTM D4318
PL: 20	LL: 42	PI: 22
DESCRIPTION: SANDY CLAY (SIEVED THROUGH #40)		

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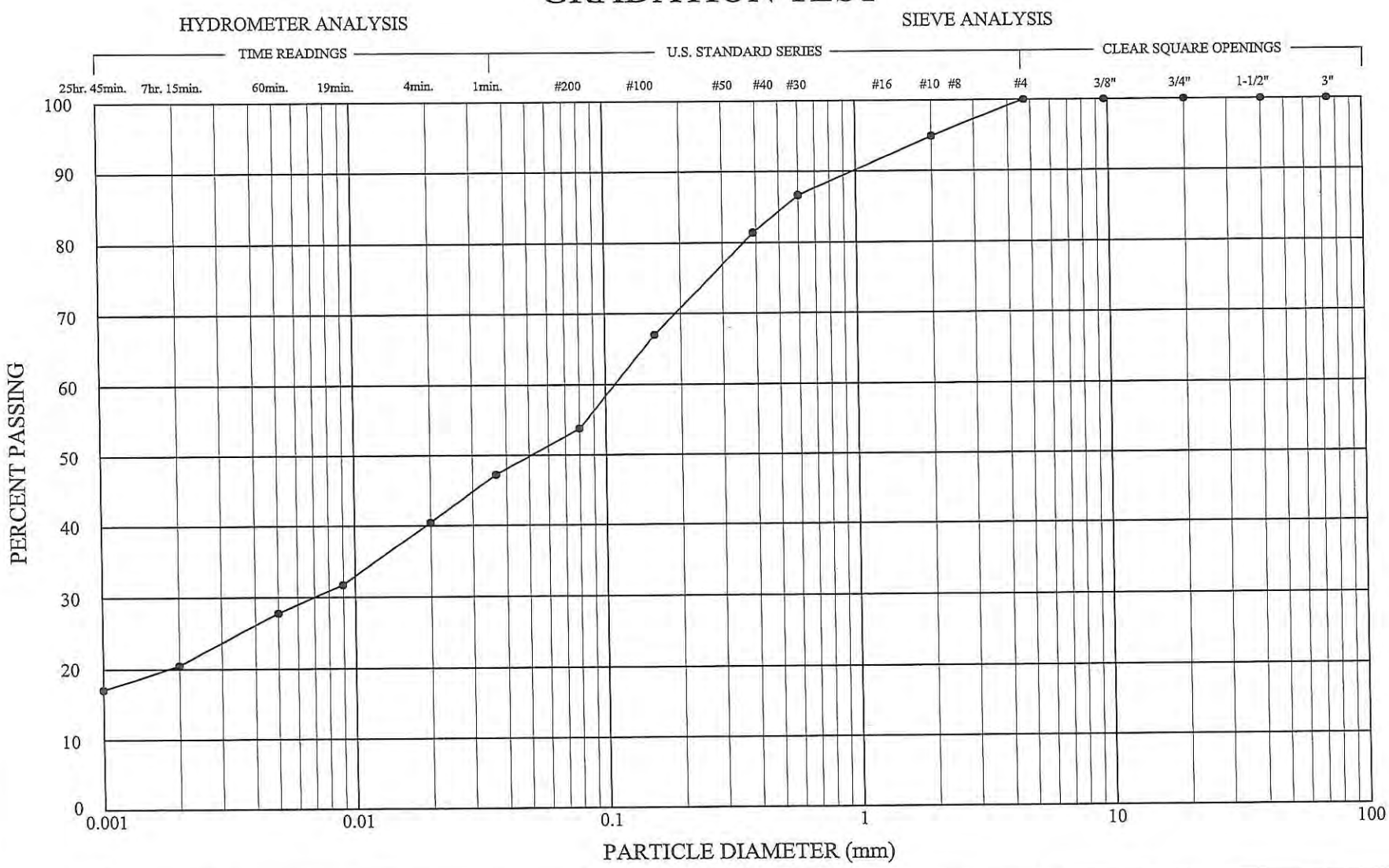
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-A**	DEPTH: **70'**	METHOD: **ASTM D421**	%PASSING#200: **53.7**	U.S.C.S. **CL**
DESCRIPTION: **SANDY CLAY**		PLASTICITY INDEX(PI): **12**	LIQUID LIMIT(LL): **29**	ACTIVITY:	Cc: -	Cu: -

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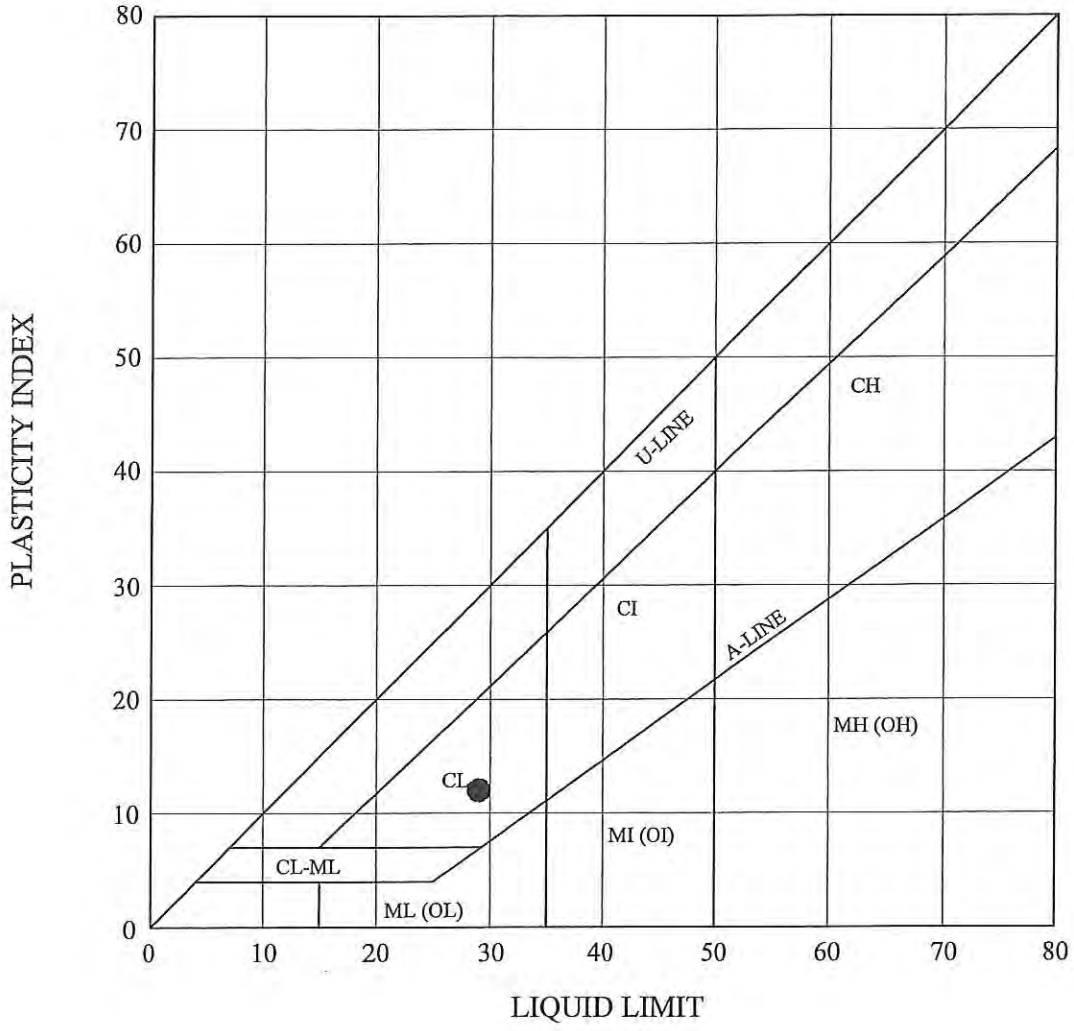
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-A	DEPTH: 70'	METHOD: ASTM D4318
PL: 17	LL: 29	PI: 12
DESCRIPTION: SANDY CLAY (SIEVED THROUGH #40)		

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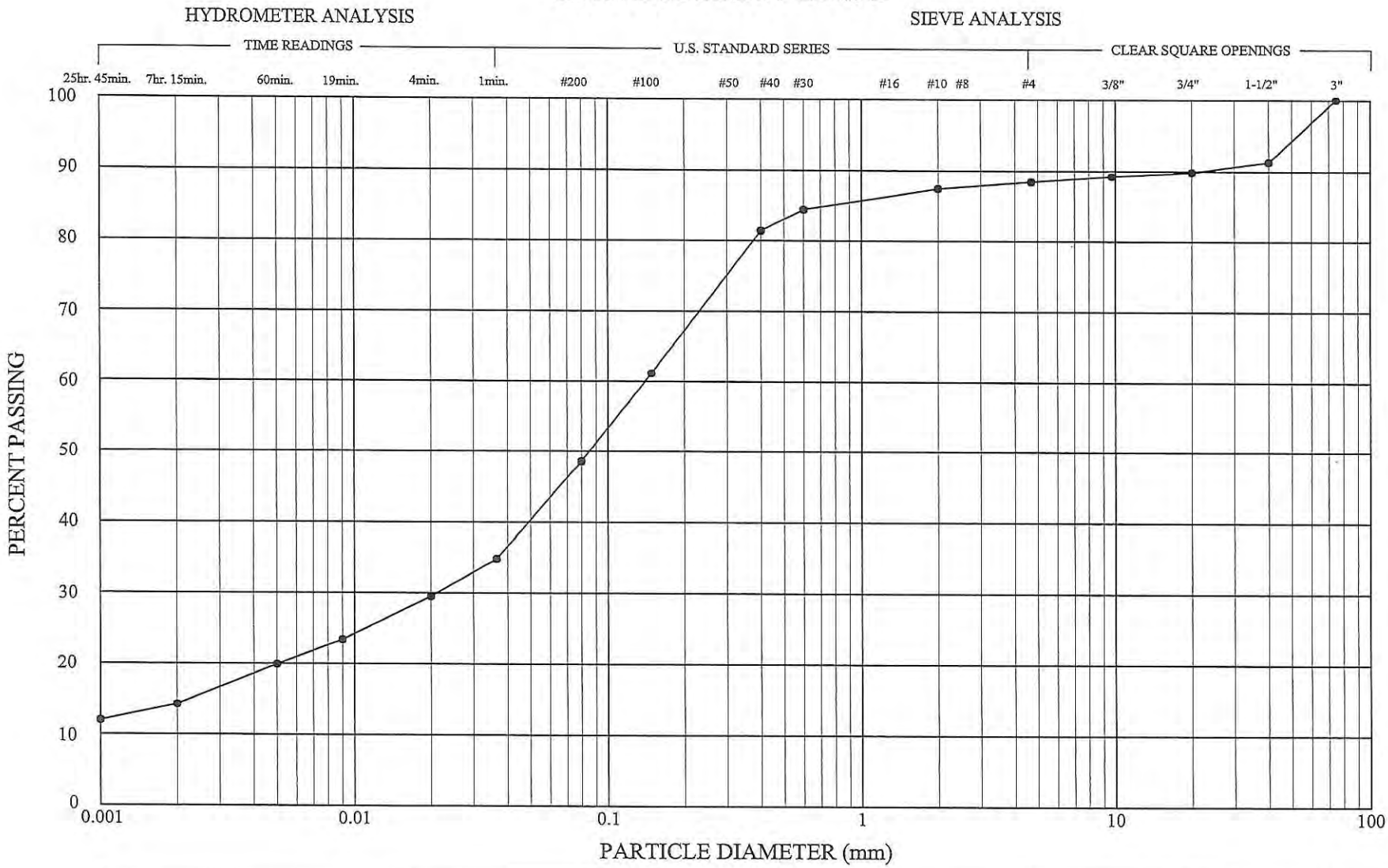
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-B**	DEPTH: **30-40'**	METHOD: **ASTM D421**	%PASSING#200: **48.6%**	U.S.C.S. **SC**
DESCRIPTION: **CLAYEY SAND**		PLASTICITY INDEX(PI):	LIQUID LIMIT(LL):	ACTIVITY:	Cc: -	Cu: -

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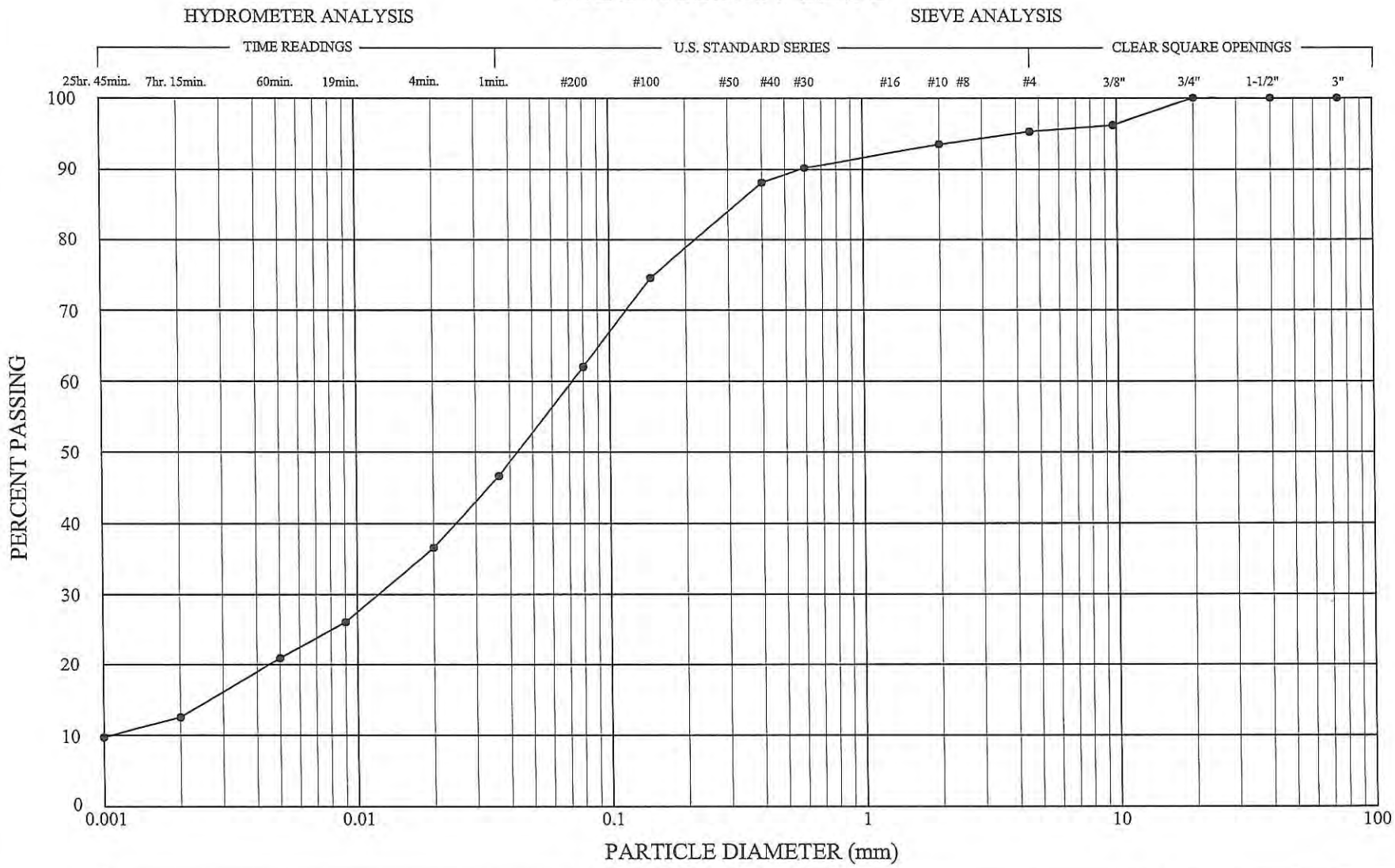
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-C**	DEPTH: **5-15'**	METHOD: **ASTM D421**	%PASSING#200: **62.0%**	U.S.C.S. **CL**	
DESCRIPTION: **SANDY CLAY**		PLASTICITY INDEX(PI): **16**	LIQUID LIMIT(LL): **31**	ACTIVITY:	Cc:	Cu:	

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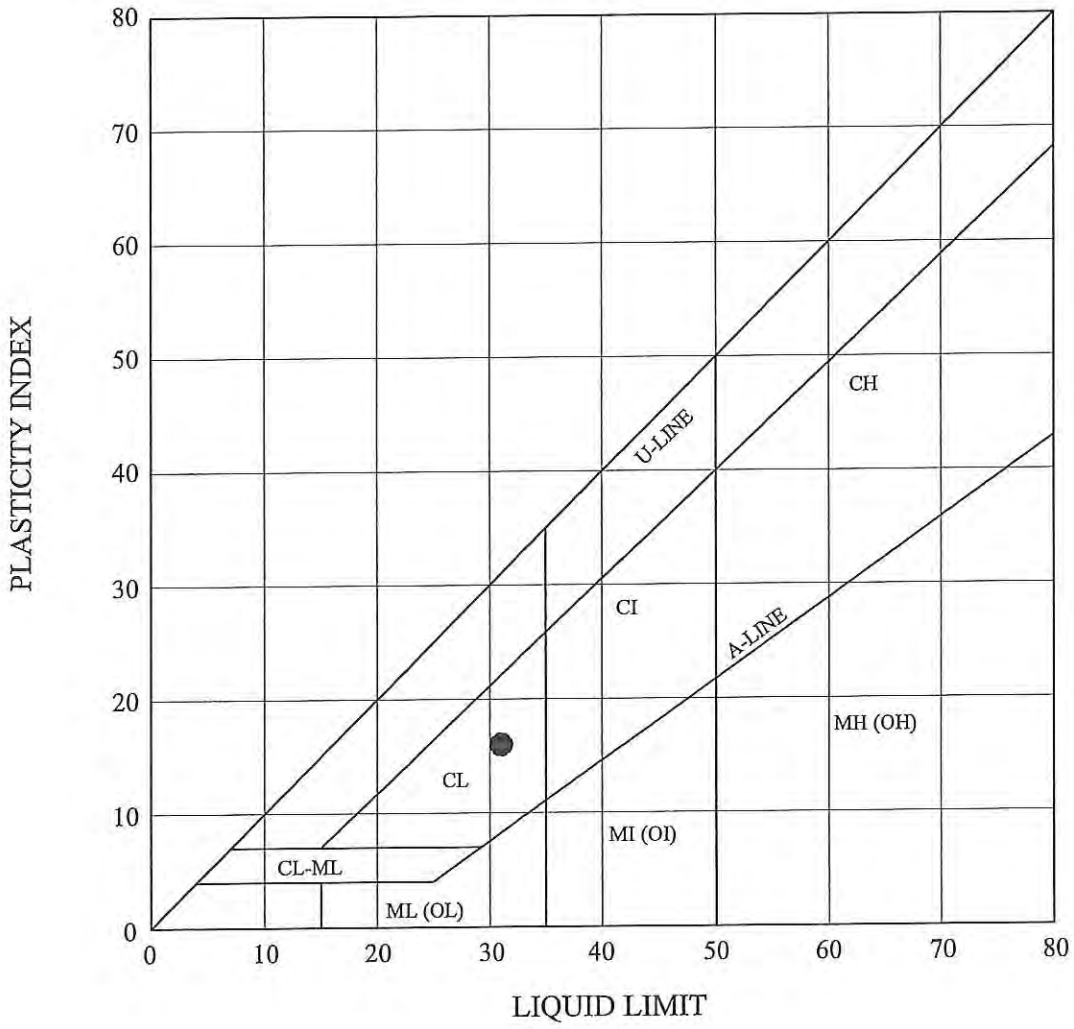
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: DH-C	DEPTH: 5-15'	METHOD: ASTM D4318
PL: 15	LL: 31	PI: 16
DESCRIPTION: SANDY CLAY (SIEVED THROUGH #40)		

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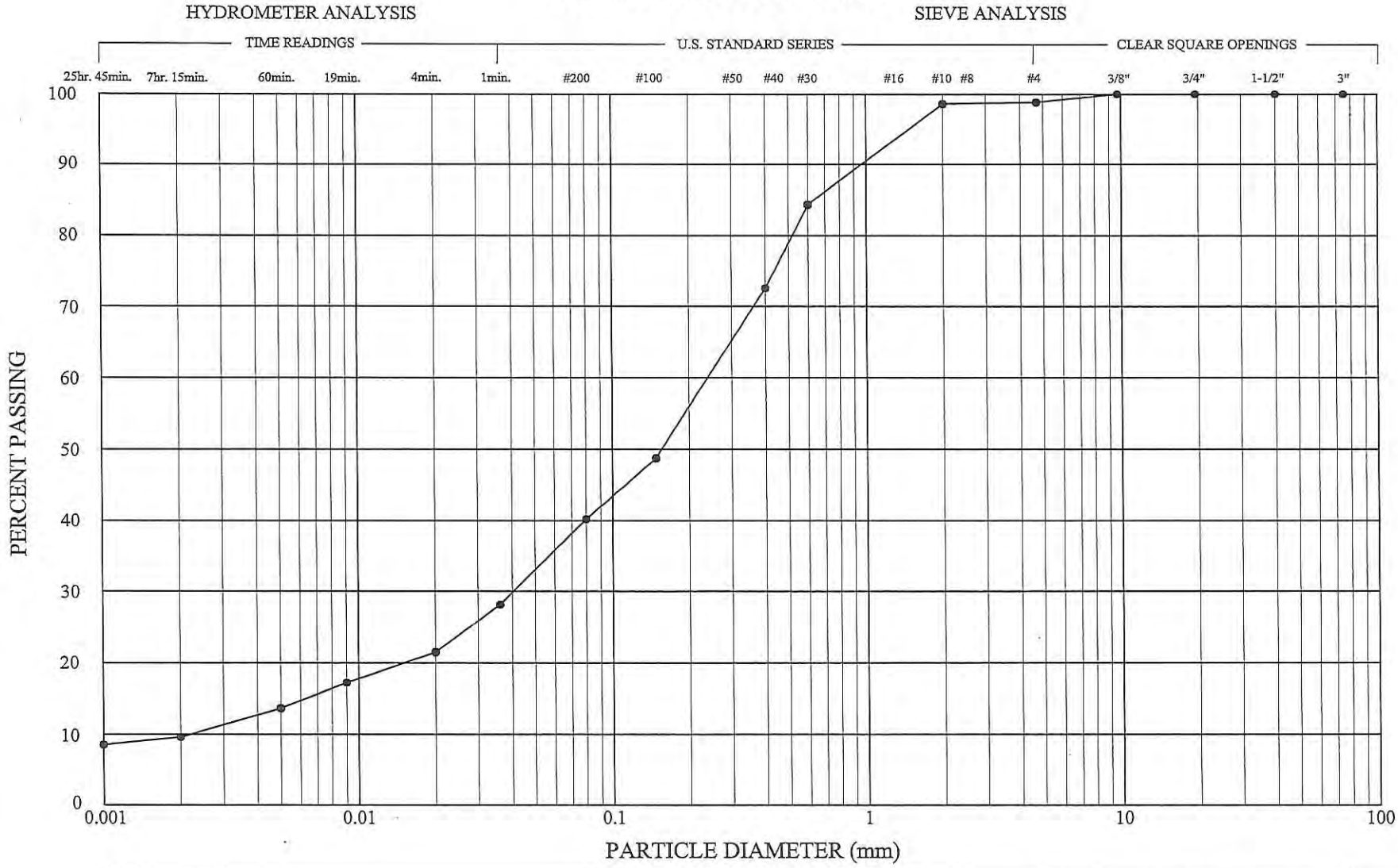
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **DH-C**	DEPTH: **25-35'**	METHOD: **ASTM D421**	%PASSING#200: **40.2 %**	U.S.C.S. **SC**	
DESCRIPTION: **LIGHT GRAY CLAYEY SAND**	PLASTICITY INDEX(PI):	LIQUID LIMIT(LL):	ACTIVITY:	Cc: 2.89	Cu: 125		

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EXPANSION INDEX ASTM D 4829

Project: CALABASAS HOLDINGS/LAS VIRGENES ROAD
Project Number: 1344.20
Sample: DH-C
Depth: 5 - 15'
Description: SANDSTONE
Tested By: RGT

1.0. Preliminary Saturation

Weight of Cup	195.80	grams
Weight of Soil and Cup - Wet	304.00	grams
Weight of Soil and Cup - Dry	292.20	grams
Weight of Water	11.80	grams
Weight of Soil	96.40	grams
Soil-Water Content	0.12	

2.0. Dry Unit Weight

Weight of Ring	198.90	grams
Weight of Soil & Ring - Wet	585.80	grams
Weight of Soil - Wet	386.90	grams
Weight of Soil - Dry	344.71	grams
	0.758	lbs
	102.37	pcf

3.0. Saturation Calculations

Water Content (w)	0.12	
Specific Gravity of Soil (G_s)	2.60	
Unit Weight of Water	62.40	pcf
SATURATION OF SAMPLE	0.54	

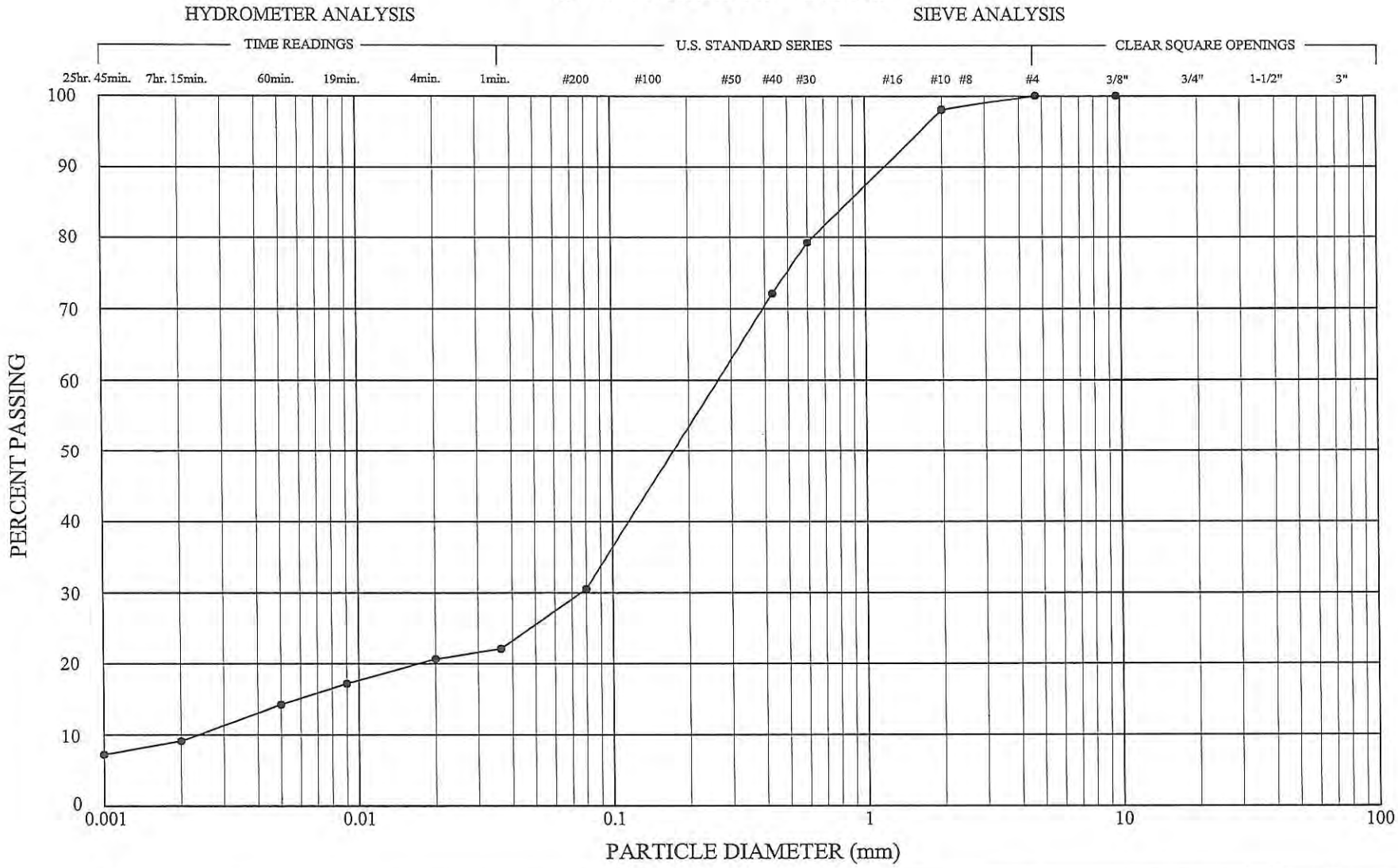
4.0. Expansion Index Calculations

Initial Height (H_1)	0.000	inches
Final Height (H_2)	0.016	inches
Change in Height	0.016	
EXPANSION INDEX - MEASURED	16.00	

5.0. E.I. - Weighted per UBC

Depth Interval:	Wt Factor:	Weighted E.I.
0 - 1'	0.4	22.40
1 - 2'	0.3	20.80
2 - 3'	0.2	19.20
3 - 4'	0.1	17.60
Below 4'	0.0	16.00

GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **CH-A**	DEPTH: **126'**	METHOD: **ASTM D421**	%PASSING#200: **30.5**	U.S.C.S. **SC**	
DESCRIPTION: **LIGHT GRAY CLAYEY SAND**		PLASTICITY INDEX(PI): **21**	LIQUID LIMIT(LL): **40**	ACTIVITY:	Cc: **8.33**	Cu: **108**	

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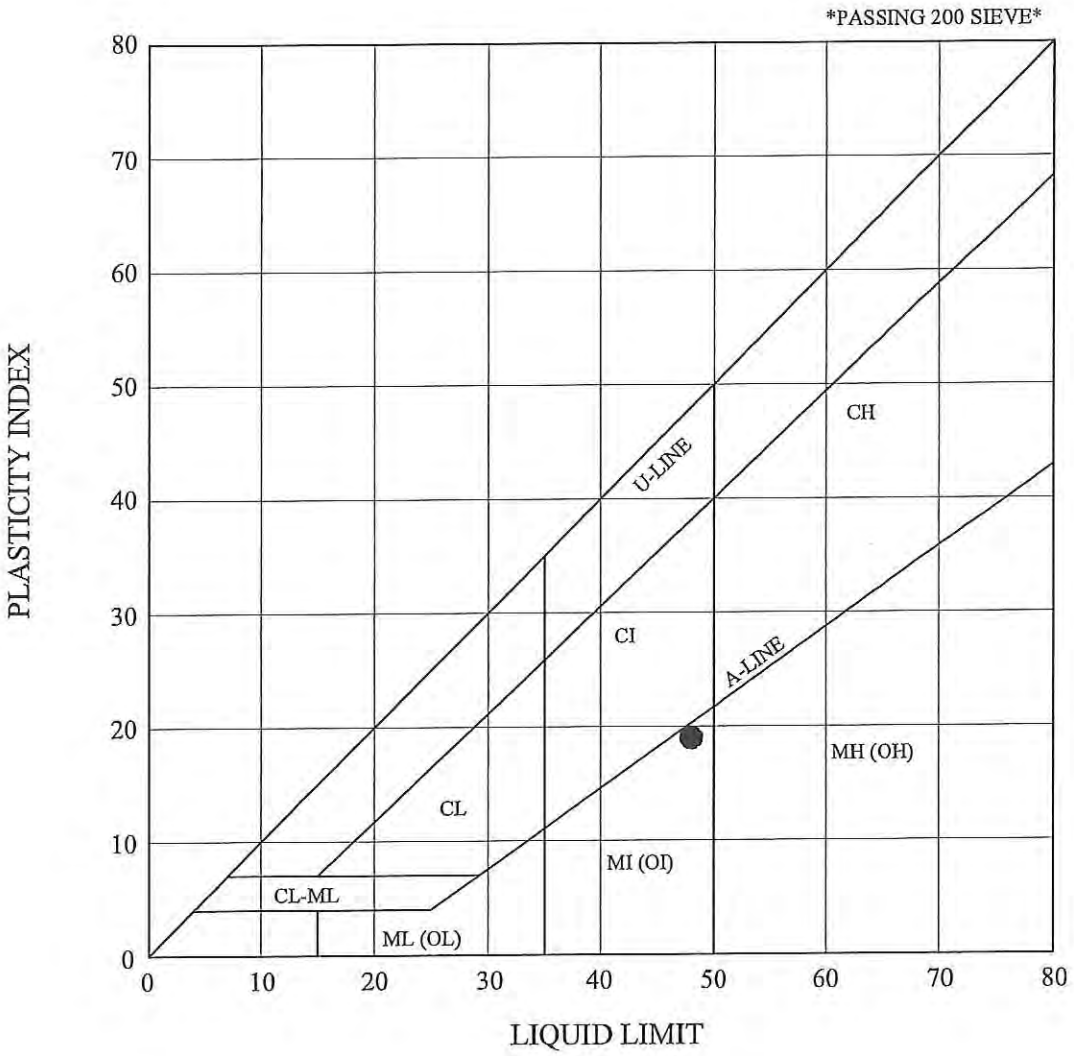
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: CH-A	DEPTH: 126'	METHOD: ASTM D4318
PL: 29	LL: 48	PI: 19
DESCRIPTION: LIGHT GRAY CLAYEY SAND (SIEVED THROUGH #200)		

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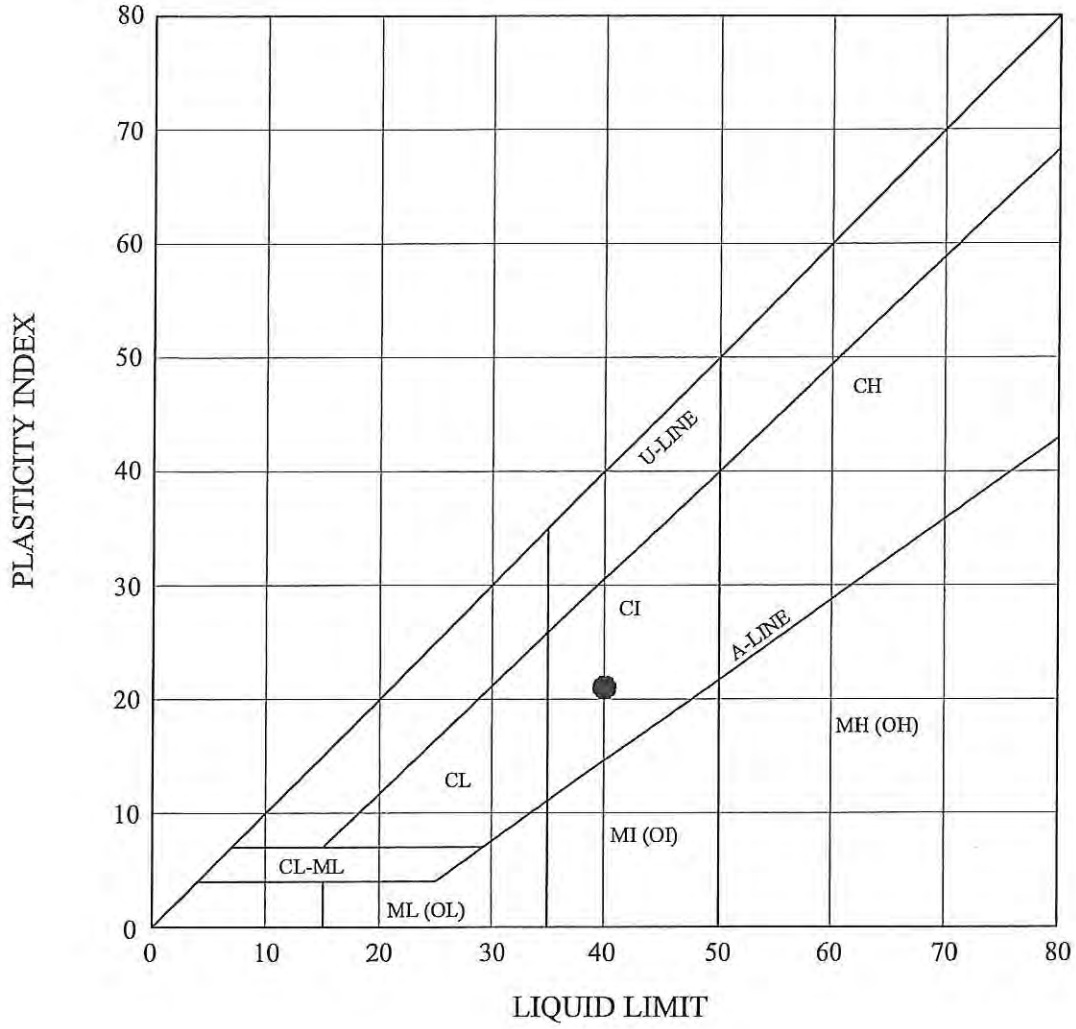
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: CH-A	DEPTH: 126'	METHOD: ASTM D4318
PL: 19	LL: 40	PI: 21
DESCRIPTION: LIGHT GRAY CLAYEY SAND (SIEVED THROUGH #40)		

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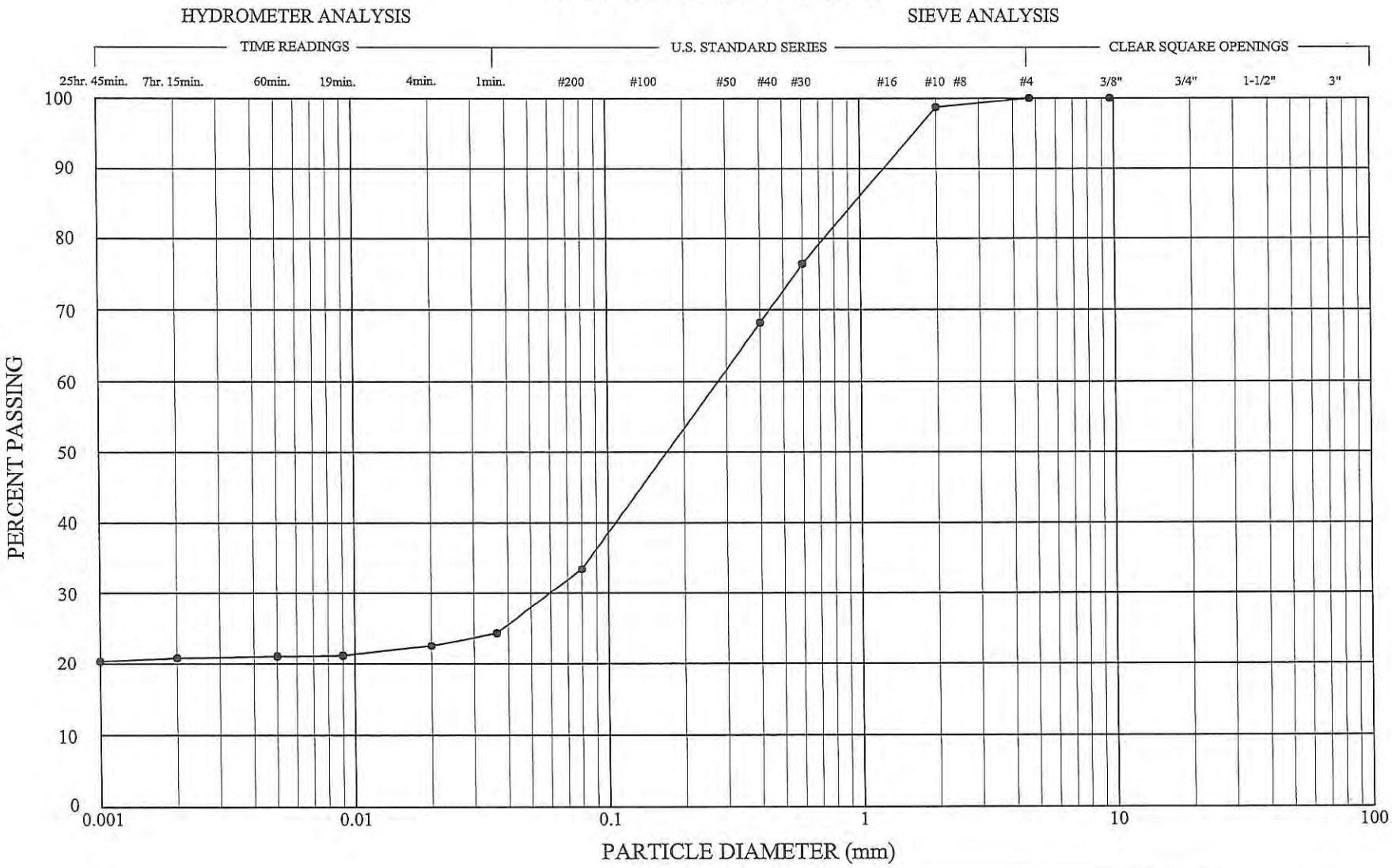
GRADATION TEST



CLAY(plastic) to SILT(non-plastic)	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

P.N. **1344.20**	PROJECT: **CALABASAS HOLDINGS/ LAS VIRGENES ROAD**	SAMPLE: **CH-B**	DEPTH: **70'**	METHOD: **ASTM D421**	%PASSING#200: **33.4**	U.S.C.S. **SC**	
DESCRIPTION: **LIGHT GRAY CLAYEY SAND**		PLASTICITY INDEX(PI): **18**	LIQUID LIMIT(LL): **44**	ACTIVITY:	Cc: **80**	Cu: **2.13**	

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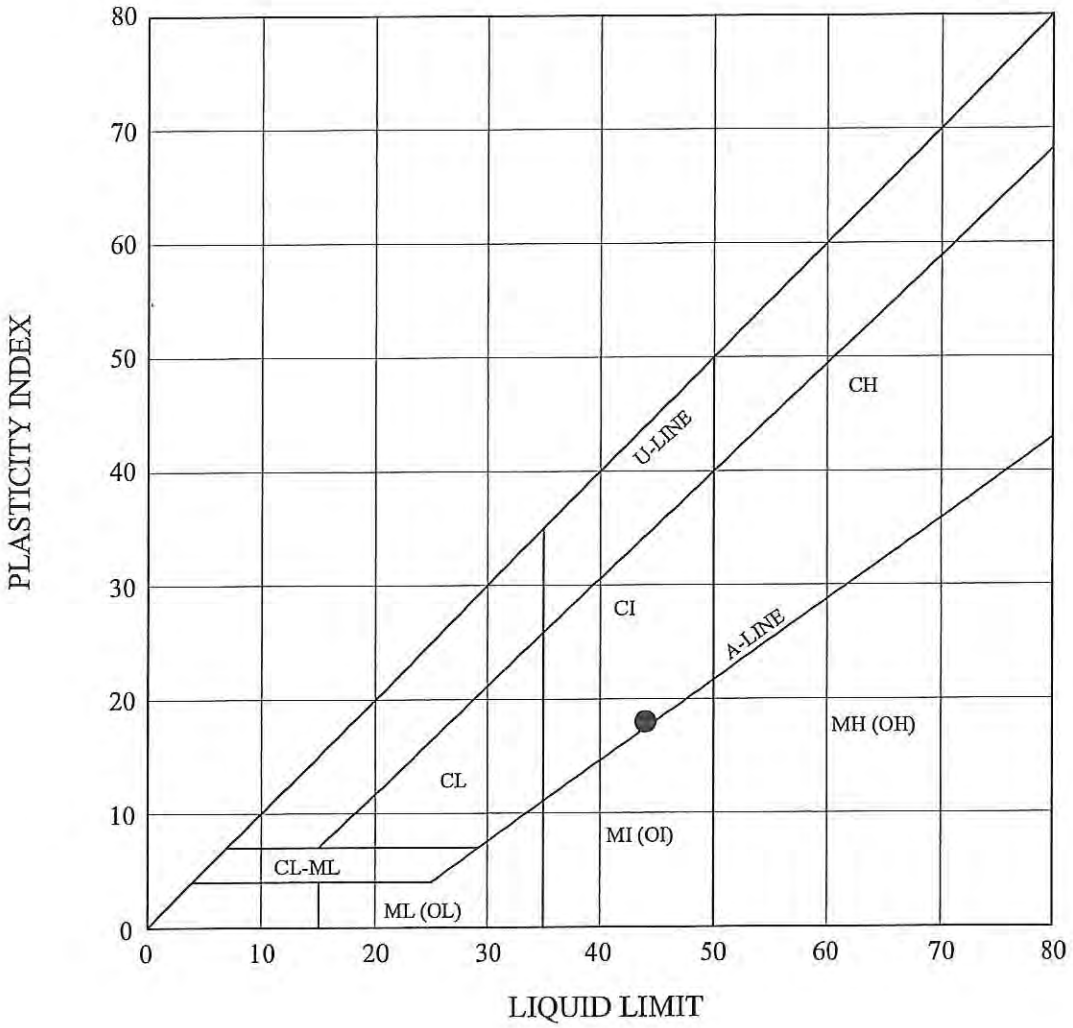
PLASTICITY INDEX
(ASTM D4318)



P.N. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD	
SAMPLE: CH-B	DEPTH: 70'	METHOD: ASTM D4318
PL: 26	LL: 44	PI: 18
DESCRIPTION: LIGHT BROWN CLAYEY SAND (SIEVED THROUGH #40)		

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GEOTECHNICAL PROGRAMMING SYSTEM

DIRECT SHEAR TEST
(CONSTANT NORMAL STRESS)

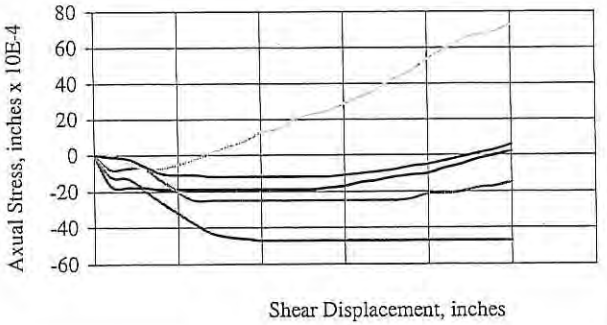
PROJECT NO. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD		
SAMPLE LOCATION: CH-B	SAMPLE DEPTH: 59'	TEST METHOD: ASTM D3080	
SAMPLE DESCRIPTION: Clay (CH)			

SPECIMEN NO.	1	2	3
Normal Stress (psf)	-	-	-
Initial Water Content (%)	-	-	-
Final Water Content (%)	-	-	-
Dry Unit Wt. (pcf)	-	-	-

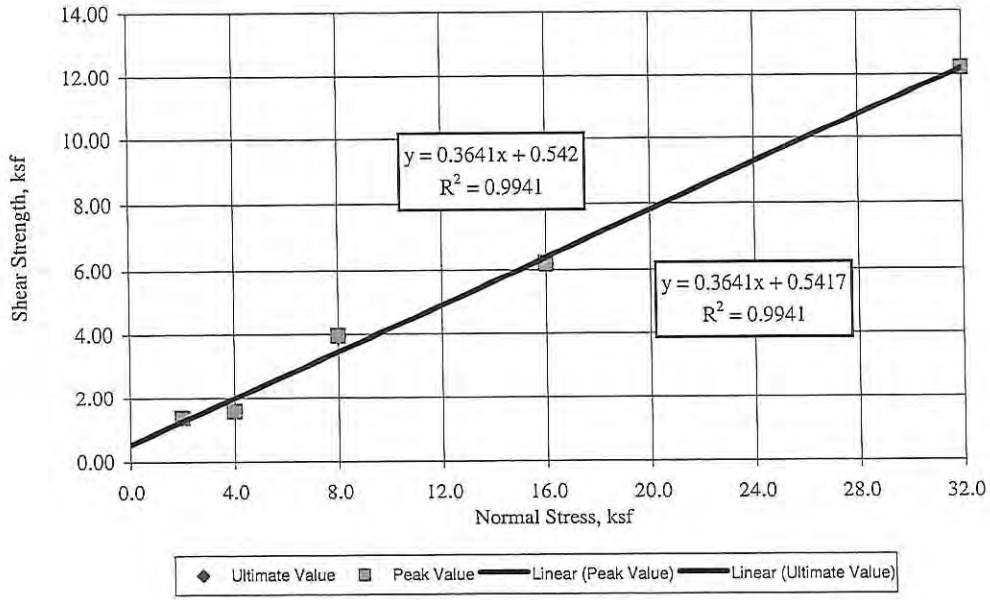
SUMMARY:

C [peak] (ksf) =	0.54
Phi [peak] (deg) =	20
C [ultimate] (ksf) =	0.54
Phi [ultimate] (deg) =	20

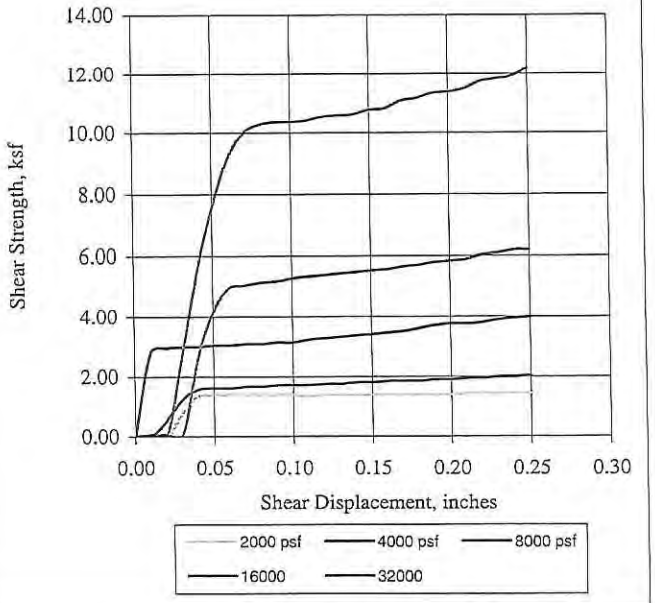
Axial Stress vs. Shear Displacement



Shear Strength vs. Normal Stress



Shear Strength vs. Shear Displacement



EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	RQD (%) AFTER DEERE	TIME	
							12:13	1/24/92
121.5 INTERLAYERED sandstone and siltstone. BEDDING 80 - 90°		123						
123.7 FRACTURE, slight offset, dips 60°					100	100	11	
124.4 SANDSTONE, light gray, fine to medium grained. BEDDING 80+°		125					12:24	
				126.7			12:34	
127.7 SILTSTONE bed, approximately 2 inches thick. BEDDING 80+°					100	100	10	
SANDSTONE, gray, hard, fine to medium grained.		130						
				131.7			12:44	
							12:54	
133.4 - 133.8 COARSE grained. BEDDING - 60°					100	100	10	
		135						
SANDSTONE, gray, medium to coarse grained, moderately hard to hard. BEDDING - 63°				136.7			1:04	
							1:14	
					98	98	9	
		140						
				141.7			1:23	Stem
							1:36	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	RQD (%) AFTER DEERE	TIME	
							12:13	1/24/92
121.5 INTERLAYERED sandstone and siltstone. BEDDING 80 - 90°		123						
123.7 FRACTURE, slight offset, dips 60°					100	100	11	
124.4 SANDSTONE, light gray, fine to medium grained. BEDDING 80+°		125					12:24	
				126.7			12:34	
127.7 SILTSTONE bed, approximately 2 inches thick. BEDDING 80+°					100	100	10	
SANDSTONE, gray, hard, fine to medium grained.		130					12:44	
				131.7			12:54	
133.4 - 133.8 COARSE grained. BEDDING - 60°					100	100	10	
SANDSTONE, gray, medium to coarse grained, moderately hard to hard. BEDDING - 63°		135		136.7			1:04	
							1:14	
					98	98	9	
		140						
				141.7			1:23	Stem
							1:36	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME	
							1:36	1/24/92
SANDSTONE, gray, medium to coarse grained, moderately hard to hard.		143			100	100	8	
		145						
146.3 SILTSTONE, gray, moderately hard. BEDDING - 75°				146.7			1:44	
							1:54	
149.2 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 80°					98	98	10	
		150						
				151.7			2:04	
							2:14	
					100	100	9	
		155						
							2:23	
156.7 SANDSTONE, light gray, moderately hard, medium to coarse grained, contains few rounded siltstone clasts, massive.				156.7			2:34	
					100	100	10	
		160						
				161.7			2:44	
							2:54	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)		ROD (%) AFTER BEERE	TIME	
								1:36	1/24/92
SANDSTONE, gray, medium to coarse grained, moderately hard to hard.		143			100		100	8	
		145							
146.3 SILTSTONE, gray, moderately hard. BEDDING - 75°				146.7				1:44	
								1:54	
149.2 SANDSTONE, light gray, moderately hard, medium grained. BEDDING - 80°		150			98		98	10	
				151.7				2:04	
								2:14	
		155			100		100	9	
								2:23	
156.7 SANDSTONE, light gray, moderately hard, medium to coarse grained, contains few rounded siltstone clasts, massive.				156.7				2:34	
					100		100	10	
		160							
				161.7				2:44	
								2:54	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	RQD (%) AFTER DEERE	TIME	
							2:54	
SANDSTONE, light gray, moderately hard, medium to coarse grained, massive.		163			100	100	11	
		165						
				166.7			3:05	1/24/92
167.3 1" wide fracture zone, soft sand filled dips 50°							8:43	1/27/92
169.6 SANDSTONE, gray, fine grained.		170			100	100	24	
				171.7			9:07	
							9:20	
173.7 SANDSTONE, contains some siltstone clasts to 176.0		175			100	100	14	
176.0 ½" thick fine-grained sandstone; layered, dark gray, dips 20°				176.9			9:34	
							9:44	
176.7 SILTSTONE, gray to dark gray, moderately hard, thinly bedded. BEDDING - 80°								
177.3 OFFSET siltstone beds, very thin (1/16") black clay gouge, polished dips - 50°		180			98	98	15	
179.8 SANDSTONE, gray, hard, medium grained				181.7			9:59	
							10:09	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME	
							2:54	
SANDSTONE, light gray, moderately hard, medium to coarse grained, massive.		163			100	100	11	
		165		166.7			3:05	1/24/92
167.3 1" wide fracture zone, soft sand filled dips 50°							8:43	1/27/92
169.6 SANDSTONE, gray, fine grained.		170			100	100	24	
				171.7			9:07	
							9:20	
173.7 SANDSTONE, contains some siltstone clasts to 176.0		175			100	100	14	
176.0 ½" thick fine-grained sandstone; layered, dark gray, dips 20°				176.9			9:34	
176.7 SILTSTONE, gray to dark gray, moderately hard, thinly bedded. BEDDING - 80°							9:44	
177.3 OFFSET siltstone beds, very thin (1/16") black clay gouge, polished dips - 50°		180			98	98	15	
179.8 SANDSTONE, gray, hard, medium grained				181.7			9:59	
							10:09	

EXPLORATION DRILL HOLE LOG

HOLE No. CE-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME	
							10:09	1/27/92
SANDSTONE, medium-grained Contact Dips - 15° 183.8 SANDSTONE, fine-grained, moderately hard, contains few siltstone clasts. BEDDING - 70° Folded at high angle.		183 185			100	100	15	
				186.7			10:24	
GRADES to very hard sandstone							10:35	
190.3 DARK gray band, dips 35 - 40°		190						
				191.7			10:46	
					100	100	10:58 10	
		195						
				196.7			11:08	
					98	86	11:18 14	
200.5 INTERLAYERED siltstone and sandstone, gray, moderately hard to hard, thinly bedded. BEDDING 80 - 90°		200						
				201.7			11:32	
							11:49	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME
							10:09
SANDSTONE, medium-grained		183					1/27/92
Contact Dips - 15°							
183.8 SANDSTONE, fine-grained, moderately hard, contains few siltstone clasts. BEDDING - 70° Folded at high angle.		185			100	100	15
				186.7			10:24
GRADES to very hard sandstone							10:35
		190					
190.3 DARK gray band, dips 35 - 40°				191.7			10:46
					100	100	10:58 10
		195					
				196.7			11:08
					98	86	11:18 14
		200					
200.5 INTERLAYERED siltstone and sandstone, gray, moderately hard to hard, thinly bedded. BEDDING 80 - 90°				201.7			11:32
							11:49

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME	
							11:49	1/27/92
INTERLAYERED siltstone and sandstone, gray, moderately hard to hard.		203						
204.7 - 205.4 SANDSTONE, gray, hard, medium-grained.		205			100	100	17	
				206.7			12:06	
INTERLAYERED siltstone and sandstone, gray, moderately hard to hard, thinly bedded. BEDDING -70°					100	100	12:18 15	
		210						
				211.7			12:33	
					97	97	12:43 15	
		215						
				216.7			12:58	
							1:08	
218.1 - 220.1 SANDSTONE, gray, moderately hard to hard. BEDDING - 80°								
		220						
220.1 SILTSTONE, gray, moderately hard, thinly bedded.				221.7			1:20	
							1:29	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME	
							11:49	1/27/92
INTERLAYERED siltstone and sandstone, gray, moderately hard to hard.		203						
204.7 - 205.4 SANDSTONE, gray, hard, medium-grained.		205			100	100	17	
				206.7			12:06	
INTERLAYERED siltstone and sandstone, gray, moderately hard to hard, thinly bedded. BEDDING -70°					100	100	12:18 15	
		210						
				211.7			12:33	
					97	97	12:43 15	
		215						
				216.7			12:58	
							1:08	
218.1 - 220.1 SANDSTONE, gray, moderately hard to hard. BEDDING - 80°								
		220						
220.1 SILTSTONE, gray, moderately hard, thinly bedded.				221.7			1:20	
							1:29	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER BEERE	TIME	
							1:29	1/27/92
221.9 SANDSTONE, gray, hard, medium-grained.		223						
		225			100	100	10	
225.8 - 226.2 INTERLAYERED siltstone and sandstone				226.7			1:39	
226.2 SANDSTONE, gray, medium-grained, hard							1:49	
229.7 GRADES to fine-grained								
		230			100	100	11	
				231.7			2:00	
							2:09	
					98	98	11	
234.2 INTERLAYERED siltstone and sandstone, gray, thinly bedded. BEDDING - 75°		235						
235.1 - 236.7 SANDSTONE, gray, hard, medium-grained.				236.7			2:20	
							2:29	
236.7 INTERLAYERED siltstone and sandstone, gray, moderately hard, folded, contorted bedding. BEDDING - 70°, minor offsets -¼"					100	100	17	
240.0 SANDSTONE, gray, hard, medium-grained		240		241.7			2:46	
							2:55	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)		ROD (%) AFTER DEERE	TIME	
								1:29	1/27/92
221.9 SANDSTONE, gray, hard, medium-grained.		223							
		225			100		100	10	
225.8 - 226.2 INTERLAYERED siltstone and sandstone				226.7				1:39	
226.2 SANDSTONE, gray, medium-grained, hard								1:49	
229.7 GRADES to fine-grained									
		230			100		100	11	
				231.7				2:00	
								2:09	
					98		98	11	
234.2 INTERLAYERED siltstone and sandstone, gray, thinly bedded. BEDDING - 75°		235							
235.1 - 236.7 SANDSTONE, gray, hard, medium-grained.				236.7				2:20	
								2:29	
236.7 INTERLAYERED siltstone and sandstone, gray, moderately hard, folded, contorted bedding. BEDDING - 70°, minor offsets -¼"									
					100		100	17	
240.0 SANDSTONE, gray, hard, medium-grained		240							
				241.7				2:46	
								2:55	

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

DRILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	ROD (%) AFTER DEERE	TIME	
							2:55	
SANDSTONE, gray, hard, medium-grained, massive		243			100	100	12	1/27/92
		245						
246.7 - 249.8 SOME clayey siltstone clasts, rounded, ¼" diam.				246.7			3:07	
					100	100	3:17 11	
249.8 SANDSTONE, fine-grained. Contact Dips - 65°		250						
				251.7			3:28	
253.1 - 255.0 SOME clayey siltstone clasts, rounded, ¼" diam.							3:40	
					100	100	12	
		255						
				256.7			3:52	
							4:02	
258.1 - 259.3 INTERLAYERED siltstone and sandstone, gray, moderately hard, minor offsets to ¼". BEDDING - 80°							18	
259.3 SANDSTONE, gray, medium-grained, hard to very hard.		260						
				261.7			4:20	1/27/92
				END				

EXPLORATION DRILL HOLE LOG

HOLE No. CH-1

PROJECT PAZAR - Calabasas Promenade DATE 1-23-92 LOGGED BY J.OT.

RILL RIG HOLE DIA. 6 7/8 SAMPLER

GROUNDWATER DEPTH INITIAL FINAL HOLE ELEV.

DESCRIPTION	GRAPHIC	DEPTH	SAMPLE	INTERVAL	CORE RECOVERY (%)	RQD (%) AFTER DEERE	TIME	
							2:55	1/27/92
SANDSTONE, gray, hard, medium-grained, massive		243			100	100	12	
		245						
246.7 - 249.8 SOME clayey silt-stone clasts, rounded, ¼" diam.				246.7			3:07	
					100	100	3:17 11	
249.8 SANDSTONE, fine-grained. Contact Dips - 65°		250						
				251.7			3:28	
253.1 - 255.0 SOME clayey silt-stone clasts, rounded, ¼" diam.					100	100	3:40 12	
		255						
				256.7			3:52	
258.1 - 259.3 INTERLAYERED silt-stone and sandstone, gray, moderately hard, minor offsets to ½". BEDDING - 80°							4:02 18	
259.3 SANDSTONE, gray, medium-grained, hard to very hard.		260						
				261.7			4:20	1/27/92
				END				

ADDENDUM LETTER #5

RESPONSE TO THE CITY OF CALABASAS

GEOLOGIC AND GEOTECHNICAL REVIEW COMMENTS

DRAFT E.I.R - CALABASAS PROMENADE

JANUARY 15, 1992 JOB NUMBER: 2003-88

PROJECT: TENTATIVE PARCEL MAP NO. 22131

LAS VIRGENES ROAD

CALABASAS, CALIFORNIA

CLIENT: BAZAR AND ASSOCIATES

31238 VIA COLINAS, UNIT E
WESTLAKE VILLAGE, CA 91362
(818) 991-7148 (805) 497-1244

EXPLORATION DRILL HOLE LOG

HOLE No. B-7

PROJECT Pazar and Associates DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 46' FINAL 44' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT*	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
SANDY SILT, light brown, firm, Dry. FILL		1 2 3 4 5 6 7		25				
SANDY CLAY, light to medium brown, medium dense, slightly moist, contains some rock fragments, slightly porous. ALLUVIUM		8 9 10		49				
color change to dark brown, and becomes moist.		11 12 13 14 15 16 17 18		59				
SANDY CLAY, medium brown, Firm to Stiff, Moist. (cont)		19 20		55				

* Adjusted for effective vertical overburden pressure

EXPLORATION DRILL HOLE LOG

HOLE No. B-7

PROJECT Pazar and Associates

DATE 12-23-91 LOGGED BY P. H.

DRILL RIG Hollow Stem HOLE DIA. 6" SAMPLER Mod. Cal.

GROUNDWATER DEPTH INITIAL 46' FINAL 44' HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	WATER CONTENT	DRY DENSITY (pcf)	COHESION (psf)	PHI ANGLE
Contains numerous rock fragments to 2" in LENGTH		21						
		22						
		23						
		24						
CLAYEY SAND, light brown, dense, moist, contains some rock fragments		25		43				
		26						
		27						
		28						
		29						
		30		60				
		31						
		32						
		33						
		34						
		35		49				
		36						
CLAYEY SAND, light brown, dense, moist, contains some rock fragments		37						
		38						
		39						
		40		37				

GEOTECHNICAL PROGRAMMING SYSTEM

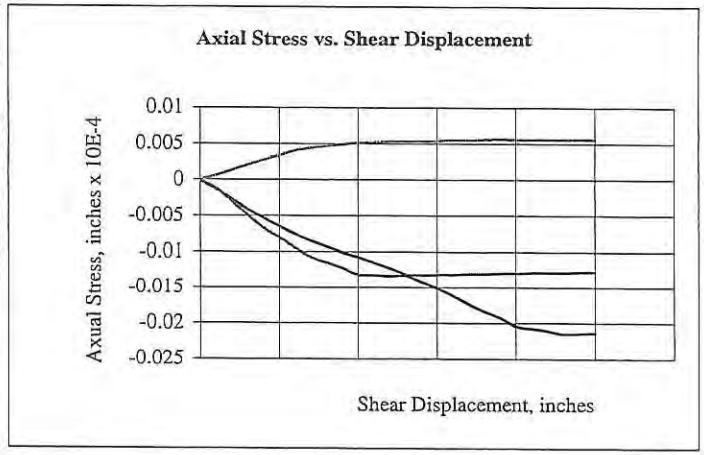
DIRECT SHEAR TEST
(CONSTANT NORMAL STRESS)

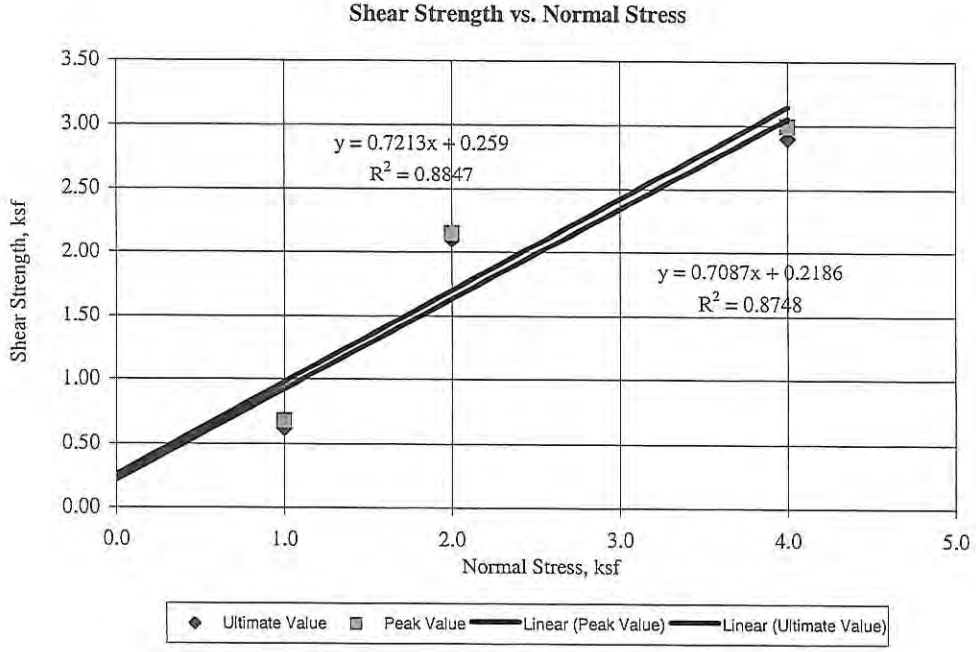
PROJECT NO. 1344.20	PROJECT: CALABASAS HOLDINGS/LAS VIRGENES ROAD		
SAMPLE LOCATION: DH-A	SAMPLE DEPTH: 10'	TEST METHOD: ASTM D3080	
SAMPLE DESCRIPTION: SANDSTONE			

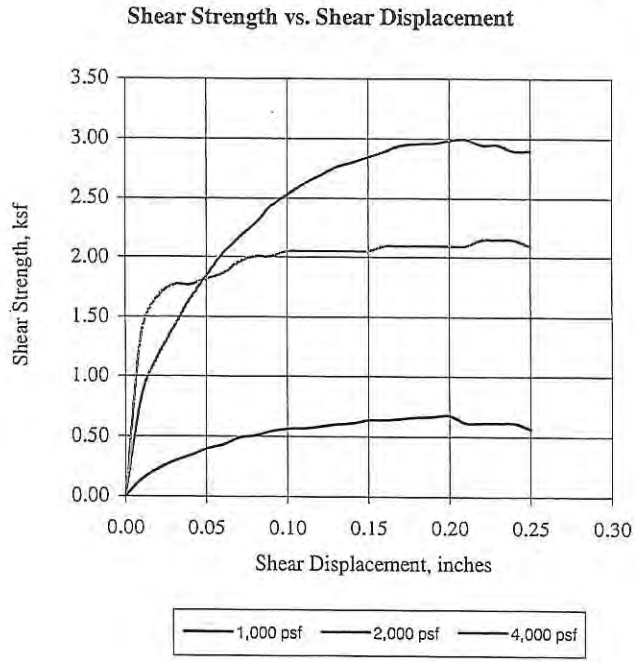
SPECIMEN NO.	1	2	3
Normal Stress (psf)	1000	2000	4000
Initial Water Content (%)	10	10	10
Final Water Content (%)	22	22	25
Dry Unit Wt. (pcf)	96	96	96

SUMMARY:

C [peak] (ksf) =	0.26
Phi [peak] (deg) =	36
C [ultimate] (ksf) =	0.22
Phi [ultimate] (deg) =	35

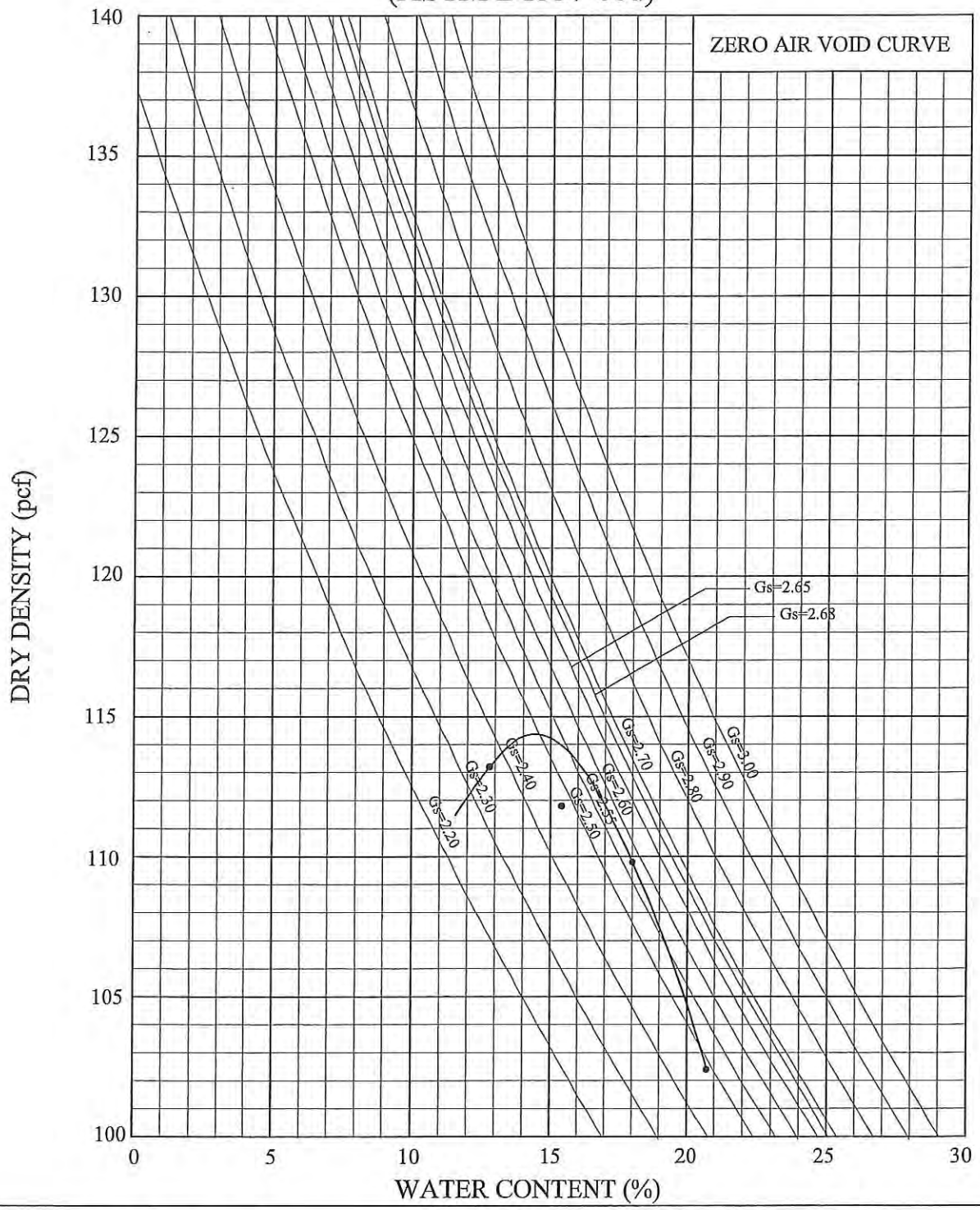






COMPACTION TEST

(ASTM D1557-00d)



Maximum Dry Density: 114.5	Optimum Water Content: 14.4
Sample No.: DH-1 @ 15-20'	Specific Gravity: 2.60
Sample Description: Clayey Sand	
Project: CALABASAS HOLDINGS/LAS VIRGENES ROAD	P.N. 1344.20

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GEOTECHNICAL PROGRAMMING SYSTEM

DIRECT SHEAR TEST
(CONSTANT NORMAL STRESS)

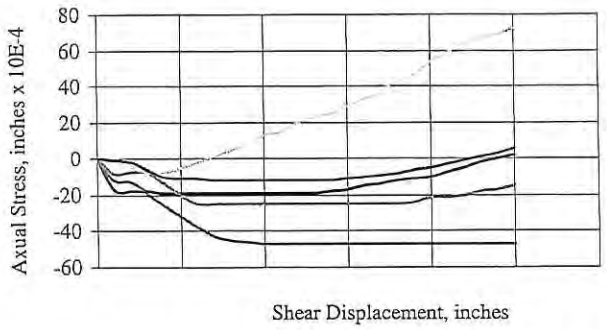
PROJECT NO.	1344.20	PROJECT:	MESSENGER INVESTMENTS / CALABASAS HOLDINGS		
SAMPLE LOCATION:	CH-B	SAMPLE DEPTH:	59'	TEST METHOD:	ASTM D3080
SAMPLE DESCRIPTION:	Clay (CH)				

SPECIMEN NO.	1	2	3
Normal Stress (psf)	-	-	-
Initial Water Content (%)	-	-	-
Final Water Content (%)	-	-	-
Dry Unit Wt. (pcf)	-	-	-

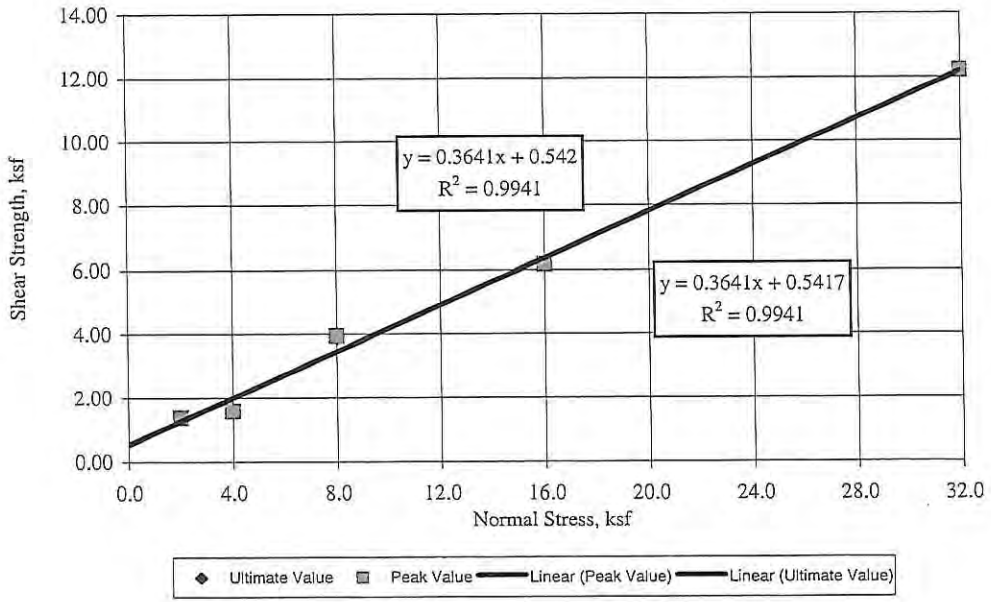
SUMMARY:

C [peak] (ksf) =	0.54
Phi [peak] (deg) =	20
C [ultimate] (ksf) =	0.54
Phi [ultimate] (deg) =	20

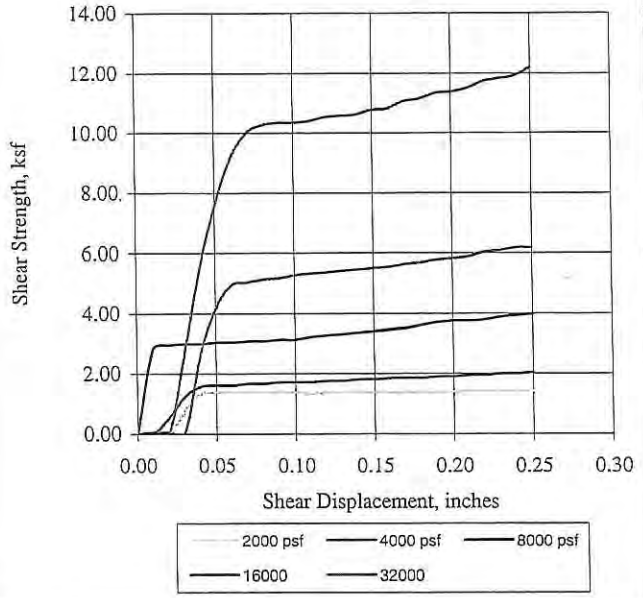
Axial Stress vs. Shear Displacement



Shear Strength vs. Normal Stress



Shear Strength vs. Shear Displacement



GEOTECHNICAL PROGRAMMING SYSTEM

DIRECT SHEAR TEST
(CONSTANT NORMAL STRESS)

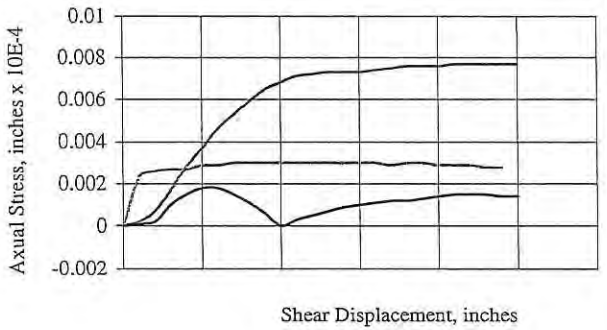
PROJECT NO.	1344.10	PROJECT:	CALABASAS HOLDINGS/LAS VIRGENES ROAD		
SAMPLE LOCATION:	DH-1	SAMPLE DEPTH:	15'-20'	TEST METHOD:	ASTM D3080
SAMPLE DESCRIPTION:	95% Remolded of Max Density (Bulk)				

SPECIMEN NO.	1	2	3
Normal Stress (psf)	2000	4000	8000
Initial Water Content (%)	14.4	14.4	14.4
Final Water Content (%)	22	23	22
Dry Unit Wt. (pcf)	108.8	108.8	108.8

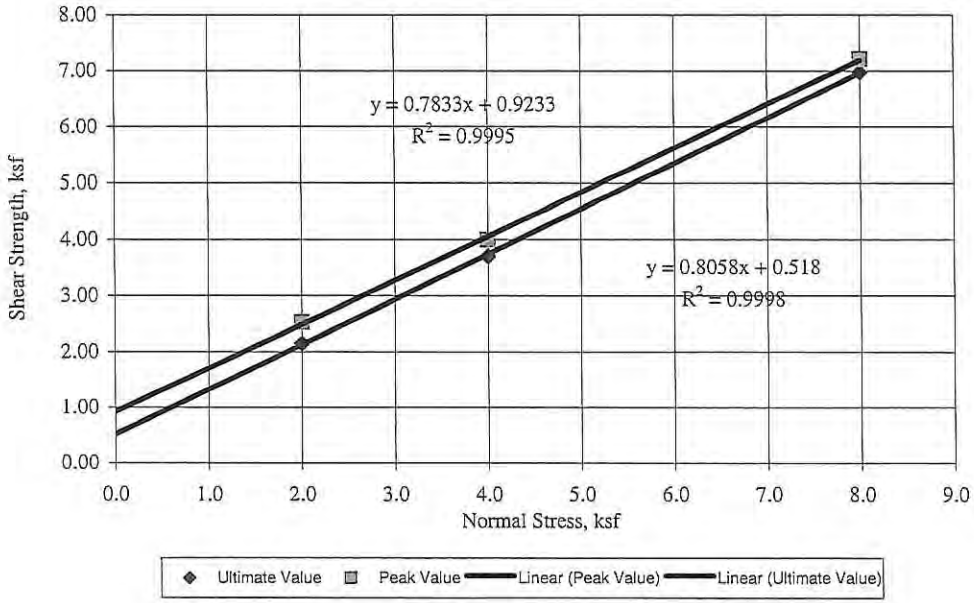
SUMMARY:

C [peak] (ksf) =	0.92
Phi [peak] (deg) =	39
C [ultimate] (ksf) =	0.52
Phi [ultimate] (deg) =	39

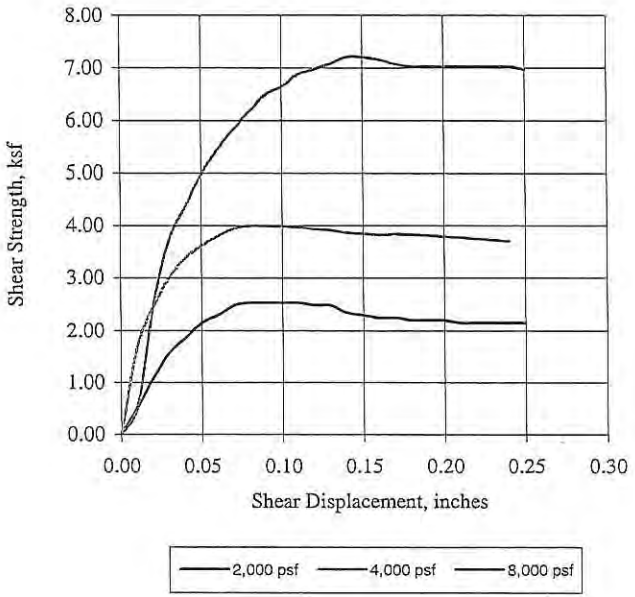
Axial Stress vs. Shear Displacement



Shear Strength vs. Normal Stress



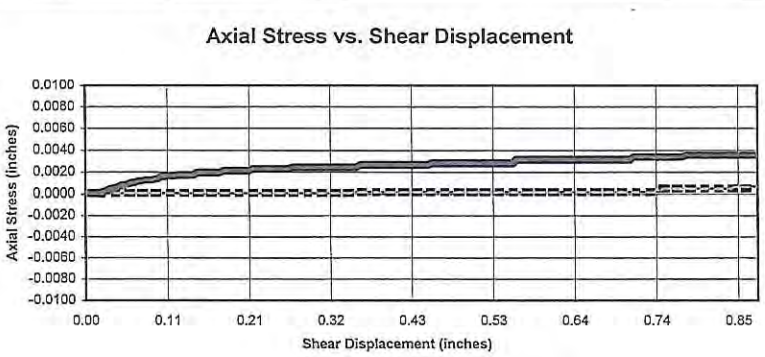
Shear Strength vs. Shear Displacement

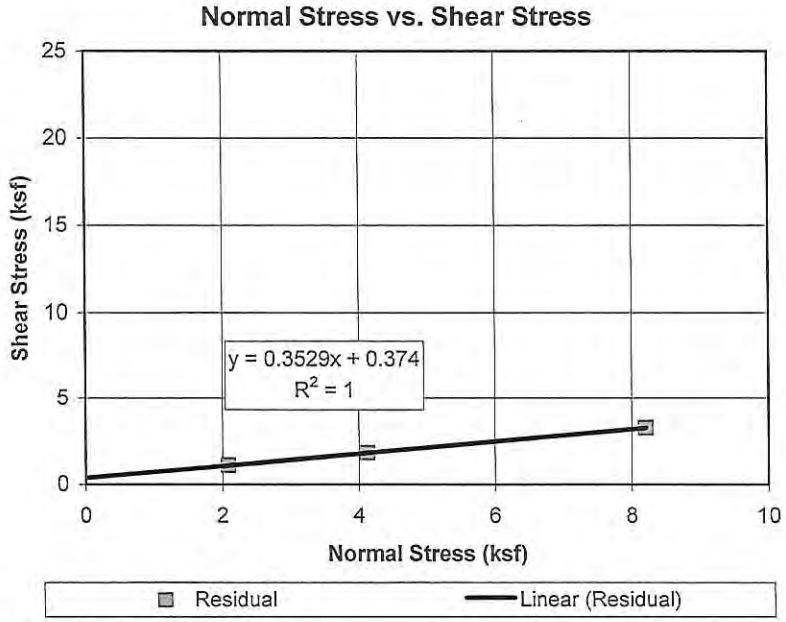


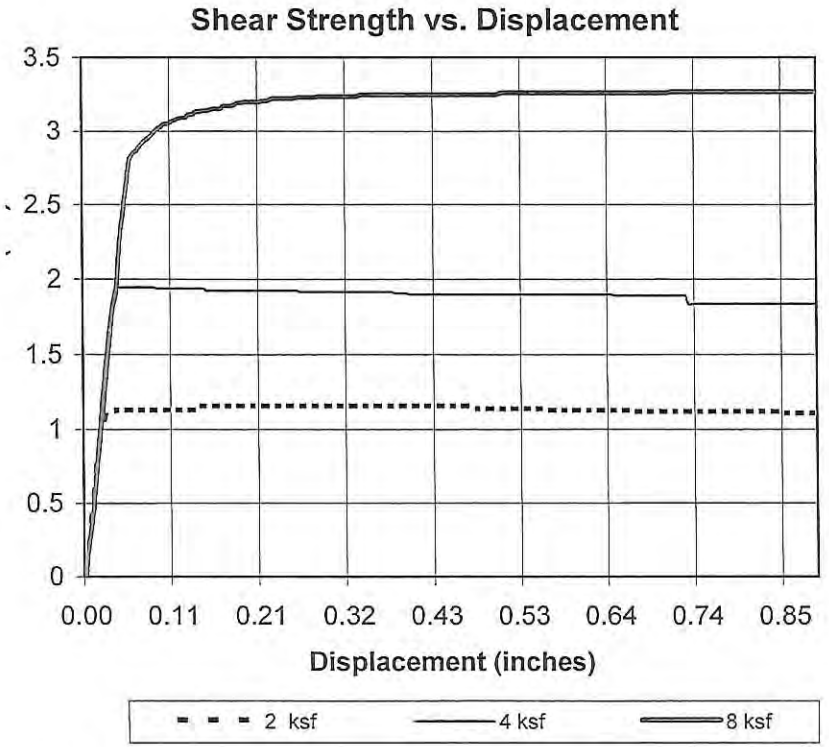
RJR ENGINEERING GROUP
TORSIONAL RING SHEAR TEST (ASTM D6467)

Project Number:	1344.20	Project:	Calabasas Holdings/Las Virgenes Road	% Passing #40:	72%	% Passing #200:	31%
Sample Depth:	126'	Sample Location:	CH-A	LL:	40	C (residual) (ksf):	0.374
Sample Description:	Claystone			PL:	19	Phi (residual) (deg):	19

Sample Thickness:	5mm	Preshear Displacement	10.6 in	Sample Sieved Through:	#40
Ring Radii:	15mm	Shear Rate:	0.0008 in/min	Test Length	1200 min
Specimen	1	2	3	Water Content (Initial)	61%
Normal Stress (ksf)	2.09	4.13	8.21	Saturation (Final)	100%



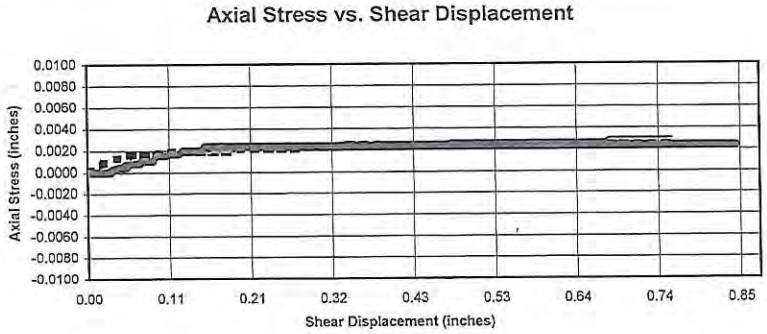


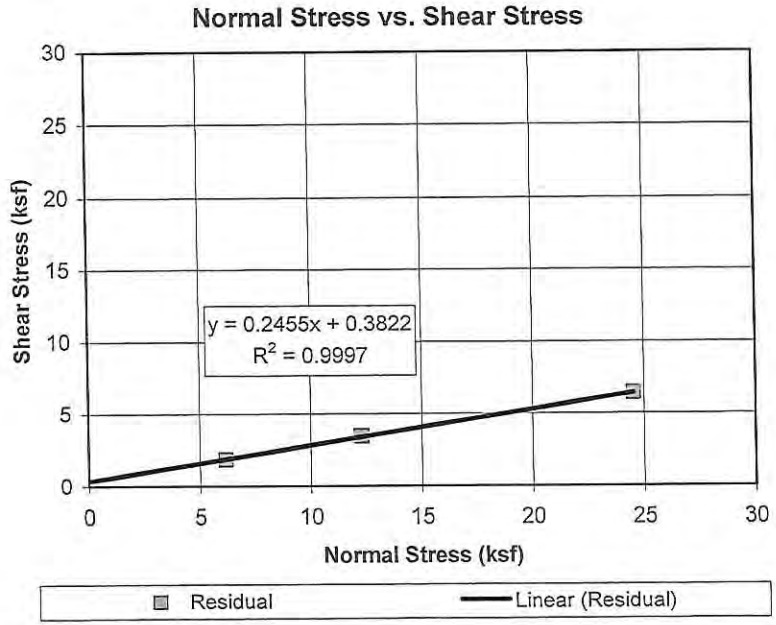


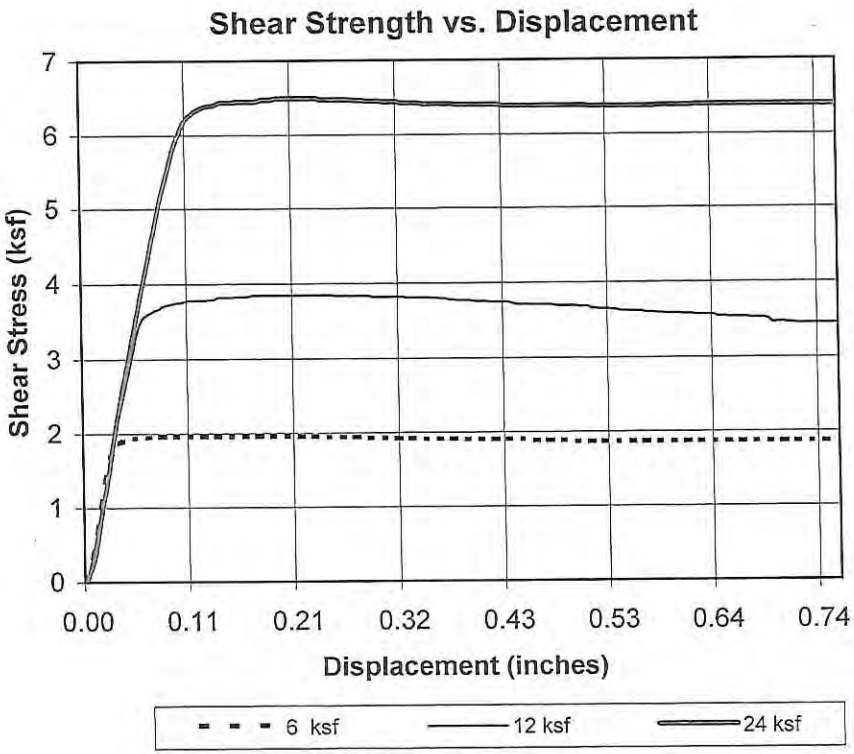
RJR ENGINEERING GROUP
TORSIONAL RING SHEAR TEST (ASTM D6467)

Project Number:	1344.20	Project:	Calabasas Holdings/Las Virgenes Road	% Passing #40:	66%	% Passing #200:	33%
Sample Depth:	70'	Sample Location:	CH-B	LL:	44	C (residual) (ksf):	0.382
Sample Description:	Claystone			PL:	26	Phi (residual) (deg):	14

Sample Thickness:	5mm	Preshear Displacement	10.6 in	Sample Sieved Through:	#40
Ring Radii:	15mm	Shear Rate:	0.0008 in/min	Test Length	1200 min
Specimen	1	2	3	Water Content (Initial)	58%
Normal Stress (ksf)	6.17	12.29	24.54	Saturation (Final)	100%





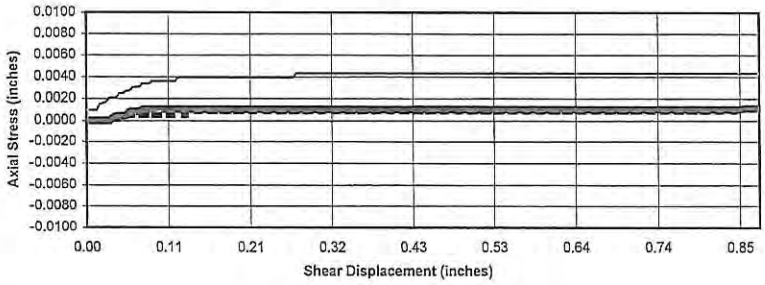


RJR ENGINEERING GROUP
TORSIONAL RING SHEAR TEST (ASTM D6467)

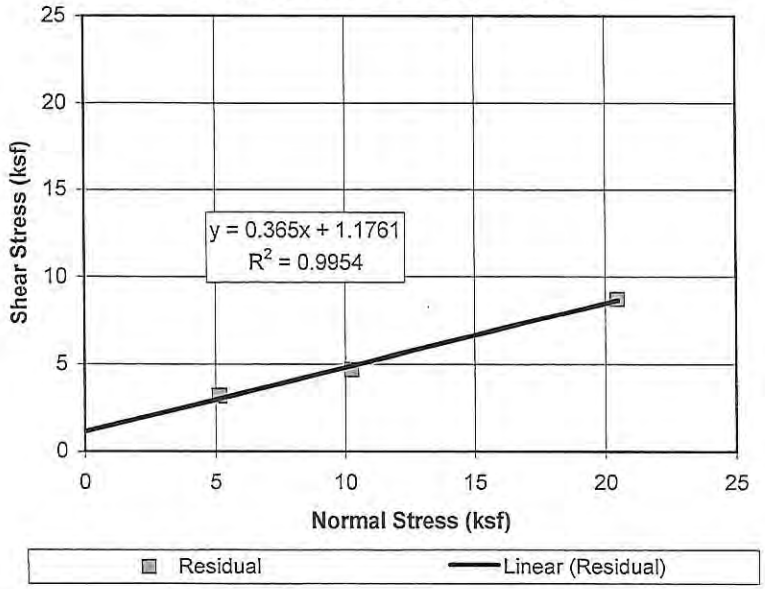
Project Number:	1344.20	Project:	Calabasas Holdings/Las Virgenes Road	% Passing #40:	99%	% Passing #200:	92%
Sample Depth:	58'	Sample Location:	DH-3	LL:	42	C (residual) (ksf):	1.18
Sample Description:	Anoxic Siltstone			PL:	19	Phi (residual) (deg):	20

Sample Thickness:	5mm	Preshear Displacement	10.6 in	Sample Sieved Through:	#40
Ring Radii:	15mm	Shear Rate:	0.0008 in/min	Test Length	1200 min
Specimen	1	2	3	Water Content (Initial)	69%
Normal Stress (ksf)	5.15	10.25	20.46	Saturation (Final)	100%

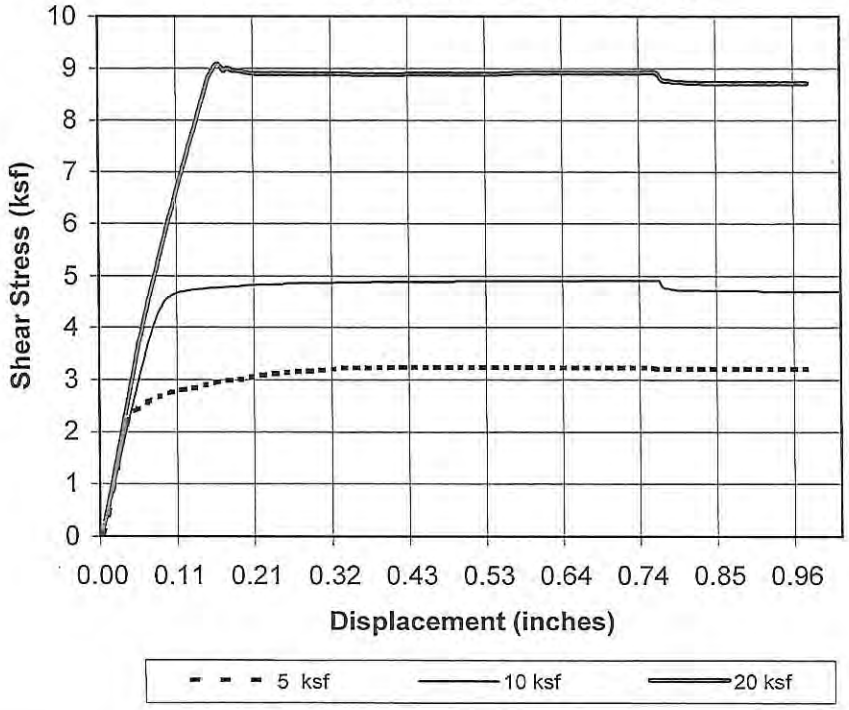
Axial Stress vs. Shear Displacement



Normal Stress vs. Shear Stress



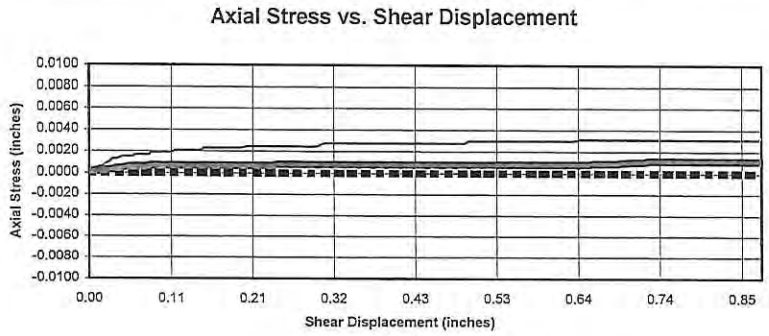
Shear Strength vs. Displacement

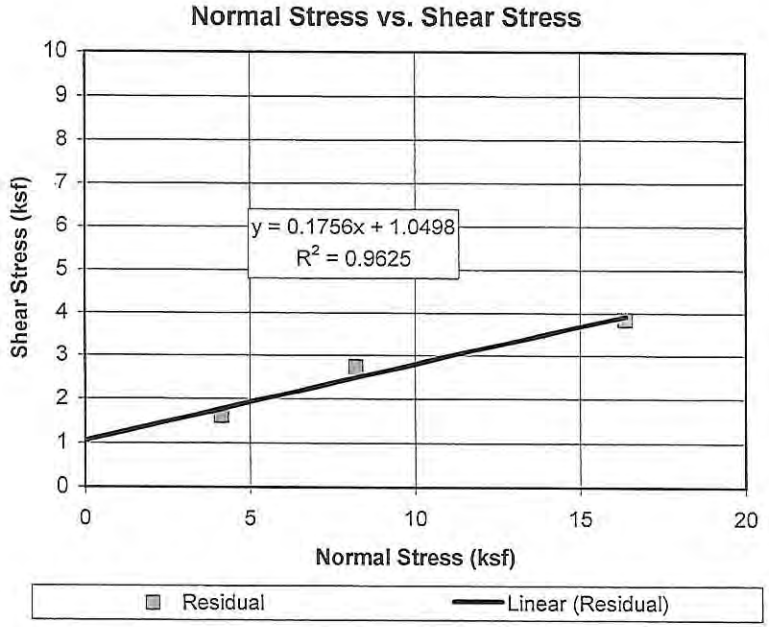


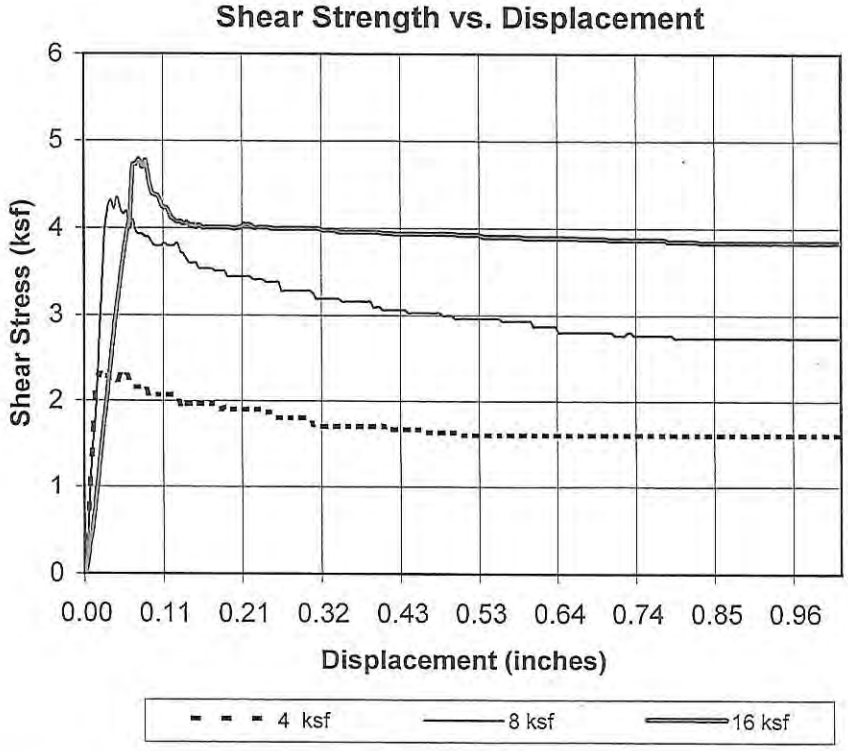
RJR ENGINEERING GROUP
TORSIONAL RING SHEAR TEST (ASTM D6467)

Project Number:	1344.20	Project:	Calabasas Holdings/Las Virgenes Road	% Passing #40:	33%	% Passing #200:	7%
Sample Depth:	42'	Sample Location:	DH-5	LL:	77	C (residual) (ksf):	1.045
Sample Description:	Claystone			PL:	32	Phi (residual) (deg):	10

Sample Thickness:	5mm	Preshear Displacement	10.6 in	Sample Sieved Through:	#40
Ring Radii:	15mm	Shear Rate:	0.0008 in/min	Test Length	1200 min
Specimen	1	2	3	Water Content (Initial)	65%
Normal Stress (ksf)	4.13	8.21	16.37	Saturation (Final)	100%

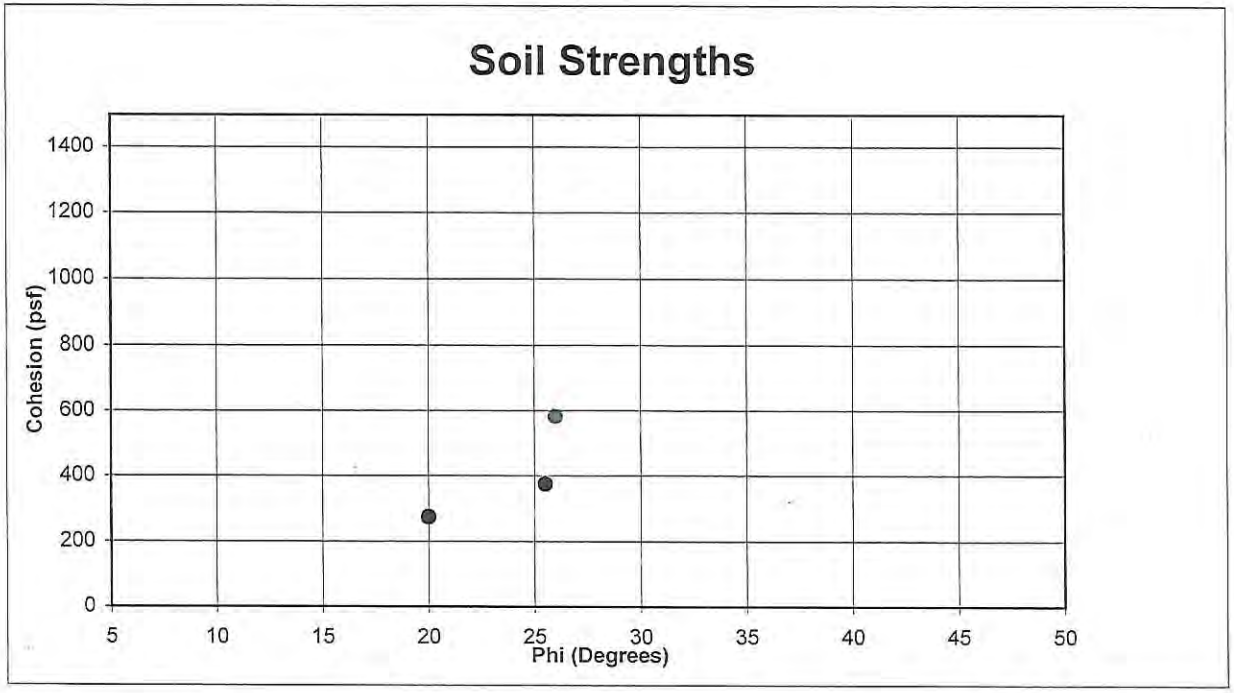






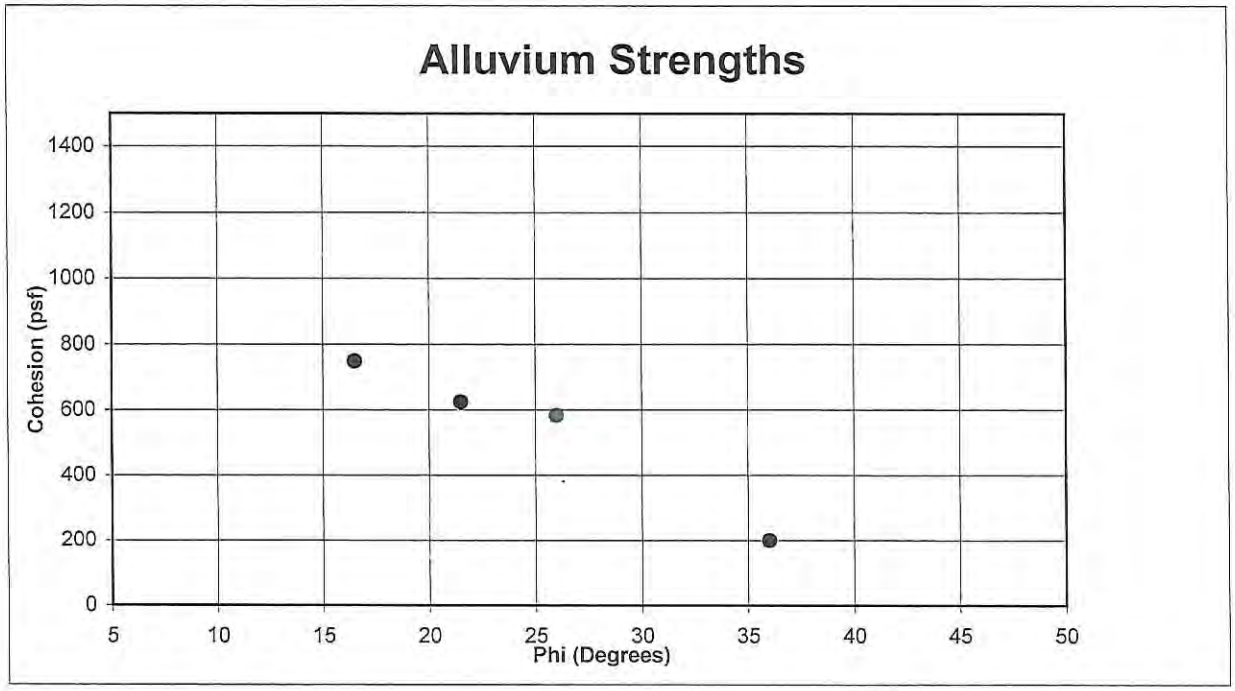
SOIL SHEAR STRENGTH DATA PLOT

SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
Subsurface Design, Inc. (2002), APN: 2069-011-005	Soil	20	275	ult.	TT-02 @ 1'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	Soil	26	375	ult.	TT-09 @ 4'	
CDMG Shear Strength Statistics, Calabasas Quad.	Qa	26	582			Mean Value, green



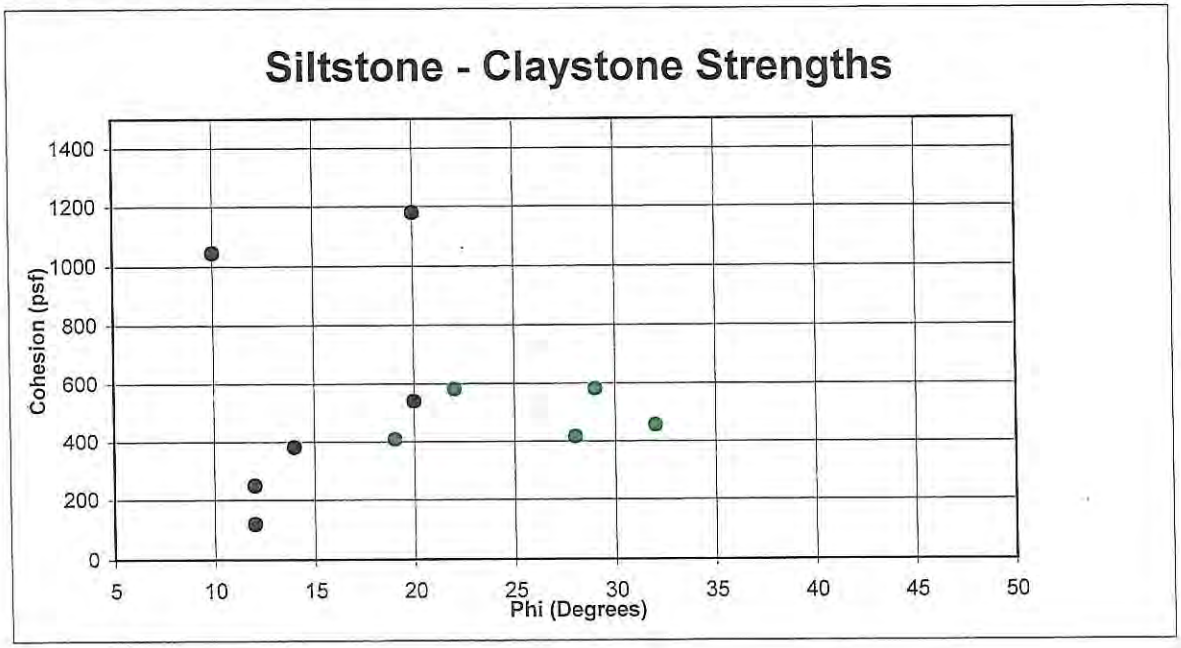
ALLUVIUM SHEAR STRENGTH DATA PLOT

SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
RJR Engineering (2003), Tract 53534	Alluvium	36	200	ult.		CPT
Subsurface Design, Inc. (2002), APN: 2069-011-005	Alluvium	17	750	ult.	DH-05 @ 11'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	Alluvium	22	624	ult.	DH-05 @ 17'	
CDMG Shear Strength Statistics, Calabasas Quad.	Qa	26	582			Mean Value, green



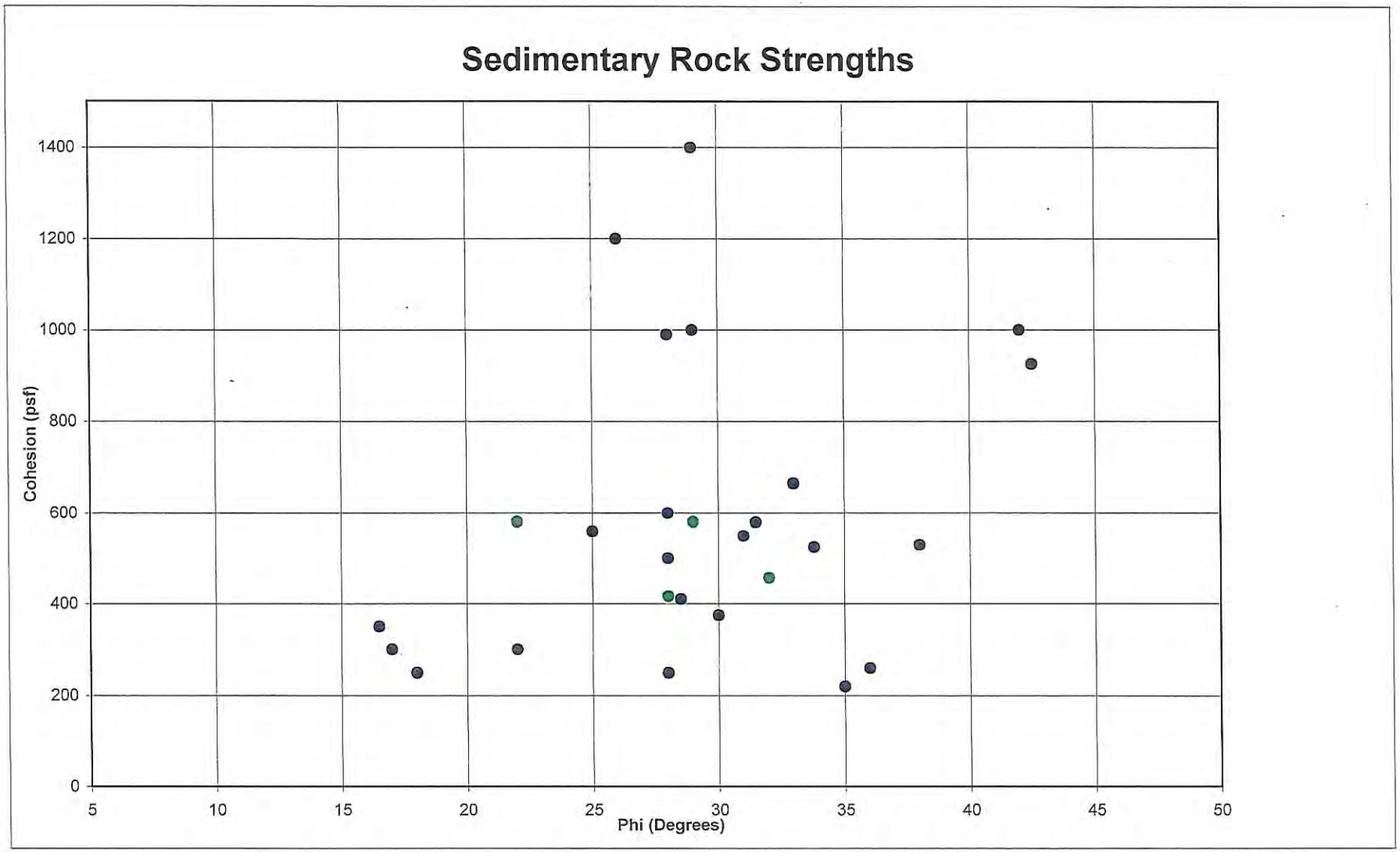
SILTSTONE - CLAYSTONE SHEAR STRENGTH DATA PLOT

SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
Pacific Soils Engineering, Inc. (1993), Tract 51593	Claystone, Ttc	12	250	res	PSE-5 @ 40'	Along Bedding
Pacific Soils Engineering, Inc. (1993), Tract 51593	Claystone, Ttc	12	120	res	DB-1	Along Bedding
RJR Engineering (2004), Tract 62443	Claystone, Ttc	20	540	pk & res	CH-B @ 59'	Clay Layer
RJR Engineering (2007), Tract 62443	Siltstone	20	1180	res	DH-3 @ 58'	
RJR Engineering (2007), Tract 62443	Claystone	10	1045	res	DH-5 @ 42'	Slide Plane
RJR Engineering (2007), Tract 62443	Claystone	14	382	res	CH-B @ 70'	
RJR Engineering (2007), Tract 62443	Claystone	19	410	res	CH-A @ 126'	
CDMG Shear Strength Statistics, Calabasas Quad.	Ttc	29	582	adverse bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Ttc	32	457	favorable bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Tm	22	582	adverse bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Tm	28	417	favorable bedding conditions		Mean Value, green



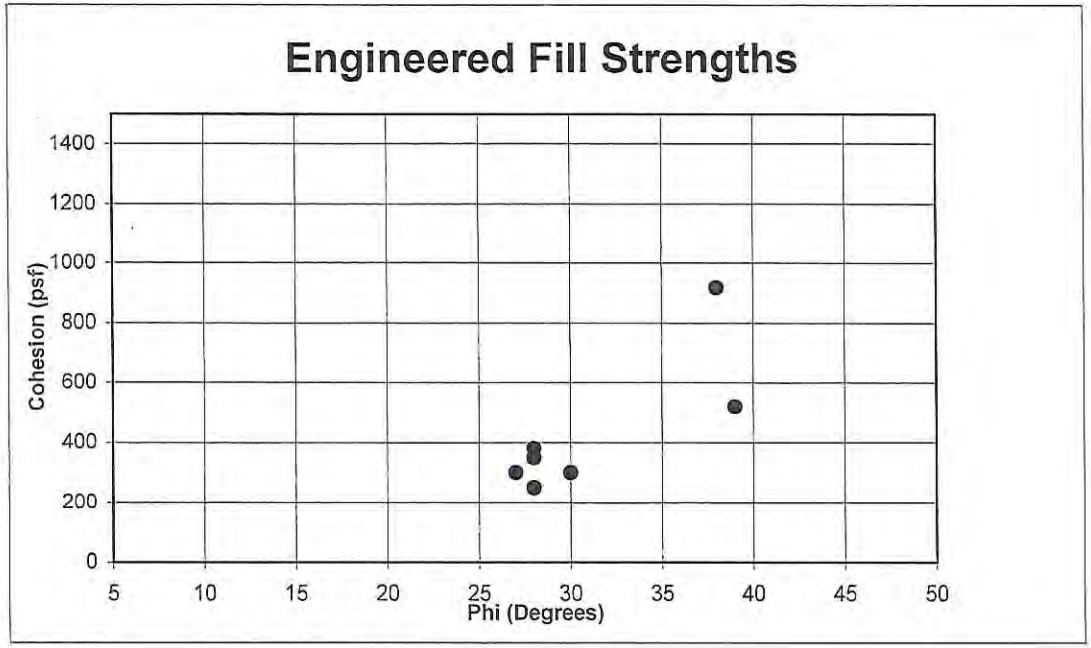
UNDIFFERENTIATED SEDIMENTARY ROCK SHEAR STRENGTH DATA PLOT

SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
Pacific Soils Engineering, Inc. (1993), Tract 51593	SS and Siltst, Ttc	42	1000	res	PSE-5,6 @ 80-90'	Cross-Bedding
Pacific Soils Engineering, Inc. (1993), Tract 51593	SS and Siltst, Ttc	29	1000	res	DB-1	Cross-Bedding
West Coast Soils (2003), Tract 62443	SS and Siltst, Ttc	29	1400	unknown	B-4 @ 20'	
West Coast Soils (2003), Tract 62443	SS and Siltst, Ttc	31	550	unknown	B-4 @ 60'	
GeoSoils, Inc. (1990), Tract 62443	SS and Siltst, Ttc	43	925	pk		Cross-Bedding
GeoSoils, Inc. (1990), Tract 62443	SS and Siltst, Ttc	38	530	res		Cross-Bedding
GeoSoils, Inc. (1990), Tract 62443	SS and Siltst, Ttc	22	300	pk		Along Bedding
GeoSoils, Inc. (1990), Tract 62443	SS and Siltst, Ttc	18	250	res		Along Bedding
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	28	600	pk	B-11 @ 60'	Along Bedding
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	28	250	res	B-11 @ 60'	Along Bedding
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	28	990	pk	B-17 @ 30'	
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	28	500	res	B-17 @ 30'	
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	26	1200	pk	B-16 @ 60'	
GeoSoils, Inc. (1987), Tract 35596	SS and Siltst	25	560	res	B-16 @ 60'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	17	350	res	DH-01 @ 10'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	33	665	ult	DH-01 @ 50'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	17	300	res	DH-02 @ 10'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	32	580	ult	TT-01 @ 6'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	34	525	ult	TT-03 @ 5'	
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	29	410	ult	TT-07 @ 7'	Along Bedding
Subsurface Design, Inc. (2002), APN: 2069-011-005	SS and Siltst, Ttc	30	375	ult	TT-10 @ 6'	Along Bedding
RJR Engineering (2006), Tract 62443	SS and Siltst, Tm	36	260	pk	DH-A @ 10'	
RJR Engineering (2006), Tract 62443	SS and Siltst, Tm	35	220	ult	DH-A @ 10'	
CDMG Shear Strength Statistics, Calabasas Quad.	Ttc	29	582	adverse bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Ttc	32	457	favorable bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Tm	22	582	adverse bedding conditions		Mean Value, green
CDMG Shear Strength Statistics, Calabasas Quad.	Tm	28	417	favorable bedding conditions		Mean Value, green

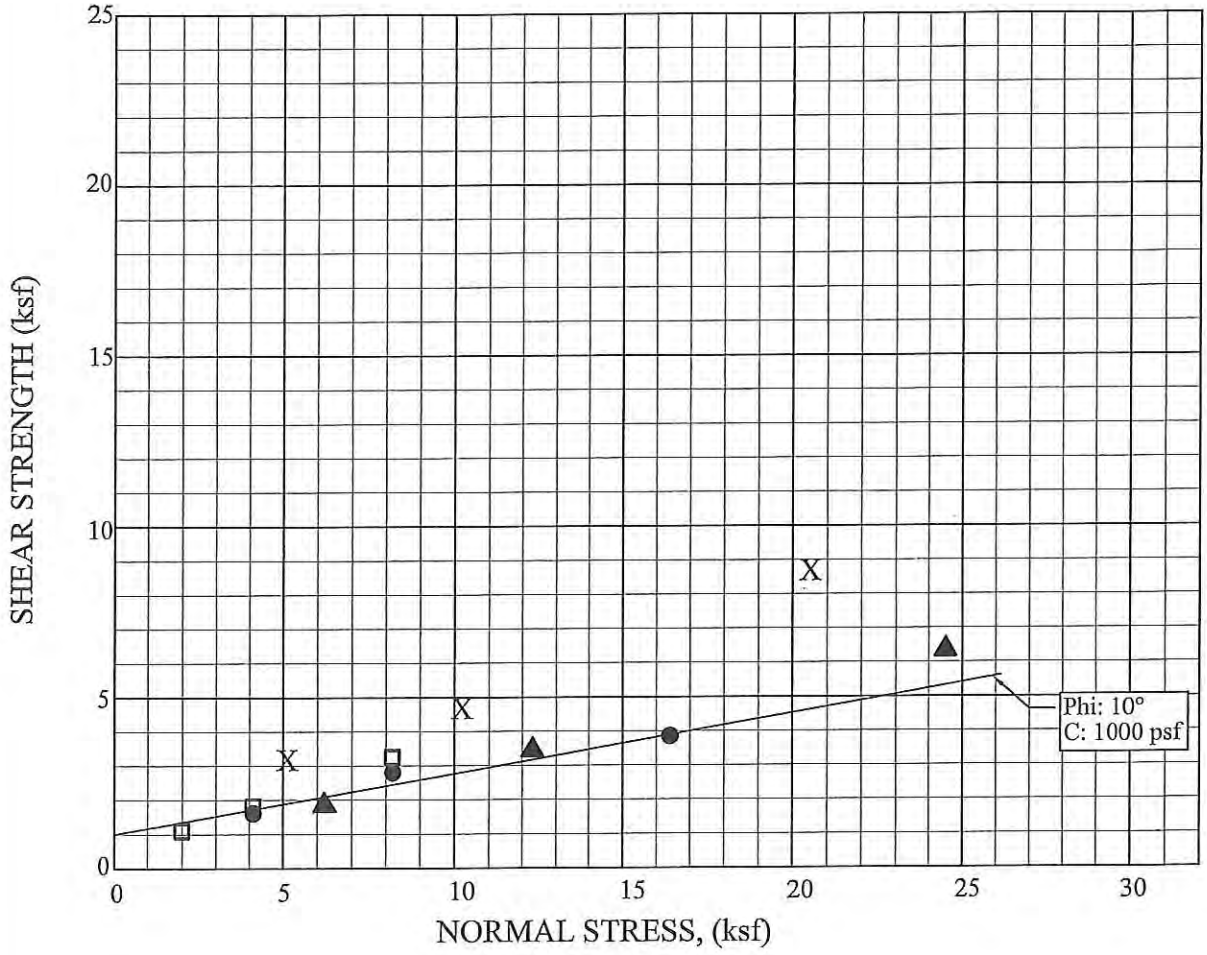

Sedimentary Rock Strengths
Cohesion (psf)
1400
1200
1000
800
600
400
200
0
5
10
15
20
25
30
35
40
45
50
Phi (Degrees)

ENGINEERED FILL SHEAR STRENGTH DATA PLOT

SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
Pacific Soils Engineering, Inc. (1993), Tract 62443	Fill	30	300		PSE-6 @ 81'	Remolded to 93%
Pacific Soils Engineering, Inc. (1993), Tract 62444	Fill	27	300		PSE-2, PSE-12	Remolded to 90%
GeoSoils, Inc. (1990), Tract 62443	Fill	30	300	pk		Remolded
GeoSoils, Inc. (1990), Tract 62443	Fill	28	250	ult.		Remolded
West Coast Soils (2003), Tract 62443	Fill	28	350		B-4 @ 40'	Remolded
Subsurface Design, Inc. (2002), APN: 2069-011-005	Fill	28	380		DH-02 @ 2'	Remolded
RJR Engineering (2007), Tract 62443	Fill	38	920	pk	DH-1 @ 15'-20'	95% Remolded
RJR Engineering (2007), Tract 62443	Fill	39	520	res	DH-1 @ 15'-20'	95% Remolded



COMPOSITE RING SHEAR DATA POINT PLOT
FOR SILTSTONE-CLAYSTONE ROCK STRENGTHS
RESIDUAL SHEAR STRENGTHS



CONSULTANT	ADDRESS	ROCK TYPE	SAMPLE	SYMBOL
RJR Engineering (2007)	Tract 62443, Las Virgenes Rd.	Claystone	DH-5 @ 42'	● Residual
RJR Engineering (2007)	Tract 62443, Las Virgenes Rd.	Claystone	CH-B @ 70'	▲ Residual
RJR Engineering (2007)	Tract 62443, Las Virgenes Rd.	Siltstone	DH-3 @ 58'	X Residual
RJR Engineering (2007)	Tract 62443, Las Virgenes Rd.	Siltstone	CH-A @ 126'	□ Residual

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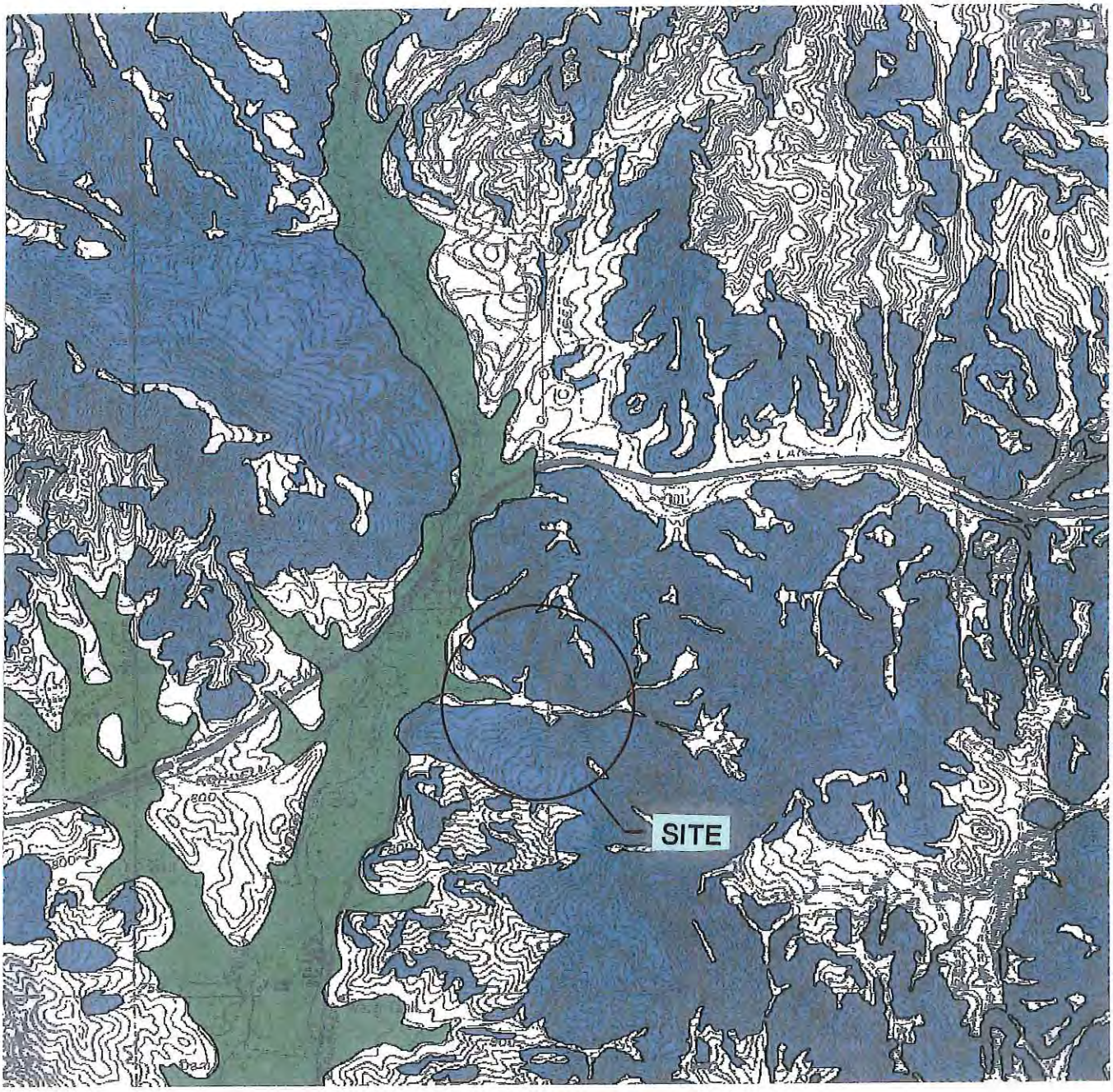
APPENDIX C



REFERENCE: State of California, Division of Mines and Geology, Seismic Hazard Zones Map, Calabasas Quadrangle, Los Angeles and Ventura Counties, California, 1998

P.N. 1344.11

NORTH

Scale: 1" = 2,000'

SEISMIC HAZARD ZONES

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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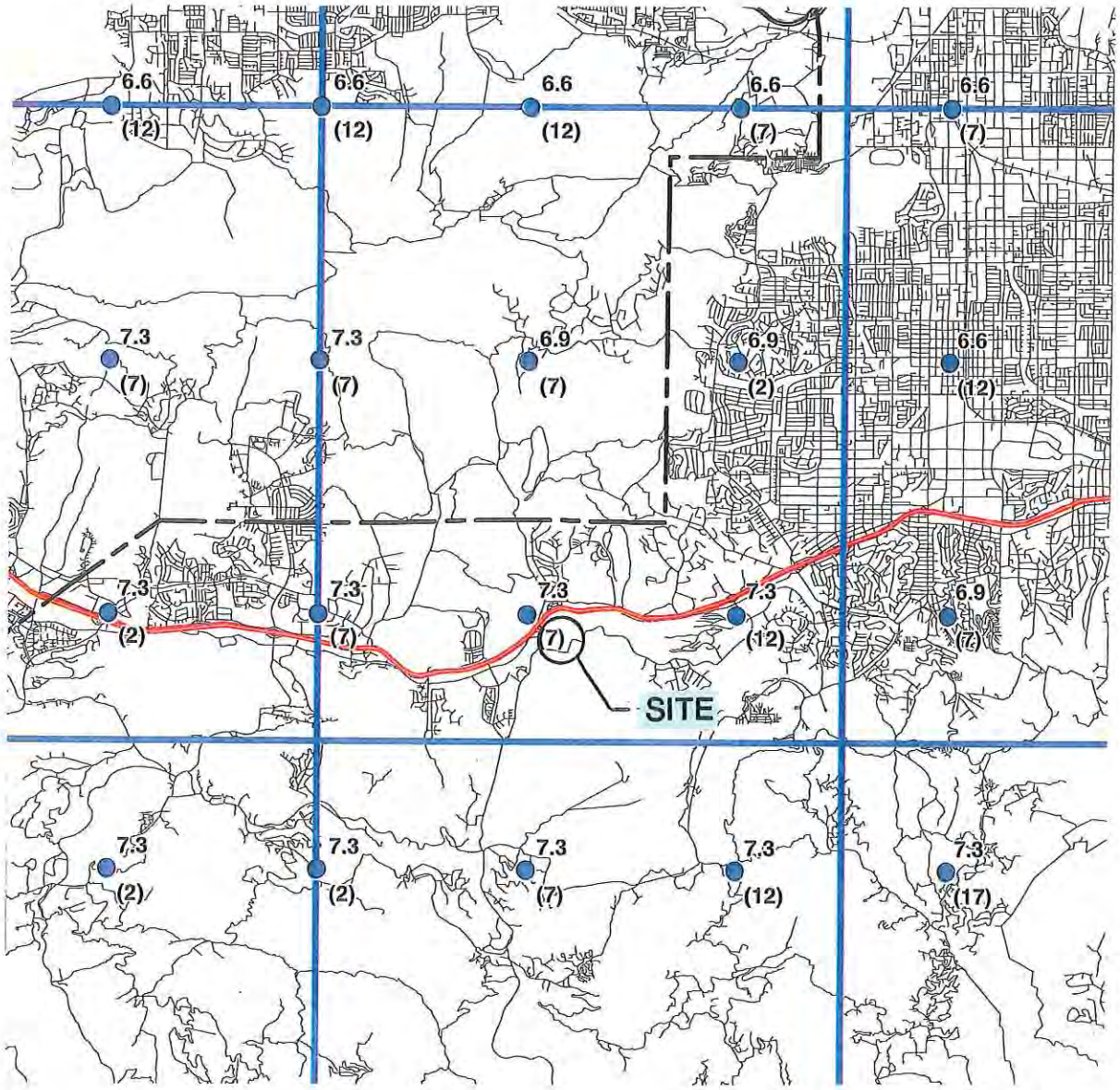

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report for the Calabasas 7.5 Minute Quadrangle, Predominant Earthquake Map, Los Angeles and Ventura Counties, California, 1997 (Revised 2001)

P.N. 1344.11

NORTH

Scale: 1" = 13,670'

PREDOMINATE EARTHQUAKE CONDITIONS

10% EXCEEDANCE IN 50 YEARS PEAK GROUND ACCELERATION

CALABASAS HOLDINGS

LAS VIRGENES ROAD

CALABASAS, CALIFORNIA

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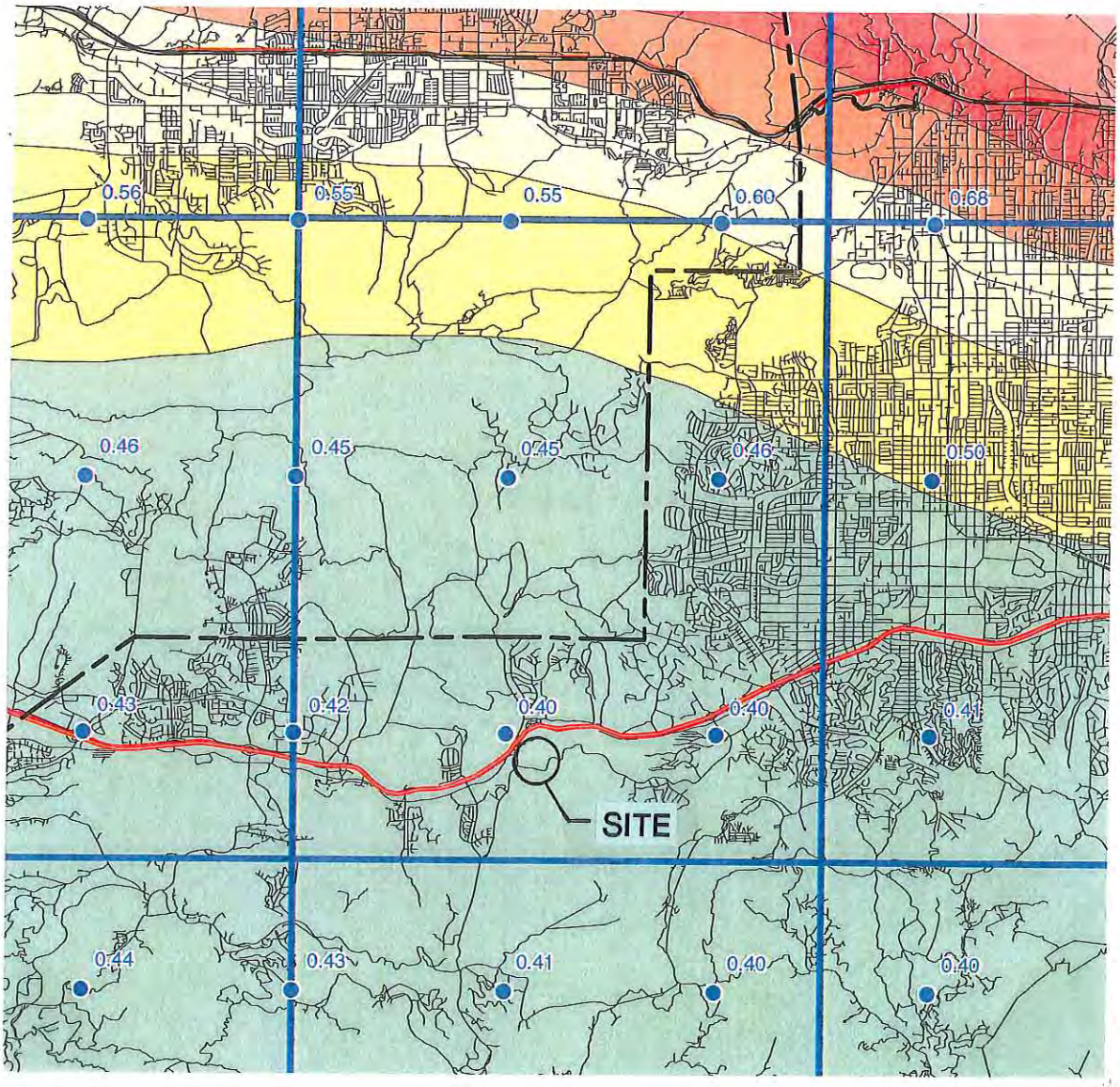

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report for the Calabasas 7.5 Minute Quadrangle, Soft Rock Conditions Map, Los Angeles and Ventura Counties, California, 1997 (Revised 2001)

P.N. 1344.11

NORTH

Scale: 1" = 13,670'

SOFT ROCK CONDITIONS

10% EXCEEDANCE IN 50 YEARS PEAK GROUND ACCELERATION (g)

CALABASAS HOLDINGS

LAS VIRGENES ROAD

CALABASAS, CALIFORNIA

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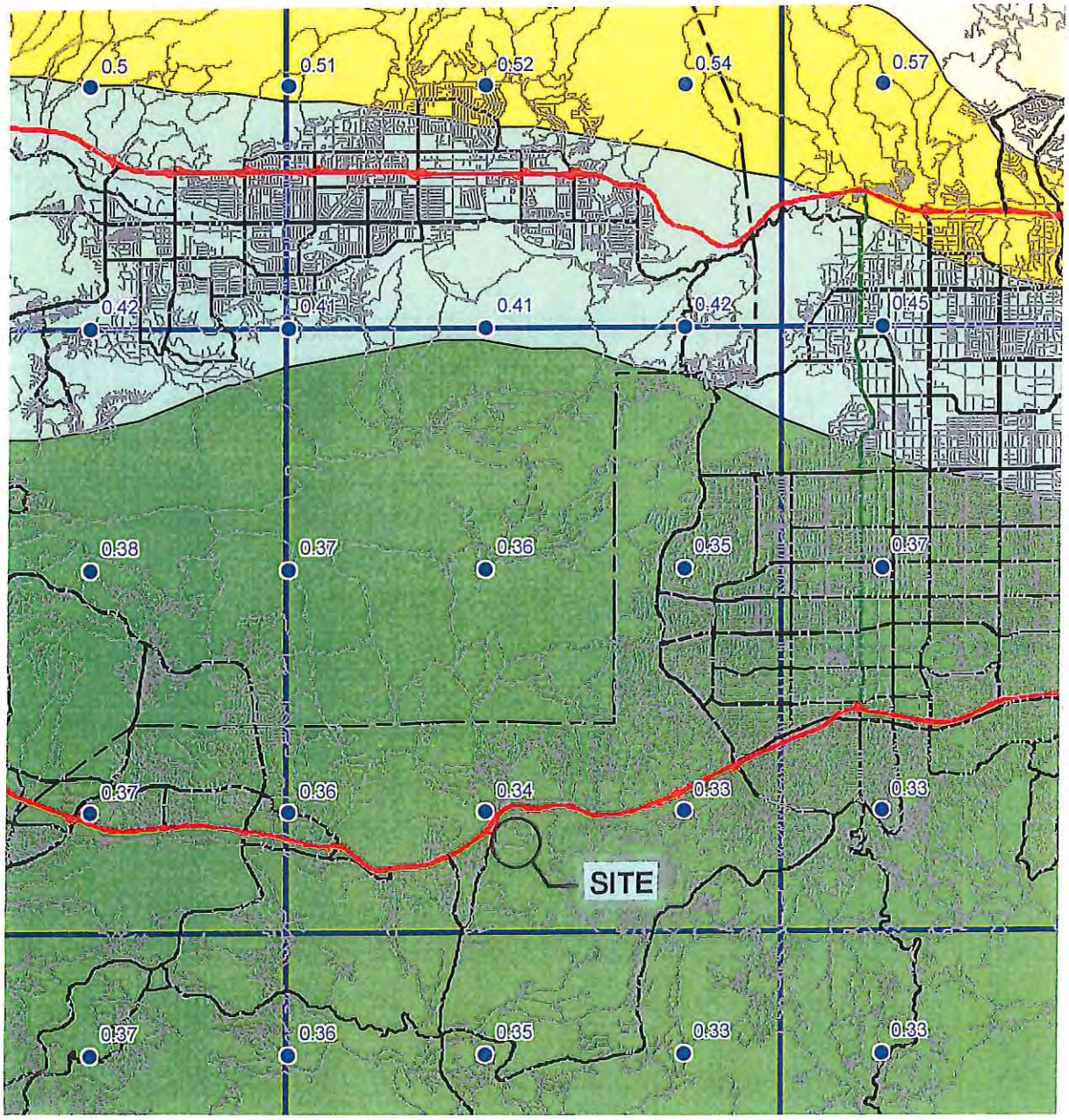

REFERENCE: California Department of Conservation, Division of Mines and Geology, Seismic Hazard Report 006, Liquefaction Opportunity, Calabasas, Los Angeles and Ventura Counties, California, 1998, Revised 2006

1344.11

NORTH

LIQUEFACTION OPPORTUNITY

CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Scale: 1" = 13,670'

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RJR ENGINEERING GROUP
CBC 2007 Design Values

General Site Data

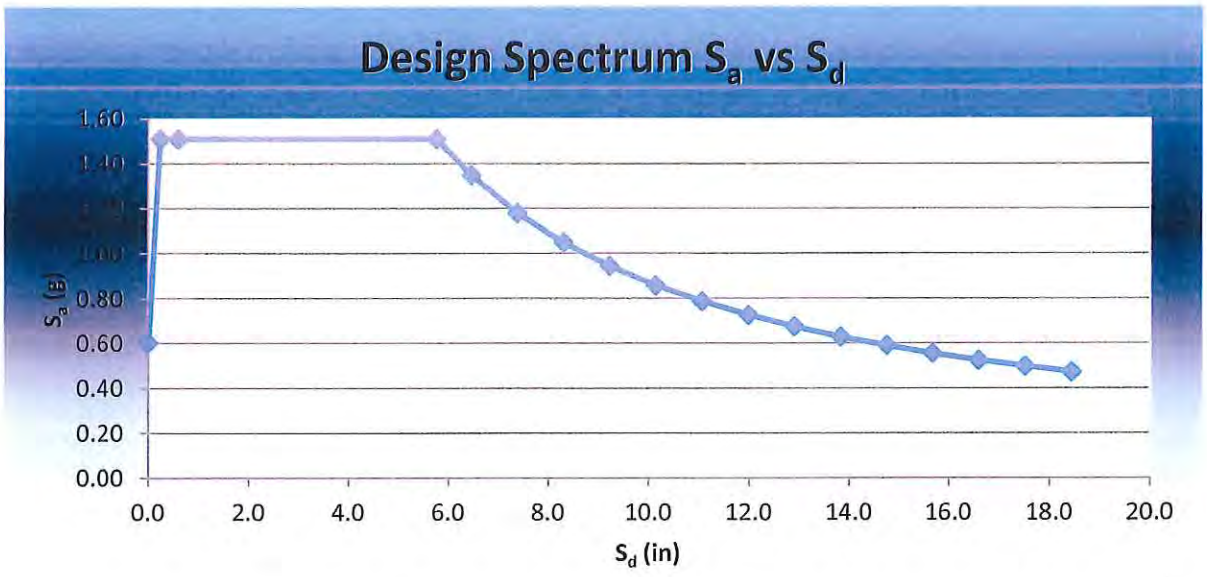
		CBC 2007 Reference
Seismic Category (Short Period)	D	Tables 1613.5.6(1) & 1613.5.6(2)
Seismic Category (1 Second Period)	D	Tables 1613.5.6(1) & 1613.5.6(2)
Site Class	D	Table 1613.5.2
Occupancy Category	I	Table 1604.5
Latitude	34.139 N	
Longitude	-118.627 W	

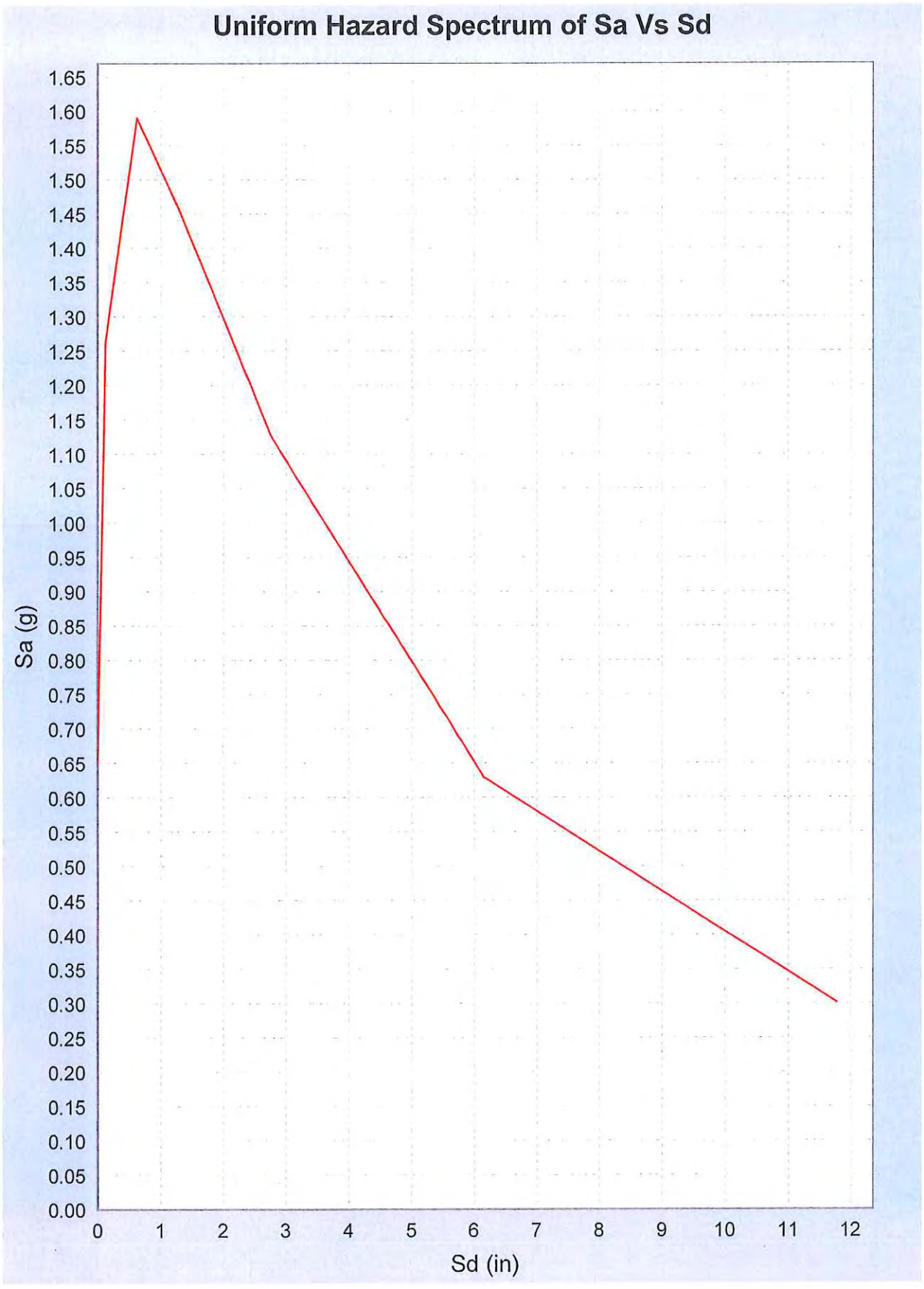
Maximum Considered Earthquake (MCE) Ground Motion

Short Period (0.2g)Spectral Response	S_s:	1.948 g	Figure 1613.5(1) & 1613.5(2)
One (1) Second Specteral Response	S_1:	0.739 g	Figure 1613.5.1
Site Coefficient	F_a:	1.00	Table 1613.5.3(1)
Site Coefficient	F_v:	1.50	Table 1613.5.3(2)
	S_{MS}:	1.95 g	$F_a * S_S$
	S_{M1}:	1.11 g	$F_v * S_1$

Design Earthquake Ground Motion

Short Period Spectral Response	S_{DS}:	1.30 g	$2/3 * S_{MS}$
One (1) Second Specteral Response	S_{D1}:	0.74 g	$2/3 * S_{M1}$
	T_O:	0.11 sec	$0.2 * S_{D1}/S_{DS}$
	T_s:	0.57 sec	S_{D1}/S_{DS}

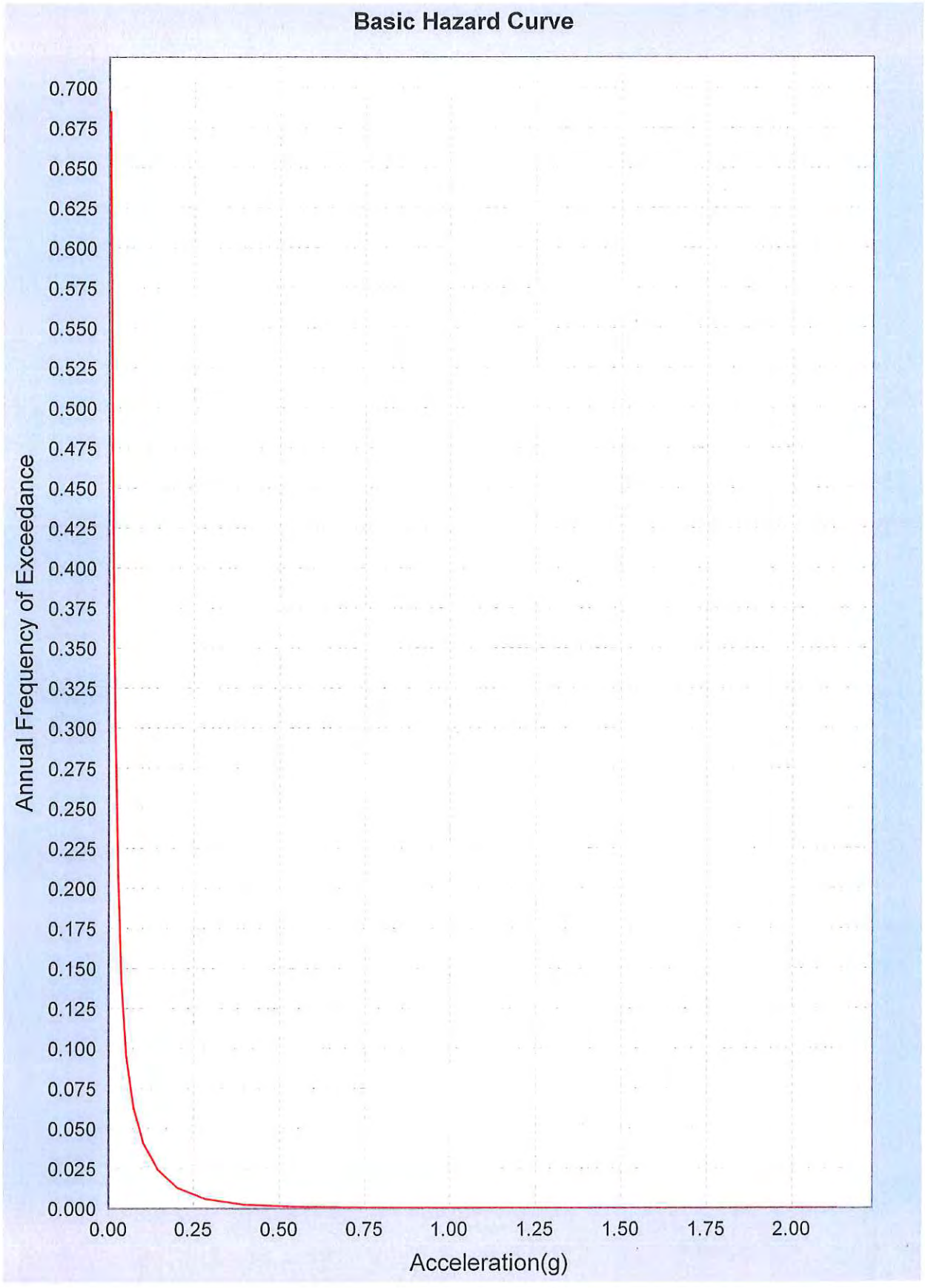




Uniform Hazard Spectrum

5% Damping

Ground Motion ≥ % PE in 50 years



probabilistic Hazard curve

Return Period 2,475

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**********************
*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 1344.12

DATE: 09-07-2011

JOB NAME: Messenger / Calabasas

CALCULATION NAME: EQ FAULT / Calabasas

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.1387
SITE LONGITUDE: 118.6913

SEARCH RADIUS: 100 mi

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
MALIBU COAST	6.6(10.6)	6.7	0.389	X
ANACAPA-DUME	8.1(13.0)	7.3	0.446	X
SANTA MONICA	9.7(15.6)	6.6	0.267	IX
SIMI-SANTA ROSA	12.9(20.8)	6.7	0.217	VIII
NORTHRIDGE (E. Oak Ridge)	13.0(21.0)	6.9	0.245	IX
PALOS VERDES	14.0(22.5)	7.1	0.183	VIII
SANTA SUSANA	14.9(24.0)	6.6	0.177	VIII
HOLLYWOOD	16.3(26.2)	6.4	0.143	VIII
OAK RIDGE (Onshore)	16.7(26.8)	6.9	0.192	VIII
SIERRA MADRE (San Fernando)	18.0(29.0)	6.7	0.156	VIII
HOLSER	18.9(30.4)	6.5	0.131	VIII
VERDUGO	19.4(31.2)	6.7	0.145	VIII
NEWPORT-INGLEWOOD (L.A.Basin)	19.7(31.7)	6.9	0.115	VII
SAN CAYETANO	21.3(34.2)	6.8	0.141	VIII
SAN GABRIEL	21.6(34.7)	7.0	0.113	VII
COMPTON THRUST	23.9(38.4)	6.8	0.126	VIII
SIERRA MADRE	25.4(40.8)	7.0	0.135	VIII
RAYMOND	26.8(43.2)	6.5	0.091	VII
ELYSIAN PARK THRUST	28.5(45.9)	6.7	0.098	VII
VENTURA - PITAS POINT	29.8(47.9)	6.8	0.100	VII
OAK RIDGE(Blind Thrust Offshore)	32.1(51.7)	6.9	0.099	VII
SANTA YNEZ (East)	32.8(52.8)	7.0	0.073	VII
CHANNEL IS. THRUST (Eastern)	33.4(53.7)	7.4	0.135	VIII
MONTALVO-OAK RIDGE TREND	34.5(55.5)	6.6	0.075	VII
M.RIDGE-ARROYO PARIDA-SANTA ANA	36.5(58.7)	6.7	0.075	VII
CLAMSHELL-SAWPIT	37.2(59.8)	6.5	0.065	VI
RED MOUNTAIN	39.4(63.4)	6.8	0.075	VII
SAN ANDREAS - 1857 Rupture	39.8(64.0)	7.8	0.106	VII
SAN ANDREAS - Mojave	39.8(64.0)	7.1	0.064	VI
WHITTIER	40.0(64.3)	6.8	0.052	VI
SAN ANDREAS - Carrizo	40.3(64.8)	7.2	0.068	VI
SAN JOSE	46.3(74.5)	6.5	0.051	VI
SANTA CRUZ ISLAND	48.3(77.7)	6.8	0.060	VI
BIG PINE	49.5(79.6)	6.7	0.039	V
GARLOCK (West)	49.5(79.6)	7.1	0.051	VI
PLEITO THRUST	50.4(81.1)	7.2	0.076	VII
CHINO-CENTRAL AVE. (Elsinore)	52.3(84.2)	6.7	0.052	VI
CUCAMONGA	52.7(84.8)	7.0	0.063	VI
NEWPORT-INGLEWOOD (Offshore)	58.4(94.0)	6.9	0.037	V
NORTH CHANNEL SLOPE	58.7(94.5)	7.1	0.060	VI

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
SANTA YNEZ (West)	59.0(95.0)	6.9	0.037	V
ELSINORE-GLEN IVY	63.4(102.1)	6.8	0.032	V
WHITE WOLF	63.9(102.8)	7.2	0.059	VI
SAN ANDREAS - San Bernardino	67.6(108.8)	7.3	0.043	VI
SAN ANDREAS - Southern	67.6(108.8)	7.4	0.046	VI
SAN JACINTO-SAN BERNARDINO	68.1(109.6)	6.7	0.028	V
SANTA ROSA ISLAND	70.0(112.6)	6.9	0.044	VI
CLEGHORN	71.2(114.6)	6.5	0.023	IV
CORONADO BANK	74.3(119.6)	7.4	0.041	V
NORTH FRONTAL FAULT ZONE (West)	82.8(133.3)	7.0	0.039	V
SAN JACINTO-SAN JACINTO VALLEY	83.6(134.6)	6.9	0.026	V
ELSINORE-TEMECULA	84.1(135.4)	6.8	0.024	IV
LOS ALAMOS-W. BASELINE	86.1(138.6)	6.8	0.033	V
GARLOCK (East)	88.0(141.6)	7.3	0.032	V
HELENDALE - S. LOCKHARDT	89.6(144.2)	7.1	0.027	V
LENWOOD-LOCKHART-OLD WOMAN SPRGS	91.7(147.6)	7.3	0.031	V
LIONS HEAD	96.5(155.3)	6.6	0.025	V

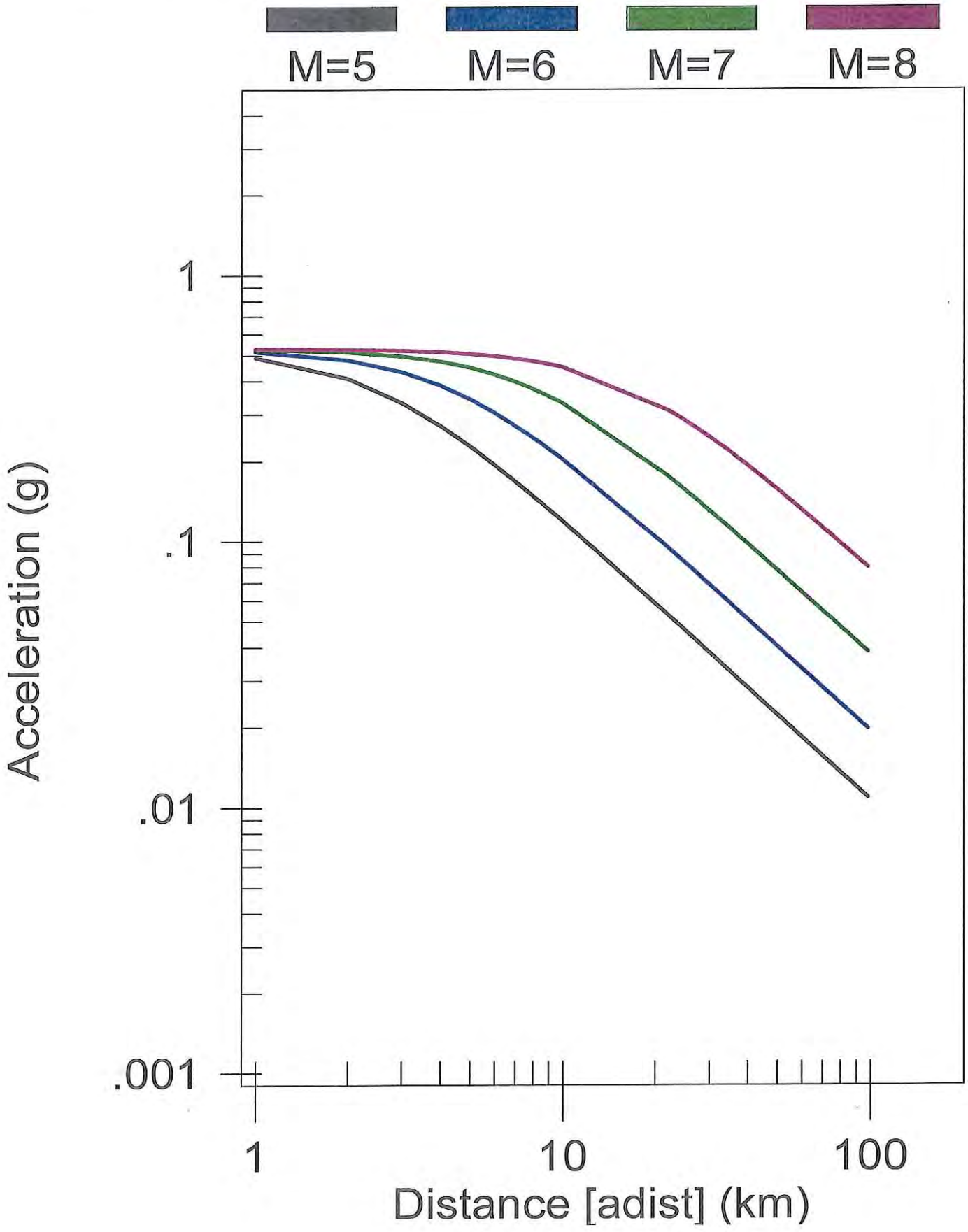
-END OF SEARCH- 57 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE MALIBU COAST FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 6.6 MILES (10.6 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4462 g

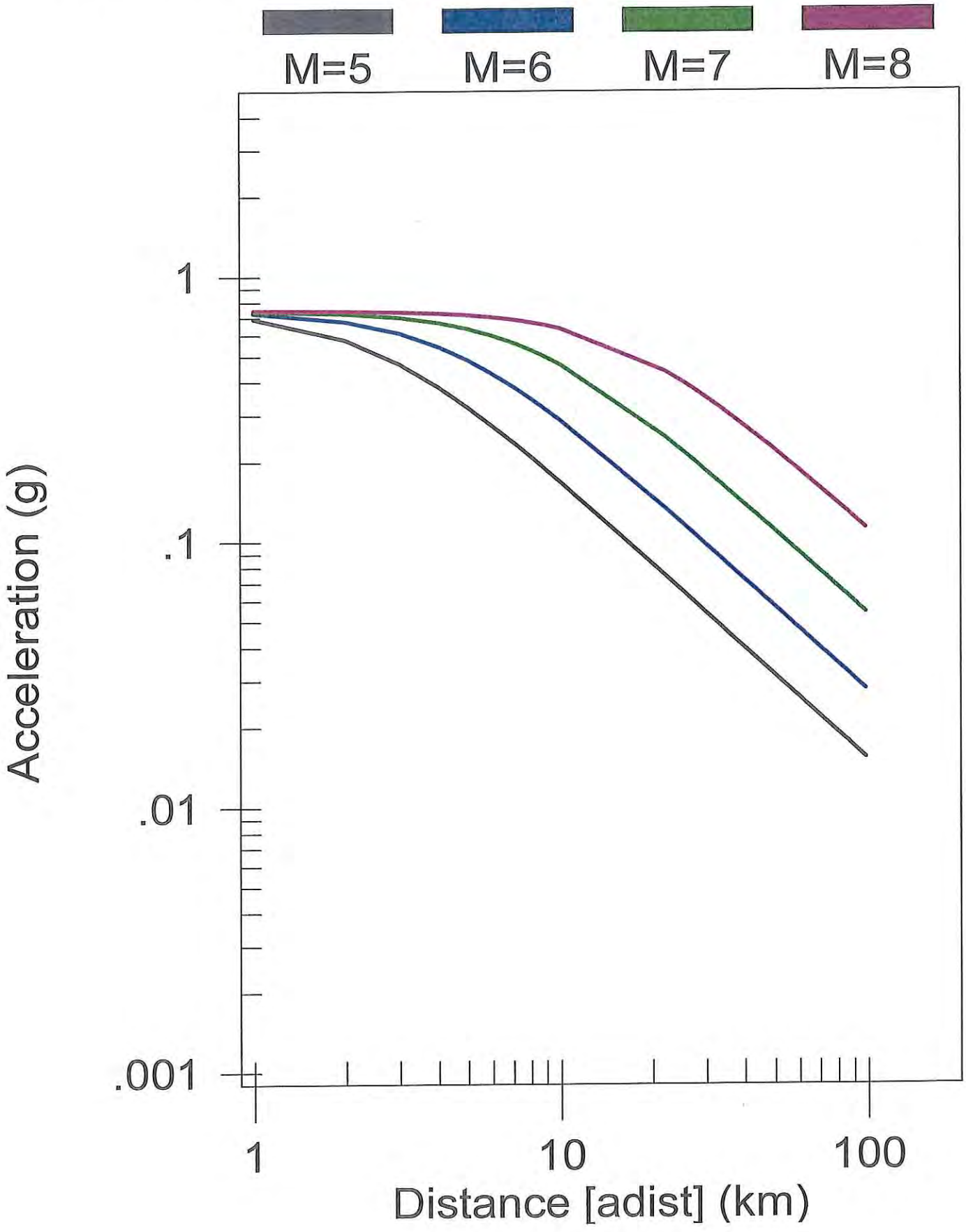
STRIKE-SLIP FAULTS

11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



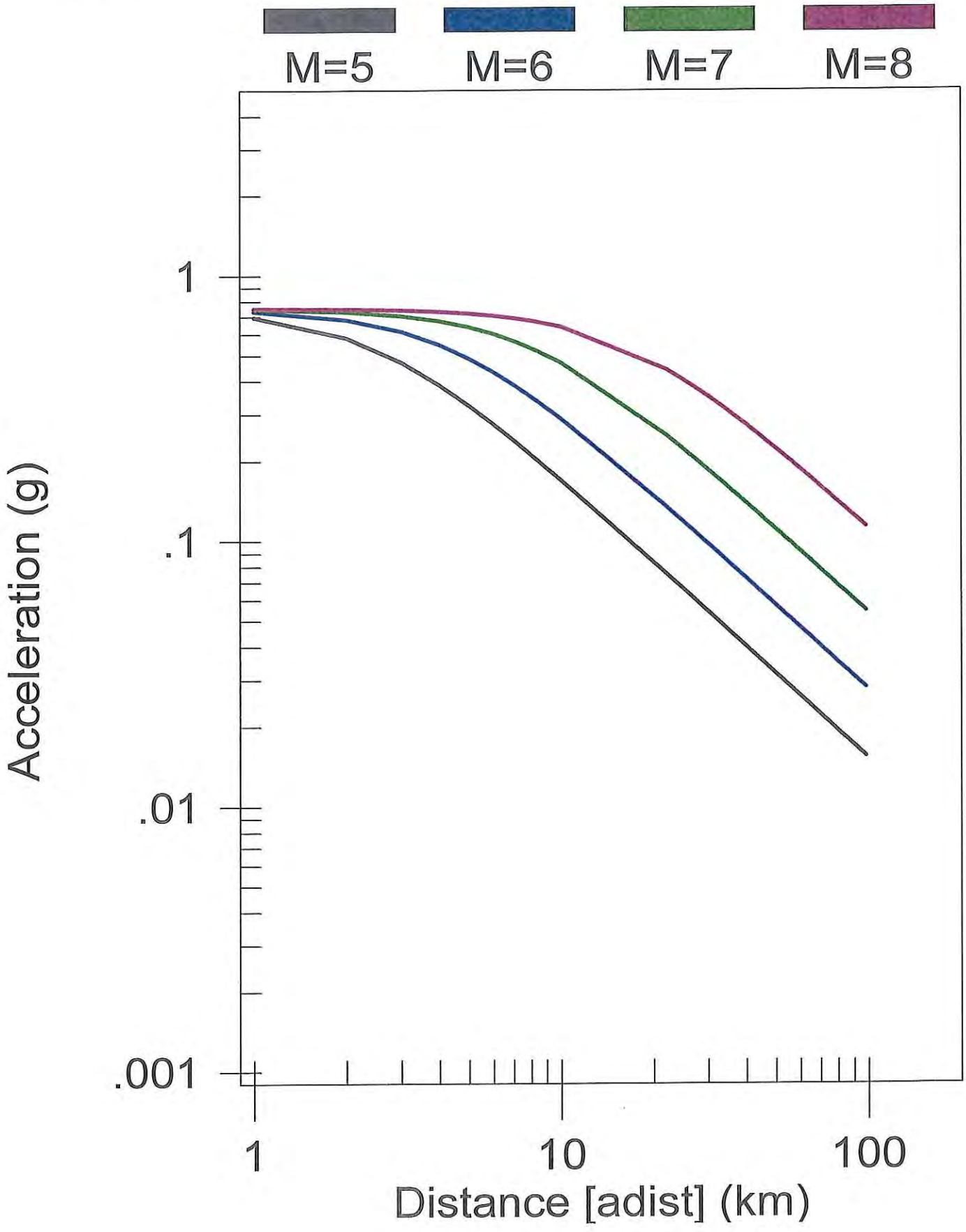
DIP-SLIP FAULTS

11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



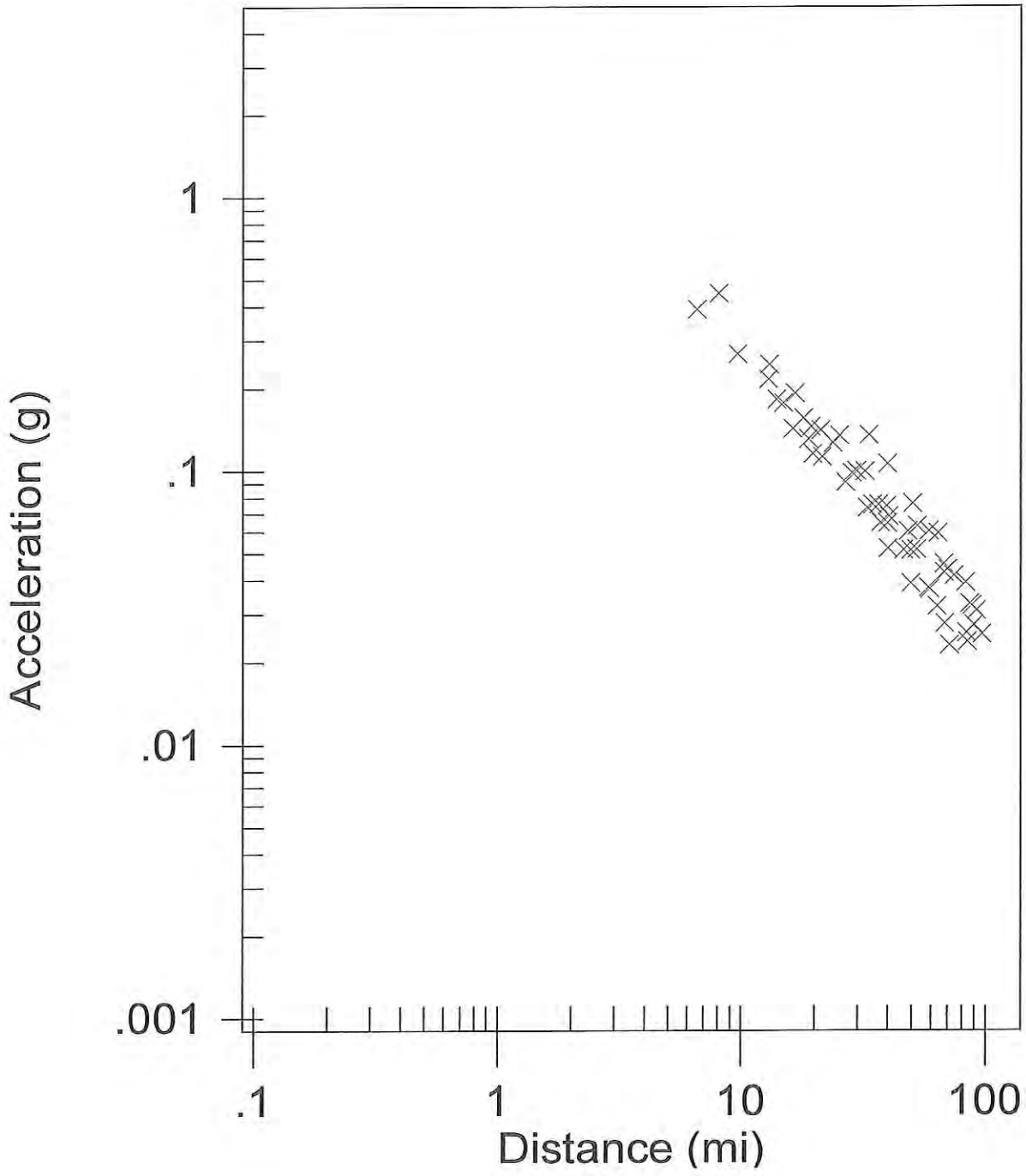
BLIND-THRUST FAULTS

11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



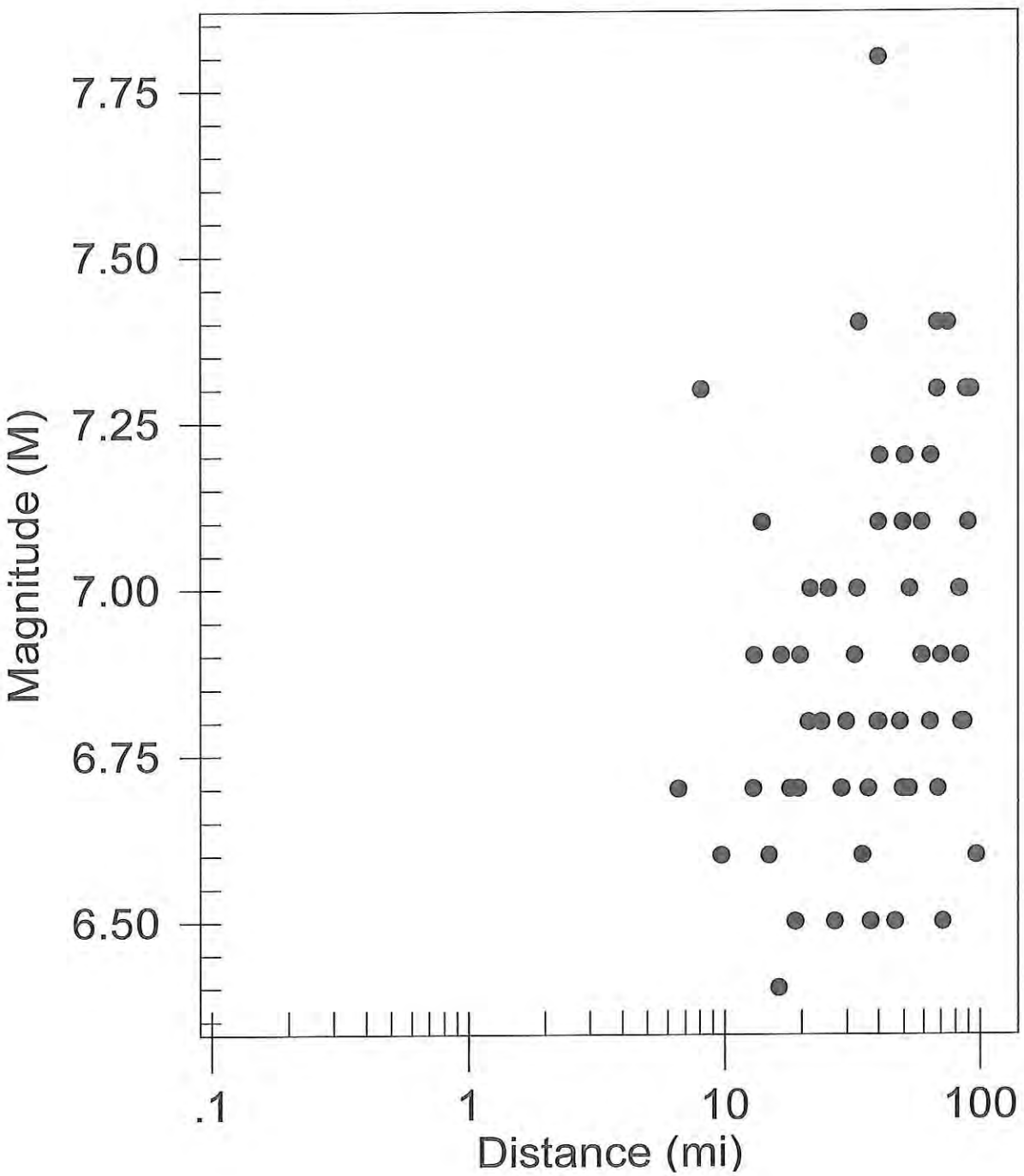
MAXIMUM EARTHQUAKES

Messenger / Calabasas



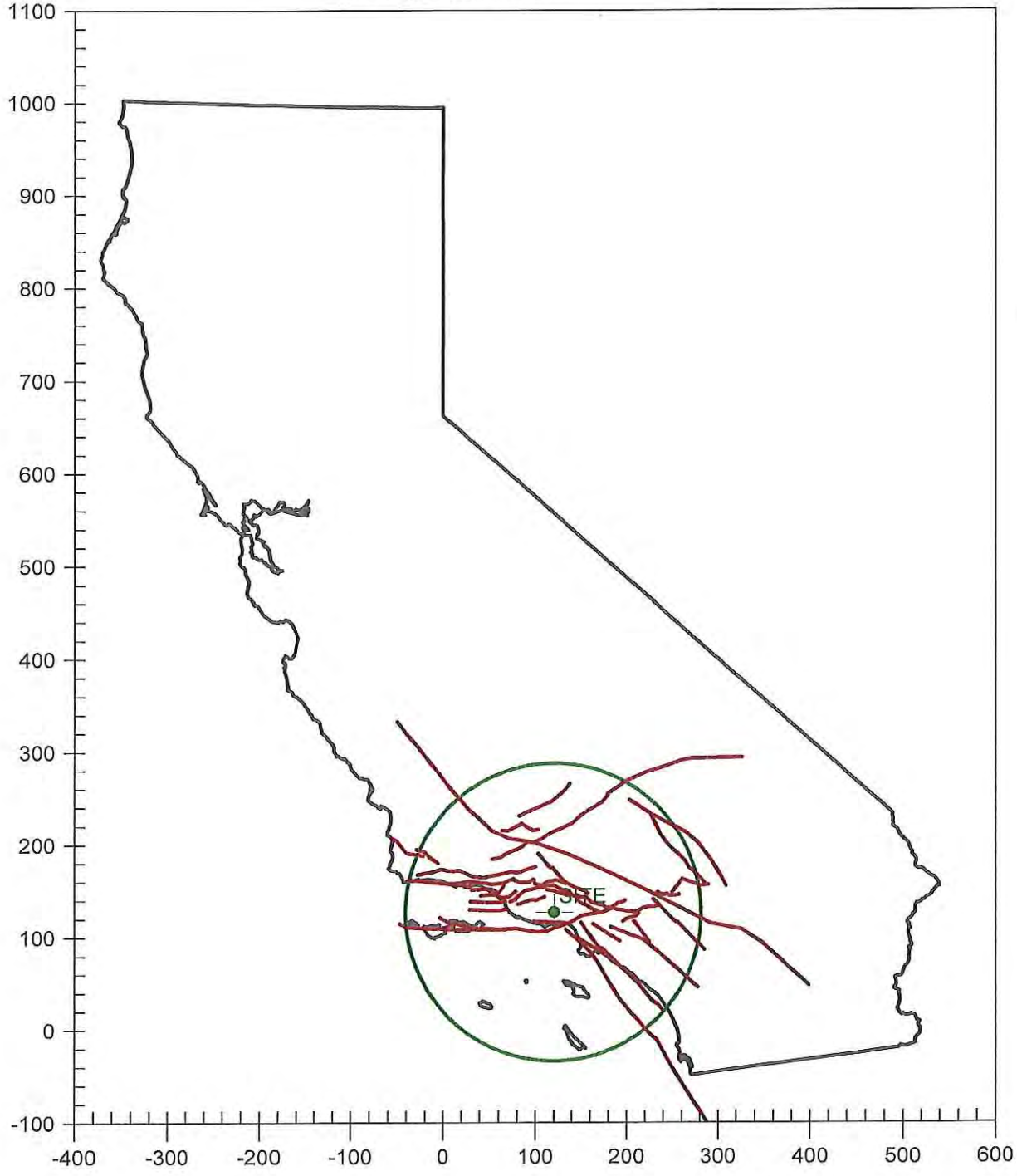
EARTHQUAKE MAGNITUDES & DISTANCES

Messenger / Calabasas



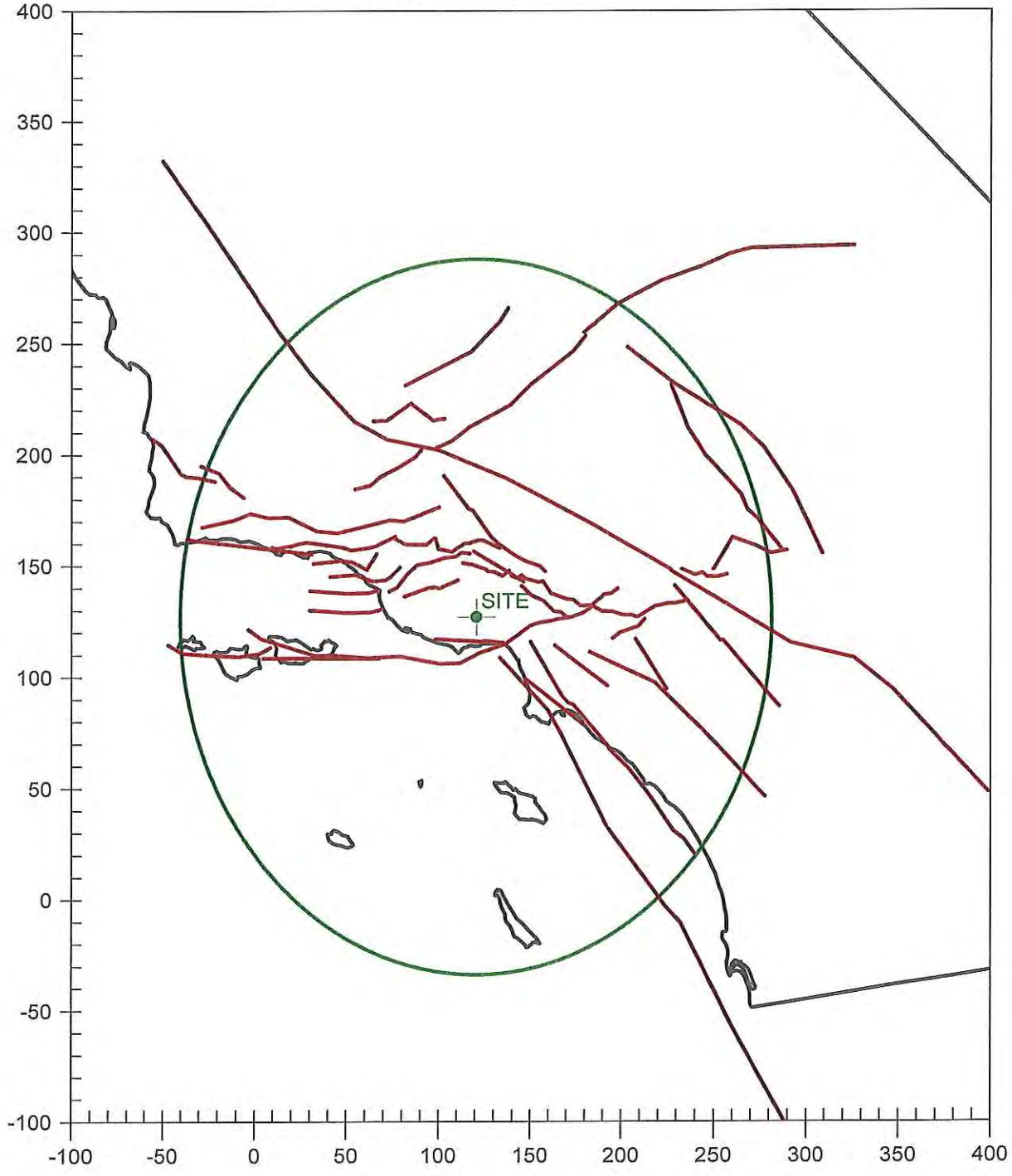
CALIFORNIA FAULT MAP

Messenger / Calabasas



CALIFORNIA FAULT MAP

Messenger / Calabasas



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*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 1344.12

DATE: 09-07-2011

JOB NAME: Messenger / Calabasas

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE: 4.00
   MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
   SITE LATITUDE: 34.1387
   SITE LONGITUDE: 118.6913

SEARCH DATES:
           START DATE: 1800
           END DATE: 2010

SEARCH RADIUS:
           100.0 mi
           160.9 km

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND: 0 Depth Source: A
   Basement Depth: 5.00 km   Campbell SSR: 0   Campbell SHR: 0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 3.0

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.1000	118.8000	05/10/1911	1340 0.0	0.0	4.00	0.076	VII	6.8(10.9)
GSP	34.2180	118.6070	01/18/1994	113509.9	12.0	4.20	0.080	VII	7.3(11.7)
GSP	34.2280	118.5730	01/17/1994	175608.2	19.0	4.60	0.081	VII	9.1(14.7)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.266	IX	10.2(16.4)
GSP	34.2780	118.6110	01/29/1994	121656.4	2.0	4.30	0.061	VI	10.7(17.1)
GSB	34.2850	118.6240	01/17/1994	135602.4	19.0	4.70	0.074	VII	10.8(17.4)
DMG	34.2650	118.5770	04/15/1971	111432.0	4.2	4.20	0.057	VI	10.9(17.5)
GSP	34.2690	118.5760	01/17/1994	125546.8	16.0	4.10	0.053	VI	11.1(17.9)
GSP	34.2540	118.5450	01/17/1994	130627.9	0.0	4.60	0.066	VI	11.5(18.6)
GSG	34.3040	118.7220	01/17/1994	221922.3	10.0	4.00	0.049	VI	11.5(18.6)
GSP	34.2150	118.5100	01/19/1994	140914.8	17.0	4.50	0.063	VI	11.6(18.7)
GSP	34.3040	118.7370	01/19/1994	091310.9	13.0	4.10	0.051	VI	11.7(18.8)
GSP	34.2740	118.5630	01/27/1994	171958.8	14.0	4.60	0.065	VI	11.9(19.1)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.146	VIII	12.3(19.8)
GSP	34.2610	118.5340	01/17/1994	123939.8	14.0	4.50	0.059	VI	12.3(19.8)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.107	VII	12.9(20.8)
DMG	34.2730	118.5320	06/21/1971	16 1 8.5	4.1	4.00	0.044	VI	13.0(20.9)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.078	VII	13.1(21.2)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.081	VII	13.3(21.4)
PAS	33.9440	118.6810	01/01/1979	231438.9	11.3	5.00	0.072	VI	13.5(21.6)
DMG	33.9500	118.6320	08/31/1930	04036.0	0.0	5.20	0.081	VII	13.5(21.7)
DMG	34.2840	118.5280	04/02/1971	54025.0	3.0	4.00	0.042	VI	13.7(22.0)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.083	VII	13.9(22.4)
GSB	34.3330	118.6230	01/18/1994	072356.0	14.0	4.30	0.048	VI	14.0(22.5)
GSB	34.3430	118.6660	01/17/1994	234925.4	8.0	4.30	0.047	VI	14.2(22.8)
GSP	34.0490	118.9150	02/19/1995	212418.1	15.0	4.30	0.047	VI	14.2(22.9)
PAS	33.9330	118.6690	10/17/1979	205237.3	5.5	4.20	0.044	VI	14.3(22.9)
DMG	34.2860	118.5150	03/31/1971	145222.5	2.1	4.60	0.054	VI	14.3(23.0)
DMG	34.3440	118.6360	02/09/1971	143436.1	-2.0	4.90	0.063	VI	14.5(23.4)
PAS	34.3470	118.6560	04/08/1976	152138.1	14.5	4.60	0.054	VI	14.5(23.4)
DMG	34.0000	118.5000	06/22/1920	248 0.0	0.0	4.90	0.063	VI	14.5(23.4)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.066	VI	14.5(23.4)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.066	VI	14.5(23.4)
MGI	34.0000	118.5000	03/08/1918	1230 0.0	0.0	4.00	0.039	V	14.5(23.4)
MGI	34.0000	118.5000	06/23/1920	1220 0.0	0.0	4.00	0.039	V	14.5(23.4)
DMG	34.0000	118.5000	03/06/1918	1820 0.0	0.0	4.00	0.039	V	14.5(23.4)
DMG	34.0000	118.5000	11/08/1914	1140 0.0	0.0	4.50	0.051	VI	14.5(23.4)
GSP	34.2450	118.4710	01/18/1994	155144.9	12.0	4.00	0.039	V	14.6(23.4)
GSB	34.3190	118.5580	01/18/1994	132444.1	1.0	4.50	0.051	VI	14.6(23.5)
GSP	34.3540	118.7040	05/01/1996	194956.4	14.0	4.10	0.041	V	14.9(23.9)
PAS	33.9190	118.6270	01/19/1989	65328.8	11.9	5.00	0.062	VI	15.6(25.1)
GSP	34.3590	118.6290	01/24/1994	055024.3	12.0	4.30	0.043	VI	15.6(25.1)
GSB	34.3580	118.6220	01/18/1994	040126.8	1.0	4.50	0.047	VI	15.6(25.2)
GSP	34.3650	118.7080	01/19/1994	044314.5	12.0	4.10	0.039	V	15.6(25.2)
GSP	34.3630	118.6270	01/24/1994	055421.1	10.0	4.20	0.040	V	15.9(25.6)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.064	VI	15.9(25.6)
GSP	34.3620	118.6150	03/20/1996	073759.8	13.0	4.10	0.038	V	16.0(25.8)
GSP	34.3680	118.6370	01/17/1994	194353.4	13.0	4.10	0.037	V	16.1(26.0)
GSP	34.2910	118.4760	02/06/1994	131926.9	11.0	4.10	0.037	V	16.2(26.0)
GSB	34.3450	118.5520	01/24/1994	041518.8	6.0	4.80	0.053	VI	16.3(26.2)
GSP	34.2870	118.4660	01/19/1994	071406.2	11.0	4.00	0.035	V	16.4(26.5)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.066	VI	16.5(26.5)
GSP	34.3770	118.6490	04/27/1997	110928.4	15.0	4.80	0.052	VI	16.6(26.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.079	VII	16.6(26.8)
PAS	34.0540	118.9640	04/13/1982	11 212.2	16.6	4.00	0.035	V	16.6(26.8)
GSP	34.2920	118.4660	01/19/1994	144635.2	6.0	4.00	0.035	V	16.7(26.8)
DMG	34.2680	118.4450	08/30/1964	225737.1	15.4	4.00	0.035	V	16.7(26.8)
GSP	34.3740	118.6220	01/17/1994	155410.8	12.0	4.80	0.052	VI	16.7(26.9)
GSB	34.3600	118.5710	01/19/1994	044048.0	2.0	4.50	0.044	VI	16.7(26.9)
GSP	34.3040	118.4730	01/17/1994	150703.2	2.0	4.20	0.038	V	16.9(27.2)
DMG	34.2960	118.4640	03/30/1971	85443.3	2.6	4.10	0.036	V	16.9(27.2)
GSB	34.3000	118.4660	01/21/1994	183915.3	10.0	4.70	0.048	VI	17.0(27.4)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.060	VI	17.0(27.4)
DMG	34.3800	118.6230	10/29/1936	223536.1	10.0	4.00	0.034	V	17.1(27.5)
GSB	34.3100	118.4740	01/21/1994	184228.8	7.0	4.20	0.037	V	17.1(27.6)
GSP	34.2970	118.4580	01/21/1994	185344.6	7.0	4.30	0.039	V	17.2(27.7)
GSP	34.3010	118.4520	01/21/1994	185244.2	7.0	4.30	0.038	V	17.7(28.4)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.055	VI	17.7(28.4)
DMG	34.0170	118.9670	04/16/1948	222624.0	0.0	4.70	0.046	VI	17.9(28.7)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.061	VI	17.9(28.8)
GSG	34.3340	118.4840	01/17/1994	223152.1	10.0	4.20	0.035	V	17.9(28.9)
GSP	34.3110	118.4560	01/17/1994	193534.3	2.0	4.00	0.032	V	17.9(28.9)
GSP	34.3790	118.5630	01/18/1994	003935.0	7.0	4.40	0.039	V	18.1(29.2)
GSP	34.2990	118.4390	02/03/1994	162335.4	8.0	4.20	0.035	V	18.2(29.2)
GSP	34.3790	118.5610	01/18/1994	152346.9	7.0	4.80	0.048	VI	18.2(29.3)
PDP	34.0590	118.3870	09/09/2001	235918.0	4.0	4.20	0.035	V	18.2(29.4)
GSP	34.3170	118.4550	01/17/1994	132644.7	2.0	4.70	0.045	VI	18.3(29.4)
DMG	34.0000	118.4170	12/07/1938	338 0.0	0.0	4.00	0.031	V	18.4(29.6)
GSP	34.3970	118.6090	07/22/1999	095724.0	11.0	4.00	0.031	V	18.4(29.7)
GSB	34.2990	118.4280	01/23/1994	085508.7	6.0	4.20	0.034	V	18.7(30.0)
PAS	34.0160	118.9880	10/26/1984	172043.5	13.3	4.60	0.041	V	19.0(30.5)
MGI	34.0000	118.4000	02/22/1920	1610 0.0	0.0	4.60	0.041	V	19.2(30.9)
MGI	34.0000	118.4000	01/29/1927	2324 0.0	0.0	4.00	0.030	V	19.2(30.9)
MGI	34.0000	118.4000	10/01/1930	040 0.0	0.0	4.60	0.041	V	19.2(30.9)
MGI	34.0000	118.4000	02/07/1927	429 0.0	0.0	4.60	0.041	V	19.2(30.9)
GSP	34.2840	118.4040	01/14/2001	022614.1	8.0	4.30	0.035	V	19.2(30.9)
DMG	34.3610	118.4870	02/10/1971	143526.7	4.4	4.20	0.033	V	19.3(31.0)
GSP	34.3570	118.4800	02/25/1994	125912.6	1.0	4.10	0.031	V	19.3(31.1)
GSP	34.2890	118.4030	01/14/2001	025053.7	8.0	4.00	0.030	V	19.5(31.3)
GSP	34.3310	118.4420	01/17/1994	141430.3	1.0	4.50	0.038	V	19.5(31.3)
DMG	34.3560	118.4740	03/25/1971	2254 9.9	4.6	4.20	0.033	V	19.5(31.3)
GSP	34.3740	118.4950	01/28/1994	200953.4	0.0	4.20	0.032	V	19.7(31.7)
DMG	34.3530	118.4560	03/07/1971	13340.5	3.3	4.50	0.037	V	20.0(32.1)
GSG	34.4080	118.5590	01/17/1994	200205.4	0.0	4.00	0.029	V	20.1(32.3)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.170	VIII	20.1(32.3)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.074	VII	20.1(32.3)
GSP	34.2930	118.3890	12/06/1994	034834.5	9.0	4.50	0.037	V	20.3(32.6)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.083	VII	20.3(32.7)
GSP	34.3110	118.3980	06/15/1994	055948.6	7.0	4.20	0.031	V	20.5(33.0)
GSP	34.3120	118.3930	05/25/1994	125657.1	7.0	4.40	0.034	V	20.8(33.5)
DMG	34.4170	118.8330	06/01/1946	11 631.0	0.0	4.10	0.029	V	20.8(33.5)
PAS	34.3800	118.4590	08/12/1977	21926.1	9.5	4.50	0.035	V	21.3(34.3)
DMG	34.3840	118.4550	02/10/1971	113134.6	6.0	4.20	0.029	V	21.6(34.8)
DMG	34.3990	118.4730	03/09/1974	05431.9	24.4	4.70	0.038	V	21.9(35.2)
DMG	33.9030	118.4310	11/29/1938	192115.8	10.0	4.00	0.026	V	22.1(35.5)
DMG	34.3570	118.4060	02/09/1971	141950.2	11.8	4.00	0.026	V	22.2(35.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	34.1000	118.3000	07/26/1920	1215 0.0	0.0	4.00	0.026	V	22.5(36.2)
MGI	34.1000	118.3000	07/16/1920	2127 0.0	0.0	4.60	0.035	V	22.5(36.2)
MGI	34.1000	118.3000	07/16/1920	2130 0.0	0.0	4.60	0.035	V	22.5(36.2)
MGI	34.1000	118.3000	07/16/1920	2022 0.0	0.0	4.60	0.035	V	22.5(36.2)
DMG	34.3970	118.4390	02/21/1971	55052.6	6.9	4.70	0.036	V	22.9(36.9)
DMG	34.3920	118.4270	02/21/1971	71511.7	7.2	4.50	0.032	V	23.1(37.2)
DMG	33.9900	119.0580	05/29/1955	164335.4	17.4	4.10	0.026	V	23.3(37.6)
T-A	34.4200	118.9200	03/29/1917	8 6 0.0	0.0	4.30	0.029	V	23.4(37.6)
DMG	34.3990	118.4190	02/10/1971	134953.7	9.7	4.30	0.028	V	23.8(38.2)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.047	VI	24.3(39.2)
MGI	34.0000	118.3000	06/22/1920	2035 0.0	0.0	4.00	0.024	IV	24.3(39.2)
MGI	34.0000	118.3000	06/30/1920	350 0.0	0.0	4.00	0.024	IV	24.3(39.2)
DMG	34.3350	118.3310	02/09/1971	155820.7	14.2	4.80	0.035	V	24.6(39.6)
DMG	34.3390	118.3320	02/09/1971	141612.9	11.1	4.10	0.024	V	24.7(39.8)
DMG	33.9830	118.3000	02/11/1940	192410.0	0.0	4.00	0.023	IV	24.8(40.0)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.039	V	25.0(40.2)
DMG	34.4110	118.4010	02/09/1971	14 434.0	8.0	4.20	0.025	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.062	VI	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 140.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 154.0	8.0	4.20	0.025	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 838.0	8.0	4.50	0.029	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 150.0	8.0	4.50	0.029	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 444.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 8 4.0	8.0	4.00	0.023	IV	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 8 7.0	8.0	4.20	0.025	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.062	VI	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 346.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 439.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 325.0	8.0	4.40	0.028	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.046	VI	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 230.0	8.0	4.30	0.027	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 133.0	8.0	4.20	0.025	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 541.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 550.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 853.0	8.0	4.60	0.031	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 2 3.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 745.0	8.0	4.50	0.029	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 4 7.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 231.0	8.0	4.70	0.033	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 446.0	8.0	4.20	0.025	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 710.0	8.0	4.00	0.023	IV	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 159.0	8.0	4.10	0.024	V	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 730.0	8.0	4.00	0.023	IV	25.1(40.3)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.091	VII	25.1(40.3)
DMG	34.3870	118.3640	02/09/1971	143917.8	-1.6	4.00	0.023	IV	25.3(40.8)
DMG	34.4260	118.4140	02/10/1971	518 7.2	5.8	4.50	0.029	V	25.4(40.8)
DMG	34.4280	118.4130	04/01/1971	15 3 3.6	8.0	4.10	0.024	IV	25.5(41.1)
PAS	34.3780	119.0350	04/03/1985	4 449.8	27.9	4.00	0.022	IV	25.6(41.3)
DMG	34.3960	118.3660	02/10/1971	173855.1	6.2	4.20	0.025	V	25.7(41.3)
DMG	34.4460	118.4360	02/10/1971	185441.7	8.1	4.20	0.025	V	25.7(41.4)
DMG	34.4850	118.5210	07/16/1965	74622.4	15.1	4.00	0.022	IV	25.8(41.5)
MGI	33.8000	118.5000	06/18/1915	15 5 0.0	0.0	4.00	0.022	IV	25.8(41.6)
GSP	34.5000	118.5600	07/05/1991	174157.1	11.0	4.10	0.023	IV	26.0(41.9)

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FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.4330	118.3980	02/09/1971	144017.4	-2.0	4.10	0.023	IV	26.3(42.4)
DMG	34.4570	118.4270	02/09/1971	161926.5	-1.0	4.20	0.024	IV	26.6(42.9)
DMG	34.3680	118.3140	04/25/1971	1448 6.5	-2.0	4.00	0.021	IV	26.7(43.0)
DMG	34.3610	118.3060	02/09/1971	141021.5	5.0	4.70	0.031	V	26.8(43.1)
T-A	34.0000	118.2500	01/17/1857	1 0 0.0	0.0	4.30	0.025	V	27.0(43.4)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.036	V	27.0(43.4)
T-A	34.0000	118.2500	05/02/1856	810 0.0	0.0	4.30	0.025	V	27.0(43.4)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.036	V	27.0(43.4)
T-A	34.0000	118.2500	05/04/1857	6 0 0.0	0.0	4.30	0.025	V	27.0(43.4)
T-A	34.0000	118.2500	03/21/1880	1425 0.0	0.0	4.30	0.025	V	27.0(43.4)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.036	V	27.0(43.4)
DMG	34.5290	118.6440	02/07/1956	21656.5	16.0	4.20	0.023	IV	27.1(43.6)
DMG	34.4310	118.3690	08/14/1974	144555.2	8.2	4.20	0.023	IV	27.3(43.9)
DMG	34.3700	118.3020	02/10/1971	31212.0	0.8	4.00	0.021	IV	27.4(44.0)
PAS	34.4630	118.4090	09/24/1977	212824.3	5.0	4.20	0.023	IV	27.6(44.4)
DMG	33.8830	118.3170	03/11/1933	1457 0.0	0.0	4.90	0.033	V	27.8(44.7)
DMG	34.4110	118.3290	02/10/1971	5 636.0	4.7	4.30	0.024	IV	27.9(45.0)
DMG	33.7700	118.4800	04/24/1931	182754.8	0.0	4.40	0.025	V	28.2(45.4)
MGI	34.1000	118.2000	04/21/1921	1538 0.0	0.0	4.00	0.020	IV	28.2(45.4)
MGI	34.1000	118.2000	05/02/1916	1432 0.0	0.0	4.00	0.020	IV	28.2(45.4)
MGI	34.1000	118.2000	01/27/1860	830 0.0	0.0	4.30	0.024	IV	28.2(45.4)
PDP	33.9220	118.2700	10/28/2001	162745.6	21.0	4.00	0.020	IV	28.4(45.7)
DMG	34.4830	118.9830	09/04/1942	63433.0	0.0	4.50	0.025	V	29.0(46.7)
DMG	34.4830	118.9830	09/03/1942	14 6 1.0	0.0	4.50	0.025	V	29.0(46.7)
DMG	33.7670	118.4500	10/11/1940	55712.3	0.0	4.70	0.028	V	29.1(46.9)
DMG	33.7830	118.4170	11/01/1940	725 3.0	0.0	4.00	0.020	IV	29.1(46.9)
DMG	33.7830	118.4170	10/12/1940	024 0.0	0.0	4.00	0.020	IV	29.1(46.9)
DMG	33.7830	118.4170	11/02/1940	25826.0	0.0	4.00	0.020	IV	29.1(46.9)
DMG	33.7830	118.4170	10/14/1940	205111.0	0.0	4.00	0.020	IV	29.1(46.9)
MGI	34.2000	119.2000	06/16/1914	1052 0.0	0.0	4.60	0.026	V	29.4(47.3)
MGI	34.0000	118.2000	06/26/1917	424 0.0	0.0	4.00	0.019	IV	29.7(47.8)
MGI	34.0000	118.2000	06/26/1917	2120 0.0	0.0	4.60	0.026	V	29.7(47.8)
MGI	34.0000	118.2000	06/26/1917	2115 0.0	0.0	4.60	0.026	V	29.7(47.8)
MGI	34.0000	118.2000	06/26/1917	2130 0.0	0.0	4.60	0.026	V	29.7(47.8)
MGI	34.0000	118.2000	02/13/1917	13 5 0.0	0.0	4.60	0.026	V	29.7(47.8)
T-A	34.1700	118.1700	03/07/1888	1554 0.0	0.0	4.30	0.022	IV	29.9(48.1)
GSP	34.0300	118.1800	06/12/1989	165718.4	16.0	4.40	0.023	IV	30.2(48.6)
DMG	34.1180	119.2200	03/18/1957	185628.0	13.8	4.70	0.027	V	30.2(48.7)
GSP	34.0200	118.1800	06/12/1989	172225.5	16.0	4.10	0.020	IV	30.4(48.9)
DMG	33.9390	118.2050	01/11/1950	214135.0	0.4	4.10	0.019	IV	31.0(50.0)
DMG	34.5860	118.6130	02/07/1956	31638.6	2.6	4.60	0.025	V	31.2(50.2)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.031	V	31.4(50.6)
DMG	33.8500	118.2670	03/11/1933	629 0.0	0.0	4.40	0.022	IV	31.4(50.6)
PAS	33.9060	119.1660	05/23/1978	91650.8	6.0	4.00	0.018	IV	31.6(50.8)
PAS	34.1490	118.1350	12/03/1988	113826.4	13.3	4.90	0.029	V	31.8(51.2)
DMG	33.8000	118.3000	11/03/1931	16 5 0.0	0.0	4.00	0.018	IV	32.4(52.1)
MGI	33.8000	118.3000	12/31/1928	1045 0.0	0.0	4.00	0.018	IV	32.4(52.1)
PAS	34.5410	118.9890	06/12/1984	02752.4	11.7	4.10	0.018	IV	32.5(52.4)
MGI	33.9000	118.2000	10/08/1927	1914 0.0	0.0	4.60	0.024	IV	32.6(52.4)
DMG	33.8670	118.2170	06/19/1944	3 6 7.0	0.0	4.40	0.021	IV	33.0(53.1)
DMG	33.8670	118.2170	06/19/1944	0 333.0	0.0	4.50	0.022	IV	33.0(53.1)
DMG	33.8670	118.2000	11/13/1933	2128 0.0	0.0	4.00	0.017	IV	33.8(54.4)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.062	VI	33.9(54.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.6000	118.9000	05/18/1940	91512.0	0.0	4.00	0.017	IV	34.0(54.7)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.033	V	34.2(55.1)
PAS	34.0600	118.1000	10/01/1987	1449 5.9	11.7	4.70	0.024	IV	34.2(55.1)
PAS	34.0490	118.1010	10/01/1987	144541.5	13.6	4.70	0.024	IV	34.3(55.2)
DMG	33.9500	118.1330	10/25/1933	7 046.0	0.0	4.30	0.019	IV	34.5(55.5)
PAS	34.0760	118.0900	10/01/1987	1448 3.1	11.7	4.10	0.017	IV	34.6(55.7)
DMG	34.5000	119.1170	11/17/1954	23 351.0	0.0	4.40	0.020	IV	34.8(56.0)
PAS	34.0520	118.0900	10/01/1987	151231.8	10.8	4.70	0.023	IV	34.9(56.2)
DMG	33.8170	118.2170	10/22/1941	65718.5	0.0	4.90	0.026	V	35.1(56.5)
PAS	34.0500	118.0870	10/01/1987	155953.5	10.4	4.00	0.016	IV	35.1(56.5)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.034	V	35.2(56.7)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.046	VI	35.4(57.0)
DMG	33.7590	118.2530	08/31/1938	31814.2	10.0	4.50	0.020	IV	36.3(58.4)
MGI	34.3000	119.3000	05/15/1927	1120 0.0	0.0	4.00	0.016	IV	36.5(58.7)
MGI	34.3000	119.3000	09/28/1926	1749 0.0	0.0	4.00	0.016	IV	36.5(58.7)
MGI	34.3000	119.3000	05/01/1904	1830 0.0	0.0	4.60	0.021	IV	36.5(58.7)
DMG	33.6630	118.4130	01/08/1967	738 5.3	17.7	4.00	0.016	IV	36.5(58.8)
PAS	34.0770	118.0470	02/11/1988	152555.7	12.5	4.70	0.022	IV	37.1(59.7)
DMG	33.6320	118.4670	01/08/1967	73730.4	11.4	4.00	0.015	IV	37.3(60.0)
DMG	33.7830	118.2000	12/27/1939	192849.0	0.0	4.70	0.022	IV	37.3(60.1)
DMG	34.6670	118.8330	01/24/1950	215659.0	0.0	4.00	0.015	IV	37.4(60.1)
DMG	33.9000	118.1000	07/08/1929	1646 6.7	13.0	4.70	0.022	IV	37.6(60.6)
DMG	34.1500	119.3500	08/22/1950	224758.0	0.0	4.20	0.017	IV	37.6(60.6)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.025	V	38.5(61.9)
DMG	33.9670	118.0500	01/30/1941	13446.9	0.0	4.10	0.015	IV	38.5(62.0)
DMG	33.6330	118.4000	10/17/1934	938 0.0	0.0	4.00	0.015	IV	38.7(62.3)
MGI	34.4000	119.3000	08/12/1925	1845 0.0	0.0	4.00	0.014	IV	39.1(63.0)
DMG	33.7500	118.1830	08/04/1933	41748.0	0.0	4.00	0.014	IV	39.6(63.7)
MGI	34.1000	118.0000	01/27/1930	2026 0.0	0.0	4.60	0.019	IV	39.6(63.7)
MGI	34.2000	118.0000	01/09/1921	530 0.0	0.0	4.60	0.019	IV	39.7(63.9)
PAS	33.6300	119.0200	10/23/1981	172816.9	12.0	4.60	0.019	IV	39.9(64.1)
DMG	34.6170	119.0830	02/26/1950	0 622.0	0.0	4.70	0.020	IV	39.9(64.1)
PAS	33.6710	119.1110	09/04/1981	155050.3	5.0	5.30	0.028	V	40.3(64.8)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.030	V	40.3(64.8)
DMG	33.7500	118.1670	05/16/1933	205855.0	0.0	4.00	0.014	IV	40.3(64.8)
DMG	33.7830	118.1330	11/20/1933	1032 0.0	0.0	4.00	0.014	IV	40.3(64.9)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.030	V	40.3(64.9)
DMG	33.7830	118.1330	01/13/1940	749 7.0	0.0	4.00	0.014	IV	40.3(64.9)
PAS	33.6370	119.0560	10/23/1981	191552.5	6.3	4.60	0.019	IV	40.5(65.1)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.031	V	40.6(65.3)
MGI	34.0000	118.0000	05/05/1929	1 7 0.0	0.0	4.60	0.019	IV	40.7(65.5)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.023	IV	40.7(65.5)
MGI	34.0000	118.0000	05/05/1929	735 0.0	0.0	4.00	0.014	IV	40.7(65.5)
GSP	34.2500	117.9900	06/28/1991	170055.5	9.0	4.30	0.016	IV	40.8(65.6)
DMG	34.6830	119.0000	04/06/1943	223624.0	0.0	4.00	0.014	III	41.5(66.8)
DMG	33.7670	118.1170	11/04/1939	2141 0.0	0.0	4.00	0.013	III	41.7(67.1)
DMG	33.7500	118.1330	03/11/1933	11 4 0.0	0.0	4.60	0.018	IV	41.7(67.2)
DMG	33.9960	117.9750	06/15/1967	458 5.5	10.0	4.10	0.014	IV	42.1(67.8)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.030	V	42.6(68.5)
DMG	34.7170	118.9670	06/11/1935	1810 0.0	0.0	4.00	0.013	III	42.9(69.0)
DMG	33.6040	119.1050	03/25/1956	332 2.3	8.2	4.20	0.014	IV	43.9(70.6)
DMG	33.7330	118.1000	03/11/1933	15 9 0.0	0.0	4.40	0.016	IV	43.9(70.7)
DMG	33.7330	118.1000	03/11/1933	1350 0.0	0.0	4.40	0.016	IV	43.9(70.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7330	118.1000	03/11/1933	1447 0.0	0.0	4.40	0.016	IV	43.9(70.7)
DMG	33.7500	118.0830	03/11/1933	436 0.0	0.0	4.60	0.017	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2232 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	835 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	1825 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	1738 0.0	0.0	4.50	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	448 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	2354 0.0	0.0	4.50	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	336 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	740 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	616 0.0	0.0	4.60	0.017	IV	44.0(70.8)
DMG	33.7500	118.0830	03/16/1933	1530 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/21/1933	326 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	1651 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/15/1933	540 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2240 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/25/1933	1346 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1357 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2 4 0.0	0.0	4.90	0.020	IV	44.0(70.8)
DMG	33.7500	118.0830	04/02/1933	1536 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	546 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/19/1933	2123 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/20/1933	1358 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/14/1933	036 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/14/1933	1219 0.0	0.0	4.50	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1138 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	521 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/14/1933	2242 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.023	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	2128 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	04/02/1933	8 0 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	513 0.0	0.0	4.70	0.018	IV	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	343 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	258 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2 5 0.0	0.0	4.30	0.015	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	3 9 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	6 1 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.022	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	311 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	15 2 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/30/1933	1225 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/23/1933	1831 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	22 0 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	751 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	759 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	8 8 0.0	0.0	4.50	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	832 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	515 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	432 0.0	0.0	4.70	0.018	IV	44.0(70.8)
DMG	33.7500	118.0830	03/17/1933	1651 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	553 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	926 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	611 0.0	0.0	4.40	0.016	IV	44.0(70.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	118.0830	03/11/1933	618 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1129 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1956 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/23/1933	840 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/15/1933	2 8 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1141 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	440 0.0	0.0	4.70	0.018	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1147 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	04/01/1933	642 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	837 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/16/1933	1529 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	3 5 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.026	V	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1025 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1045 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	347 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	339 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1944 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	635 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	227 0.0	0.0	4.60	0.017	IV	44.0(70.8)
DMG	33.7500	118.0830	03/15/1933	432 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	23 5 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	252 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	216 0.0	0.0	4.80	0.019	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	11 0 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	259 0.0	0.0	4.60	0.017	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	911 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/18/1933	2052 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	211 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1653 0.0	0.0	4.80	0.019	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	210 0.0	0.0	4.60	0.017	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	1547 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	524 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2231 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.022	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	439 0.0	0.0	4.90	0.020	IV	44.0(70.8)
DMG	33.7500	118.0830	03/31/1933	1049 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	555 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	1532 0.0	0.0	4.10	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	034 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	617 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	257 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/12/1933	027 0.0	0.0	4.40	0.016	IV	44.0(70.8)
DMG	33.7500	118.0830	03/13/1933	1929 0.0	0.0	4.20	0.014	IV	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	222 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.023	IV	44.0(70.8)
DMG	33.7500	118.0830	03/16/1933	1456 0.0	0.0	4.00	0.013	III	44.0(70.8)
DMG	34.5650	118.1130	02/28/1969	45612.4	5.3	4.30	0.015	IV	44.2(71.1)
GSP	34.4810	119.3530	10/23/1996	220929.4	14.0	4.20	0.014	IV	44.5(71.6)
DMG	33.6330	118.2000	11/01/1940	20 046.0	0.0	4.00	0.013	III	44.9(72.2)
DMG	33.6300	118.2000	09/13/1929	132338.2	0.0	4.00	0.012	III	45.0(72.4)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.028	V	45.4(73.1)
DMG	34.2000	117.9000	07/13/1935	105416.5	0.0	4.70	0.018	IV	45.4(73.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.5430	118.3400	09/14/1963	35116.2	2.2	4.20	0.014	III	45.8(73.7)
DMG	33.8000	118.0000	10/21/1913	938 0.0	0.0	4.00	0.012	III	46.0(74.0)
DMG	33.9860	119.4750	08/06/1973	232917.0	16.9	5.00	0.021	IV	46.0(74.1)
DMG	34.7840	118.9020	07/27/1972	03117.4	8.0	4.40	0.015	IV	46.1(74.2)
DMG	34.2500	119.5000	04/13/1917	359 0.0	0.0	4.50	0.015	IV	46.8(75.3)
DMG	34.2500	119.5000	04/21/1917	659 0.0	0.0	4.00	0.012	III	46.8(75.3)
DMG	33.7000	118.0670	07/20/1940	4 113.0	0.0	4.00	0.012	III	46.9(75.4)
DMG	33.7000	118.0670	02/08/1940	165617.0	0.0	4.00	0.012	III	46.9(75.4)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.021	IV	46.9(75.4)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.021	IV	46.9(75.4)
MGI	34.0000	119.5000	05/03/1926	1353 0.0	0.0	4.30	0.014	III	47.2(76.0)
DMG	34.0000	119.5000	03/19/1905	440 0.0	0.0	4.00	0.012	III	47.2(76.0)
DMG	34.0000	119.5000	02/18/1926	1818 0.0	0.0	5.00	0.020	IV	47.2(76.0)
PAS	33.9650	117.8860	01/01/1976	172012.9	6.2	4.20	0.013	III	47.6(76.6)
DMG	33.5830	119.1830	02/10/1952	135055.0	0.0	4.00	0.012	III	47.6(76.6)
DMG	33.7500	118.0000	11/16/1934	2126 0.0	0.0	4.00	0.012	III	47.8(77.0)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.070	VI	47.8(77.0)
DMG	34.3490	119.4920	07/14/1958	52555.3	16.0	4.70	0.017	IV	47.9(77.2)
DMG	34.2670	119.5170	04/12/1944	153310.0	0.0	4.00	0.012	III	48.0(77.2)
USG	34.4180	119.4680	09/07/1984	11 345.2	9.5	4.00	0.012	III	48.3(77.8)
DMG	33.6830	118.0500	03/11/1933	1250 0.0	0.0	4.40	0.014	IV	48.4(77.8)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.026	V	48.4(77.8)
DMG	33.9170	119.5000	08/26/1954	1348 3.0	0.0	4.80	0.017	IV	48.7(78.4)
DMG	33.6170	118.1170	01/20/1934	2117 0.0	0.0	4.50	0.015	IV	48.8(78.5)
PAS	33.5380	118.2070	05/25/1982	134430.3	13.7	4.10	0.012	III	49.9(80.3)
DMG	33.6710	118.0120	10/20/1961	223534.2	5.6	4.10	0.012	III	50.6(81.4)
DMG	34.2670	119.5670	06/29/1968	191357.0	10.0	4.40	0.013	III	50.8(81.7)
DMG	33.5000	118.2500	06/18/1920	10 8 0.0	0.0	4.50	0.014	IV	50.8(81.8)
DMG	34.8350	118.9880	11/29/1936	55445.3	10.0	4.00	0.011	III	51.0(82.0)
MGI	33.8000	117.9000	05/22/1902	740 0.0	0.0	4.30	0.013	III	51.0(82.0)
DMG	34.1000	117.8000	03/31/1931	2033 0.0	0.0	4.00	0.011	III	51.0(82.1)
DMG	33.6800	117.9930	11/20/1961	85334.7	4.4	4.00	0.011	III	51.0(82.1)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.033	V	51.2(82.5)
DMG	34.8670	118.8670	07/22/1952	74455.0	0.0	4.10	0.011	III	51.3(82.5)
DMG	34.2450	119.5880	06/29/1968	203633.6	1.8	4.00	0.011	III	51.7(83.2)
DMG	33.6540	117.9940	10/20/1961	194950.5	4.6	4.30	0.012	III	52.1(83.9)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.020	IV	52.1(83.9)
DMG	33.6170	118.0330	05/21/1938	944 0.0	0.0	4.00	0.011	III	52.2(83.9)
DMG	34.8430	119.0260	03/07/1939	195331.8	10.0	4.00	0.011	III	52.2(84.0)
DMG	33.6650	117.9790	10/20/1961	214240.7	7.2	4.00	0.011	III	52.3(84.2)
DMG	34.5000	119.5000	12/05/1920	1158 0.0	0.0	4.50	0.014	III	52.4(84.4)
DMG	34.5000	119.5000	06/29/1926	2321 0.0	0.0	5.50	0.024	V	52.4(84.4)
DMG	34.5000	119.5000	08/05/1930	1125 0.0	0.0	5.00	0.018	IV	52.4(84.4)
DMG	33.6590	117.9810	10/20/1961	20 714.5	6.1	4.00	0.011	III	52.5(84.4)
DMG	34.3330	119.5830	07/01/1941	2354 0.0	0.0	4.50	0.014	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	848 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	09/15/1941	137 2.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	1025 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/12/1941	1618 0.0	0.0	4.50	0.014	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	821 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	09/25/1941	51256.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	09/08/1941	31423.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	11/18/1941	18 810.0	0.0	4.00	0.011	III	52.6(84.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.3330	119.5830	07/01/1941	1820 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	945 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	11/21/1941	1656 3.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	9 5 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	830 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	09/14/1941	14518.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	09/08/1941	31245.0	0.0	4.50	0.014	III	52.6(84.7)
DMG	34.3330	119.5830	07/03/1941	1926 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/02/1941	2219 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	10/02/1938	1845 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	858 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	34.3330	119.5830	07/01/1941	819 0.0	0.0	4.00	0.011	III	52.6(84.7)
DMG	33.6170	118.0170	10/02/1933	1326 1.0	0.0	4.00	0.011	III	52.8(85.0)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.019	IV	52.8(85.0)
DMG	33.6170	118.0170	03/15/1933	111332.0	0.0	4.90	0.017	IV	52.8(85.0)
DMG	34.3670	119.5830	07/01/1941	75054.8	0.0	5.90	0.030	V	53.3(85.7)
DMG	34.2550	119.6140	07/31/1968	224445.3	15.0	4.00	0.010	III	53.3(85.8)
DMG	34.8670	119.0170	07/21/1952	2153 9.0	0.0	4.30	0.012	III	53.6(86.2)
DMG	33.6000	118.0170	12/25/1935	1715 0.0	0.0	4.50	0.013	III	53.6(86.3)
PAS	34.2510	119.6220	03/23/1988	84247.0	16.4	4.00	0.010	III	53.7(86.4)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.032	V	53.9(86.7)
DMG	33.5610	118.0580	01/15/1937	183547.0	10.0	4.00	0.010	III	53.9(86.8)
DMG	34.4000	117.8000	02/24/1946	6 752.0	0.0	4.10	0.011	III	54.0(86.8)
DMG	34.2540	119.6280	07/08/1968	91837.2	15.7	4.00	0.010	III	54.1(87.0)
DMG	33.4300	119.0960	10/31/1969	103929.0	7.3	4.80	0.016	IV	54.2(87.2)
DMG	33.6000	118.0000	03/11/1933	231 0.0	0.0	4.40	0.012	III	54.3(87.5)
DMG	33.6000	118.0000	03/11/1933	217 0.0	0.0	4.50	0.013	III	54.3(87.5)
DMG	34.8850	119.0020	02/23/1939	91846.7	10.0	4.50	0.013	III	54.5(87.7)
MGI	33.7000	117.9000	07/08/1902	945 0.0	0.0	4.00	0.010	III	54.5(87.7)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.018	IV	54.6(87.8)
DMG	34.1830	119.6460	06/29/1968	63320.9	8.4	4.00	0.010	III	54.6(87.9)
DMG	33.5170	118.1000	03/22/1941	82240.0	0.0	4.00	0.010	III	54.7(88.0)
DMG	34.8830	119.0330	08/20/1952	84747.0	0.0	4.20	0.011	III	54.9(88.4)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.038	V	55.0(88.4)
PAS	34.0060	117.7390	02/18/1989	717 4.8	3.3	4.30	0.012	III	55.2(88.9)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.017	IV	55.5(89.3)
T-A	34.9200	118.9200	08/29/1857	0 0 0.0	0.0	4.30	0.012	III	55.5(89.3)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.017	IV	55.5(89.3)
GSP	34.1500	117.7200	03/01/1990	032303.0	11.0	4.70	0.014	IV	55.5(89.3)
DMG	34.2500	119.6540	06/29/1968	153242.8	14.6	4.10	0.010	III	55.5(89.3)
PDP	33.9550	117.7460	12/14/2001	120135.5	13.0	4.00	0.010	III	55.5(89.4)
GSP	34.1100	117.7200	04/17/1990	223227.2	4.0	4.60	0.014	III	55.5(89.4)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.021	IV	55.6(89.5)
DMG	34.9110	118.9730	02/23/1939	84551.7	10.0	4.50	0.013	III	55.7(89.6)
PAS	34.1360	117.7090	06/26/1988	15 458.5	7.9	4.60	0.013	III	56.1(90.3)
MGI	33.8000	117.8000	05/20/1917	945 0.0	0.0	4.00	0.010	III	56.1(90.3)
MGI	33.8000	117.8000	11/09/1926	1535 0.0	0.0	4.60	0.013	III	56.1(90.3)
MGI	33.8000	117.8000	05/19/1917	719 0.0	0.0	4.00	0.010	III	56.1(90.3)
MGI	33.8000	117.8000	11/04/1926	2238 0.0	0.0	4.60	0.013	III	56.1(90.3)
MGI	33.8000	117.8000	05/19/1917	635 0.0	0.0	4.00	0.010	III	56.1(90.3)
MGI	33.8000	117.8000	11/10/1926	1723 0.0	0.0	4.60	0.013	III	56.1(90.3)
MGI	33.8000	117.8000	11/07/1926	1948 0.0	0.0	4.60	0.013	III	56.1(90.3)
PAS	33.5080	118.0710	11/20/1988	53928.7	6.0	4.50	0.013	III	56.2(90.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.019	IV	56.2(90.5)
DMG	33.7670	117.8170	08/22/1936	521 0.0	0.0	4.00	0.010	III	56.3(90.5)
DMG	34.9030	119.0380	05/08/1939	248 5.3	10.0	4.50	0.013	III	56.3(90.7)
DMG	34.9000	119.0500	07/22/1952	143018.0	0.0	4.30	0.011	III	56.4(90.7)
DMG	33.5670	117.9830	07/07/1937	1112 0.0	0.0	4.00	0.010	III	56.6(91.1)
DMG	33.5670	117.9830	04/17/1934	1833 0.0	0.0	4.00	0.010	III	56.6(91.1)
DMG	33.6670	119.5000	11/30/1939	64251.0	0.0	4.00	0.010	III	56.6(91.1)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.019	IV	56.6(91.2)
GSP	34.1300	117.7000	03/01/1990	003457.1	4.0	4.00	0.010	III	56.7(91.2)
DMG	34.9280	118.9700	01/15/1955	1 3 6.7	9.1	4.30	0.011	III	56.8(91.3)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.020	IV	56.9(91.6)
GSP	34.9180	119.0200	12/24/2000	010421.9	14.0	4.40	0.012	III	57.0(91.7)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.016	IV	57.1(91.9)
GSP	34.1400	117.6900	03/02/1990	172625.4	6.0	4.60	0.013	III	57.2(92.1)
DMG	33.8540	117.7520	10/04/1961	22131.6	4.3	4.10	0.010	III	57.2(92.1)
DMG	34.2120	119.6910	06/26/1968	181111.2	13.9	4.00	0.010	III	57.3(92.3)
MGI	34.0000	117.7000	12/03/1929	9 5 0.0	0.0	4.00	0.010	III	57.5(92.5)
GSP	33.9510	117.7090	01/05/1998	181406.5	11.0	4.30	0.011	III	57.7(92.8)
DMG	34.8410	119.2400	01/11/1958	23 847.4	10.8	4.00	0.010	III	57.7(92.8)
DMG	34.1000	117.6830	01/09/1934	1410 0.0	0.0	4.50	0.012	III	57.7(92.8)
DMG	34.1000	117.6830	01/18/1934	214 0.0	0.0	4.00	0.010	III	57.7(92.8)
DMG	34.1180	119.7020	07/05/1968	04517.2	5.9	5.20	0.018	IV	57.8(93.0)
GSP	33.6200	117.9000	04/07/1989	200730.2	13.0	4.50	0.012	III	57.8(93.0)
DMG	34.9450	118.9680	03/04/1963	201042.3	8.5	4.00	0.010	III	57.8(93.1)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.016	IV	57.9(93.2)
DMG	34.9500	118.9500	10/16/1952	1222 7.0	0.0	4.30	0.011	III	57.9(93.2)
DMG	34.2530	119.6980	06/29/1968	191221.3	9.5	4.20	0.011	III	58.0(93.4)
PAS	33.4710	118.0610	02/27/1984	101815.0	6.0	4.00	0.009	III	58.6(94.3)
DMG	34.9330	119.0670	02/10/1954	235838.0	0.0	4.50	0.012	III	58.9(94.7)
DMG	34.3170	119.7000	10/21/1953	16 238.0	0.0	4.00	0.009	III	58.9(94.8)
DMG	34.9220	119.1030	01/09/1963	6 4 3.8	8.7	4.00	0.009	III	58.9(94.8)
DMG	34.9500	119.0170	11/11/1952	181225.0	0.0	4.10	0.010	III	59.0(94.9)
DMG	34.9670	118.9500	07/30/1952	11 255.0	0.0	4.10	0.010	III	59.0(95.0)
DMG	34.9670	118.9500	11/27/1952	153641.0	0.0	4.00	0.009	III	59.0(95.0)
PAS	34.3470	119.6960	08/13/1978	225453.4	12.8	5.10	0.017	IV	59.1(95.1)
DMG	34.0720	119.7230	07/05/1968	23614.1	4.3	4.00	0.009	III	59.2(95.2)
DMG	34.9830	118.9000	07/24/1952	95032.0	0.0	4.30	0.011	III	59.5(95.7)
DMG	34.9830	118.9000	03/23/1953	17 637.0	0.0	4.00	0.009	III	59.5(95.7)
DMG	35.0000	118.7330	04/29/1953	124745.0	0.0	4.70	0.013	III	59.5(95.8)
DMG	35.0000	118.7330	08/23/1952	6 3 3.0	0.0	4.30	0.011	III	59.5(95.8)
DMG	34.1920	119.7330	07/05/1968	036 6.4	15.6	4.00	0.009	III	59.6(95.9)
DMG	34.9670	119.0000	09/02/1952	204556.0	0.0	4.70	0.013	III	59.8(96.3)
DMG	35.0000	118.8330	12/01/1952	52610.0	0.0	4.40	0.011	III	60.0(96.6)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.017	IV	60.0(96.6)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.020	IV	60.0(96.6)
DMG	33.3390	119.1040	10/24/1969	202642.5	-1.8	4.70	0.013	III	60.1(96.7)
MGI	34.4000	119.7000	08/26/1927	1240 0.0	0.0	4.00	0.009	III	60.3(97.1)
MGI	34.4000	119.7000	08/09/1926	412 0.0	0.0	4.00	0.009	III	60.3(97.1)
MGI	34.4000	119.7000	03/25/1806	8 0 0.0	0.0	5.00	0.015	IV	60.3(97.1)
MGI	34.4000	119.7000	06/24/1926	1530 0.0	0.0	4.00	0.009	III	60.3(97.1)
MGI	34.4000	119.7000	07/06/1926	1745 0.0	0.0	4.00	0.009	III	60.3(97.1)
GDP	33.8060	117.7150	03/07/2000	002028.2	11.0	4.00	0.009	III	60.4(97.3)
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.016	IV	60.6(97.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.1760	119.7540	07/07/1968	143330.8	12.8	4.50	0.012	III	60.8(97.8)
T-A	34.5000	119.6700	03/14/1857	23 0 0.0	0.0	4.30	0.010	III	61.1(98.4)
T-A	34.5000	119.6700	07/09/1885	0 0 0.0	0.0	4.30	0.010	III	61.1(98.4)
T-A	34.5000	119.6700	02/09/1902	15 0 0.0	0.0	4.30	0.010	III	61.1(98.4)
T-A	34.5000	119.6700	06/25/1855	22 0 0.0	0.0	4.30	0.010	III	61.1(98.4)
T-A	34.5000	119.6700	06/01/1893	12 0 0.0	0.0	5.00	0.015	IV	61.1(98.4)
T-A	34.5000	119.6700	05/31/1854	1250 0.0	0.0	4.30	0.010	III	61.1(98.4)
DMG	34.9830	119.0330	07/21/1952	235328.0	0.0	4.50	0.012	III	61.4(98.9)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.054	VI	61.5(99.0)
GSP	34.3740	117.6490	08/20/1998	234958.4	9.0	4.40	0.011	III	61.7(99.2)
DMG	33.3670	118.1500	04/16/1942	72833.0	0.0	4.00	0.009	III	61.7(99.3)
DMG	34.4900	119.6910	09/16/1962	181235.2	13.3	4.00	0.009	III	62.0(99.7)
DMG	35.0000	119.0000	07/21/1952	1417 0.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/22/1952	82122.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1317 0.0	0.0	4.00	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/22/1952	175236.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1259 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.015	IV	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1638 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1313 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1415 0.0	0.0	4.40	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/22/1952	133143.0	0.0	4.80	0.013	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	14 6 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	01/25/1919	2229 0.0	0.0	4.00	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1222 0.0	0.0	4.90	0.014	IV	62.0(99.8)
DMG	35.0000	119.0000	08/10/1952	194424.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1553 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1442 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1336 0.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1542 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	03/13/1929	228 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1311 0.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	13 8 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1617 0.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	132512.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	12 7 0.0	0.0	4.70	0.013	III	62.0(99.8)
DMG	35.0000	119.0000	07/25/1952	0 3 0.0	0.0	4.00	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	18 0 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1359 0.0	0.0	4.60	0.012	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1212 0.0	0.0	4.60	0.012	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1451 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1536 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	07/22/1952	191024.0	0.0	4.10	0.009	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	12 6 0.0	0.0	4.80	0.013	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1228 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1239 0.0	0.0	4.20	0.010	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1240 0.0	0.0	4.90	0.014	IV	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.035	V	62.0(99.8)
DMG	35.0000	119.0000	07/23/1952	043 8.0	0.0	4.40	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1218 0.0	0.0	4.40	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1210 0.0	0.0	4.50	0.011	III	62.0(99.8)
DMG	35.0000	119.0000	07/21/1952	1225 0.0	0.0	4.70	0.013	III	62.0(99.8)
DMG	35.0000	119.0170	05/25/1953	324 1.0	0.0	4.80	0.013	III	62.3(100.2)

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FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.088	VII	62.3(100.2)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.025	V	62.3(100.2)
DMG	35.0330	118.8500	10/07/1953	145921.0	0.0	4.90	0.014	IV	62.4(100.4)
DMG	34.3250	119.7610	08/09/1956	0 849.2	4.0	4.00	0.009	III	62.4(100.4)
DMG	35.0000	119.0330	07/21/1952	1159 0.0	0.0	4.50	0.011	III	62.6(100.7)
DMG	35.0000	119.0330	07/21/1952	1158 0.0	0.0	4.60	0.012	III	62.6(100.7)
DMG	35.0000	119.0330	07/21/1952	1155 0.0	0.0	4.50	0.011	III	62.6(100.7)
DMG	35.0000	119.0330	07/21/1952	1157 0.0	0.0	4.50	0.011	III	62.6(100.7)
DMG	35.0000	119.0330	07/21/1952	1154 0.0	0.0	4.50	0.011	III	62.6(100.7)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.021	IV	62.6(100.7)
MGI	34.5000	119.7000	08/26/1919	1457 0.0	0.0	4.00	0.009	III	62.7(100.9)
MGI	34.5000	119.7000	08/26/1919	1212 0.0	0.0	4.00	0.009	III	62.7(100.9)
MGI	34.5000	119.7000	07/29/1925	14 0 0.0	0.0	4.00	0.009	III	62.7(100.9)
DMG	35.0000	119.0500	09/12/1952	103525.0	0.0	4.50	0.011	III	62.9(101.2)
DMG	35.0170	118.9830	08/17/1952	9 9 7.0	0.0	4.10	0.009	III	62.9(101.2)
DMG	35.0330	118.9170	07/23/1952	211658.0	0.0	4.10	0.009	III	63.1(101.5)
DMG	34.3500	119.7670	11/10/1940	102510.0	0.0	4.00	0.009	III	63.1(101.5)
DMG	35.0330	118.9330	07/22/1952	223133.0	0.0	4.70	0.012	III	63.3(101.8)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.027	V	63.3(101.8)
DMG	34.1830	117.5830	10/03/1948	24628.0	0.0	4.00	0.009	III	63.4(102.0)
DMG	34.2000	119.8000	12/21/1812	19 0 0.0	0.0	7.00	0.052	VI	63.5(102.1)
DMG	35.0000	119.0830	11/07/1952	85535.0	0.0	4.60	0.012	III	63.5(102.2)
PAS	35.0000	119.1030	05/13/1975	02135.6	19.1	4.50	0.011	III	63.9(102.8)
DMG	35.0170	119.0500	08/05/1953	122059.0	0.0	4.30	0.010	III	64.0(103.0)
DMG	35.0500	118.9000	09/25/1952	162136.0	0.0	4.10	0.009	III	64.0(103.0)
DMG	35.0330	119.0000	07/22/1952	101939.0	0.0	4.10	0.009	III	64.2(103.3)
DMG	35.0670	118.6170	07/23/1952	235136.0	0.0	4.00	0.009	III	64.2(103.4)
DMG	35.0670	118.7670	07/22/1952	21 211.0	0.0	4.20	0.009	III	64.2(103.4)
DMG	34.3000	119.8000	06/29/1925	144216.0	0.0	6.25	0.031	V	64.3(103.4)
MGI	34.3000	119.8000	07/03/1925	1638 0.0	0.0	5.30	0.017	IV	64.3(103.4)
MGI	34.3000	119.8000	07/03/1925	1821 0.0	0.0	5.30	0.017	IV	64.3(103.4)
DMG	35.0500	118.9500	08/17/1952	614 4.0	0.0	4.00	0.009	III	64.6(104.0)
DMG	35.0500	118.9500	11/14/1952	2334 1.4	0.0	4.00	0.009	III	64.6(104.0)
DMG	33.9500	117.5830	04/11/1941	12024.0	0.0	4.00	0.008	III	64.7(104.2)
DMG	34.4710	119.7570	11/16/1958	934 6.1	15.2	4.00	0.008	III	65.0(104.5)
DMG	35.0670	118.8830	08/17/1952	21 442.0	0.0	4.30	0.010	III	65.0(104.6)
DMG	35.0670	118.8830	08/14/1952	114146.0	0.0	4.20	0.009	III	65.0(104.6)
DMG	34.3040	117.5700	05/05/1969	16 2 9.6	8.8	4.40	0.010	III	65.0(104.6)
DMG	35.0330	119.0500	08/07/1952	163151.0	0.0	4.90	0.014	III	65.0(104.6)
DMG	35.0330	119.0500	07/27/1952	71611.0	0.0	4.10	0.009	III	65.0(104.6)
DMG	35.0330	119.0500	08/18/1952	44010.0	0.0	4.70	0.012	III	65.0(104.6)
DMG	35.0450	119.0040	03/23/1956	212327.1	12.1	4.30	0.010	III	65.0(104.7)
PAS	35.0460	119.0010	06/05/1975	144645.3	9.0	4.10	0.009	III	65.1(104.7)
DMG	33.5450	117.8070	10/27/1969	1316 2.3	6.5	4.50	0.011	III	65.2(104.9)
DMG	33.4000	119.4000	07/24/1947	1654 2.0	0.0	4.30	0.010	III	65.2(105.0)
DMG	33.2910	119.1930	10/24/1969	82912.1	10.0	5.10	0.015	IV	65.2(105.0)
DMG	35.0830	118.7500	07/26/1952	15 831.0	0.0	4.40	0.010	III	65.3(105.1)
DMG	35.0830	118.7500	07/22/1952	84734.0	0.0	4.70	0.012	III	65.3(105.1)
DMG	35.0830	118.7500	07/26/1952	18 244.0	0.0	4.00	0.008	III	65.3(105.1)
DMG	34.1830	117.5480	09/01/1937	163533.5	10.0	4.50	0.011	III	65.4(105.2)
DMG	35.0830	118.5830	07/22/1952	81624.0	0.0	4.40	0.010	III	65.5(105.4)
DMG	35.0830	118.5830	08/04/1952	535 0.0	0.0	4.00	0.008	III	65.5(105.4)
DMG	35.0670	118.9330	07/23/1952	223220.0	0.0	4.10	0.009	III	65.5(105.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.0630	118.4230	08/26/1952	205640.6	-0.8	4.40	0.010	III	65.6(105.6)
MGI	34.4000	119.8000	09/09/1929	515 0.0	0.0	4.60	0.011	III	65.8(105.9)
DMG	34.2810	117.5520	09/13/1970	44748.6	8.0	4.40	0.010	III	65.8(105.9)
PAS	35.0180	119.1410	11/10/1981	223435.5	3.1	4.50	0.011	III	65.9(106.0)
PAS	34.4020	119.8020	03/10/1986	153316.3	18.0	4.10	0.009	III	65.9(106.1)
DMG	35.0330	119.1000	01/12/1954	234037.0	0.0	4.10	0.009	III	66.0(106.2)
DMG	35.0330	119.1000	09/02/1953	152756.0	0.0	4.00	0.008	III	66.0(106.2)
DMG	35.0330	119.1000	02/07/1954	0 953.0	0.0	4.40	0.010	III	66.0(106.2)
DMG	35.0330	119.1000	01/13/1954	14531.0	0.0	4.40	0.010	III	66.0(106.2)
DMG	35.0670	118.9830	08/04/1952	194750.0	0.0	4.00	0.008	III	66.2(106.5)
DMG	34.1670	117.5330	03/01/1948	81213.0	0.0	4.70	0.012	III	66.2(106.5)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.018	IV	66.4(106.8)
PAS	35.0120	119.1790	11/10/1981	2237 5.0	9.4	4.20	0.009	III	66.4(106.8)
DMG	35.1000	118.6170	09/26/1952	202120.0	0.0	4.00	0.008	III	66.5(107.0)
DMG	34.2110	117.5300	09/01/1937	1348 8.2	10.0	4.50	0.011	III	66.5(107.0)
PAS	34.2110	117.5300	10/19/1979	122237.8	4.9	4.10	0.009	III	66.5(107.0)
DMG	34.3330	119.8330	06/26/1933	62542.0	0.0	4.30	0.010	III	66.5(107.1)
DMG	34.3330	119.8330	06/26/1933	62752.0	0.0	4.30	0.010	III	66.5(107.1)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.014	IV	66.7(107.4)
DMG	33.8000	117.6000	09/16/1903	1210 0.0	0.0	4.00	0.008	III	66.7(107.4)
PAS	35.0950	118.5190	06/22/1981	45747.3	5.0	4.00	0.008	III	66.7(107.4)
PAS	35.0350	119.1370	06/16/1978	42131.6	1.8	4.30	0.010	III	66.9(107.6)
DMG	34.1270	117.5210	12/27/1938	10 928.6	10.0	4.00	0.008	III	66.9(107.6)
DMG	35.0670	119.0330	07/27/1952	113438.0	0.0	4.10	0.009	III	67.0(107.8)
DMG	35.0670	119.0330	07/23/1952	175329.0	0.0	4.10	0.009	III	67.0(107.8)
DMG	35.0660	119.0490	01/24/1974	5 2 0.8	6.4	4.30	0.009	III	67.2(108.1)
DMG	34.1400	117.5150	01/01/1965	8 418.0	5.9	4.40	0.010	III	67.2(108.2)
T-A	34.4200	119.8200	00/00/1862	0 0 0.0	0.0	5.70	0.021	IV	67.3(108.2)
DMG	35.0670	119.0670	02/24/1954	223022.0	0.0	4.50	0.010	III	67.6(108.7)
DMG	34.2670	117.5180	09/12/1970	141011.2	8.0	4.10	0.009	III	67.6(108.8)
DMG	35.0500	119.1330	05/23/1953	75255.0	0.0	4.20	0.009	III	67.7(109.0)
DMG	35.0500	119.1330	08/06/1953	1120 4.0	0.0	4.40	0.010	III	67.7(109.0)
DMG	34.2000	117.5000	06/14/1892	1325 0.0	0.0	4.90	0.013	III	68.2(109.7)
DMG	35.1000	118.9670	08/25/1952	62026.0	0.0	4.70	0.012	III	68.2(109.7)
DMG	35.0500	119.1670	12/14/1950	135623.0	0.0	4.40	0.010	III	68.5(110.2)
DMG	35.1170	118.4810	05/01/1953	64820.9	2.4	4.10	0.008	III	68.6(110.4)
DMG	35.1000	119.0000	07/22/1952	14 511.0	0.0	4.30	0.009	III	68.6(110.5)
DMG	35.1000	119.0000	07/24/1952	311 7.0	0.0	4.10	0.008	III	68.6(110.5)
DMG	35.1330	118.7000	09/02/1952	124132.0	0.0	4.60	0.011	III	68.6(110.5)
DMG	35.1330	118.7670	07/21/1952	194122.0	0.0	5.50	0.018	IV	68.8(110.7)
DMG	35.1330	118.7670	07/25/1952	143442.0	0.0	4.40	0.010	III	68.8(110.7)
DMG	34.0000	117.5000	07/03/1908	1255 0.0	0.0	4.00	0.008	III	68.8(110.7)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.048	VI	68.8(110.7)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.034	V	68.9(110.9)
DMG	34.1240	117.4800	05/15/1955	17 326.0	7.6	4.00	0.008	II	69.2(111.4)
DMG	35.1330	118.5170	07/28/1952	54554.0	0.0	4.20	0.009	III	69.4(111.6)
DMG	35.1330	118.5170	07/23/1952	152524.0	0.0	4.00	0.008	II	69.4(111.6)
DMG	35.1330	118.5170	08/14/1952	72822.0	0.0	4.10	0.008	III	69.4(111.6)
DMG	35.1330	118.5170	07/22/1952	141 2.0	0.0	4.50	0.010	III	69.4(111.6)
DMG	34.1160	117.4750	06/28/1960	20 048.0	12.0	4.10	0.008	III	69.5(111.9)
GSP	35.0980	118.3060	12/31/1995	214823.1	7.0	4.00	0.008	II	69.8(112.3)
DMG	35.1500	118.6830	08/13/1952	173925.0	0.0	4.70	0.011	III	69.8(112.4)
DMG	35.1500	118.6330	01/27/1954	141948.0	0.0	5.00	0.013	III	69.9(112.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.1000	119.0830	07/24/1946	019 8.0	0.0	4.00	0.008	II	70.0(112.7)
DMG	35.1000	119.0830	12/06/1934	743 0.0	0.0	4.00	0.008	II	70.0(112.7)
DMG	35.0500	119.2330	08/19/1952	191226.0	0.0	4.50	0.010	III	70.0(112.7)
DMG	34.2170	117.4670	03/25/1941	234341.0	0.0	4.00	0.008	II	70.1(112.9)
PAS	34.1350	117.4480	01/08/1983	71930.4	4.6	4.10	0.008	III	71.0(114.3)
DMG	35.0830	119.2330	03/03/1956	62412.0	0.0	4.20	0.008	III	72.1(116.0)
DMG	35.1830	118.6500	07/21/1952	151358.0	0.0	5.10	0.014	III	72.1(116.1)
DMG	35.1830	118.6000	07/26/1952	2241 3.0	0.0	4.60	0.010	III	72.3(116.3)
DMG	35.1830	118.6000	07/29/1952	154950.0	0.0	4.90	0.012	III	72.3(116.3)
DMG	35.1830	118.6000	07/26/1952	63850.0	0.0	4.00	0.008	II	72.3(116.3)
DMG	34.1320	117.4260	04/15/1965	20 833.3	5.5	4.50	0.010	III	72.3(116.4)
DMG	34.1120	117.4260	03/19/1937	12338.4	10.0	4.00	0.008	II	72.3(116.4)
DMG	33.6820	117.5530	07/05/1938	18 655.7	10.0	4.50	0.010	III	72.4(116.6)
DMG	35.1500	119.0500	11/11/1952	1722 8.0	0.0	4.20	0.008	III	72.7(117.0)
DMG	33.7170	117.5170	06/19/1935	1117 0.0	0.0	4.00	0.007	II	73.3(118.0)
T-A	34.0000	117.4200	04/12/1888	1315 0.0	0.0	4.30	0.009	III	73.3(118.0)
T-A	34.0000	117.4200	09/10/1920	1415 0.0	0.0	4.30	0.009	III	73.3(118.0)
DMG	35.2000	118.6330	07/22/1952	321 5.0	0.0	4.40	0.009	III	73.3(118.0)
GSP	35.1490	119.1040	05/28/1993	044740.6	21.0	5.20	0.014	IV	73.6(118.4)
DMG	35.1990	118.5310	09/01/1961	165148.9	4.5	4.00	0.007	II	73.8(118.7)
DMG	33.7170	117.5070	08/06/1938	22 056.0	10.0	4.00	0.007	II	73.8(118.8)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.017	IV	73.9(118.9)
DMG	35.1940	118.4650	07/22/1952	19 858.2	3.7	4.30	0.009	III	74.0(119.1)
DMG	33.7250	117.4980	01/03/1956	02548.9	13.7	4.70	0.011	III	74.1(119.2)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.017	IV	74.1(119.3)
DMG	33.2670	119.4500	11/18/1947	2159 3.0	0.0	5.00	0.012	III	74.3(119.6)
GSP	34.1900	117.3900	12/28/1989	094108.1	15.0	4.50	0.009	III	74.4(119.8)
DMG	35.2170	118.6670	09/14/1952	204324.0	0.0	4.10	0.008	II	74.5(119.8)
MGI	34.0000	117.4000	05/22/1907	652 0.0	0.0	4.60	0.010	III	74.5(119.8)
DMG	33.7480	117.4790	06/22/1971	104119.0	8.0	4.20	0.008	III	74.5(119.9)
USG	34.1390	117.3860	02/21/1987	231530.1	2.6	4.07	0.008	II	74.6(120.0)
DMG	35.2170	118.8170	12/15/1953	124436.0	0.0	4.60	0.010	III	74.8(120.4)
DMG	35.2170	118.8170	07/23/1952	1317 5.0	0.0	5.70	0.019	IV	74.8(120.4)
DMG	33.7330	117.4670	10/26/1954	162226.0	0.0	4.10	0.008	II	75.5(121.5)
DMG	35.2330	118.6000	01/10/1953	221738.0	0.0	4.00	0.007	II	75.7(121.9)
DMG	35.2330	118.6000	07/22/1952	91025.0	0.0	4.50	0.009	III	75.7(121.9)
DMG	35.1840	119.0990	07/01/1959	234923.4	9.0	4.70	0.010	III	75.8(122.0)
DMG	35.2290	118.5130	06/28/1957	1132 0.8	1.6	4.10	0.008	II	76.0(122.2)
DMG	33.0380	118.7340	09/13/1937	221439.5	10.0	4.00	0.007	II	76.0(122.4)
DMG	35.2330	118.5330	03/17/1953	161517.0	0.0	4.00	0.007	II	76.1(122.4)
DMG	35.2330	118.5330	07/22/1952	15 314.0	0.0	4.20	0.008	II	76.1(122.4)
DMG	35.2330	118.5330	07/21/1952	174244.0	0.0	5.10	0.013	III	76.1(122.4)
DMG	35.2330	118.5330	07/30/1952	144650.0	0.0	4.10	0.008	II	76.1(122.4)
DMG	35.2330	118.5330	07/24/1952	1735 6.0	0.0	4.20	0.008	II	76.1(122.4)
DMG	35.2330	118.5330	07/29/1952	173643.0	0.0	4.40	0.009	III	76.1(122.4)
DMG	35.2350	118.5480	03/03/1973	181449.5	8.0	4.00	0.007	II	76.1(122.5)
DMG	34.0000	120.0170	04/01/1945	234342.0	0.0	5.40	0.015	IV	76.4(123.0)
DMG	35.2410	118.5600	07/21/1952	1912 7.4	5.8	4.30	0.008	III	76.5(123.1)
DMG	35.2390	118.5180	07/21/1952	2021 5.1	-2.0	4.20	0.008	II	76.6(123.3)
DMG	33.8330	117.4000	06/05/1940	82727.0	0.0	4.00	0.007	II	76.9(123.7)
DMG	34.0330	117.3500	04/18/1940	184343.9	0.0	4.40	0.009	III	77.0(124.0)
DMG	33.9330	117.3670	10/24/1943	02921.0	0.0	4.00	0.007	II	77.1(124.1)
DMG	35.1830	119.1740	06/04/1956	83319.3	14.3	4.00	0.007	II	77.1(124.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.1180	117.3410	09/22/1951	82239.1	11.9	4.30	0.008	III	77.2(124.2)
DMG	34.1400	117.3390	02/26/1936	93327.6	10.0	4.00	0.007	II	77.3(124.4)
DMG	34.1270	117.3380	02/23/1936	222042.7	10.0	4.50	0.009	III	77.3(124.5)
GSP	34.1680	117.3370	06/28/1997	214525.1	9.0	4.20	0.008	II	77.4(124.6)
DMG	35.2500	118.4830	07/23/1952	1330 4.0	0.0	4.40	0.009	III	77.6(124.9)
DMG	35.2500	118.4830	07/23/1952	93842.0	0.0	4.20	0.008	II	77.6(124.9)
T-A	34.1700	117.3200	12/02/1859	2210 0.0	0.0	4.30	0.008	III	78.4(126.1)
DMG	34.0330	117.3170	09/03/1935	647 0.0	0.0	4.50	0.009	III	78.9(127.0)
DMG	35.2670	118.4500	07/21/1952	191619.0	0.0	4.30	0.008	III	79.1(127.3)
DMG	35.2830	118.5830	07/31/1952	1719 8.0	0.0	4.50	0.009	III	79.2(127.5)
DMG	35.2830	118.5500	07/23/1952	34928.0	0.0	4.70	0.010	III	79.4(127.8)
DMG	35.2830	118.5500	07/23/1952	737 0.0	0.0	4.80	0.010	III	79.4(127.8)
DMG	35.2830	118.5500	07/31/1952	41022.0	0.0	4.20	0.008	II	79.4(127.8)
DMG	35.2830	118.5500	08/01/1952	31611.6	0.0	4.50	0.009	III	79.4(127.8)
DMG	35.2830	118.5500	07/26/1952	922 6.0	0.0	4.30	0.008	III	79.4(127.8)
DMG	35.2830	118.5500	07/22/1952	15151.0	0.0	4.40	0.008	III	79.4(127.8)
MGI	34.1000	117.3000	11/22/1911	257 0.0	0.0	4.00	0.007	II	79.6(128.0)
MGI	34.1000	117.3000	12/27/1901	11 0 0.0	0.0	4.60	0.009	III	79.6(128.0)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.014	III	79.6(128.0)
DMG	34.1000	117.3000	02/16/1931	1327 0.0	0.0	4.00	0.007	II	79.6(128.0)
MGI	34.2000	117.3000	04/13/1913	1045 0.0	0.0	4.00	0.007	II	79.6(128.1)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.011	III	79.9(128.6)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.011	III	79.9(128.6)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.021	IV	79.9(128.6)
DMG	35.3000	118.6670	08/13/1952	212548.0	0.0	4.10	0.007	II	80.2(129.0)
DMG	35.3000	118.8000	12/23/1905	2223 0.0	0.0	5.00	0.011	III	80.4(129.4)
DMG	35.2900	118.4700	07/24/1952	12 757.6	14.1	4.10	0.007	II	80.5(129.5)
DMG	35.2890	118.4600	07/26/1952	1 221.3	10.8	4.20	0.007	II	80.5(129.5)
GSP	32.9750	118.7910	03/04/1992	190627.0	6.0	4.20	0.007	II	80.5(129.6)
DMG	35.3000	118.5330	07/21/1952	182338.0	0.0	4.50	0.009	III	80.7(129.8)
DMG	35.3000	118.5330	09/02/1952	1638 9.0	0.0	4.00	0.007	II	80.7(129.8)
DMG	35.3000	118.5330	07/30/1952	95929.0	0.0	4.00	0.007	II	80.7(129.8)
DMG	35.3000	118.5330	07/21/1952	182628.0	0.0	4.10	0.007	II	80.7(129.8)
DMG	35.3000	118.5000	02/19/1953	812 6.0	0.0	4.40	0.008	III	80.9(130.2)
DMG	35.2890	118.4110	08/10/1952	122318.0	4.0	4.60	0.009	III	81.0(130.3)
DMG	33.1500	119.4500	06/17/1934	243 0.0	0.0	4.00	0.007	II	81.0(130.4)
DMG	33.1500	119.4500	01/05/1940	62052.0	0.0	4.00	0.007	II	81.0(130.4)
DMG	34.0000	117.2830	11/07/1939	1852 8.4	0.0	4.70	0.010	III	81.1(130.5)
DMG	35.3050	118.5070	08/09/1952	10 732.1	-2.0	4.20	0.007	II	81.2(130.7)
DMG	35.3030	118.4810	09/04/1952	18 649.1	5.8	4.40	0.008	III	81.3(130.8)
DMG	35.3030	118.4730	08/01/1952	213522.4	4.2	4.00	0.007	II	81.3(130.9)
DMG	35.3080	118.5160	07/31/1952	19 515.4	7.3	4.00	0.007	II	81.3(130.9)
DMG	35.2990	118.4350	07/25/1952	20 6 6.1	-1.4	4.80	0.010	III	81.4(131.0)
PAS	34.6610	119.9730	05/07/1984	193232.8	9.9	4.20	0.007	II	81.4(131.0)
DMG	35.2940	118.4010	08/13/1952	42940.6	14.5	4.60	0.009	III	81.4(131.1)
DMG	35.3000	118.4320	07/23/1952	61045.9	14.5	4.20	0.007	II	81.5(131.2)
DMG	35.3140	118.5300	07/26/1952	225856.1	6.8	4.30	0.008	II	81.7(131.4)
DMG	35.3110	118.4990	07/25/1952	1313 8.2	2.8	5.00	0.011	III	81.7(131.4)
DMG	35.3150	118.5160	07/25/1952	194323.7	11.2	5.70	0.017	IV	81.8(131.7)
DMG	33.9960	117.2700	02/17/1952	123658.3	16.0	4.50	0.009	III	81.9(131.8)
DMG	35.3130	118.4890	10/20/1952	181443.6	14.0	4.30	0.008	II	81.9(131.8)
DMG	35.3160	118.5140	07/24/1952	14 525.9	5.4	4.30	0.008	II	81.9(131.8)
DMG	35.3140	118.4820	08/30/1952	45559.8	5.5	4.70	0.009	III	82.0(132.0)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	35.2100	118.0660	07/11/1992	181416.2	10.0	5.70	0.017	IV	82.0(132.0)
MGI	35.3000	119.0000	09/04/1908	0 0 0.0	0.0	4.60	0.009	III	82.1(132.1)
MGI	35.3000	119.0000	01/08/1903	030 0.0	0.0	4.60	0.009	III	82.1(132.1)
DMG	35.3210	118.5400	07/24/1952	141012.2	9.5	4.00	0.007	II	82.1(132.1)
DMG	35.3160	118.4870	09/15/1952	44013.2	4.2	4.90	0.011	III	82.1(132.1)
DMG	35.3170	118.4940	07/25/1952	19 944.6	5.5	5.70	0.017	IV	82.1(132.2)
DMG	35.3200	118.5180	07/27/1952	0 915.6	6.5	4.20	0.007	II	82.2(132.2)
GDP	34.0470	117.2550	02/21/2000	134943.1	15.0	4.50	0.008	III	82.4(132.5)
DMG	35.3210	118.4940	02/11/1955	194431.5	14.7	4.50	0.008	III	82.4(132.6)
T-A	34.0800	117.2500	10/07/1869	0 0 0.0	0.0	4.30	0.008	II	82.5(132.7)
DMG	35.3330	118.7330	08/05/1952	65010.0	0.0	4.40	0.008	III	82.5(132.8)
DMG	35.3330	118.6000	09/16/1952	142454.0	0.0	4.00	0.007	II	82.6(133.0)
DMG	35.3330	118.6000	07/31/1952	12 9 9.0	0.0	5.80	0.018	IV	82.6(133.0)
DMG	35.3330	118.6000	07/23/1952	164853.0	0.0	4.50	0.008	III	82.6(133.0)
DMG	35.3330	118.6000	07/23/1952	161838.0	0.0	4.50	0.008	III	82.6(133.0)
DMG	35.3330	118.6000	08/10/1952	6 118.0	0.0	4.00	0.007	II	82.6(133.0)
DMG	35.3240	118.4860	01/20/1953	81322.8	7.2	4.00	0.007	II	82.7(133.0)
DMG	35.3170	118.9500	09/01/1952	1039 0.0	0.0	4.10	0.007	II	82.7(133.0)
DMG	35.3330	118.5670	08/08/1952	51718.0	0.0	4.00	0.007	II	82.8(133.2)
DMG	35.3300	118.5070	05/29/1968	22938.7	3.1	4.00	0.007	II	82.9(133.4)
DMG	35.3330	118.5330	08/01/1952	103556.0	0.0	4.00	0.007	II	82.9(133.5)
DMG	34.0000	117.2500	11/01/1932	445 0.0	0.0	4.00	0.007	II	83.0(133.5)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.024	IV	83.0(133.5)
PAS	34.0230	117.2450	10/02/1985	234412.4	15.2	4.80	0.010	III	83.1(133.7)
DMG	35.3370	118.5370	08/30/1952	45954.8	3.5	4.00	0.007	II	83.2(133.9)
DMG	35.3380	118.5230	08/06/1952	34624.2	12.6	4.30	0.008	II	83.4(134.1)
DMG	35.3330	118.9170	08/22/1952	224124.0	0.0	5.80	0.018	IV	83.4(134.3)
DMG	35.3330	118.9170	07/29/1952	195132.0	0.0	4.50	0.008	III	83.4(134.3)
DMG	35.3330	118.9170	07/31/1952	195314.0	0.0	4.50	0.008	III	83.4(134.3)
DMG	35.3330	118.9170	08/07/1952	1919 7.0	0.0	4.20	0.007	II	83.4(134.3)
DMG	35.3350	118.4740	07/23/1952	172224.0	6.6	4.50	0.008	III	83.5(134.4)
DMG	35.3360	118.4720	07/23/1952	105413.5	19.7	4.10	0.007	II	83.6(134.5)
DMG	35.3400	118.4730	07/24/1952	5 249.6	2.1	4.50	0.008	III	83.9(135.0)
DMG	34.0430	117.2280	04/03/1939	25044.7	10.0	4.00	0.006	II	83.9(135.1)
GSP	34.0240	117.2300	03/11/1998	121851.8	14.0	4.50	0.008	III	83.9(135.1)
DMG	35.3450	118.5070	07/23/1952	18 328.3	10.4	4.00	0.006	II	83.9(135.1)
T-A	35.3300	119.0000	01/04/1870	7 0 0.0	0.0	4.30	0.007	II	84.1(135.3)
DMG	35.3510	118.5270	08/11/1952	132149.2	-2.0	4.40	0.008	II	84.2(135.5)
DMG	35.3580	118.6160	08/24/1955	17 540.9	7.2	4.00	0.006	II	84.3(135.6)
DMG	35.3460	118.4650	12/25/1952	55633.0	4.6	4.10	0.007	II	84.3(135.7)
DMG	35.3560	118.5380	07/19/1955	2 425.5	6.4	4.10	0.007	II	84.5(136.0)
DMG	35.3670	118.5830	07/23/1952	65342.0	0.0	4.20	0.007	II	85.0(136.8)
DMG	35.3670	118.5830	07/23/1952	04738.0	0.0	4.60	0.009	III	85.0(136.8)
DMG	35.3670	118.5830	07/28/1952	154120.0	0.0	4.00	0.006	II	85.0(136.8)
DMG	35.3670	118.5830	07/27/1952	73539.0	0.0	4.20	0.007	II	85.0(136.8)
DMG	35.3670	118.5830	07/23/1952	03832.0	0.0	6.10	0.021	IV	85.0(136.8)
DMG	35.3670	118.5830	09/16/1952	1521 8.0	0.0	4.30	0.007	II	85.0(136.8)
DMG	35.3670	118.5830	07/23/1952	31923.0	0.0	5.00	0.011	III	85.0(136.8)
DMG	35.3670	118.5830	07/23/1952	62628.0	0.0	4.00	0.006	II	85.0(136.8)
DMG	35.3670	118.5830	07/23/1952	4 140.0	0.0	4.70	0.009	III	85.0(136.8)
DMG	35.3500	118.9670	02/04/1954	204841.0	0.0	4.00	0.006	II	85.1(136.9)
DMG	35.3670	118.8330	03/17/1935	2026 0.0	0.0	4.00	0.006	II	85.2(137.1)
DMG	35.3670	118.5330	07/23/1952	195134.0	0.0	4.20	0.007	II	85.3(137.2)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	35.3720	118.7740	12/15/1987	182346.1	3.2	4.10	0.007	II	85.3(137.2)
MGI	34.1000	117.2000	04/23/1923	2113 0.0	0.0	4.00	0.006	II	85.3(137.2)
GSP	35.3700	118.8500	12/18/1990	165643.0	6.0	4.20	0.007	II	85.5(137.6)
DMG	35.3670	118.5000	06/20/1953	231852.0	0.0	4.40	0.008	II	85.5(137.6)
DMG	35.3670	118.8830	09/12/1953	64116.0	0.0	4.10	0.007	II	85.5(137.6)
DMG	35.3600	118.4380	08/03/1952	15156.1	7.0	4.10	0.007	II	85.5(137.7)
DMG	35.3790	118.6680	11/21/1955	205527.6	5.3	4.30	0.007	II	85.6(137.8)
DMG	35.3830	118.6000	09/05/1953	192436.0	0.0	4.10	0.007	II	86.1(138.5)
DMG	35.3830	118.5670	07/23/1952	546 3.0	0.0	4.70	0.009	III	86.2(138.7)
DMG	35.3830	118.8500	10/13/1952	222035.0	0.0	4.00	0.006	II	86.4(139.0)
DMG	35.3830	118.8500	07/29/1952	7 347.0	0.0	6.10	0.020	IV	86.4(139.0)
MGI	35.2000	119.5000	12/01/1920	130 0.0	0.0	4.60	0.008	III	86.5(139.2)
DMG	35.2000	119.5000	06/09/1928	822 0.0	0.0	4.00	0.006	II	86.5(139.2)
DMG	35.3950	118.6200	08/08/1955	32150.5	4.1	4.70	0.009	III	86.8(139.7)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.019	IV	86.9(139.9)
DMG	35.4000	118.6330	10/02/1952	231021.0	0.0	4.20	0.007	II	87.1(140.2)
DMG	35.4000	118.5830	07/25/1952	7 351.0	0.0	4.10	0.007	II	87.3(140.5)
DMG	35.4000	118.5830	07/24/1952	114756.0	0.0	4.40	0.008	II	87.3(140.5)
DMG	35.4000	118.8170	07/29/1952	8 146.0	0.0	5.10	0.011	III	87.4(140.6)
PAS	33.0330	117.9440	02/22/1983	21830.4	10.0	4.30	0.007	II	87.6(141.0)
PAS	35.2700	119.4020	09/26/1980	131841.1	5.0	4.10	0.006	II	87.9(141.5)
PAS	35.2970	119.3460	05/06/1985	231433.0	24.4	4.40	0.007	II	88.2(141.9)
PAS	33.5350	120.0490	01/12/1983	1719 0.6	5.0	4.20	0.007	II	88.3(142.1)
DMG	35.3330	119.2500	01/20/1941	135816.0	0.0	4.00	0.006	II	88.3(142.2)
DMG	34.7000	120.1000	07/28/1945	23348.0	0.0	4.20	0.007	II	89.1(143.4)
DMG	35.4320	118.6640	09/30/1964	175125.8	7.4	4.00	0.006	II	89.3(143.7)
DMG	35.4330	118.7000	05/01/1954	22 439.0	0.0	4.20	0.007	II	89.4(143.8)
DMG	33.7380	117.1870	04/27/1962	91232.1	5.7	4.10	0.006	II	90.5(145.6)
DMG	35.4540	118.6050	02/07/1964	22 750.3	-2.0	4.40	0.007	II	90.9(146.4)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.018	IV	91.0(146.4)
GSP	34.1920	117.0950	04/06/1994	190104.1	7.0	4.80	0.009	III	91.3(146.9)
DMG	32.8670	118.2500	02/13/1952	151337.0	0.0	4.70	0.008	III	91.4(147.1)
PAS	35.4520	118.8990	02/08/1985	65816.9	11.1	4.60	0.008	III	91.4(147.1)
DMG	35.4650	118.6680	02/07/1964	221052.0	-0.5	4.20	0.007	II	91.6(147.4)
DMG	35.4540	118.4760	11/23/1953	2039 0.9	5.9	4.40	0.007	II	91.6(147.5)
GSP	35.4530	118.4310	05/06/1997	191253.8	6.0	4.50	0.008	II	91.9(147.9)
DMG	35.4400	118.3470	01/02/1964	194841.0	6.3	4.20	0.006	II	91.9(148.0)
USG	33.0170	117.8170	07/16/1986	1247 3.7	10.0	4.11	0.006	II	92.3(148.6)
USG	33.0170	117.8170	07/14/1986	11112.6	10.0	4.12	0.006	II	92.3(148.6)
PAS	34.7360	120.1470	11/06/1986	91958.3	0.0	4.00	0.006	II	92.6(149.0)
PAS	34.7370	120.1480	10/25/1984	1036 2.4	6.0	4.50	0.007	II	92.7(149.1)
PAS	32.9900	117.8490	07/13/1986	14 133.0	12.0	4.60	0.008	II	92.9(149.6)
PAS	32.9860	117.8440	10/01/1986	201218.6	6.0	4.00	0.006	II	93.3(150.2)
DMG	32.8170	118.3500	12/26/1951	04654.0	0.0	5.90	0.017	IV	93.3(150.2)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.012	III	93.4(150.4)
DMG	35.5000	118.7000	01/06/1905	1430 0.0	0.0	5.00	0.010	III	94.0(151.3)
GSP	32.9850	117.8180	06/21/1995	211736.2	6.0	4.30	0.007	II	94.2(151.6)
DMG	33.8500	120.3000	08/27/1949	155428.0	0.0	4.00	0.006	II	94.2(151.6)
DMG	34.0170	117.0500	02/19/1940	12 655.7	0.0	4.60	0.008	II	94.2(151.6)
DMG	35.5000	118.5000	07/27/1952	24912.0	0.0	4.00	0.006	II	94.6(152.3)
DMG	35.4170	119.3000	06/04/1941	84719.0	0.0	4.00	0.006	II	94.8(152.5)
DMG	35.5000	118.9670	09/29/1948	4 648.0	0.0	4.20	0.006	II	95.3(153.3)
GSP	32.9700	117.8100	04/04/1990	085439.3	6.0	4.00	0.006	II	95.3(153.4)

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FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	32.9700	117.8030	07/14/1986	03246.2	10.0	4.00	0.006	II	95.5(153.7)
GSP	34.1800	117.0200	12/04/1991	081703.5	11.0	4.00	0.006	II	95.5(153.7)
DMG	35.4500	119.2500	01/23/1935	1352 0.0	0.0	4.00	0.006	II	95.9(154.4)
DMG	33.7000	117.1000	06/11/1902	245 0.0	0.0	4.50	0.007	II	96.1(154.6)
PAS	32.9450	117.8310	07/29/1986	81741.8	10.0	4.10	0.006	II	96.1(154.7)
PAS	35.2250	117.6290	05/02/1975	18 323.1	10.0	4.20	0.006	II	96.2(154.9)
PAS	32.9330	117.8410	07/29/1986	81741.6	10.0	4.30	0.006	II	96.6(155.4)
USG	32.7700	118.3340	06/16/1985	1027 0.7	5.0	4.14	0.006	II	96.7(155.6)
GSP	34.1200	116.9980	06/29/1992	144126.0	4.0	4.40	0.007	II	96.8(155.7)
PAS	32.9450	117.8060	09/07/1984	11 313.4	6.0	4.30	0.006	II	96.9(155.9)
GSP	34.0970	116.9960	12/05/1997	170438.9	4.0	4.10	0.006	II	96.9(156.0)
DMG	35.3530	117.8260	07/03/1944	53823.5	-2.0	4.70	0.008	III	97.2(156.3)
DMG	34.0000	117.0000	06/30/1923	022 0.0	0.0	4.50	0.007	II	97.2(156.4)
GSP	34.0850	116.9890	06/30/1992	214900.3	3.0	4.40	0.007	II	97.4(156.7)
DMG	34.3330	117.0000	02/27/1942	1 853.0	0.0	4.00	0.006	II	97.5(156.8)
DMG	34.1670	116.9830	10/16/1951	1241 5.0	0.0	4.00	0.006	II	97.6(157.1)
PDP	32.7600	118.2880	08/16/2001	180433.8	6.0	4.40	0.007	II	98.0(157.7)
MGI	34.0000	120.4000	03/29/1911	425 0.0	0.0	4.60	0.007	II	98.2(158.0)
PAS	34.1510	116.9720	11/20/1978	655 9.5	6.1	4.30	0.006	II	98.2(158.1)
DMG	34.5830	120.3330	12/18/1934	3 9 0.0	0.0	4.00	0.005	II	98.5(158.5)
DMG	34.5830	120.3330	12/17/1934	1110 0.0	0.0	4.50	0.007	II	98.5(158.5)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.012	III	98.9(159.1)
DMG	34.2670	116.9670	08/29/1943	51630.0	0.0	4.00	0.005	II	98.9(159.1)
DMG	34.2670	116.9670	08/29/1943	35754.0	0.0	4.00	0.005	II	98.9(159.1)
PAS	32.9470	117.7360	01/15/1989	153955.2	6.0	4.20	0.006	II	99.0(159.2)
PAS	34.1980	116.9590	04/01/1978	105227.4	8.0	4.00	0.005	II	99.0(159.4)
PDP	32.7340	118.3340	08/16/2001	220628.1	25.0	4.20	0.006	II	99.1(159.6)
DMG	35.5340	118.2640	05/28/1955	194420.0	12.3	4.50	0.007	II	99.3(159.9)
DMG	34.7000	120.3000	07/31/1902	920 0.0	0.0	5.50	0.012	III	99.5(160.1)
DMG	34.7000	120.3000	01/12/1915	431 0.0	0.0	5.50	0.012	III	99.5(160.1)
DMG	34.1330	116.9500	06/10/1938	1440 0.0	0.0	4.00	0.005	II	99.5(160.1)
DMG	34.4330	116.9830	04/18/1945	458 2.0	0.0	4.30	0.006	II	99.5(160.2)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.021	IV	99.6(160.3)
DMG	32.7500	118.2000	06/25/1939	149 0.0	0.0	4.50	0.007	II	100.0(160.9)

****

-END OF SEARCH- 935 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2010

LENGTH OF SEARCH TIME: 211 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 6.8 MILES (10.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.266 g

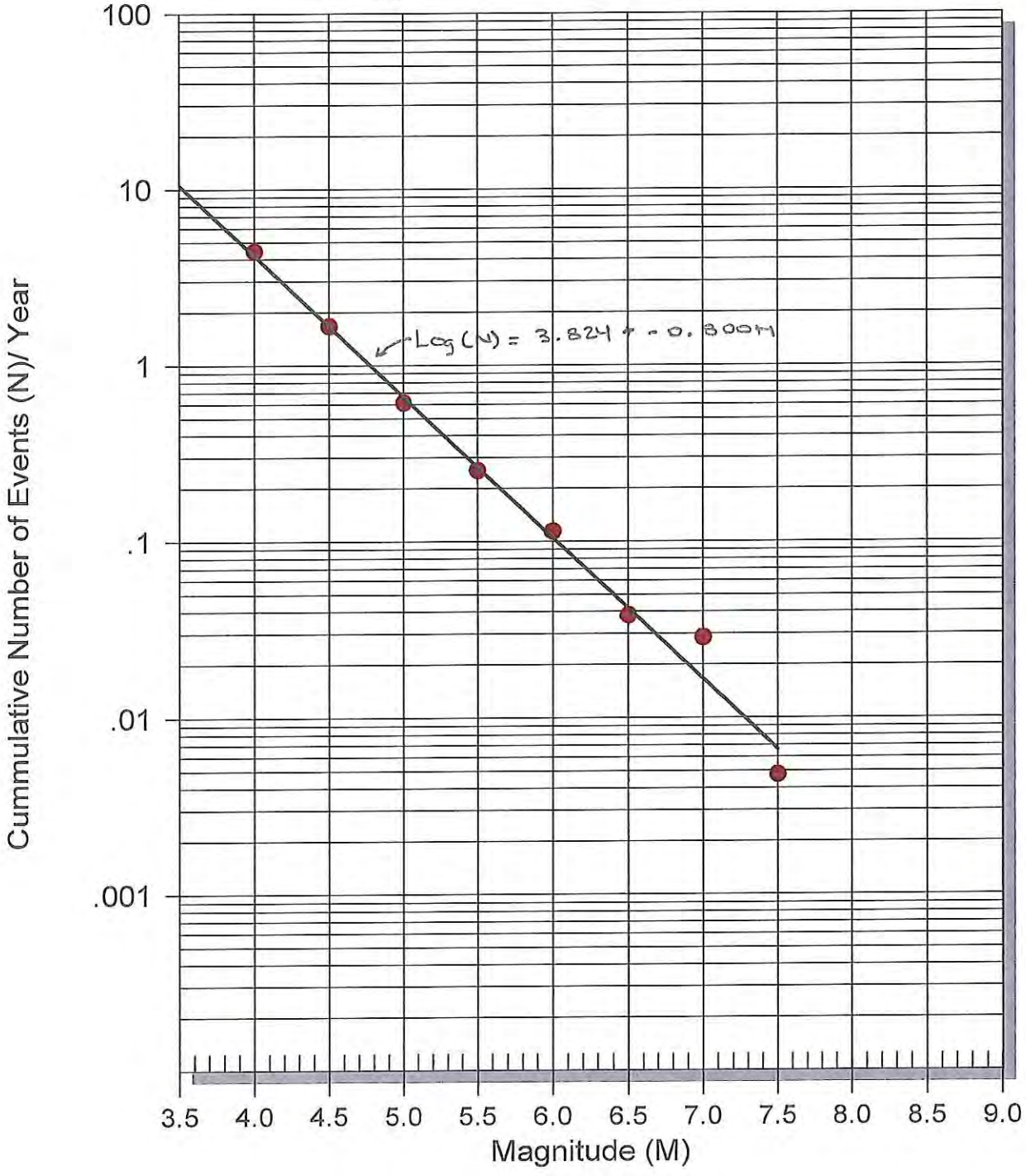
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 3.824
b-value= 0.800
beta-value= 1.843

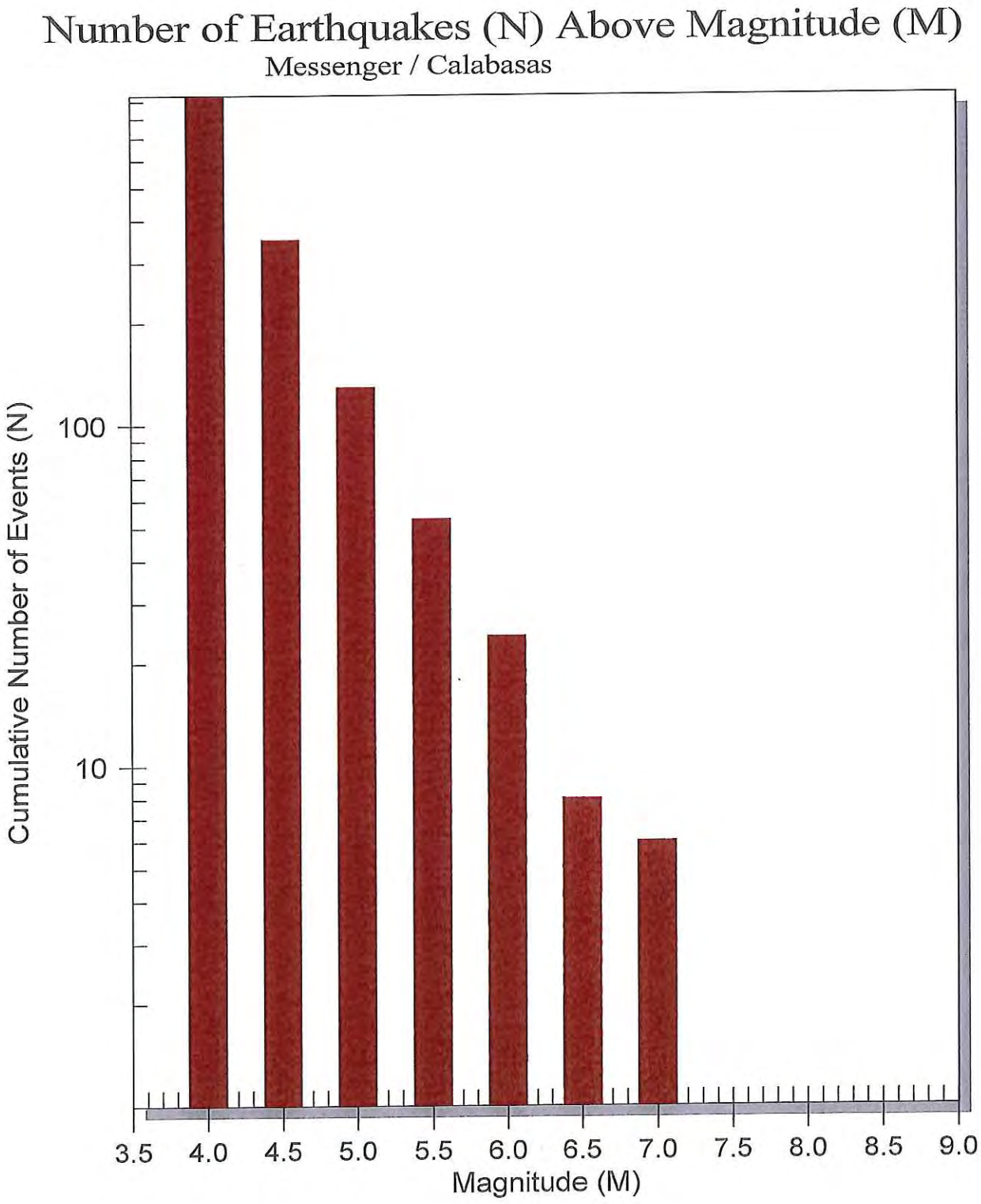
TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	935	4.43128
4.5	351	1.66351
5.0	129	0.61137
5.5	53	0.25118
6.0	24	0.11374
6.5	8	0.03791
7.0	6	0.02844
7.5	1	0.00474

EARTHQUAKE RECURRENCE CURVE

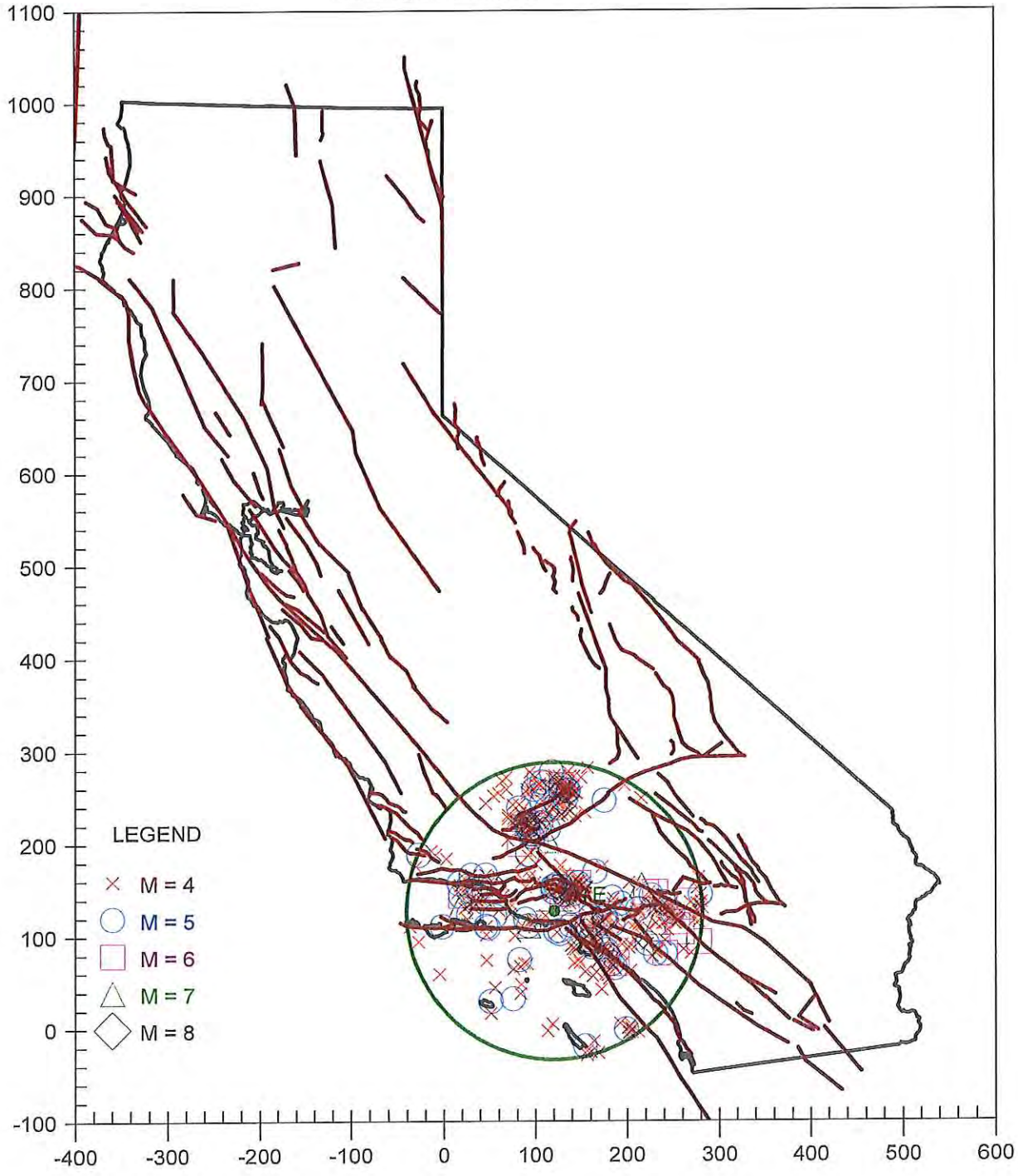
Messenger / Calabasas




Number of Earthquakes (N) Above Magnitude (M)
Messenger / Calabasas
Cumulative Number of Events (N)
100
10
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Magnitude (M)

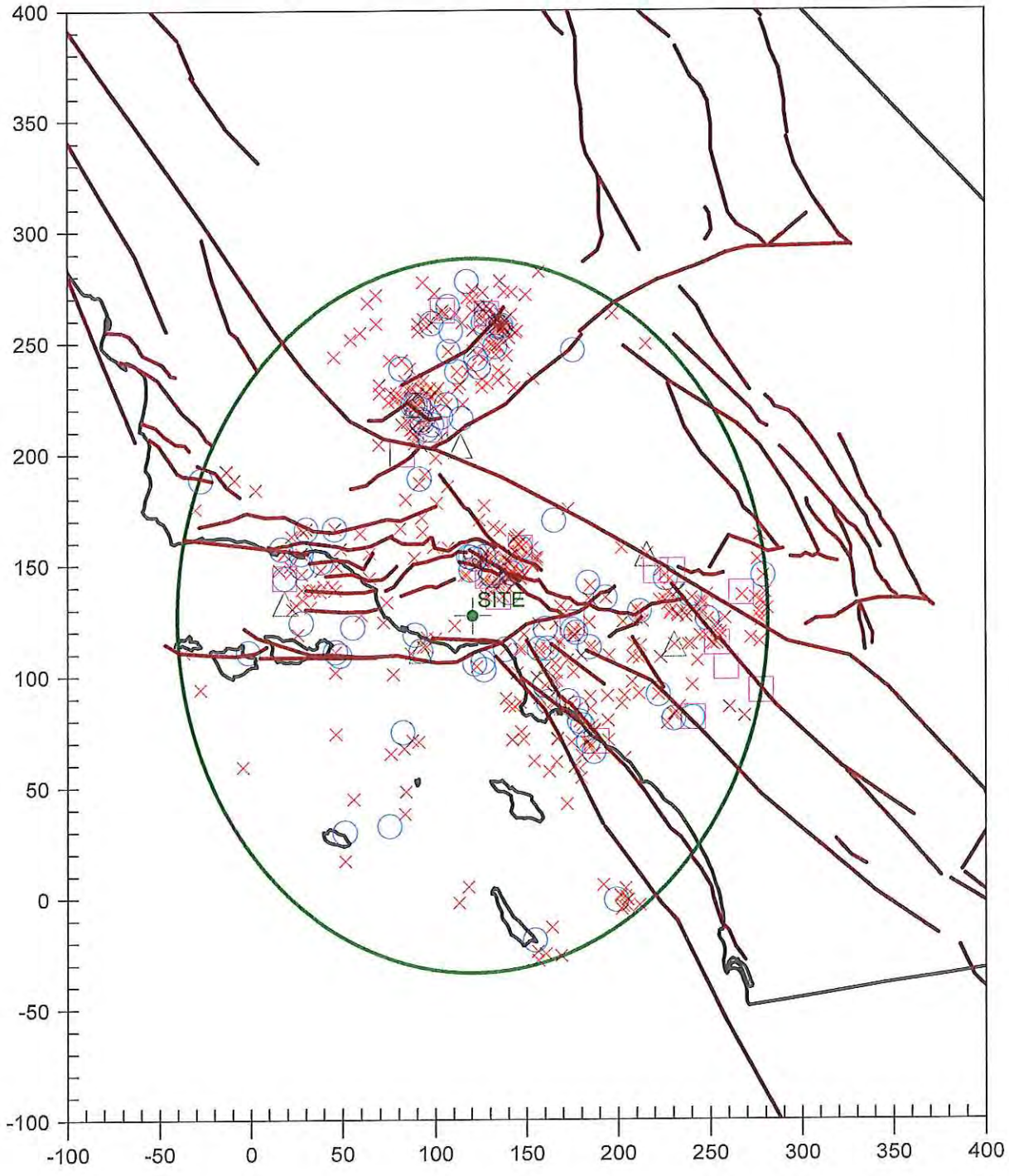
EARTHQUAKE EPICENTER MAP

Messenger / Calabasas



EARTHQUAKE EPICENTER MAP

Messenger / Calabasas



```
*****************************************
*                                       *
*        FRISKSP - IBM-PC VERSION       *
*                                       *
*  Modified from *FRISK* (McGuire 1978) *
*   To Perform Probabilistic Earthquake *
*  Hazard Analyses Using Multiple Forms *
* of Ground-Motion-Attenuation Relations *
*                                       *
*   Modifications by:  Thomas F. Blake  *
*              - 1988-2000 -            *
*                                       *
*              VERSION 4.00             *
*             (Visual Fortran)          *
*****************************************
```

TITLE: Messenger / Calabasas

IPR_FILE
0

IPLOT
0

SITE CONDITION
0.00

BASEMENT DEPTH (km)
5.00

RHGA FACTOR RHGA DIST (km)
1.000 0.000

NFLT	NSITE	NPROB	NATT	LCD
44	1	2	6	1

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9
C10	C11	C12	C13	C14					
1	-4.0330	0.8120	0.0360	-1.0610	0.0410	-0.0050	-0.0180	0.7660	0.0340
0.0000	0.3430	0.3510	0.0000	-0.1230					
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23
PER	DSMIN	SIGA	IRELAF	ICHK					
1	-0.1380	-0.2890	0.0000	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
0.0000	3.0000	0.4650	38	0					

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9
C10	C11	C12	C13	C14					
2	-4.0330	0.8120	0.0360	-1.0610	0.0410	-0.0050	-0.0180	0.7660	0.0340
0.0000	0.3430	0.3510	0.0000	-0.1230					
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23
PER	DSMIN	SIGA	IRELAF	ICHK					
2	-0.1380	-0.2890	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000
0.0000	3.0000	0.4650	38	0					

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9
C10	C11	C12	C13	C14					
3	-4.0330	0.8120	0.0360	-1.0610	0.0410	-0.0050	-0.0180	0.7660	0.0340
0.0000	0.3430	0.3510	0.0000	-0.1230					
ATT	C15	C16	C17	C18	C19	C20	C21	C22	C23
PER	DSMIN	SIGA	IRELAF	ICHK					
3	-0.1380	-0.2890	0.0000	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
0.0000	3.0000	0.4650	38	0					

ATT	C1	C2	C3	C4	C5	C6	C7	C8	C9
C10	C11	C12	C13	C14					

```
  4   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340
0.0000    0.3430    0.3510    0.0000   -0.1230
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23
PER       DSMIN     SIGA      IRELAF    ICHK
  4   -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    1.0000    0.0000
0.0000    3.0000    0.4650       38         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9
C10       C11       C12       C13       C14
  5   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340
0.0000    0.3430    0.3510    0.0000   -0.1230
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23
PER       DSMIN     SIGA      IRELAF    ICHK
  5   -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000
0.0000    3.0000    0.4650       38         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9
C10       C11       C12       C13       C14
  6   -4.0330    0.8120    0.0360   -1.0610    0.0410   -0.0050   -0.0180    0.7660    0.0340
0.0000    0.3430    0.3510    0.0000   -0.1230
ATT       C15       C16       C17       C18       C19       C20       C21       C22       C23
PER       DSMIN     SIGA      IRELAF    ICHK
  6   -0.1380   -0.2890    0.0000    1.0000    0.0000    0.0000    0.0000    0.0000    1.0000
0.0000    3.0000    0.4650       38         0

 PROBLEM DATA:

 BOZ. ET AL.(1999)HOR PS COR 1    AMPLITUDES:
    15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900
1.000
              1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00

 BOZ. ET AL.(1999)HOR PS COR 2    AMPLITUDES:
    15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900
1.000
              1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   3    MWF MAGNITUDE:     7.50

 RISKS SPECIFIED:
   5     0.013900  0.010000  0.005000  0.002105  0.001000

 SITE COORDINATES:
  1    -118.1387   34.6913
 FAULT INFORMATION:

 ------------------------------------------------------------------------------

 FAULT  1

 FAULT NAME:  SAN ANDREAS - 1857 Rupture


 NFP     NRL    ATTENUATION CODES:
 12      10       1  3

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1 34.0000   2.072  17.200   2.000   0.500

 NMAX AMMAX  PMAX
  1    7.80  1.00


   dmchar ampchar dmpchar
     0.50    7.30    1.00

 Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
 Input Fault Area    - cm**2
```

0.414E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.8000	1.0000	0.22372	0.20895	0.01477

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES

1	-120.5605	36.0019
2	-120.2928	35.7488
3	-119.8632	35.3106
4	-119.8598	35.3072
5	-119.6673	35.1336
6	-119.4061	34.9395
7	-119.2103	34.8639
8	-118.9010	34.8175
9	-118.5075	34.7006
10	-118.5024	34.6989
11	-118.0075	34.5116
12	-117.5298	34.3106

NDP
2
ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	0.0000	12.0000

Computed Total Fault Area = 0.41E+04

FAULT 2

FAULT NAME: SAN ANDREAS - Mojave

NFP NRL ATTENUATION CODES:
3 10 1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	30.0000	2.072	4.900	2.000	0.500

NMAX	AMMAX	PMAX
1	7.10	1.00

dmchar	ampchar	dmpchar
0.50	6.60	1.00

Slip Rate (30.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.300E+12
Input Fault Area - cm**2
0.119E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.1000	1.0000	0.17754	0.13551	0.04202

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -118.5024 34.6989
2 -118.0075 34.5116
3 -117.5298 34.3106

NDP
2
ORIGINAL FAULT CROSS SECTION
1 0.0000 0.0000
2 0.0000 12.0000

Computed Total Fault Area = 0.12E+04

FAULT 3

FAULT NAME: SAN ANDREAS - Carrizo

NFP NRL ATTENUATION CODES:
6 10 1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	34.0000	2.072	7.200	2.000	0.500

NMAX	AMMAX	PMAX
1	7.20	1.00

dmchar	ampchar	dmpchar
0.50	6.70	1.00

Slip Rate (34.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.300E+12
Input Fault Area - cm**2
0.174E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.2000	1.0000	0.24626	0.19696	0.04930

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -119.8598 35.3072
2 -119.6673 35.1336
3 -119.4061 34.9395
4 -119.2103 34.8639

```
 5    -118.9010    34.8175
 6    -118.5075    34.7006

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000     0.0000
 2       0.0000    12.0000

Computed Total Fault Area = 0.17E+04

--------------------------------------------------------------------------------

FAULT  4

FAULT NAME:  SAN GABRIEL


NFP     NRL   ATTENUATION CODES:
10      10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  3.600  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.936E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000   0.00616   0.00445   0.00171


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

FAULT SEGMENT COORDINATES
 1    -118.2802    34.3179
 2    -118.3118    34.3394
 3    -118.3904    34.3598
 4    -118.4577    34.3853
 5    -118.5587    34.4363
 6    -118.5975    34.4649
 7    -118.6873    34.5536
 8    -118.7026    34.5700
 9    -118.7312    34.5792
10    -118.8761    34.7139

NDP
  2
ORIGINAL FAULT CROSS SECTION
```

```
 1       0.0000    0.0000
 2       0.0000   13.0000

 Computed Total Fault Area = 0.93E+03

 ------------------------------------------------------------------------------

 FAULT  5

 FAULT NAME:  GARLOCK (West)


 NFP    NRL   ATTENUATION CODES:
  7     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  6.0000  2.072  4.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.10  1.00


   dmchar ampchar dmpchar
     0.50    6.60    1.00

 Slip Rate (  6.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.116E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.03807   0.02906   0.00901


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.9166   34.8293
  2    -118.8288   34.8548
  3    -118.7184   34.9114
  4    -118.4750   34.9963
  5    -118.3476   35.0812
  6    -118.0900   35.2086
  7    -118.0136   35.2709

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.12E+04

 ------------------------------------------------------------------------------
```

FAULT 6

FAULT NAME: SIERRA MADRE (San Fernando)

NFP	NRL	ATTENUATION CODES:	
8	10	2	4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	2.0000	2.072	0.900	2.000	1.000

NMAX	AMMAX	PMAX
1	6.70	1.00

dmchar	ampchar	dmpchar
0.50	6.20	1.00

Slip Rate (2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.324E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	6.7000	1.0000	0.00781	0.00447	0.00334

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES

1	-118.2940	34.2782
2	-118.2951	34.2782
3	-118.3196	34.2745
4	-118.3956	34.2905
5	-118.4189	34.3039
6	-118.4520	34.2940
7	-118.4778	34.3027
8	-118.4790	34.3027

NDP
2
ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	12.7000	12.7000

Computed Total Fault Area = 0.33E+03

FAULT 7

FAULT NAME: SIERRA MADRE

NFP	NRL	ATTENUATION CODES:	
12	10	2	4

```
 AMMIN    AMSTEP  IRATE     RATE    BETA   ECTR   ECDP   COEF
 5.000    0.1000      1   3.0000   2.072  2.800  2.000  1.000

 NMAX AMMAX   PMAX
  1    7.00   1.00


   dmchar ampchar dmpchar
     0.50    6.50    1.00

 Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.103E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000    0.02034    0.01469    0.00565


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.7397   34.1231
  2    -117.7691   34.1317
  3    -117.8176   34.1323
  4    -117.8807   34.1470
  5    -117.9402   34.1501
  6    -118.0027   34.1752
  7    -118.0683   34.1758
  8    -118.1118   34.2010
  9    -118.1492   34.2028
 10    -118.2461   34.2279
 11    -118.2896   34.2751
 12    -118.2960   34.2751

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000

 Computed Total Fault Area = 0.10E+04

 ------------------------------------------------------------------------

 FAULT  8

 FAULT NAME:  HOLSER


 NFP     NRL   ATTENUATION CODES:
  5      10      2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA   ECTR   ECDP   COEF
 5.000    0.1000      1   0.4000   2.072  1.000  2.000  1.000

 NMAX AMMAX   PMAX
```

```
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.280E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00212   0.00097   0.00115


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.7533   34.4386
  2    -118.7345   34.4386
  3    -118.6741   34.4499
  4    -118.6427   34.4487
  5    -118.5483   34.4172

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       5.9000   12.7000

 Computed Total Fault Area = 0.26E+03

 ------------------------------------------------------------------------------

 FAULT  9

 FAULT NAME:  NORTHRIDGE (E. Oak Ridge)


 NFP    NRL   ATTENUATION CODES:
  2     10      5  6

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.5000  2.072  1.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.682E+13
```

```
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.9000   1.0000    0.00891    0.00602    0.00288


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA       B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.7027    34.4057
  2    -118.4078    34.2781

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1        0.0000     4.9900
  2        0.0000     5.0000
  3       16.3000    19.7000

 Computed Total Fault Area = 0.67E+03

 ------------------------------------------------------------------------------

 FAULT 10

 FAULT NAME:  SANTA SUSANA


 NFP     NRL    ATTENUATION CODES:
  8      10       2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1   5.0000   2.072   1.300   2.000   1.000

 NMAX AMMAX   PMAX
  1    6.60   1.00


   dmchar ampchar dmpchar
     0.50    6.10    1.00

 Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.432E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.6000   1.0000    0.03249    0.01677    0.01573


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA       B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.4950    34.3242
```

```
 2    -118.4955   34.3242
 3    -118.5340   34.3030
 4    -118.5811   34.3204
 5    -118.6163   34.3229
 6    -118.6339   34.3330
 7    -118.7081   34.3506
 8    -118.7672   34.3594

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       9.2000   13.1000

Computed Total Fault Area = 0.41E+03

-------------------------------------------------------------------------------

FAULT 11

FAULT NAME:  VERDUGO


NFP    NRL   ATTENUATION CODES:
 7     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.522E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00315   0.00180   0.00135


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910
0.240

FAULT SEGMENT COORDINATES
 1    -118.1536   34.1313
 2    -118.1865   34.1496
 3    -118.2285   34.1551
 4    -118.2907   34.1971
 5    -118.3657   34.2227
 6    -118.4077   34.2538
 7    -118.4206   34.2612

NDP
```

```
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000

 Computed Total Fault Area = 0.52E+03

 ------------------------------------------------------------------------

 FAULT 12

 FAULT NAME:  CLAMSHELL-SAWPIT


 NFP    NRL   ATTENUATION CODES:
  4     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  0.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
    0.50    6.00    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.288E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00273   0.00125   0.00148


 IND_RL
     2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.8458   34.2402
  2    -117.8844   34.2218
  3    -117.9279   34.2181
  4    -117.9990   34.1777

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000

 Computed Total Fault Area = 0.30E+03

 ------------------------------------------------------------------------

 FAULT 13

 FAULT NAME:  RAYMOND
```

```
 NFP    NRL   ATTENUATION CODES:
  4     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  1.000  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.273E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00259   0.00118   0.00140


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.0051   34.1670
  2    -118.0579   34.1444
  3    -118.1258   34.1293
  4    -118.2227   34.1217

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.4000   12.6000

 Computed Total Fault Area = 0.26E+03

 ------------------------------------------------------------------------------

 FAULT 14

 FAULT NAME:  OAK RIDGE (Onshore)


 NFP    NRL   ATTENUATION CODES:
  9     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  4.0000  2.072  2.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00
```

```
   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.700E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.02235   0.01511   0.00723


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -119.2050   34.2481
  2    -119.1582   34.2630
  3    -119.0974   34.3165
  4    -119.0402   34.3522
  5    -118.9589   34.3631
  6    -118.8805   34.3813
  7    -118.8104   34.3850
  8    -118.7742   34.4013
  9    -118.7227   34.3978

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    1.0000
  2       0.0000    1.1000
  3       5.9000   13.7000

 Computed Total Fault Area = 0.67E+03

 ------------------------------------------------------------------------------

 FAULT 15

 FAULT NAME:  SAN CAYETANO


 NFP    NRL   ATTENUATION CODES:
  9     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  6.0000  2.072  2.200  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.80  1.00


   dmchar ampchar dmpchar
     0.50    6.30    1.00

 Slip Rate (  6.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
```

```
 Input Fault Area     - cm**2
0.660E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.8000   1.0000    0.03867    0.02422    0.01445


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA       B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1     -118.7621    34.4361
  2     -118.8313    34.4047
  3     -118.9130    34.4172
  4     -118.9281    34.4587
  5     -118.9382    34.4612
  6     -118.9835    34.4348
  7     -119.0690    34.4361
  8     -119.1067    34.4386
  9     -119.1708    34.4625

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000     0.0000
  2        7.5000    13.0000

 Computed Total Fault Area = 0.60E+03

 ------------------------------------------------------------------------------

 FAULT 16

 FAULT NAME:  HOLLYWOOD


 NFP     NRL    ATTENUATION CODES:
  4      10       2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1  1.0000   2.072   0.800   2.000   1.000

 NMAX AMMAX   PMAX
  1    6.40   1.00


   dmchar ampchar dmpchar
     0.50    5.90    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area     - cm**2
0.238E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1   6.4000   1.0000    0.00575    0.00229    0.00346
```

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -118.2302 34.1192
2 -118.3170 34.1104
3 -118.3723 34.0991
4 -118.4063 34.0827

NDP
2
ORIGINAL FAULT CROSS SECTION
1 0.0000 0.0000
2 4.8000 13.2000

Computed Total Fault Area = 0.25E+03

FAULT 17

FAULT NAME: GARLOCK (East)

NFP NRL ATTENUATION CODES:
8 10 1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	7.0000	2.072	7.700	2.000	1.000

NMAX	AMMAX	PMAX
1	7.30	1.00

dmchar	ampchar	dmpchar
0.50	6.80	1.00

Slip Rate (7.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.186E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.3000	1.0000	0.05021	0.04176	0.00845

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -118.0221 35.2851
2 -117.8126 35.3983
3 -117.6908 35.4408
4 -117.5521 35.4860
5 -117.2945 35.5427

```
 6    -117.1389   35.5851
 7    -117.0058   35.6049
 8    -116.3915   35.5964

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   12.0000

Computed Total Fault Area = 0.19E+04

--------------------------------------------------------------------------------

FAULT 18

FAULT NAME:  LENWOOD-LOCKHART-OLD WOMAN SPRGS


NFP    NRL   ATTENUATION CODES:
 6     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.6000  2.072  7.400  2.000  1.000

NMAX AMMAX  PMAX
 1    7.30  1.00


   dmchar ampchar dmpchar
     0.50    6.80    1.00

Slip Rate (  0.6000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.194E+14
LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.00449   0.00373   0.00076


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

FAULT SEGMENT COORDINATES
 1    -116.6350   34.3537
 2    -116.7991   34.6085
 3    -116.9662   34.7953
 4    -117.0992   34.8888
 5    -117.4814   35.0643
 6    -117.7616   35.2199

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       0.0000   13.0000
```

Computed Total Fault Area = 0.19E+04

FAULT 19

FAULT NAME: HELENDALE - S. LOCKHARDT

NFP	NRL	ATTENUATION CODES:	
7	10	1	3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	0.6000	2.072	4.800	2.000	1.000

NMAX	AMMAX	PMAX
1	7.10	1.00

dmchar	ampchar	dmpchar
0.50	6.60	1.00

Slip Rate (0.6000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.126E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.1000	1.0000	0.00414	0.00316	0.00098

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES

1	-116.8699	34.3707
2	-117.0115	34.5038
3	-117.0709	34.5434
4	-117.1077	34.6057
5	-117.3115	34.7727
6	-117.4106	34.8859
7	-117.5012	35.0614

NDP
2
ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	0.0000	13.0000

Computed Total Fault Area = 0.13E+04

FAULT 20

FAULT NAME: SAN ANDREAS - Southern

```
 NFP     NRL    ATTENUATION CODES:
  6      10       1  3

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1 24.0000  2.072 10.100   2.000   0.500

 NMAX AMMAX  PMAX
  1    7.40  1.00


   dmchar ampchar dmpchar
     0.50    6.90    1.00

 Slip Rate ( 24.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.243E+14
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  7.4000  1.0000   0.19048   0.16368   0.02679


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.5264   34.3054
  2    -116.8357   33.9944
  3    -116.4765   33.9240
  4    -116.4697   33.9223
  5    -116.2463   33.7882
  6    -115.7119   33.3501

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.24E+04

 ------------------------------------------------------------------------------

 FAULT 21

 FAULT NAME:  SAN ANDREAS - San Bernardino


 NFP     NRL    ATTENUATION CODES:
  3      10       1  3

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1 24.0000  2.072   5.300   2.000   0.500

 NMAX AMMAX  PMAX
  1    7.30  1.00
```

```
   dmchar ampchar dmpchar
     0.50    6.80    1.00

 Slip Rate ( 24.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.193E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.3000  1.0000   0.17864   0.14858   0.03006


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.5264   34.3054
  2    -116.8357   33.9944
  3    -116.4765   33.9240

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   18.0000

 Computed Total Fault Area = 0.19E+04

 ------------------------------------------------------------------------------

 FAULT 22

 FAULT NAME:  SANTA YNEZ (East)


 NFP    NRL   ATTENUATION CODES:
  6     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.0000  2.072  3.400  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.00  1.00


   dmchar ampchar dmpchar
     0.50    6.50    1.00

 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.884E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000   0.01164   0.00840   0.00323
```

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -119.6298 34.4939
2 -119.5091 34.4864
3 -119.3783 34.5065
4 -119.1972 34.5367
5 -119.1167 34.5317
6 -118.9055 34.5870

NDP
2
ORIGINAL FAULT CROSS SECTION
1 0.0000 0.0000
2 2.3000 12.8000

Computed Total Fault Area = 0.89E+03

FAULT 23

FAULT NAME: SANTA MONICA

NFP NRL ATTENUATION CODES:
3 10 2 4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	1.0000	2.072	1.400	2.000	1.000

NMAX	AMMAX	PMAX
1	6.60	1.00

dmchar	ampchar	dmpchar
0.50	6.10	1.00

Slip Rate (1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area - cm**2
0.364E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	6.6000	1.0000	0.00597	0.00308	0.00289

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -118.4085 34.0814
2 -118.5244 34.0263
3 -118.6855 33.9896

```
 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000     0.0000
  2       3.4000    12.6000

 Computed Total Fault Area = 0.35E+03

 ------------------------------------------------------------------------------

 FAULT 24

 FAULT NAME:  PLEITO THRUST


 NFP     NRL   ATTENUATION CODES:
  5      10       2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1   2.0000   2.072   2.200   2.000   1.000

 NMAX AMMAX   PMAX
  1    7.20   1.00


    dmchar ampchar dmpchar
      0.50    6.70    1.00

 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.167E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
    IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
       1  7.2000  1.0000   0.01529   0.01223   0.00306


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -119.2951   34.9408
  2    -119.2170   34.9410
  3    -119.0668   35.0093
  4    -118.9350   34.9400
  5    -118.8694   34.9462

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      10.4000    6.0000

 Computed Total Fault Area = 0.52E+03

 ------------------------------------------------------------------------------
```

FAULT 25

FAULT NAME: CUCAMONGA

NFP	NRL	ATTENUATION CODES:	
6	10	2	4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	5.0000	2.072	1.400	2.000	1.000

NMAX	AMMAX	PMAX
1	7.00	1.00

dmchar	ampchar	dmpchar
0.50	6.50	1.00

Slip Rate (5.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area - cm**2
0.504E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.0000	1.0000	0.01809	0.01307	0.00503

IND_RL
2

RUPTURE AREA VS. MAGNITUDE	A_RA	B_RA	SIG_RA	-3.490	0.910
0.240					

FAULT SEGMENT COORDINATES

1	-117.4343	34.1842
2	-117.5088	34.1737
3	-117.5585	34.1737
4	-117.6004	34.1671
5	-117.6278	34.1645
6	-117.7285	34.1253

NDP
2

ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	12.7000	12.7000

Computed Total Fault Area = 0.54E+03

FAULT 26

FAULT NAME: CLEGHORN

NFP	NRL	ATTENUATION CODES:	
6	10	1	3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	3.0000	2.072	1.200	2.000	1.000

```
 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.325E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.01849   0.00846   0.01003


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.4644   34.3113
  2    -117.3880   34.2858
  3    -117.3455   34.2943
  4    -117.3172   34.2773
  5    -117.2577   34.2745
  6    -117.2040   34.2830

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   13.0000

 Computed Total Fault Area = 0.33E+03

 ------------------------------------------------------------------------------

 FAULT 27

 FAULT NAME:  SIMI-SANTA ROSA


 NFP    NRL   ATTENUATION CODES:
  5     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  1.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
```

0.330E+12
Input Fault Area - cm**2
0.450E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	6.7000	1.0000	0.00543	0.00311	0.00232

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES

1	-118.7982	34.2901
2	-118.9084	34.2578
3	-118.9364	34.2615
4	-118.9680	34.2615
5	-119.1147	34.2261

NDP
3
ORIGINAL FAULT CROSS SECTION

1	0.0000	1.0000
2	0.0000	1.1000
3	7.5000	14.0000

Computed Total Fault Area = 0.45E+03

FAULT 28

FAULT NAME: ELYSIAN PARK THRUST

NFP NRL ATTENUATION CODES:
2 10 5 6

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	1.5000	2.072	1.700	2.000	0.500

NMAX	AMMAX	PMAX
1	6.70	1.00

dmchar	ampchar	dmpchar
0.50	6.20	1.00

Slip Rate (1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area - cm**2
0.510E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	6.7000	1.0000	0.01006	0.00576	0.00430

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -117.9173 33.8473
2 -118.2277 34.0169

NDP
3
ORIGINAL FAULT CROSS SECTION
1 0.0000 9.9900
2 0.0000 10.0000
3 14.1000 15.1000

Computed Total Fault Area = 0.51E+03

FAULT 29

FAULT NAME: SAN JOSE

NFP NRL ATTENUATION CODES:
4 10 2 4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COÉF
5.000	0.1000	1	0.5000	2.072	1.100	2.000	1.000

NMAX	AMMAX	PMAX
1	6.50	1.00

dmchar	ampchar	dmpchar
0.50	6.00	1.00

Slip Rate (0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.286E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE	+ CH-RATE
1	6.5000	1.0000	0.00271	0.00124	0.00147

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -117.6901 34.1141
2 -117.7305 34.0846
3 -117.8384 34.0601
4 -117.8789 34.0393

NDP
2
ORIGINAL FAULT CROSS SECTION

```
 1       0.0000    0.0000
 2       3.4000   12.6000

 Computed Total Fault Area = 0.25E+03

 ------------------------------------------------------------------------------

 FAULT 30

 FAULT NAME:  NEWPORT-INGLEWOOD (L.A.Basin)


 NFP    NRL   ATTENUATION CODES:
  5     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  3.200  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.832E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00664   0.00449   0.00215


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.3723   34.0337
  2    -118.1862   33.8073
  3    -118.1510   33.7822
  4    -118.1208   33.7746
  5    -117.9246   33.6061

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   13.0000

 Computed Total Fault Area = 0.83E+03

 ------------------------------------------------------------------------------

 FAULT 31

 FAULT NAME:  SAN JACINTO-SAN BERNARDINO
```

```
 NFP     NRL    ATTENUATION CODES:
  3      10       1  3

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1 12.0000  2.072   1.700   2.000   1.000

 NMAX AMMAX   PMAX
  1    6.70   1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate ( 12.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.525E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.07597   0.04350   0.03248


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.5080   34.2450
  2    -117.2500   34.0167
  3    -117.2370   34.0170

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   15.0000

 Computed Total Fault Area = 0.54E+03

 ------------------------------------------------------------------------------

 FAULT 32

 FAULT NAME:  WHITE WOLF


 NFP     NRL    ATTENUATION CODES:
  4      10       2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000       1  2.0000  2.072   3.300   2.000   1.000

 NMAX AMMAX   PMAX
  1    7.20   1.00


   dmchar ampchar dmpchar
     0.50    6.70    1.00
```

```
 Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.141E+14
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  7.2000  1.0000   0.01291   0.01033   0.00259


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -119.0977   35.0846
  2    -118.7069   35.2162
  3    -118.5337   35.3357
  4    -118.4813   35.3921

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      10.5000   18.2000

 Computed Total Fault Area = 0.15E+04

 ------------------------------------------------------------------------------

 FAULT 33

 FAULT NAME:  WHITTIER


 NFP    NRL   ATTENUATION CODES:
  2     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  2.5000  2.072  1.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.80  1.00


   dmchar ampchar dmpchar
     0.50    6.30    1.00

 Slip Rate (  2.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.555E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000   0.01355   0.00848   0.00506


 IND_RL
```

2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -118.0180 33.9860
2 -117.6370 33.8540

NDP
2
ORIGINAL FAULT CROSS SECTION
1 0.0000 0.0000
2 0.0000 15.0000

Computed Total Fault Area = 0.57E+03

FAULT 34

FAULT NAME: BIG PINE

NFP NRL ATTENUATION CODES:
6 10 1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	0.8000	2.072	2.000	2.000	1.000

NMAX	AMMAX	PMAX
1	6.70	1.00

dmchar	ampchar	dmpchar
0.50	6.20	1.00

Slip Rate (0.8000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.533E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE	+ CH-RATE
1	6.7000	1.0000	0.00514	0.00294	0.00220

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -119.4025 34.6645
2 -119.3167 34.6780
3 -119.2468 34.7160
4 -119.1389 34.7528
5 -119.0507 34.7896
6 -119.0065 34.8215

NDP

```
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000     0.0000
  2       0.0000    13.0000

 Computed Total Fault Area = 0.53E+03

 ------------------------------------------------------------------------

 FAULT 35

 FAULT NAME:  CHINO-CENTRAL AVE. (Elsinore)


 NFP     NRL   ATTENUATION CODES:
  2      10      2  4

 AMMIN   AMSTEP  IRATE     RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  1.400  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.476E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00574   0.00329   0.00245


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.7455   34.0332
  2    -117.5682   33.8275

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       7.2000   15.4000

 Computed Total Fault Area = 0.48E+03

 ------------------------------------------------------------------------

 FAULT 36

 FAULT NAME:  MALIBU COAST
```

```
 NFP     NRL    ATTENUATION CODES:
  4      10       2  4

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1   0.3000   2.072   1.800   2.000   1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.481E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00174   0.00100   0.00074


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -118.5333   34.0299
  2    -118.6339   34.0412
  3    -118.6666   34.0387
  4    -118.9332   34.0513

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       3.4000   12.6000

 Computed Total Fault Area = 0.48E+03

 ------------------------------------------------------------------------------

 FAULT 37

 FAULT NAME:  GRAVEL HILLS - HARPER LAKE


 NFP     NRL    ATTENUATION CODES:
  5      10       1  3

 AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
 5.000    0.1000      1   0.6000   2.072   3.300   2.000   1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00
```

Slip Rate (0.6000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.858E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	6.9000	1.0000	0.00411	0.00278	0.00133

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES

1	-116.9185	34.8724
2	-116.9600	34.8880
3	-117.0171	34.9489
4	-117.3374	35.1746
5	-117.4541	35.2563

NDP
2
ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	0.0000	13.0000

Computed Total Fault Area = 0.85E+03

FAULT 38

FAULT NAME: PALOS VERDES

NFP NRL ATTENUATION CODES:
4 10 1 3

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	3.0000	2.030	4.800	2.000	1.000

NMAX	AMMAX	PMAX
1	7.10	1.00

dmchar	ampchar	dmpchar
0.50	6.60	1.00

Slip Rate (3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.125E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.1000	1.0000	0.02038	0.01553	0.00485

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -117.9388 33.2825
2 -118.1977 33.6571
3 -118.2758 33.7560
4 -118.5568 33.9720

NDP
2
ORIGINAL FAULT CROSS SECTION
1 0.0000 0.0000
2 0.0000 13.0000

Computed Total Fault Area = 0.13E+04

FAULT 39

FAULT NAME: NORTH FRONTAL FAULT ZONE (West)

NFP NRL ATTENUATION CODES:
5 10 2 4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	1.0000	2.072	2.500	2.000	1.000

NMAX	AMMAX	PMAX
1	7.00	1.00

dmchar	ampchar	dmpchar
0.50	6.50	1.00

Slip Rate (1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.900E+13
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE	+ CH-RATE
1	7.0000	1.0000	0.00592	0.00428	0.00165

IND_RL
2

RUPTURE AREA VS. MAGNITUDE A_RA B_RA SIG_RA -3.490 0.910
0.240

FAULT SEGMENT COORDINATES
1 -117.2810 34.3070
2 -117.1640 34.4330
3 -117.0310 34.3950
4 -116.9370 34.3620
5 -116.8473 34.3707

```
NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.75E+03

-------------------------------------------------------------------------------

FAULT 40

FAULT NAME:  COMPTON THRUST


NFP    NRL   ATTENUATION CODES:
 2     10      5  6

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.5000  2.072  1.900  2.000  0.500

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
0.585E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.8000  1.0000   0.00935   0.00585   0.00349


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

FAULT SEGMENT COORDINATES
 1    -118.0582   33.6908
 2    -118.4060   33.8831

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1       0.0000    5.0000
 2       0.0000    5.1000
 3      14.1000   10.1000

Computed Total Fault Area = 0.58E+03

-------------------------------------------------------------------------------

FAULT 41
```

FAULT NAME: ANACAPA-DUME

NFP	NRL	ATTENUATION CODES:	
6	10	2	4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	3.0000	2.072	3.700	2.000	1.000

NMAX	AMMAX	PMAX
1	7.30	1.00

dmchar	ampchar	dmpchar
0.50	6.80	1.00

Slip Rate (3.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area - cm**2
0.210E+14
LOG10[Mo(m)] = (1.50)m + (16.05)

IMAX	AMMAX	PMAX	ARATE = EX-RATE + CH-RATE		
1	7.3000	1.0000	0.02430	0.02021	0.00409

IND_RL
2

RUPTURE AREA VS. MAGNITUDE	A_RA	B_RA	SIG_RA	-3.490	0.910
0.240					

FAULT SEGMENT COORDINATES

1	-118.6945	33.9849
2	-118.7913	33.9530
3	-118.9120	33.9508
4	-119.1410	33.9838
5	-119.3403	33.9792
6	-119.4963	33.9883

NDP
2
ORIGINAL FAULT CROSS SECTION

1	0.0000	0.0000
2	19.8000	19.8000

Computed Total Fault Area = 0.20E+04

FAULT 42

FAULT NAME: M.RIDGE-ARROYO PARIDA-SANTA ANA

NFP	NRL	ATTENUATION CODES:	
14	10	2	4

AMMIN	AMSTEP	IRATE	RATE	BETA	ECTR	ECDP	COEF
5.000	0.1000	1	0.4000	2.072	3.200	2.000	1.000

NMAX	AMMAX	PMAX

```
 1    6.70  1.00

   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.975E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00470   0.00269   0.00201


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -119.1658   34.4701
  2    -119.2878   34.4298
  3    -119.3456   34.4235
  4    -119.4261   34.4160
  5    -119.4714   34.4273
  6    -119.5104   34.4311
  7    -119.6110   34.4411
  8    -119.6914   34.4499
  9    -119.7430   34.4424
 10    -119.7506   34.4411
 11    -119.7857   34.4336
 12    -119.8071   34.4336
 13    -119.8688   34.4248
 14    -119.8977   34.4298

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       7.5000   13.0000

 Computed Total Fault Area = 0.10E+04

 ------------------------------------------------------------------------

 FAULT 43

 FAULT NAME:  So. SIERRA NEVADA


 NFP    NRL   ATTENUATION CODES:
  9     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.1000  2.072  3.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.10  1.00
```

```
   dmchar ampchar dmpchar
     0.50    6.60    1.00

 Slip Rate (  0.1000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.114E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.00062   0.00048   0.00015


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1    -117.9938   35.5680
  2    -117.9051   35.6137
  3    -117.8716   35.6755
  4    -117.8917   35.7561
  5    -117.8863   35.8917
  6    -117.8957   35.9239
  7    -117.9629   36.0085
  8    -117.9857   36.0690
  9    -117.9871   36.1885

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       7.5000   13.0000

 Computed Total Fault Area = 0.12E+04

 ------------------------------------------------------------------------------

 FAULT 44

 FAULT NAME:  VENTURA - PITAS POINT


 NFP    NRL   ATTENUATION CODES:
  6     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  2.000  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.80  1.00


   dmchar ampchar dmpchar
     0.50    6.30    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
```

```
 Input Fault Area     - cm**2
0.533E+13
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX    AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  6.8000  1.0000    0.00520    0.00326    0.00195


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA       B_RA     SIG_RA  -3.490      0.910
0.240

 FAULT SEGMENT COORDINATES
  1     -119.1411    34.3453
  2     -119.1940    34.3088
  3     -119.2243    34.2928
  4     -119.3034    34.2892
  5     -119.4040    34.3166
  6     -119.5527    34.3093

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1        0.0000     1.0000
  2        0.0000     1.1000
  3        3.4000    13.6000

 Computed Total Fault Area = 0.51E+03

-------------------------------------------------------------------------------

 SITE 1 COORDINATES: -118.1387  34.6913

 BOZ. ET AL.(1999)HOR PS COR 1
      AMPLITUDES (g):
0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
      LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -
0.22     -0.11      0.00
   FAULT   1 E(NO/YR)     0.1289E-010.5833E-020.3308E-020.1856E-020.1016E-020.5510E-030.2998E-
030.1647E-030.9176E-040.5189E-04
   FAULT   2 E(NO/YR)     0.3359E-010.1424E-010.6179E-020.2620E-020.1116E-020.4858E-030.2179E-
030.1008E-030.4815E-040.2369E-04
   FAULT   3 E(NO/YR)     0.5026E-020.5546E-030.7977E-040.1416E-040.2983E-050.7218E-060.1957E-
060.5838E-070.1888E-070.6544E-08
   FAULT   4 E(NO/YR)     0.4781E-030.3099E-040.2754E-050.3311E-060.5054E-070.9305E-080.1992E-
080.4825E-090.1295E-090.3786E-10
   FAULT   5 E(NO/YR)     0.2762E-020.1904E-030.1742E-040.2129E-050.3286E-060.6100E-070.1314E-
070.3197E-080.8615E-090.2530E-09
   FAULT   6 E(NO/YR)     0.1840E-020.2146E-030.2831E-040.4552E-050.8737E-060.1944E-060.4888E-
070.1362E-070.4139E-080.1356E-08
   FAULT   7 E(NO/YR)     0.3905E-020.6438E-030.1140E-030.2324E-040.5429E-050.1428E-050.4157E-
060.1318E-060.4501E-070.1638E-07
   FAULT   8 E(NO/YR)     0.2239E-030.1036E-040.7252E-060.7287E-070.9635E-080.1574E-080.3042E-
090.6734E-100.1663E-100.4368E-11
   FAULT   9 E(NO/YR)     0.1016E-020.7999E-040.8037E-050.1055E-050.1725E-060.3360E-070.7543E-
080.1904E-080.5301E-090.1604E-09
   FAULT  10 E(NO/YR)     0.3765E-020.2102E-030.1679E-040.1864E-050.2672E-060.4671E-070.9569E-
080.2231E-080.5786E-090.1629E-09
   FAULT  11 E(NO/YR)     0.5274E-030.4520E-040.4804E-050.6576E-060.1111E-060.2224E-070.5112E-
080.1317E-080.3734E-090.1149E-09
   FAULT  12 E(NO/YR)     0.3997E-030.2419E-040.2021E-050.2312E-060.3387E-070.6023E-080.1251E-
080.2950E-090.7731E-100.2209E-10
   FAULT  13 E(NO/YR)     0.1674E-030.5251E-050.2864E-060.2396E-070.2741E-080.3973E-090.6929E-
100.1390E-100.2963E-110.4896E-12
   FAULT  14 E(NO/YR)     0.1020E-020.4237E-040.2848E-050.2802E-060.3661E-070.5939E-080.1142E-
080.2516E-090.6149E-100.1585E-10
   FAULT  15 E(NO/YR)     0.1795E-020.6254E-040.3703E-050.3307E-060.3996E-070.6071E-080.1103E-
080.2309E-090.5270E-100.1168E-10
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FAULT 16 E(NO/YR) 0.2527E-030.5715E-050.2532E-060.1821E-070.1849E-080.2429E-090.3875E-100.6728E-110.9041E-120.0000E+00
FAULT 17 E(NO/YR) 0.4468E-030.1287E-040.7013E-060.5956E-070.6943E-080.1025E-080.1817E-090.3688E-100.8010E-110.1721E-11
FAULT 18 E(NO/YR) 0.6638E-040.2109E-050.1186E-060.1020E-070.1196E-080.1772E-090.3147E-100.6434E-110.1410E-110.3003E-12
FAULT 19 E(NO/YR) 0.5627E-040.1215E-050.5288E-070.3764E-080.3798E-090.4962E-100.7852E-110.1363E-110.1802E-120.0000E+00
FAULT 20 E(NO/YR) 0.5408E-030.1606E-040.9002E-060.7822E-070.9293E-080.1395E-080.2508E-090.5180E-100.1163E-100.2435E-11
FAULT 21 E(NO/YR) 0.6902E-030.1715E-040.8483E-060.6708E-070.7390E-080.1042E-080.1767E-090.3387E-100.7051E-110.9371E-12
FAULT 22 E(NO/YR) 0.7699E-040.1115E-050.3864E-070.2349E-080.2099E-090.2459E-100.3260E-110.3192E-120.0000E+000.0000E+00
FAULT 23 E(NO/YR) 0.1551E-030.2994E-050.1212E-060.8191E-080.7933E-090.1002E-090.1513E-100.2265E-110.1029E-120.0000E+00
FAULT 24 E(NO/YR) 0.7685E-030.4730E-040.4041E-050.4716E-060.7032E-070.1270E-070.2675E-080.6389E-090.1693E-090.4884E-10
FAULT 25 E(NO/YR) 0.1365E-020.8349E-040.7052E-050.8131E-060.1198E-060.2142E-070.4467E-080.1057E-080.2779E-090.7966E-10
FAULT 26 E(NO/YR) 0.4594E-040.2408E-060.4378E-080.1651E-090.8336E-110.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 27 E(NO/YR) 0.1288E-030.2576E-050.1069E-060.7354E-080.7230E-090.9251E-100.1421E-100.2238E-110.1900E-120.0000E+00
FAULT 28 E(NO/YR) 0.2158E-030.6439E-050.3440E-060.2847E-070.3236E-080.4671E-090.8120E-100.1615E-100.3396E-110.5889E-12
FAULT 29 E(NO/YR) 0.6750E-040.1126E-050.4129E-070.2587E-080.2356E-090.2826E-100.3938E-110.4410E-120.0000E+000.0000E+00
FAULT 30 E(NO/YR) 0.3034E-040.3058E-060.8396E-080.4300E-090.3338E-100.3214E-110.2122E-120.0000E+000.0000E+000.0000E+00
FAULT 31 E(NO/YR) 0.2453E-030.1719E-050.3759E-070.1629E-080.1065E-090.6168E-110.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 32 E(NO/YR) 0.7401E-030.4739E-040.4136E-050.4886E-060.7341E-070.1333E-070.2818E-080.6748E-090.1793E-090.5192E-10
FAULT 33 E(NO/YR) 0.5460E-040.4345E-060.1017E-070.4622E-090.3205E-100.2286E-110.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 34 E(NO/YR) 0.1258E-040.7623E-070.1520E-080.6147E-100.3604E-110.7263E-130.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 35 E(NO/YR) 0.8803E-040.1347E-050.4722E-070.2876E-080.2567E-090.3015E-100.4014E-110.3263E-120.0000E+000.0000E+00
FAULT 36 E(NO/YR) 0.3338E-040.5740E-060.2158E-070.1380E-080.1280E-090.1557E-100.2222E-110.2638E-120.0000E+000.0000E+00
FAULT 37 E(NO/YR) 0.1181E-040.8456E-070.1853E-080.8016E-100.5261E-110.2817E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 38 E(NO/YR) 0.6566E-040.6474E-060.1745E-070.8804E-090.6746E-100.6430E-110.3884E-120.0000E+000.0000E+000.0000E+00
FAULT 39 E(NO/YR) 0.9424E-040.1916E-050.7991E-070.5509E-080.5417E-090.6928E-100.1065E-100.1677E-110.1295E-120.0000E+00
FAULT 40 E(NO/YR) 0.1016E-030.2073E-050.8674E-070.5995E-080.5908E-090.7575E-100.1167E-100.1870E-110.1670E-120.0000E+00
FAULT 41 E(NO/YR) 0.5213E-030.1956E-040.1222E-050.1139E-060.1423E-070.2225E-080.4145E-090.8871E-100.2093E-100.5068E-11
FAULT 42 E(NO/YR) 0.1616E-040.1289E-060.3110E-080.1457E-090.1039E-100.8171E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 43 E(NO/YR) 0.6611E-050.1349E-060.5786E-080.4107E-090.4149E-100.5432E-110.8573E-120.1468E-120.1855E-130.0000E+00
FAULT 44 E(NO/YR) 0.3359E-040.3494E-060.9686E-080.4979E-090.3879E-100.3787E-110.2518E-120.0000E+000.0000E+000.0000E+00
TOTAL E(NO/YR) 0.7634E-010.2246E-010.9789E-020.4526E-020.2142E-020.1039E-020.5184E-030.2658E-030.1400E-030.7561E-04
TOTAL RISK 0.7350E-010.2221E-010.9741E-020.4516E-020.2140E-020.1039E-020.5182E-030.2658E-030.1400E-030.7561E-04

AMPLITUDES (g):	0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
LN (AMPLITUDE):	0.10 0.18 0.26 0.34 0.41
FAULT 1 E(NO/YR)	0.2982E-040.1741E-040.1032E-040.6212E-050.3793E-05
FAULT 2 E(NO/YR)	0.1199E-040.6226E-050.3313E-050.1804E-050.1003E-05
FAULT 3 E(NO/YR)	0.2409E-080.9349E-090.3798E-090.1605E-090.7020E-10
FAULT 4 E(NO/YR)	0.1179E-100.3739E-110.1151E-110.2557E-120.0000E+00
FAULT 5 E(NO/YR)	0.7876E-100.2556E-100.8196E-110.2188E-110.0000E+00
FAULT 6 E(NO/YR)	0.4738E-090.1752E-090.6808E-100.2733E-100.1115E-10
FAULT 7 E(NO/YR)	0.6306E-080.2550E-080.1078E-080.4734E-090.2153E-09
FAULT 8 E(NO/YR)	0.1102E-110.2074E-120.0000E+000.0000E+000.0000E+00
FAULT 9 E(NO/YR)	0.5203E-100.1767E-100.6151E-110.2035E-110.5196E-12
FAULT 10 E(NO/YR)	0.4800E-100.1371E-100.2816E-110.0000E+000.0000E+00
FAULT 11 E(NO/YR)	0.3790E-100.1317E-100.4724E-110.1677E-110.5234E-12
FAULT 12 E(NO/YR)	0.6622E-110.1986E-110.4585E-120.0000E+000.0000E+00

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   FAULT  13 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  14 E(NO/YR)      0.4007E-110.7179E-120.0000E+000.0000E+000.0000E+00
   FAULT  15 E(NO/YR)      0.1621E-110.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  16 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  17 E(NO/YR)      0.2586E-120.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  18 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  19 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  20 E(NO/YR)      0.4997E-120.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  21 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  22 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  23 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  24 E(NO/YR)      0.1491E-100.4600E-110.1227E-110.1871E-120.0000E+00
   FAULT  25 E(NO/YR)      0.2409E-100.7142E-110.1770E-110.0000E+000.0000E+00
   FAULT  26 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  27 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  28 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  29 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  30 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  31 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  32 E(NO/YR)      0.1598E-100.5099E-110.1194E-110.0000E+000.0000E+00
   FAULT  33 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  34 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  35 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  36 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  37 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  38 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  39 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  40 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  41 E(NO/YR)      0.1048E-110.1146E-120.0000E+000.0000E+000.0000E+00
   FAULT  42 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  43 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   FAULT  44 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
   TOTAL     E(NO/YR)      0.4181E-040.2364E-040.1364E-040.8016E-050.4796E-05
   TOTAL RISK              0.4181E-040.2364E-040.1364E-040.8016E-050.4796E-05

     SPECIFIED RISKS:         0.013900  0.010000  0.005000  0.002105  0.001000
     ESTIMATED LN AMP.  :      -1.379    -1.217    -0.954    -0.689    -0.502
      ESTIMATED AMP. (g):     0.25186   0.29616   0.38505   0.50207   0.60510

 BOZ. ET AL.(1999)HOR PS COR 2
      AMPLITUDES (g):
0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
      LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -
0.22     -0.11      0.00
   FAULT   1 E(NO/YR)      0.8731E-020.4940E-020.3102E-020.1831E-020.1038E-020.5796E-030.3234E-
030.1818E-030.1034E-030.5960E-04
   FAULT   2 E(NO/YR)      0.2303E-010.9793E-020.3842E-020.1459E-020.5635E-030.2255E-030.9401E-
040.4081E-040.1841E-040.8605E-05
   FAULT   3 E(NO/YR)      0.3463E-020.3308E-030.4210E-040.6805E-050.1329E-050.3021E-060.7766E-
070.2211E-070.6860E-080.2291E-08
   FAULT   4 E(NO/YR)      0.2619E-030.1213E-040.8638E-060.8840E-070.1189E-070.1974E-080.3871E-
090.8676E-100.2160E-100.5799E-11
   FAULT   5 E(NO/YR)      0.1668E-020.8699E-040.6618E-050.7086E-060.9863E-070.1683E-070.3374E-
080.7715E-090.1958E-090.5387E-10
   FAULT   6 E(NO/YR)      0.9021E-030.6380E-040.5955E-050.7422E-060.1166E-060.2199E-070.4806E-
080.1185E-080.3233E-090.9578E-10
   FAULT   7 E(NO/YR)      0.2489E-020.3209E-030.4644E-040.8125E-050.1682E-050.4003E-060.1069E-
060.3147E-070.1006E-070.3450E-08
   FAULT   8 E(NO/YR)      0.6709E-040.1501E-050.6681E-070.4839E-080.4951E-090.6548E-100.1044E-
100.1837E-110.2807E-120.0000E+00
   FAULT   9 E(NO/YR)      0.5343E-030.2823E-040.2176E-050.2357E-060.3314E-070.5701E-080.1152E-
080.2652E-090.6777E-100.1875E-10
   FAULT  10 E(NO/YR)      0.1353E-020.4022E-040.2155E-050.1791E-060.2046E-070.2968E-080.5174E-
090.1033E-090.2216E-100.3750E-11
   FAULT  11 E(NO/YR)      0.2387E-030.1204E-040.9013E-060.9553E-070.1320E-070.2240E-080.4473E-
090.1019E-090.2579E-100.7068E-11
   FAULT  12 E(NO/YR)      0.1326E-030.3943E-050.2101E-060.1736E-070.1969E-080.2838E-090.4920E-
100.9721E-110.2071E-110.3778E-12
   FAULT  13 E(NO/YR)      0.4295E-040.6404E-060.2210E-070.1330E-080.1175E-090.1358E-100.1849E-
110.1062E-120.0000E+000.0000E+00
   FAULT  14 E(NO/YR)      0.4687E-030.1283E-040.6624E-060.5384E-070.6053E-080.8672E-090.1495E-
090.2940E-100.6047E-110.1028E-11
   FAULT  15 E(NO/YR)      0,7023E-030.1483E-040.6430E-060.4587E-070.4648E-080.6095E-090.9653E-
100.1596E-100.1846E-110.0000E+00
   FAULT  16 E(NO/YR)      0.4928E-040.4826E-060.1285E-070.6405E-090.4852E-100.4658E-
110.0000E+000.0000E+000.0000E+00
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FAULT 17 E(NO/YR) 0.3003E-030.7408E-050.3665E-060.2904E-070.3205E-080.4524E-090.7690E-100.1483E-100.2856E-110.4809E-12
FAULT 18 E(NO/YR) 0.4466E-040.1208E-050.6147E-070.4930E-080.5474E-090.7754E-100.1322E-100.2569E-110.5320E-120.8423E-13
FAULT 19 E(NO/YR) 0.2870E-040.4574E-060.1655E-070.1032E-080.9392E-100.1120E-100.1536E-110.1985E-120.0000E+000.0000E+00
FAULT 20 E(NO/YR) 0.4053E-030.1095E-040.5791E-060.4831E-070.5562E-080.8138E-090.1430E-090.2870E-100.5920E-110.1072E-11
FAULT 21 E(NO/YR) 0.4570E-030.9713E-050.4361E-060.3217E-070.3358E-080.4519E-090.7319E-100.1338E-100.2155E-110.0000E+00
FAULT 22 E(NO/YR) 0.3232E-040.3236E-060.8957E-080.4630E-090.3619E-100.3565E-110.3017E-120.0000E+000.0000E+000.0000E+00
FAULT 23 E(NO/YR) 0.3872E-040.3814E-060.1025E-070.5155E-090.3930E-100.3737E-110.1626E-120.0000E+000.0000E+000.0000E+00
FAULT 24 E(NO/YR) 0.5011E-030.2477E-040.1838E-050.1940E-060.2675E-070.4532E-080.9043E-090.2059E-090.5203E-100.1424E-10
FAULT 25 E(NO/YR) 0.7412E-030.3197E-040.2154E-050.2111E-060.2739E-070.4411E-080.8422E-090.1843E-090.4464E-100.1133E-10
FAULT 26 E(NO/YR) 0.5966E-050.1438E-070.1629E-090.2859E-110.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 27 E(NO/YR) 0.3772E-040.4166E-060.1203E-070.6378E-090.5090E-100.5227E-110.4409E-120.0000E+000.0000E+000.0000E+00
FAULT 28 E(NO/YR) 0.7173E-040.1196E-050.4463E-070.2850E-080.2644E-090.3205E-100.4587E-110.5722E-120.0000E+000.0000E+00
FAULT 29 E(NO/YR) 0.1354E-040.1051E-060.2424E-080.1088E-090.7471E-110.5343E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 30 E(NO/YR) 0.1010E-040.6502E-070.1361E-080.5714E-100.3593E-110.1863E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 31 E(NO/YR) 0.5237E-040.1999E-060.3030E-080.9680E-100.2554E-110.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 32 E(NO/YR) 0.4778E-030.2470E-040.1870E-050.1997E-060.2773E-070.4723E-080.9457E-090.2160E-090.5478E-100.1506E-10
FAULT 33 E(NO/YR) 0.1439E-040.6702E-070.1138E-080.4046E-100.1666E-110.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 34 E(NO/YR) 0.2569E-050.8443E-080.1164E-090.3324E-110.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 35 E(NO/YR) 0.2375E-040.1992E-060.4854E-080.2275E-090.1622E-100.1327E-110.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 36 E(NO/YR) 0.9319E-050.8789E-070.2294E-080.1129E-090.8443E-110.7799E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 37 E(NO/YR) 0.3600E-050.1625E-070.2702E-090.9381E-110.3800E-120.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 38 E(NO/YR) 0.2973E-040.2157E-060.4838E-080.2136E-090.1431E-100.9015E-120.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 39 E(NO/YR) 0.4173E-040.5814E-060.1929E-070.1129E-080.9765E-100.1101E-100.1416E-110.0000E+000.0000E+000.0000E+00
FAULT 40 E(NO/YR) 0.3453E-040.4179E-060.1272E-070.6998E-090.5755E-100.6162E-110.6160E-120.0000E+000.0000E+000.0000E+00
FAULT 41 E(NO/YR) 0.3536E-030.1132E-040.6420E-060.5582E-070.6615E-080.9899E-090.1775E-090.3650E-100.8194E-110.1759E-11
FAULT 42 E(NO/YR) 0.3576E-050.1580E-070.2663E-090.9389E-110.3980E-120.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
FAULT 43 E(NO/YR) 0.3360E-050.5109E-070.1830E-080.1141E-090.1040E-100.1240E-110.1725E-120.2114E-130.0000E+000.0000E+00
FAULT 44 E(NO/YR) 0.9542E-050.5849E-070.1179E-080.4801E-100.2857E-110.7086E-130.0000E+000.0000E+000.0000E+000.0000E+00
TOTAL E(NO/YR) 0.4788E-010.1579E-010.7061E-020.3308E-020.1605E-020.8059E-030.4176E-030.2226E-030.1218E-030.6821E-04
TOTAL RISK 0.4675E-010.1567E-010.7036E-020.3302E-020.1604E-020.8056E-030.4175E-030.2226E-030.1218E-030.6821E-04

AMPLITUDES (g):	0.1100E+01	0.1200E+01	0.1300E+01	0.1400E+01	0.1500E+01	
LN (AMPLITUDE):	0.10	0.18	0.26	0.34	0.41	
FAULT 1 E(NO/YR)	0.3486E-04	0.2070E-04	0.1247E-04	0.7619E-05	0.4718E-05	
FAULT 2 E(NO/YR)	0.4157E-05	0.2070E-05	0.1059E-05	0.5563E-06	0.2990E-06	
FAULT 3 E(NO/YR)	0.8148E-09	0.3062E-09	0.1208E-09	0.4934E-10	0.2064E-10	
FAULT 4 E(NO/YR)	0.1586E-11	0.3608E-12	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 5 E(NO/YR)	0.1537E-10	0.3898E-11	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 6 E(NO/YR)	0.3031E-10	0.1003E-10	0.3366E-11	0.9814E-12	0.0000E+00	
FAULT 7 E(NO/YR)	0.1258E-08	0.4838E-09	0.1950E-09	0.8184E-10	0.3544E-10	
FAULT 8 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 9 E(NO/YR)	0.5381E-11	0.1373E-11	0.2889E-12	0.0000E+00	0.0000E+00	
FAULT 10 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 11 E(NO/YR)	0.2005E-11	0.5059E-12	0.3528E-13	0.0000E+00	0.0000E+00	
FAULT 12 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 13 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	
FAULT 14 E(NO/YR)	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	

FAULT	15	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	16	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	17	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	18	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	19	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	20	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	21	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	22	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	23	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	24	E(NO/YR)	0.4040E-110	0.9599E-120	0.1590E-120	0.0000E+000	0.0000E+00
FAULT	25	E(NO/YR)	0.2621E-110	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	26	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	27	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	28	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	29	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	30	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	31	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	32	E(NO/YR)	0.4298E-110	0.1089E-110	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	33	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	34	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	35	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	36	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	37	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	38	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	39	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	40	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	41	E(NO/YR)	0.2718E-120	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	42	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	43	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
FAULT	44	E(NO/YR)	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+000	0.0000E+00
TOTAL		E(NO/YR)	0.3902E-040	0.2277E-040	0.1353E-040	0.8175E-050	0.5018E-05
TOTAL RISK			0.3902E-040	0.2277E-040	0.1353E-040	0.8175E-050	0.5018E-05

SPECIFIED RISKS:	0.013900	0.010000	0.005000	0.002105	0.001000
ESTIMATED LN AMP. :	-1.549	-1.382	-1.074	-0.777	-0.568
ESTIMATED AMP. (g):	0.21249	0.25107	0.34162	0.45970	0.56662

CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO
1	SAN ANDREAS - 1857 Rupture	13.1	13.1	13.5	13.1	13.2	13.2 km
2	SAN ANDREAS - Mojave	13.1	13.1	13.5	13.1	13.1	13.2 km
3	SAN ANDREAS - Carrizo	33.7	33.7	33.9	33.7	34.8	34.8 km
4	SAN GABRIEL	42.2	42.2	42.3	42.2	42.2	42.3 km
5	GARLOCK (West)	45.7	45.7	45.8	45.7	45.7	45.7 km
6	SIERRA MADRE (San Fernando)	48.1	36.2	38.4	38.4	37.3	39.2 km
7	SIERRA MADRE	48.3	34.4	36.7	36.7	35.3	37.3 km
8	HOLSER	48.3	48.3	49.6	48.3	49.2	49.2 km
9	NORTHRIDGE (E. Oak Ridge)	52.1	52.1	52.4	52.4	52.9	53.2 km
10	SANTA SUSANA	52.2	45.6	47.4	47.4	46.8	48.3 km
11	VERDUGO	54.3	41.7	43.6	43.6	42.7	44.3 km
12	CLAMSHELL-SAWPIT	56.0	42.9	44.8	44.8	43.8	45.4 km
13	RAYMOND	59.6	56.3	57.7	57.7	56.9	58.1 km
14	OAK RIDGE (Onshore)	62.6	62.6	63.2	62.6	63.7	63.7 km
15	SAN CAYETANO	63.7	63.7	63.8	63.7	64.8	64.8 km
16	HOLLYWOOD	64.2	59.5	61.0	61.0	60.2	61.4 km
17	GARLOCK (East)	66.9	66.9	66.9	66.9	67.6	67.6 km
18	LENWOOD-LOCKHART-OLD WOMAN SPRGS	68.0	68.0	68.1	68.0	68.0	68.1 km
19	HELENDALE - S. LOCKHARDT	69.7	69.7	69.8	69.7	69.7	69.7 km
20	SAN ANDREAS - Southern	70.5	70.5	70.6	70.5	71.6	71.6 km
21	SAN ANDREAS - San Bernardino	70.5	70.5	70.6	70.5	71.6	71.6 km
22	SANTA YNEZ (East)	71.1	70.8	71.0	71.0	71.9	72.1 km
23	SANTA MONICA	72.2	70.0	71.1	71.1	71.1	72.0 km
24	PLEITO THRUST	72.6	68.0	68.3	68.3	69.4	69.6 km
25	CUCAMONGA	73.3	60.6	61.9	61.9	61.5	62.7 km
26	CLEGHORN	74.7	74.7	74.8	74.7	75.8	75.8 km
27	SIMI-SANTA ROSA	75.0	73.2	74.3	74.3	74.4	75.4 km
28	ELYSIAN PARK THRUST	75.4	63.2	65.0	65.0	64.7	66.4 km
29	SAN JOSE	75.4	71.9	73.0	73.0	72.3	73.2 km
30	NEWPORT-INGLEWOOD (L.A.Basin)	76.2	76.2	76.2	76.2	76.9	76.9 km

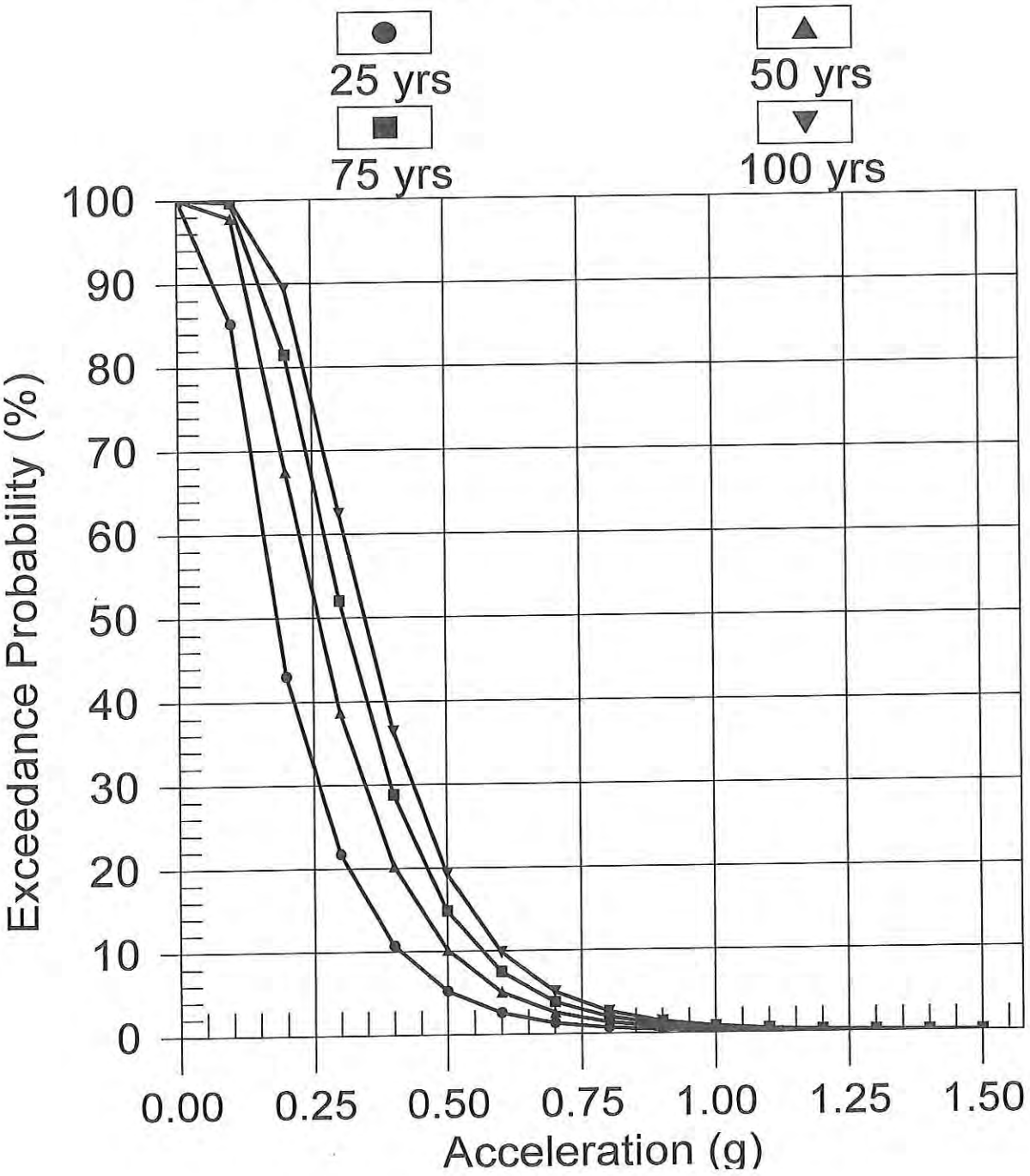
31	SAN JACINTO-SAN BERNARDINO	76.1	76.1	76.1	76.1	77.2	77.2 km
32	WHITE WOLF	78.1	67.6	70.0	70.0	68.2	70.3 km
33	WHITTIER	79.2	79.2	79.3	79.2	79.8	79.8 km
34	BIG PINE	80.7	80.7	80.7	80.7	81.3	81.3 km
35	CHINO-CENTRAL AVE. (Elsinore)	81.5	81.5	81.8	81.5	82.7	82.7 km
36	MALIBU COAST	81.9	78.7	79.7	79.7	79.3	80.2 km
37	GRAVEL HILLS - HARPER LAKE	88.7	88.7	88.7	88.7	88.8	88.8 km
38	PALOS VERDES	88.7	88.7	88.7	88.7	89.0	89.0 km
39	NORTH FRONTAL FAULT ZONE (West)	89.3	89.3	92.3	89.3	90.2	90.2 km
40	COMPTON THRUST	93.1	79.9	80.5	80.5	81.3	81.8 km
41	ANACAPA-DUME	93.6	83.7	86.0	86.0	85.0	87.1 km
42	M.RIDGE-ARROYO PARIDA-SANTA ANA	97.1	97.1	97.4	97.1	98.2	98.2 km
43	So. SIERRA NEVADA	98.4	92.7	93.7	93.7	93.9	94.7 km
44	VENTURA - PITAS POINT	99.4	99.4	99.6	99.4	100.5	100.5 km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

PROBABILITY OF EXCEEDANCE

BOZ. ET AL.(1999)HOR PS COR 1



PROBABILITY OF EXCEEDANCE

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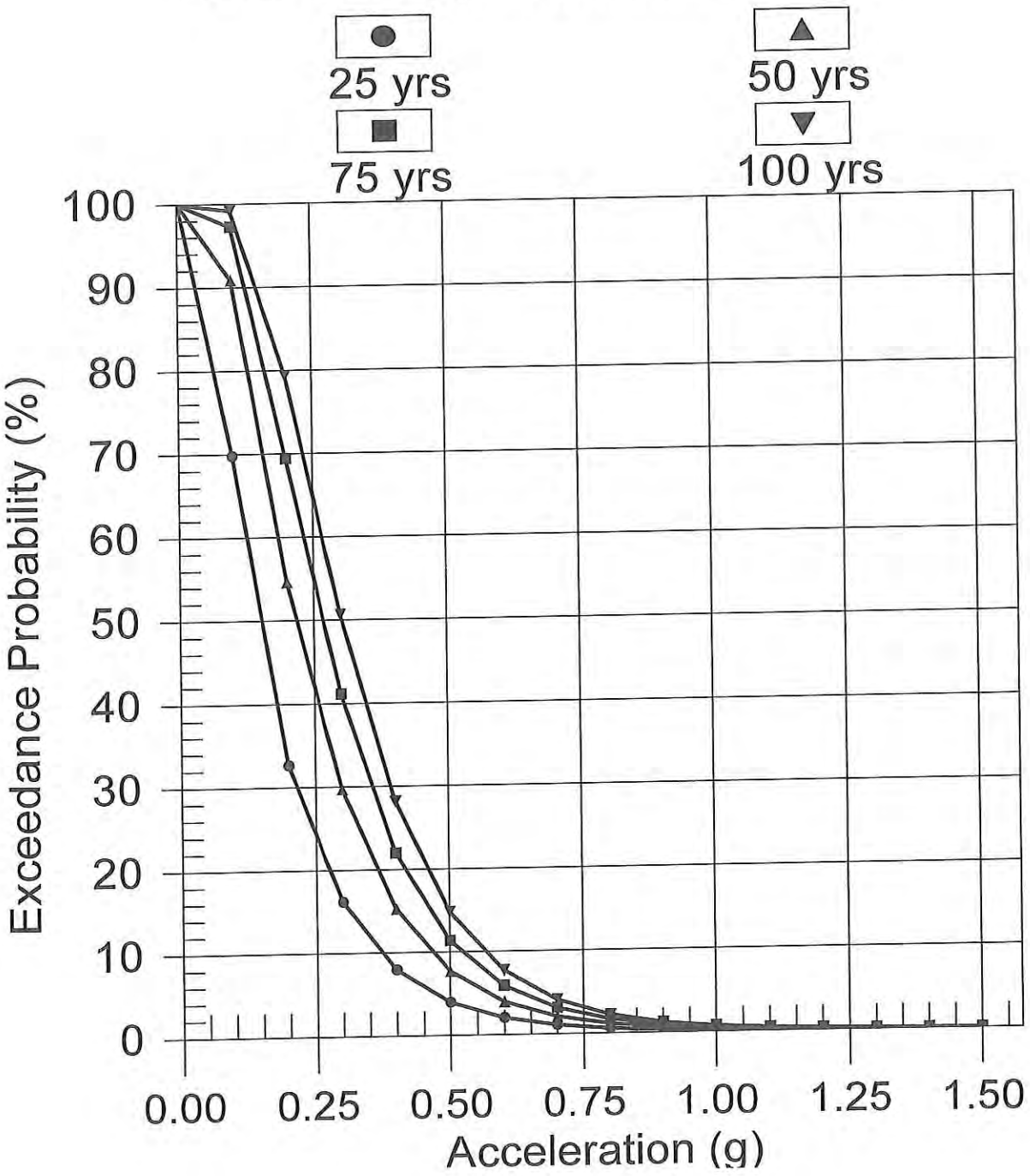

RETURN PERIOD vs. ACCELERATION

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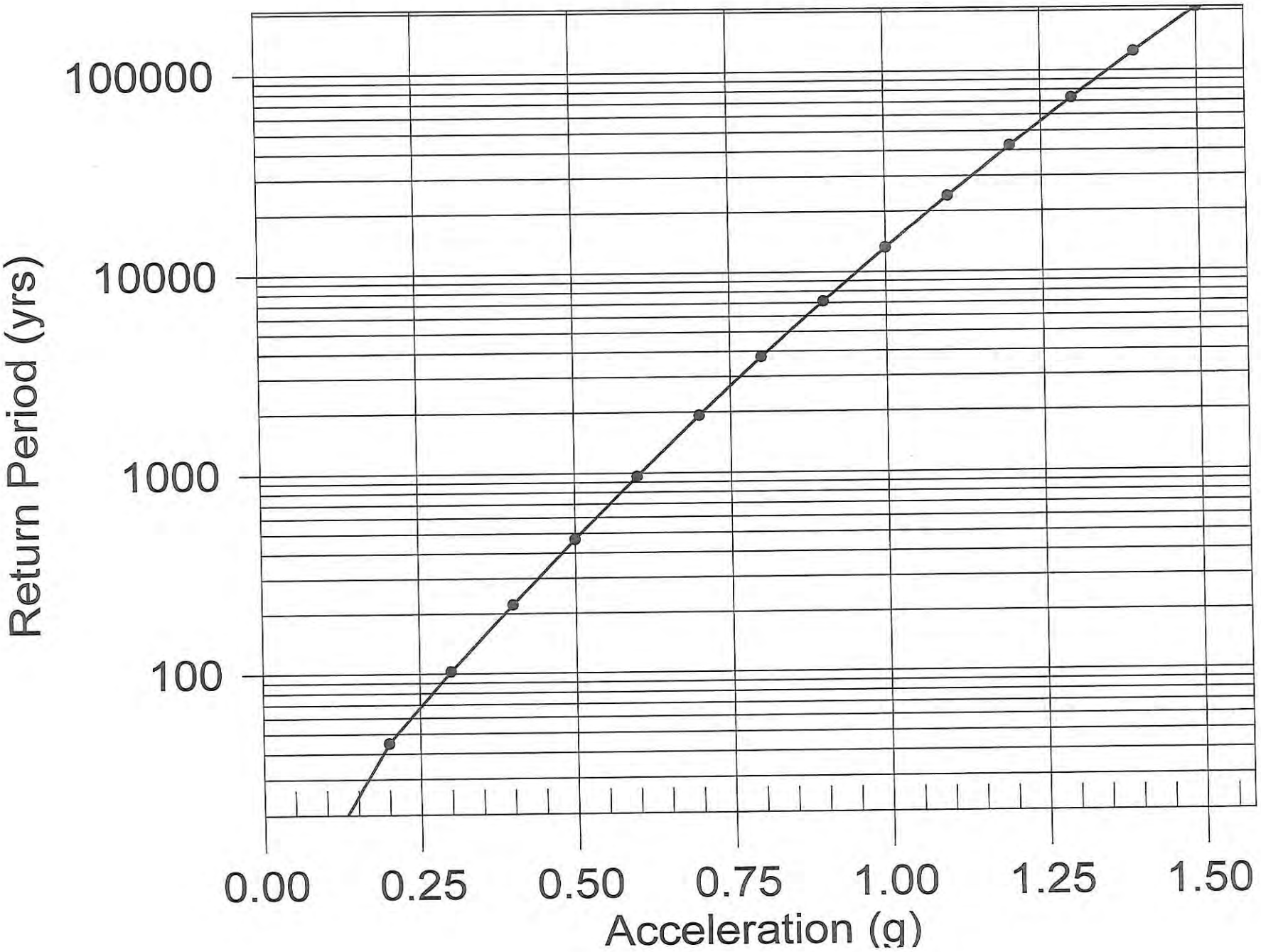

RETURN PERIOD vs. ACCELERATION

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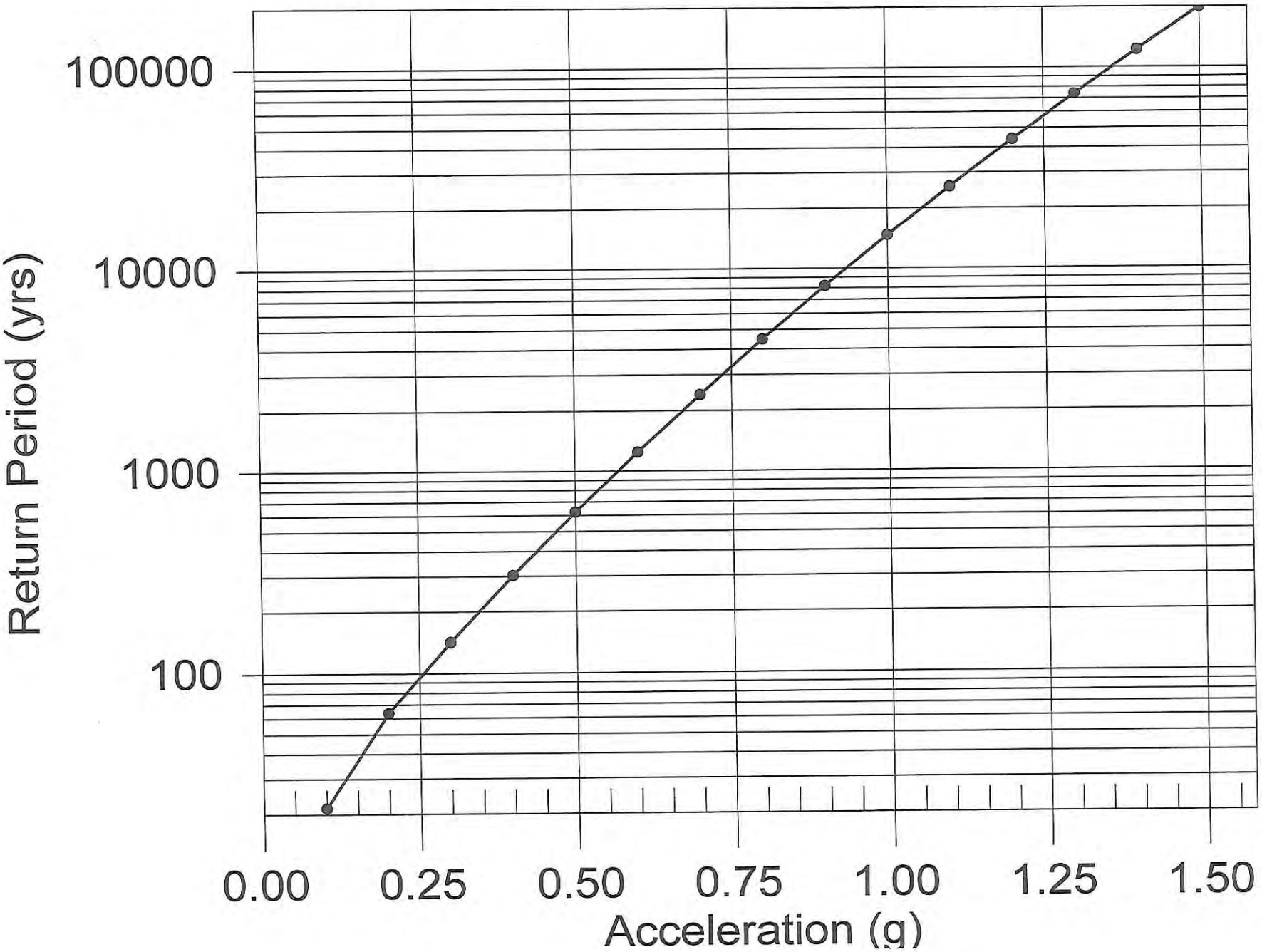
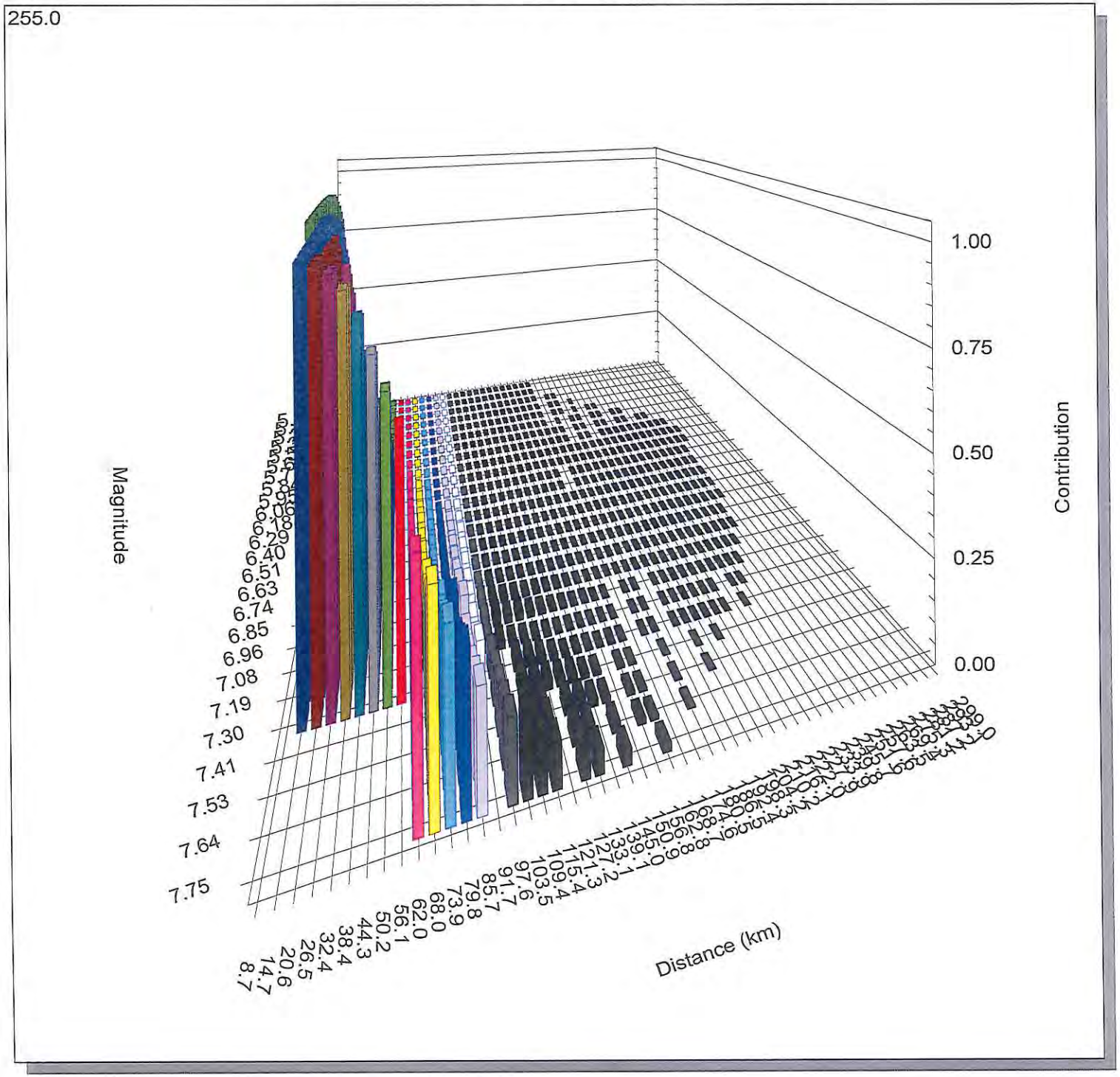
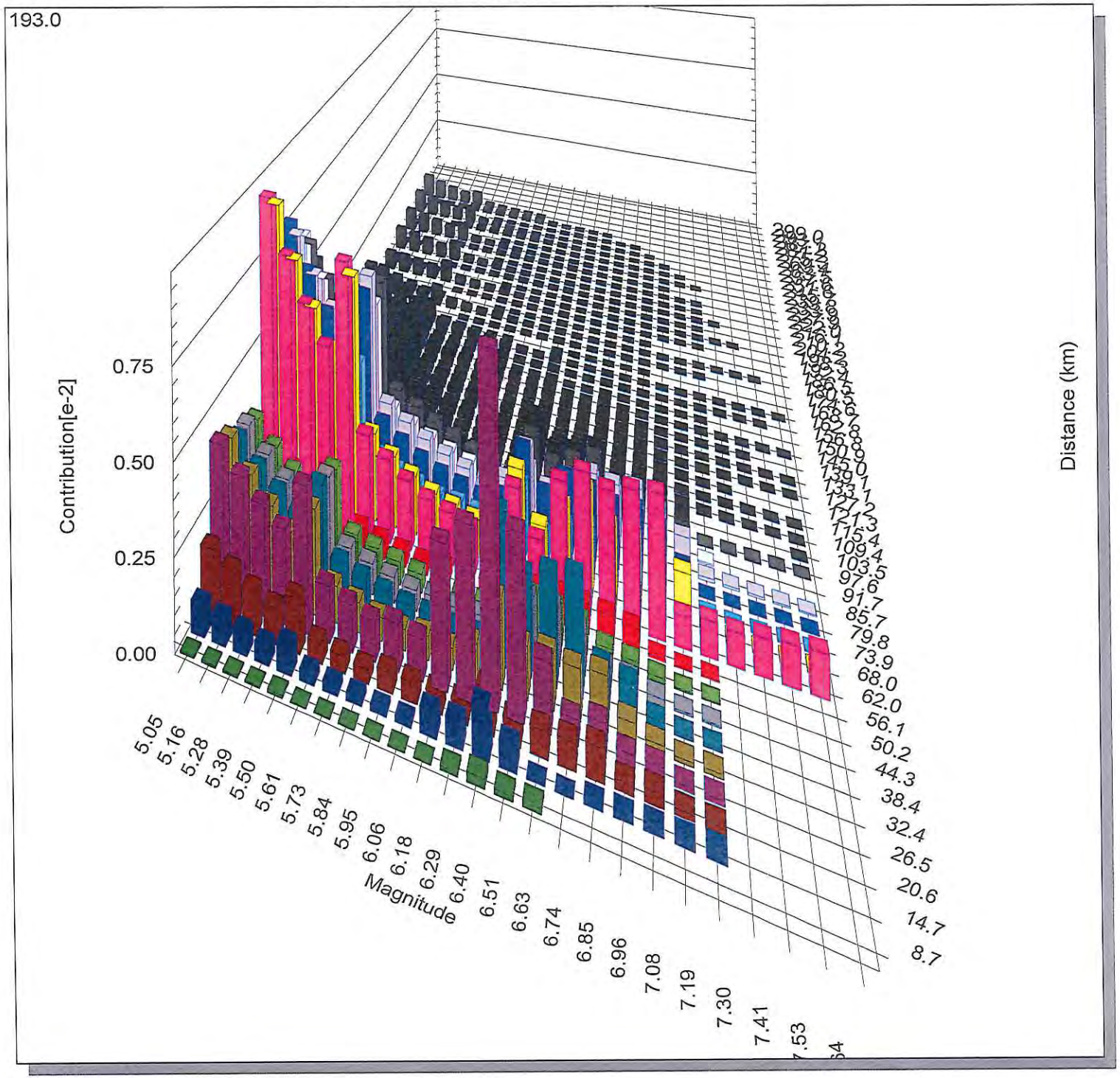


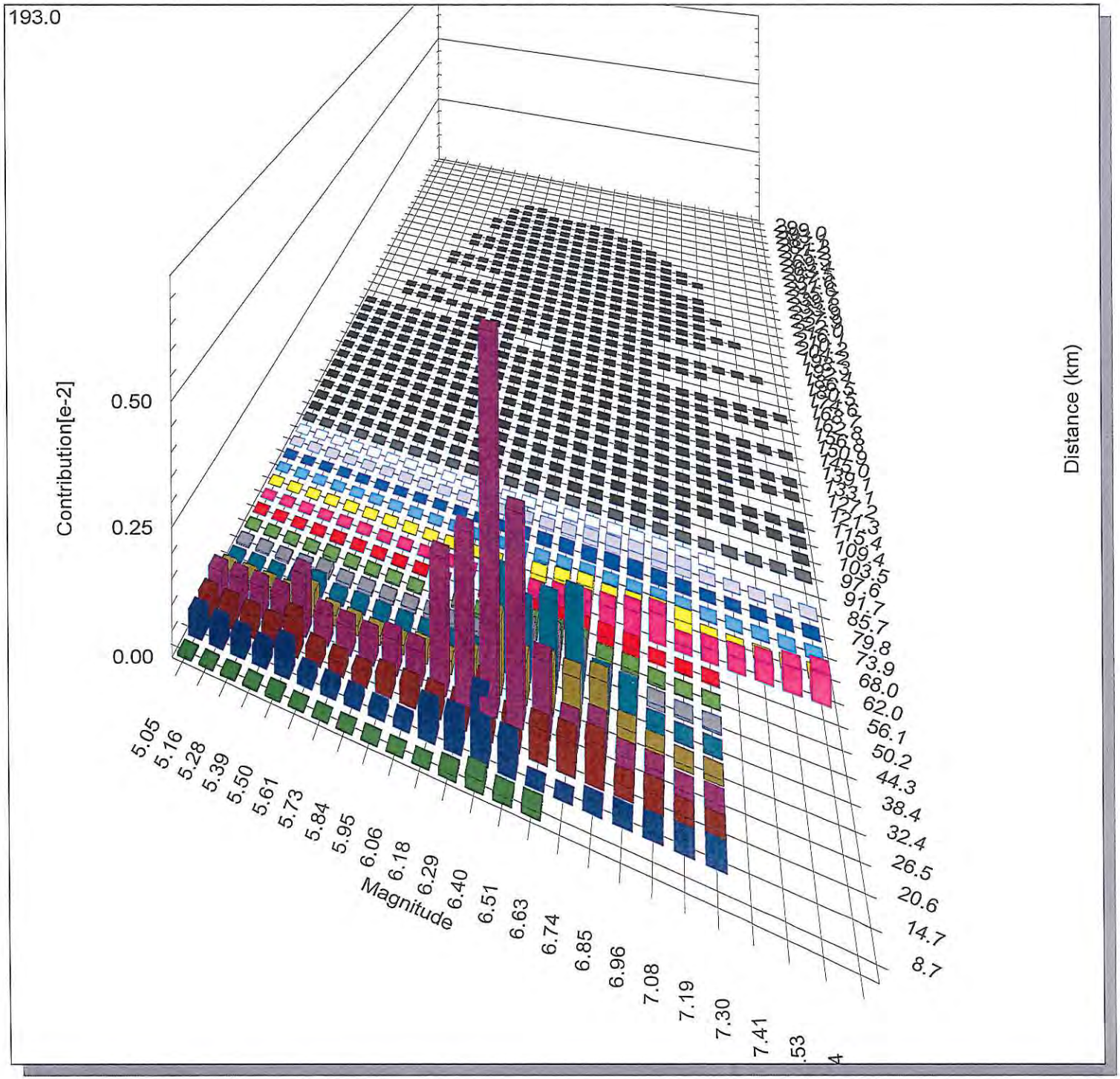
HAZARD/ACTIVITY CONTRIBUTIONS



ACTIVITY RATE CONTRIBUTIONS



HAZARD CONTRIBUTIONS

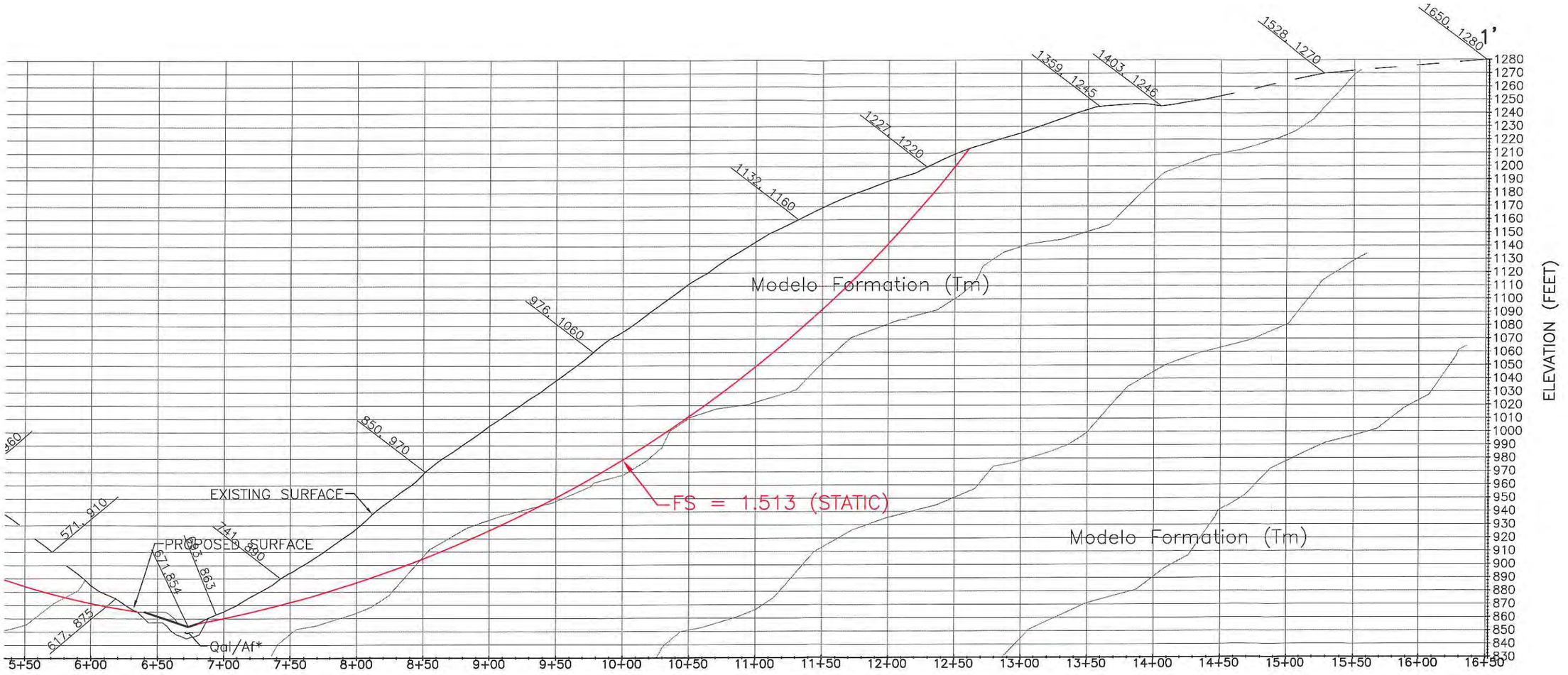


APPENDIX D

Table 9: Slope Stability Analysis

Analysis No.	Section	Condition	Analysis	Limits (Uncorrected)				Factor of Safety	Comments
				Initiation		Termination			
Appendix D									
1	1b-1b'	Circular	Static	0	200	300	670	1.391	Detention Basin Northern Slope
2	1b-1b'	Circular	Pseudo	0	200	300	670	1.078	Detention Basin Northern Slope
3	1b-1b'	Specific Surface	Newmark's	-	-	-	-	-	0.352 Permanent Displacement; Yield = 0.1532 (%g)
4	1a'-1a'	Circular	Static	0	200	300	982	1.513	Detention Basin Southern Slope
5	1a'-1a'	Circular	Pseudo	0	200	300	982	1.155	Detention Basin Southern Slope
6	2'-2'	Circular	Static	140	200	400	1000	1.758	Northside Natural Slope
7	2'-2	Circular	Pseudo	140	200	400	1000	1.310	Northside Natural Slope
8	3-3'	Circular	Static	120	200	300	920	1.623	Northside Western Most Natural Slope
9	3-3'	Circular	Pseudo	120	200	300	920	1.231	Northside Western Most Natural Slope
10	G1-G1'	Circular	Static	1100	1600	1800	2300	1.844	Global – Southern Buttress Slope
11	G1-G1'	Circular	Pseudo	1100	1600	1800	2300	1.181	Global – Southern Buttress Slope
12	G1-G1'	Circular	Static	1300	1766	1800	2300	1.913	Upper Slope – Southern Buttress Slope
13	G1-G1'	Circular	Pseudo	1300	1766	1800	2300	1.163	Upper Slope – Southern Buttress Slope
14	G2-G2'	Circular	Static	579	900	1251	2145	2.546	Global – Southern Buttress Slope
15	G2-G2'	Circular	Pseudo	579	900	1251	2145	1.620	Global – Southern Buttress Slope
16	G2-G2'	Circular	Static	969	1247	1541	2040	3.582	Upper Slope – Southern Buttress Slope
17	G2-G2'	Circular	Pseudo	969	1247	1541	2040	1.851	Upper Slope – Southern Buttress Slope
18	GAA-GAA'	Circular	Static	744	775	850	1100	1.261	Lower Local Slope - Static
19	GAA-GAA'	Circular	Static	Spec. Surface		Spec. Surface		2.037	Upper Local Slope – Landslide - Static

Analysis 1



SECTION 1–1'

GRAPHIC SCALE

0 1" 2"

0 40 80 160

1" = 80'

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-8406 FAX
890 Oaos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

SOUTH SLOPE - DESILTING BASIN
GEOLOGIC X-SECTION 1B-1B'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

NATURAL SLOPES @ DESILTN BASIN

Tract 71546 / Calabasas Geo Section 1' (North)

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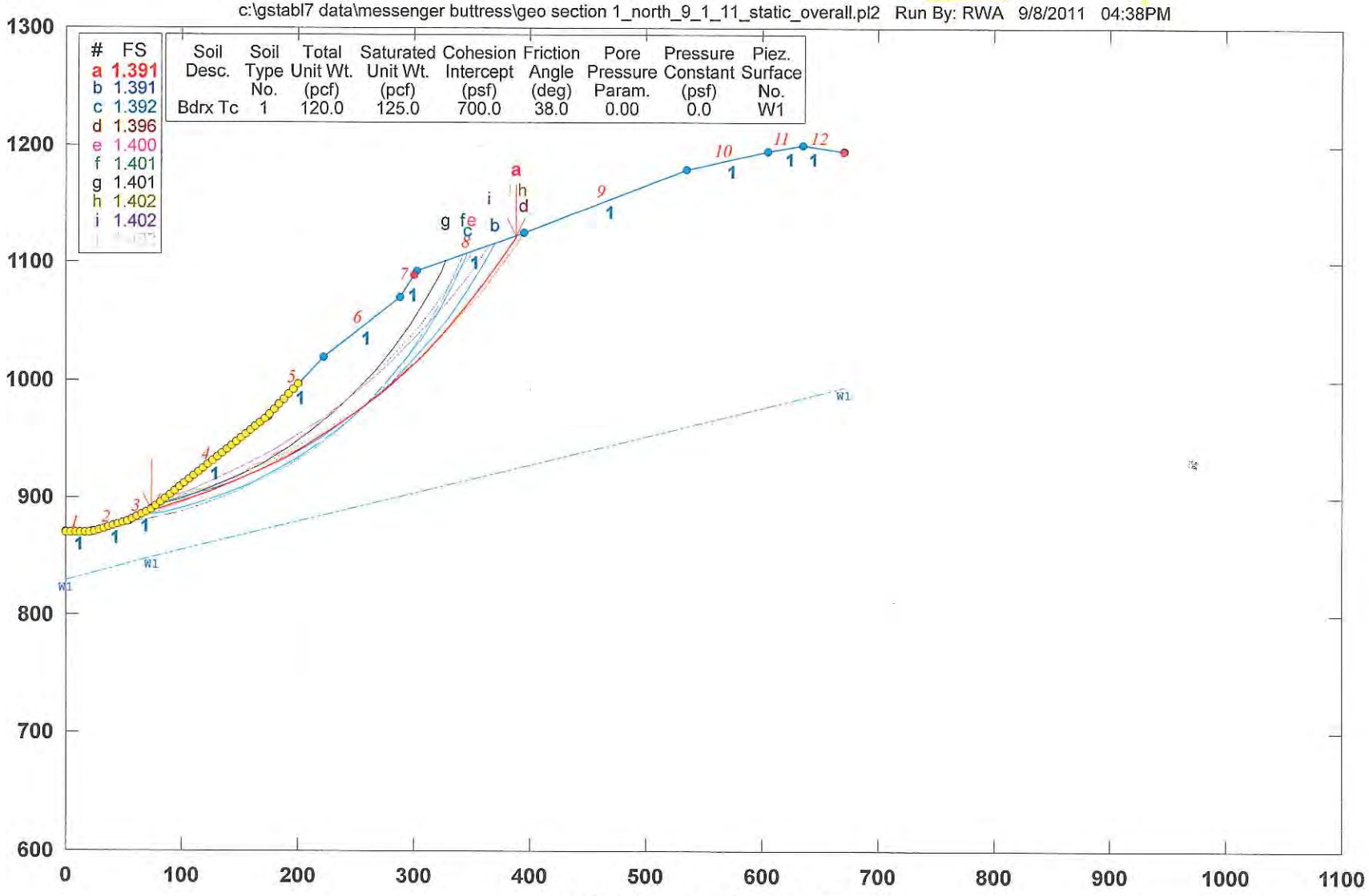

GSTABL7 v.2 FSmin=1.391

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/8/2011
Time of Run: 04:38PM
Run By: RWA
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Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_Static_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_Static_Overall.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1' (North)

BOUNDARY COORDINATES
12 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	22.00	870.00	1
2	22.00	870.00	54.00	880.00	1
3	54.00	880.00	74.00	890.00	1
4	74.00	890.00	174.00	970.00	1
5	174.00	970.00	222.00	1020.00	1
6	222.00	1020.00	288.00	1070.00	1
7	288.00	1070.00	302.00	1092.00	1
8	302.00	1092.00	395.00	1125.00	1
9	395.00	1125.00	535.00	1180.00	1
10	535.00	1180.00	605.00	1195.00	1
11	605.00	1195.00	635.00	1200.00	1
12	635.00	1200.00	670.00	1195.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	74.00	850.00
3	670.00	995.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.

50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 670.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.893 FS Min = 1.391 FS Ave = 2.186
Standard Deviation = 0.519 Coefficient of Variation = 23.76 %
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.469	889.735
2	97.487	896.674
3	121.151	904.738
4	144.408	913.909
5	167.206	924.167
6	189.496	935.489
7	211.226	947.849
8	232.350	961.221
9	252.819	975.574
10	272.588	990.877
11	291.614	1007.095
12	309.853	1024.193
13	327.266	1042.131
14	343.813	1060.871
15	359.458	1080.371
16	374.166	1100.587
17	387.903	1121.474
18	388.659	1122.750

Circle Center At X = -61.452 ; Y = 1401.916 ; and Radius = 529.654
Factor of Safety
*** 1.391 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.5	3.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	23.5	17232.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	23.7	49834.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	23.3	77307.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	22.8	99605.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.8	33742.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	15.5	86499.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	21.7	145483.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.8	81616.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.3	81938.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	20.5	165054.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	19.8	160393.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	15.4	123387.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.6	29177.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	10.4	89583.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.9	68681.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	17.4	135221.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	16.5	104048.4	0.0	0.0	0.	0.	0.0	0.0	0.0
19	15.6	73201.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	14.7	43273.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	13.7	14860.0	0.0	0.0	0.	0.	0.0	0.0	0.0

22 0.8 45.7 0.0 0.0 0. 0. 0.0 0.0 0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	896.106
2	105.921	902.031
3	129.816	909.379
4	153.236	918.127
5	176.098	928.242
6	198.323	939.691
7	219.832	952.432
8	240.552	966.421
9	260.409	981.610
10	279.334	997.945
11	297.261	1015.369
12	314.128	1033.822
13	329.876	1053.239
14	344.448	1073.552
15	357.796	1094.691
16	369.530	1115.962

Circle Center At X = -6.395 ; Y = 1309.804 ; and Radius = 422.959

Factor of Safety

*** 1.391 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.225	883.612
2	85.791	888.245
3	109.988	894.533
4	133.703	902.446
5	156.826	911.948
6	179.253	922.995
7	200.879	935.537
8	221.606	949.517
9	241.337	964.868
10	259.982	981.522
11	277.456	999.402
12	293.677	1018.424
13	308.572	1038.502
14	322.072	1059.544
15	334.115	1081.453
16	344.645	1104.127
17	345.982	1107.607

Circle Center At X = 5.233 ; Y = 1247.969 ; and Radius = 368.634

Factor of Safety

*** 1.392 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.388	887.694
2	93.321	894.919
3	116.918	903.176
4	140.134	912.450
5	162.926	922.723
6	185.250	933.977
7	207.064	946.189
8	228.328	959.337
9	249.000	973.396
10	269.042	988.339
11	288.417	1004.138
12	307.087	1020.764
13	325.018	1038.185
14	342.176	1056.368
15	358.527	1075.279
16	374.042	1094.882
17	388.691	1115.141
18	395.254	1125.100

Circle Center At X = -84.492 ; Y = 1441.258 ; and Radius = 574.554

Factor of Safety

*** 1.396 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.143	881.571
2	80.815	889.611
3	104.081	898.758
4	126.891	908.991
5	149.193	920.289
6	170.938	932.624
7	192.076	945.972
8	212.563	960.300
9	232.351	975.579
10	251.397	991.773
11	269.658	1008.847
12	287.094	1026.763
13	303.666	1045.481
14	319.338	1064.959
15	334.074	1085.155
16	347.841	1106.022
17	349.531	1108.866

Circle Center At X = -101.487 ; Y = 1387.497 ; and Radius = 530.212

Factor of Safety

*** 1.400 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.980	878.431
2	73.655	882.448
3	97.996	888.147
4	121.890	895.504
5	145.222	904.482
6	167.883	915.040
7	189.767	927.127
8	210.770	940.687
9	230.793	955.657
10	249.742	971.964
11	267.527	989.533
12	284.065	1008.281
13	299.278	1028.120
14	313.095	1048.955
15	325.449	1070.689
16	336.283	1093.219
17	341.370	1105.970

Circle Center At X = 2.841 ; Y = 1239.692 ; and Radius = 364.195

Factor of Safety

*** 1.401 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.551	892.841
2	101.537	899.889
3	125.009	908.495
4	147.866	918.622
5	170.009	930.227
6	191.344	943.258
7	211.778	957.662
8	231.224	973.374
9	249.597	990.328
10	266.818	1008.450
11	282.814	1027.663
12	297.515	1047.884
13	310.858	1069.025
14	322.786	1090.996
15	327.401	1101.013

Circle Center At X = -17.799 ; Y = 1261.673 ; and Radius = 380.958

Factor of Safety

*** 1.401 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	896.106
2	105.550	903.385
3	129.110	911.746
4	152.265	921.173
5	174.966	931.645
6	197.165	943.141
7	218.818	955.638
8	239.879	969.108
9	260.303	983.524
10	280.050	998.857
11	299.077	1015.074
12	317.344	1032.141
13	334.815	1050.023
14	351.452	1068.683
15	367.222	1088.082
16	382.091	1108.180
17	392.881	1124.248

Circle Center At X = -65.994 ; Y = 1424.134 ; and Radius = 548.276

Factor of Safety

*** 1.402 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	85.714	899.371
2	109.124	908.146
3	132.118	917.958
4	154.650	928.788
5	176.676	940.615
6	198.150	953.415
7	219.031	967.162
8	239.277	981.829
9	258.846	997.387
10	277.701	1013.803
11	295.802	1031.047
12	313.115	1049.082
13	329.603	1067.874
14	345.236	1087.384
15	359.980	1107.573
16	364.322	1114.114

Circle Center At X = -98.178 ; Y = 1426.058 ; and Radius = 557.867

Factor of Safety

*** 1.402 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	32.653	873.329
2	57.115	878.487
3	81.297	884.832
4	105.140	892.349
5	128.588	901.018
6	151.586	910.821
7	174.079	921.734
8	196.013	933.730
9	217.336	946.781
10	237.997	960.857
11	257.947	975.923
12	277.139	991.944
13	295.527	1008.881
14	313.067	1026.695
15	329.718	1045.343
16	345.440	1064.781

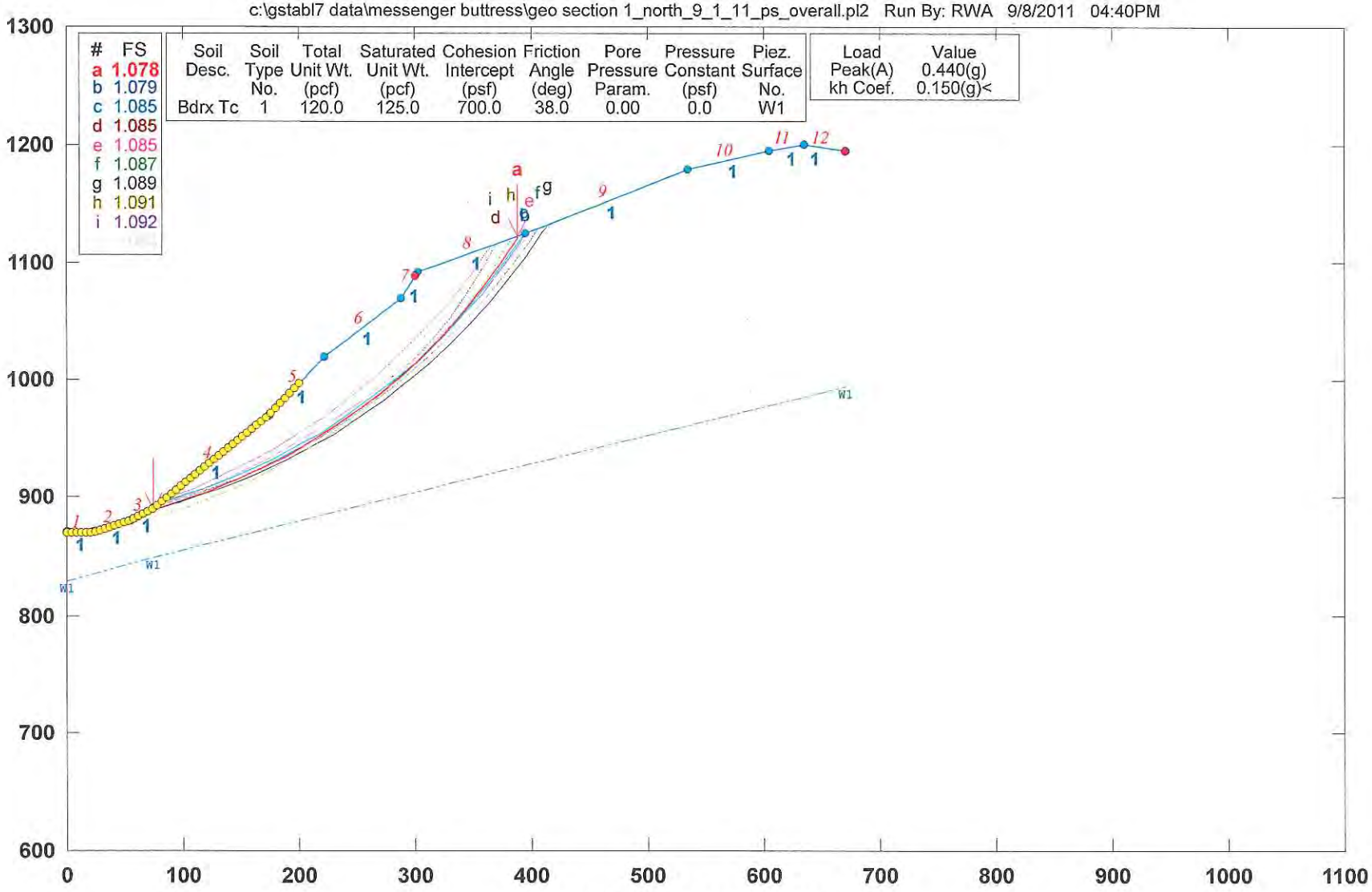
```
          17        360.195     1084.962
          18        373.949     1105.839
          19        382.693     1120.633
      Circle Center At X =   -60.849 ; Y =  1377.325 ; and Radius =   512.596
            Factor of Safety
         ***    1.403   ***
             **** END OF GSTABL7 OUTPUT ****
```

```
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_Static_Overall.in Version
Tract 71546 / Calabasas                  Geo Section 1' (North)
12 12
0. 870. 22. 870. 1
22. 870. 54. 880. 1
54. 880. 74. 890. 1
74. 890. 174. 970. 1
174. 970. 222. 1020. 1
222. 1020. 288. 1070. 1
288. 1070. 302. 1092. 1
302. 1092. 395. 1125. 1
395. 1125. 535. 1180. 1
535. 1180. 605. 1195. 1
605. 1195. 635. 1200. 1
635. 1200. 670. 1195. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
74. 850.
670. 995.
EQUAKE
0.44 0.15 0.0 0. 1
EQUAKE
0.
CIRCL2
50 50
0. 200. 300. 670.
0. 25. 0. 0.
```

Analysis 2

Tract 71546 / Calabasas Geo Section 1' (North)

c:\gstabl7 data\messenger buttress\geo section 1_north_9_1_11_ps_overall.pl2 Run By: RWA 9/8/2011 04:40PM



#	FS
a	1.078
b	1.079
c	1.085
d	1.085
e	1.085
f	1.087
g	1.089
h	1.091
i	1.092

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Bdrx Tc	1	120.0	125.0	700.0	38.0	0.00	0.0	W1

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.078

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/8/2011
Time of Run: 04:40PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_PS_Overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_PS_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_PS_Overall.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1' (North)

BOUNDARY COORDINATES
12 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	22.00	870.00	1
2	22.00	870.00	54.00	880.00	1
3	54.00	880.00	74.00	890.00	1
4	74.00	890.00	174.00	970.00	1
5	174.00	970.00	222.00	1020.00	1
6	222.00	1020.00	288.00	1070.00	1
7	288.00	1070.00	302.00	1092.00	1
8	302.00	1092.00	395.00	1125.00	1
9	395.00	1125.00	535.00	1180.00	1
10	535.00	1180.00	605.00	1195.00	1
11	605.00	1195.00	635.00	1200.00	1
12	635.00	1200.00	670.00	1195.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	74.00	850.00
3	670.00	995.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced

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and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 670.00(ft)
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At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
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Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.097 FS Min = 1.078 FS Ave = 1.655
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7	211.226	947.849
8	232.350	961.221
9	252.819	975.574
10	272.588	990.877
11	291.614	1007.095
12	309.853	1024.193
13	327.266	1042.131
14	343.813	1060.871
15	359.458	1080.371
16	374.166	1100.587
17	387.903	1121.474
18	388.659	1122.750

Circle Center At X = -61.452 ; Y = 1401.916 ; and Radius = 529.654
Factor of Safety
*** 1.078 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.5	3.6	0.0	0.0	0.	0.	0.5	0.0	0.0
2	23.5	17232.3	0.0	0.0	0.	0.	2584.8	0.0	0.0
3	23.7	49834.5	0.0	0.0	0.	0.	7475.2	0.0	0.0
4	23.3	77307.1	0.0	0.0	0.	0.	11596.1	0.0	0.0
5	22.8	99605.9	0.0	0.0	0.	0.	14940.9	0.0	0.0
6	6.8	33742.6	0.0	0.0	0.	0.	5061.4	0.0	0.0
7	15.5	86499.5	0.0	0.0	0.	0.	12974.9	0.0	0.0
8	21.7	145483.1	0.0	0.0	0.	0.	21822.5	0.0	0.0
9	10.8	81616.4	0.0	0.0	0.	0.	12242.5	0.0	0.0
10	10.3	81938.6	0.0	0.0	0.	0.	12290.8	0.0	0.0
11	20.5	165054.4	0.0	0.0	0.	0.	24758.2	0.0	0.0
12	19.8	160393.7	0.0	0.0	0.	0.	24059.0	0.0	0.0
13	15.4	123387.1	0.0	0.0	0.	0.	18508.1	0.0	0.0
14	3.6	29177.6	0.0	0.0	0.	0.	4376.6	0.0	0.0
15	10.4	89583.4	0.0	0.0	0.	0.	13437.5	0.0	0.0
16	7.9	68681.7	0.0	0.0	0.	0.	10302.3	0.0	0.0
17	17.4	135221.6	0.0	0.0	0.	0.	20283.2	0.0	0.0
18	16.5	104048.4	0.0	0.0	0.	0.	15607.3	0.0	0.0
19	15.6	73201.9	0.0	0.0	0.	0.	10980.3	0.0	0.0
20	14.7	43273.7	0.0	0.0	0.	0.	6491.1	0.0	0.0
21	13.7	14860.0	0.0	0.0	0.	0.	2229.0	0.0	0.0
22	0.8	45.7	0.0	0.0	0.	0.	6.9	0.0	0.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.388	887.694
2	93.321	894.919
3	116.918	903.176
4	140.134	912.450
5	162.926	922.723
6	185.250	933.977
7	207.064	946.189
8	228.328	959.337
9	249.000	973.396
10	269.042	988.339
11	288.417	1004.138
12	307.087	1020.764
13	325.018	1038.185
14	342.176	1056.368
15	358.527	1075.279
16	374.042	1094.882
17	388.691	1115.141
18	395.254	1125.100

Circle Center At X = -84.492 ; Y = 1441.258 ; and Radius = 574.554

Factor of Safety

*** 1.079 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	896.106
2	105.550	903.385
3	129.110	911.746
4	152.265	921.173
5	174.966	931.645
6	197.165	943.141
7	218.818	955.638
8	239.879	969.108
9	260.303	983.524
10	280.050	998.857
11	299.077	1015.074
12	317.344	1032.141
13	334.815	1050.023
14	351.452	1068.683
15	367.222	1088.082
16	382.091	1108.180
17	392.881	1124.248

Circle Center At X = -65.994 ; Y = 1424.134 ; and Radius = 548.276

Factor of Safety

*** 1.085 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	896.106
2	105.921	902.031
3	129.816	909.379
4	153.236	918.127
5	176.098	928.242
6	198.323	939.691
7	219.832	952.432
8	240.552	966.421
9	260.409	981.610
10	279.334	997.945
11	297.261	1015.369
12	314.128	1033.822
13	329.876	1053.239
14	344.448	1073.552
15	357.796	1094.691
16	369.530	1115.962

Circle Center At X = -6.395 ; Y = 1309.804 ; and Radius = 422.959

Factor of Safety
*** 1.085 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.551	892.841
2	101.138	901.128
3	124.389	910.313
4	147.271	920.383
5	169.751	931.323
6	191.794	943.117
7	213.368	955.747
8	234.443	969.196
9	254.986	983.443
10	274.968	998.467
11	294.359	1014.246
12	313.131	1030.757
13	331.256	1047.976
14	348.707	1065.878
15	365.459	1084.435
16	381.487	1103.621
17	396.768	1123.407
18	399.032	1126.584

Circle Center At X = -126.383 ; Y = 1511.272 ; and Radius = 651.188

Factor of Safety
*** 1.085 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	77.551	892.841
2	101.554	899.832
3	125.226	907.872
4	148.521	916.944
5	171.396	927.032
6	193.805	938.115
7	215.705	950.172
8	237.054	963.181
9	257.811	977.115
10	277.935	991.948
11	297.388	1007.651
12	316.131	1024.194
13	334.130	1041.545
14	351.348	1059.671
15	367.753	1078.535
16	383.313	1098.103
17	397.998	1118.335
18	404.996	1128.927

Circle Center At X = -68.990 ; Y = 1441.210 ; and Radius = 567.612

Factor of Safety
*** 1.087 ***
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.388	887.694
2	93.537	894.162
3	117.381	901.675
4	140.876	910.219
5	163.976	919.779
6	186.637	930.335
7	208.818	941.869
8	230.475	954.357
9	251.568	967.777
10	272.057	982.103
11	291.902	997.307
12	311.066	1013.361
13	329.513	1030.235
14	347.207	1047.896

15	364.115	1066.311
16	380.206	1085.444
17	395.448	1105.260
18	409.812	1125.722
19	414.160	1132.527

Circle Center At X = -66.976 ; Y = 1445.169 ; and Radius = 573.911

Factor of Safety

*** 1.089 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	32.653	873.329
2	57.115	878.487
3	81.297	884.832
4	105.140	892.349
5	128.588	901.018
6	151.586	910.821
7	174.079	921.734
8	196.013	933.730
9	217.336	946.781
10	237.997	960.857
11	257.947	975.923
12	277.139	991.944
13	295.527	1008.881
14	313.067	1026.695
15	329.718	1045.343
16	345.440	1064.781
17	360.195	1084.962
18	373.949	1105.839
19	382.693	1120.633

Circle Center At X = -60.849 ; Y = 1377.325 ; and Radius = 512.596

Factor of Safety

*** 1.091 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	85.714	899.371
2	109.124	908.146
3	132.118	917.958
4	154.650	928.788
5	176.676	940.615
6	198.150	953.415
7	219.031	967.162
8	239.277	981.829
9	258.846	997.387
10	277.701	1013.803
11	295.802	1031.047
12	313.115	1049.082
13	329.603	1067.874
14	345.236	1087.384
15	359.980	1107.573
16	364.322	1114.114

Circle Center At X = -98.178 ; Y = 1426.058 ; and Radius = 557.867

Factor of Safety

*** 1.092 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.225	883.612
2	85.791	888.245
3	109.988	894.533
4	133.703	902.446
5	156.826	911.948
6	179.253	922.995
7	200.879	935.537
8	221.606	949.517
9	241.337	964.868

```
        10          259.982       981.522
        11          277.456       999.402
        12          293.677      1018.424
        13          308.572      1038.502
        14          322.072      1059.544
        15          334.115      1081.453
        16          344.645      1104.127
        17          345.982      1107.607
    Circle Center At X =      5.233 ; Y =  1247.969 ; and Radius =   368.634
          Factor of Safety
         ***     1.093    ***
             **** END OF GSTABL7 OUTPUT ****
```

```
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_PS_Overall.in Version G7v2
Tract 71546 / Calabasas                  Geo Section 1' (North)
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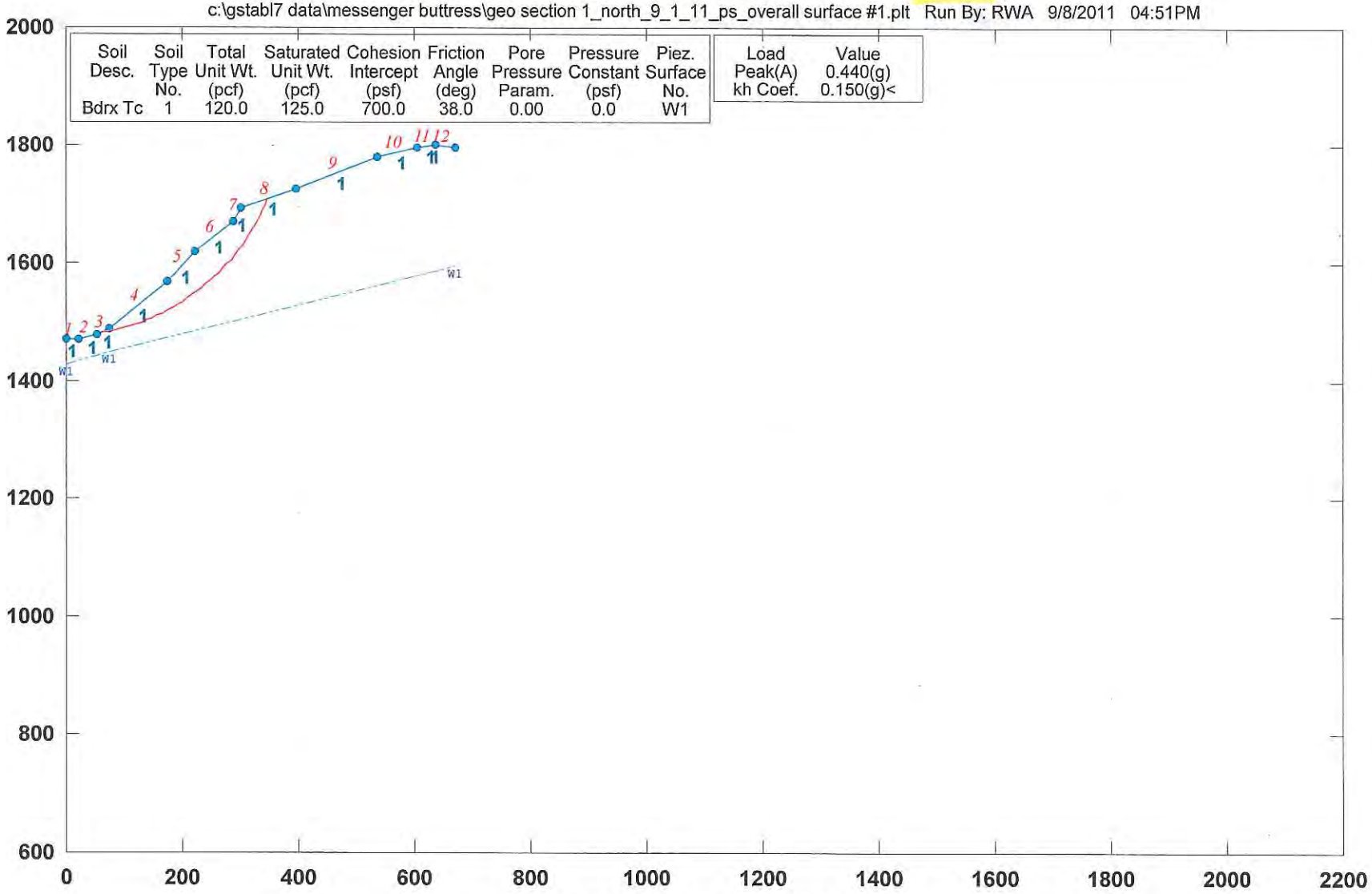
22. 870. 54. 880. 1
54. 880. 74. 890. 1
74. 890. 174. 970. 1
174. 970. 222. 1020. 1
222. 1020. 288. 1070. 1
288. 1070. 302. 1092. 1
302. 1092. 395. 1125. 1
395. 1125. 535. 1180. 1
535. 1180. 605. 1195. 1
605. 1195. 635. 1200. 1
635. 1200. 670. 1195. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
74. 850.
670. 995.
EQUAKE
0.44 0.15 0.0 0. 1
CIRCL2
50 50
0. 200. 300. 670.
0. 25. 0. 0.
```

Analysis 3

Natural Slope e Design Basin

Tract 71546 / Calabasas Geo Section 1' (North)

c:\gstabl7 data\messenger buttress\geo section 1_north_9_1_11_ps_overall surface #1.plt Run By: RWA 9/8/2011 04:51PM



GSTABL7 v.2 FSmin=1.007

Factor Of Safety Is Calculated By The Simplified Janbu Method

Newmark Analysis: 0.352 ft Displacement

Seismic Yield Coef (ky): 0.1532 (g)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/8/2011
Time of Run: 04:51PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_ps_overall Surface #1.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_ps_overall Surface #1.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_1
1_ps_overall Surface #1.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1' (North)

BOUNDARY COORDINATES
Note: User origin value specified.
Add 0.00 to X-values and 600.00 to Y-values listed.

12 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	22.00	870.00	1
2	22.00	870.00	54.00	880.00	1
3	54.00	880.00	74.00	890.00	1
4	74.00	890.00	174.00	970.00	1
5	174.00	970.00	222.00	1020.00	1
6	222.00	1020.00	288.00	1070.00	1
7	288.00	1070.00	302.00	1092.00	1
8	302.00	1092.00	395.00	1125.00	1
9	395.00	1125.00	535.00	1180.00	1
10	535.00	1180.00	605.00	1195.00	1
11	605.00	1195.00	635.00	1200.00	1
12	635.00	1200.00	670.00	1195.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	74.00	850.00
3	670.00	995.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Trial Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.225	883.612
2	71.079	885.311
3	80.885	887.274
4	90.634	889.498
5	100.321	891.983
6	109.937	894.726
7	119.476	897.727
8	128.932	900.981
9	138.296	904.488
10	147.564	908.245
11	156.728	912.249
12	165.781	916.496
13	174.716	920.985
14	183.529	925.712
15	192.211	930.673
16	200.758	935.865
17	209.162	941.284
18	217.418	946.927
19	225.520	952.788
20	233.462	958.865
21	241.239	965.152
22	248.844	971.645
23	256.272	978.340
24	263.518	985.232
25	270.577	992.315
26	277.444	999.585
27	284.113	1007.036
28	290.580	1014.663
29	296.841	1022.461
30	302.890	1030.423
31	308.724	1038.545
32	314.338	1046.821
33	319.729	1055.244
34	324.891	1063.808
35	329.823	1072.507
36	334.519	1081.336
37	338.977	1090.287
38	343.194	1099.354
39	346.908	1107.935

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.007

Table 1 - Individual Data on the 43 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.9	1908.8	0.0	0.0	0.0	0.0	286.3	0.0	0.0
2	2.9	1285.2	0.0	0.0	0.0	0.0	192.8	0.0	0.0
3	6.9	5096.9	0.0	0.0	0.0	0.0	764.5	0.0	0.0
4	9.7	12893.9	0.0	0.0	0.0	0.0	1934.1	0.0	0.0
5	9.7	19112.2	0.0	0.0	0.0	0.0	2866.8	0.0	0.0
6	9.6	24865.5	0.0	0.0	0.0	0.0	3729.8	0.0	0.0
7	9.5	30149.3	0.0	0.0	0.0	0.0	4522.4	0.0	0.0
8	9.5	34959.8	0.0	0.0	0.0	0.0	5244.0	0.0	0.0
9	9.4	39280.1	0.0	0.0	0.0	0.0	5892.0	0.0	0.0
10	9.3	43126.8	0.0	0.0	0.0	0.0	6469.0	0.0	0.0
11	9.2	46483.3	0.0	0.0	0.0	0.0	6972.5	0.0	0.0
12	9.1	49354.6	0.0	0.0	0.0	0.0	7403.2	0.0	0.0
13	8.2	47491.1	0.0	0.0	0.0	0.0	7123.7	0.0	0.0
14	0.7	4258.8	0.0	0.0	0.0	0.0	638.8	0.0	0.0
15	8.8	54979.9	0.0	0.0	0.0	0.0	8247.0	0.0	0.0
16	8.7	58609.1	0.0	0.0	0.0	0.0	8791.4	0.0	0.0
17	8.5	61694.6	0.0	0.0	0.0	0.0	9254.2	0.0	0.0
18	8.4	64215.5	0.0	0.0	0.0	0.0	9632.3	0.0	0.0
19	8.3	66201.2	0.0	0.0	0.0	0.0	9930.2	0.0	0.0

20	4.6	37955.1	0.0	0.0	0.0	0.0	5693.3	0.0	0.0
21	3.5	29491.4	0.0	0.0	0.0	0.0	4423.7	0.0	0.0
22	7.9	66568.3	0.0	0.0	0.0	0.0	9985.2	0.0	0.0
23	7.8	64972.9	0.0	0.0	0.0	0.0	9745.9	0.0	0.0
24	7.6	63021.6	0.0	0.0	0.0	0.0	9453.2	0.0	0.0
25	7.4	60753.3	0.0	0.0	0.0	0.0	9113.0	0.0	0.0
26	7.2	58190.1	0.0	0.0	0.0	0.0	8728.5	0.0	0.0
27	7.1	55359.4	0.0	0.0	0.0	0.0	8303.9	0.0	0.0
28	6.9	52286.9	0.0	0.0	0.0	0.0	7843.0	0.0	0.0
29	6.7	48992.1	0.0	0.0	0.0	0.0	7348.8	0.0	0.0
30	3.9	27613.0	0.0	0.0	0.0	0.0	4142.0	0.0	0.0
31	2.6	18230.9	0.0	0.0	0.0	0.0	2734.6	0.0	0.0
32	6.3	45388.6	0.0	0.0	0.0	0.0	6808.3	0.0	0.0
33	5.2	38438.8	0.0	0.0	0.0	0.0	5765.8	0.0	0.0
34	0.9	6655.7	0.0	0.0	0.0	0.0	998.4	0.0	0.0
35	5.8	41211.5	0.0	0.0	0.0	0.0	6181.7	0.0	0.0
36	5.6	35502.1	0.0	0.0	0.0	0.0	5325.3	0.0	0.0
37	5.4	29953.7	0.0	0.0	0.0	0.0	4493.1	0.0	0.0
38	5.2	24579.7	0.0	0.0	0.0	0.0	3687.0	0.0	0.0
39	4.9	19436.0	0.0	0.0	0.0	0.0	2915.4	0.0	0.0
40	4.7	14530.1	0.0	0.0	0.0	0.0	2179.5	0.0	0.0
41	4.5	9906.6	0.0	0.0	0.0	0.0	1486.0	0.0	0.0
42	4.2	5591.0	0.0	0.0	0.0	0.0	838.6	0.0	0.0
43	3.7	1618.5	0.0	0.0	0.0	0.0	242.8	0.0	0.0

Table 2 - Base Stress Data on the 43 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	9.78	66.15	10.00	762.00	61.54
2	11.32	72.54	2.98	921.36	151.08
3	11.32	77.44	7.02	1128.48	254.20
4	12.85	85.76	10.00	1510.51	487.58
5	14.39	95.48	10.00	1929.94	776.91
6	15.92	105.13	10.00	2316.21	1082.32
7	17.46	114.71	10.00	2670.66	1400.77
8	18.99	124.20	10.00	2995.34	1727.39
9	20.53	133.61	10.00	3290.92	2060.49
10	22.07	142.93	10.00	3558.96	2395.00
11	23.60	152.15	10.00	3800.40	2728.07
12	25.13	161.25	10.00	4016.23	3055.79
13	26.68	169.89	9.20	4198.90	3368.52
14	26.68	174.36	0.80	4305.80	3467.58
15	28.21	179.12	10.00	4466.58	3773.37
16	29.74	187.87	10.00	4767.32	4228.35
17	31.28	196.48	10.00	5041.56	4672.97
18	32.81	204.96	10.00	5289.91	5104.14
19	34.35	213.29	10.00	5512.90	5517.77
20	35.88	219.71	5.66	5669.63	5861.81
21	35.88	223.76	4.34	5728.13	5928.84
22	37.42	229.49	10.00	5727.25	6091.99
23	38.95	237.35	10.00	5711.39	6226.79
24	40.49	245.04	10.00	5674.74	6326.13
25	42.03	252.56	10.00	5617.13	6387.12
26	43.57	259.90	10.00	5538.34	6407.51
27	45.10	267.05	10.00	5438.13	6385.20
28	46.63	274.01	10.00	5316.27	6319.58
29	48.17	280.78	10.00	5172.26	6208.77
30	49.71	286.06	6.01	5046.76	6107.50
31	49.71	289.29	3.99	5022.99	6075.11
32	51.24	293.71	10.00	5169.53	6333.62
33	52.78	299.42	8.53	5333.44	6608.96
34	52.78	302.45	1.47	5351.10	6633.48
35	54.31	305.81	10.00	5124.82	6355.46
36	55.85	311.53	10.00	4687.29	5765.90
37	57.38	317.03	10.00	4227.20	5129.05
38	58.92	322.31	10.00	3743.81	4446.87
39	60.45	327.36	10.00	3235.07	3719.70

40	61.99	332.17	10.00	2700.09	2949.69
41	63.52	336.75	10.00	2136.50	2137.77
42	65.06	341.09	10.00	1542.74	1286.03
43	66.60	345.05	9.35	938.04	425.90

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 1512035.12 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 3985.87(psf)
Sum of the Driving Forces = 1501457.62 (lbs)
Average Mobilized Shear Stress = 3957.98(psf)
Total length of the failure surface = 379.35(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.1532(g)
Calculated Newmark Seismic Displacement = 0.352(ft)
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

```
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_ps_overall Surface #1.in V
Tract 71546 / Calabasas                  Geo Section 1' (North)
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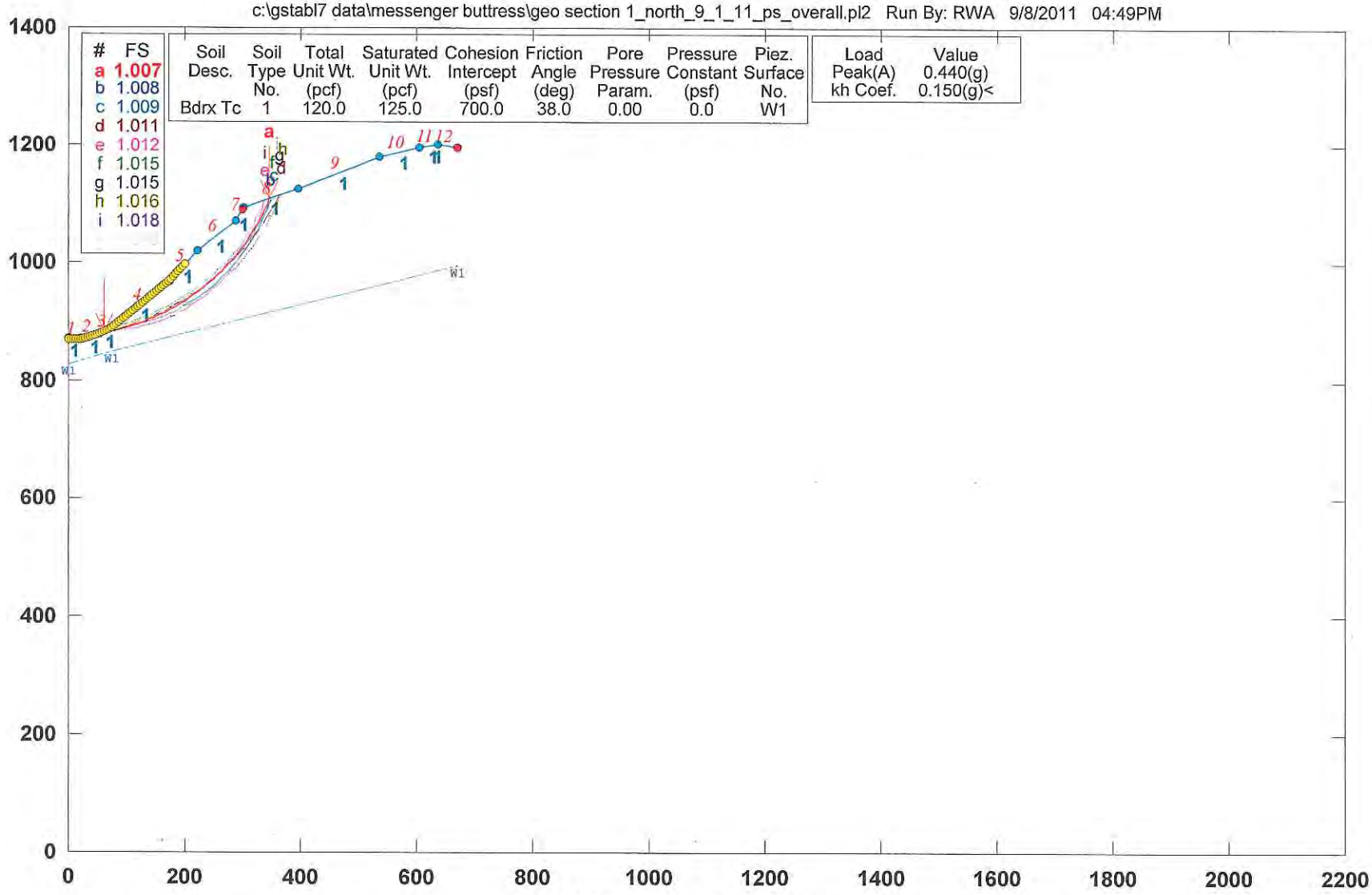
0. 870. 22. 870. 1
22. 870. 54. 880. 1
54. 880. 74. 890. 1
74. 890. 174. 970. 1
174. 970. 222. 1020. 1
222. 1020. 288. 1070. 1
288. 1070. 302. 1092. 1
302. 1092. 395. 1125. 1
395. 1125. 535. 1180. 1
535. 1180. 605. 1195. 1
605. 1195. 635. 1200. 1
635. 1200. 670. 1195. 1
0. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
74. 850.
670. 995.
EQUAKE
0.44 0.15 0.0 0. 1
SURFAC
39
61.225 883.612
71.079 885.311
80.885 887.274
90.634 889.498
100.321 891.983
109.937 894.726
119.476 897.727
128.932 900.981
138.296 904.488
147.564 908.245
156.728 912.249
165.781 916.496
174.716 920.985
183.529 925.712
192.211 930.673
200.758 935.865
209.162 941.284
217.418 946.927
225.52 952.788
233.462 958.865
241.239 965.152
248.844 971.645
256.272 978.34
263.518 985.232
270.577 992.315
277.444 999.585
284.113 1007.036
290.58 1014.663
296.841 1022.461
302.89 1030.423
308.724 1038.545
314.338 1046.821
319.729 1055.244
324.891 1063.808
329.823 1072.507
334.519 1081.336
338.977 1090.287
343.194 1099.354
346.908 1107.935
EXECUT
```

Tract 71546 / Calabasas Geo Section 1' (North)

c:\gstabl7 data\messenger buttress\geo section 1_north_9_1_11_ps_overall.pl2 Run By: RWA 9/8/2011 04:49PM



GSTABL7 v.2 FSmin=1.007

Safety Factors Are Calculated By The Simplified Janbu Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/8/2011
Time of Run: 04:49PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_ps_overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_ps_overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_ps_overall.PLT

PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1' (North)

BOUNDARY COORDINATES
12 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	22.00	870.00	1
2	22.00	870.00	54.00	880.00	1
3	54.00	880.00	74.00	890.00	1
4	74.00	890.00	174.00	970.00	1
5	174.00	970.00	222.00	1020.00	1
6	222.00	1020.00	288.00	1070.00	1
7	288.00	1070.00	302.00	1092.00	1
8	302.00	1092.00	395.00	1125.00	1
9	395.00	1125.00	535.00	1180.00	1
10	535.00	1180.00	605.00	1195.00	1
11	605.00	1195.00	635.00	1200.00	1
12	635.00	1200.00	670.00	1195.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	74.00	850.00
3	670.00	995.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.

50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 670.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 2.750 FS Min = 1.007 FS Ave = 1.382
Standard Deviation = 0.223 Coefficient of Variation = 16.12 %
Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.225	883.612
2	71.079	885.311
3	80.885	887.274
4	90.634	889.498
5	100.321	891.983
6	109.937	894.726
7	119.476	897.727
8	128.932	900.981
9	138.296	904.488
10	147.564	908.245
11	156.728	912.249
12	165.781	916.496
13	174.716	920.985
14	183.529	925.712
15	192.211	930.673
16	200.758	935.865
17	209.162	941.284
18	217.418	946.927
19	225.520	952.788
20	233.462	958.865
21	241.239	965.152
22	248.844	971.645
23	256.272	978.340
24	263.518	985.232
25	270.577	992.315
26	277.444	999.585
27	284.113	1007.036
28	290.580	1014.663
29	296.841	1022.461
30	302.890	1030.423
31	308.724	1038.545
32	314.338	1046.821
33	319.729	1055.244
34	324.891	1063.808
35	329.823	1072.507
36	334.519	1081.336
37	338.977	1090.287
38	343.194	1099.354
39	346.908	1107.935

Factor of Safety
*** 1.007 ***
Individual data on the 43 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.9	1908.9	0.0	0.0	0.	0.	286.3	0.0	0.0

2	2.9	1285.1	0.0	0.0	0.	0.	192.8	0.0	0.0
3	6.9	5096.8	0.0	0.0	0.	0.	764.5	0.0	0.0
4	9.7	12894.7	0.0	0.0	0.	0.	1934.2	0.0	0.0
5	9.7	19110.9	0.0	0.0	0.	0.	2866.6	0.0	0.0
6	9.6	24865.7	0.0	0.0	0.	0.	3729.9	0.0	0.0
7	9.5	30150.4	0.0	0.0	0.	0.	4522.6	0.0	0.0
8	9.5	34957.8	0.0	0.0	0.	0.	5243.7	0.0	0.0
9	9.4	39283.5	0.0	0.0	0.	0.	5892.5	0.0	0.0
10	9.3	43124.7	0.0	0.0	0.	0.	6468.7	0.0	0.0
11	9.2	46481.1	0.0	0.0	0.	0.	6972.2	0.0	0.0
12	9.1	49354.0	0.0	0.0	0.	0.	7403.1	0.0	0.0
13	8.2	47493.3	0.0	0.0	0.	0.	7124.0	0.0	0.0
14	0.7	4261.6	0.0	0.0	0.	0.	639.2	0.0	0.0
15	8.8	54976.3	0.0	0.0	0.	0.	8246.4	0.0	0.0
16	8.7	58613.2	0.0	0.0	0.	0.	8792.0	0.0	0.0
17	8.5	61691.5	0.0	0.0	0.	0.	9253.7	0.0	0.0
18	8.4	64218.1	0.0	0.0	0.	0.	9632.7	0.0	0.0
19	8.3	66202.9	0.0	0.0	0.	0.	9930.4	0.0	0.0
20	4.6	37951.7	0.0	0.0	0.	0.	5692.8	0.0	0.0
21	3.5	29494.7	0.0	0.0	0.	0.	4424.2	0.0	0.0
22	7.9	66568.5	0.0	0.0	0.	0.	9985.3	0.0	0.0
23	7.8	64966.9	0.0	0.0	0.	0.	9745.0	0.0	0.0
24	7.6	63021.3	0.0	0.0	0.	0.	9453.2	0.0	0.0
25	7.4	60754.8	0.0	0.0	0.	0.	9113.2	0.0	0.0
26	7.2	58192.1	0.0	0.0	0.	0.	8728.8	0.0	0.0
27	7.1	55359.5	0.0	0.0	0.	0.	8303.9	0.0	0.0
28	6.9	52284.1	0.0	0.0	0.	0.	7842.6	0.0	0.0
29	6.7	48994.8	0.0	0.0	0.	0.	7349.2	0.0	0.0
30	3.9	27612.7	0.0	0.0	0.	0.	4141.9	0.0	0.0
31	2.6	18233.6	0.0	0.0	0.	0.	2735.0	0.0	0.0
32	6.3	45385.8	0.0	0.0	0.	0.	6807.9	0.0	0.0
33	5.2	38439.3	0.0	0.0	0.	0.	5765.9	0.0	0.0
34	0.9	6658.2	0.0	0.0	0.	0.	998.7	0.0	0.0
35	5.8	41210.0	0.0	0.0	0.	0.	6181.5	0.0	0.0
36	5.6	35502.9	0.0	0.0	0.	0.	5325.4	0.0	0.0
37	5.4	29950.2	0.0	0.0	0.	0.	4492.5	0.0	0.0
38	5.2	24583.4	0.0	0.0	0.	0.	3687.5	0.0	0.0
39	4.9	19433.6	0.0	0.0	0.	0.	2915.0	0.0	0.0
40	4.7	14531.4	0.0	0.0	0.	0.	2179.7	0.0	0.0
41	4.5	9907.2	0.0	0.0	0.	0.	1486.1	0.0	0.0
42	4.2	5590.7	0.0	0.0	0.	0.	838.6	0.0	0.0
43	3.7	1618.5	0.0	0.0	0.	0.	242.8	0.0	0.0

Failure Surface Specified By 40 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.306	885.653
2	75.254	886.677
3	85.166	888.001
4	95.033	889.624
5	104.847	891.545
6	114.598	893.761
7	124.278	896.272
8	133.877	899.073
9	143.388	902.164
10	152.800	905.541
11	162.107	909.200
12	171.298	913.140
13	180.366	917.355
14	189.303	921.843
15	198.099	926.598
16	206.748	931.618
17	215.242	936.896
18	223.572	942.429
19	231.730	948.211
20	239.711	954.238
21	247.505	960.502
22	255.107	967.000

23	262.508	973.724
24	269.703	980.669
25	276.685	987.828
26	283.447	995.195
27	289.984	1002.763
28	296.288	1010.526
29	302.355	1018.475
30	308.179	1026.604
31	313.755	1034.905
32	319.077	1043.371
33	324.141	1051.995
34	328.941	1060.767
35	333.475	1069.680
36	337.737	1078.727
37	341.723	1087.898
38	345.430	1097.185
39	348.855	1106.580
40	349.622	1108.898

Factor of Safety
*** 1.008 ***
Failure Surface Specified By 41 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	53.061	879.707
2	62.898	881.509
3	72.686	883.554
4	82.421	885.840
5	92.097	888.366
6	101.707	891.131
7	111.246	894.132
8	120.708	897.369
9	130.087	900.839
10	139.377	904.539
11	148.573	908.468
12	157.669	912.623
13	166.659	917.002
14	175.538	921.602
15	184.301	926.420
16	192.942	931.453
17	201.456	936.698
18	209.837	942.153
19	218.081	947.813
20	226.183	953.675
21	234.137	959.735
22	241.939	965.991
23	249.584	972.437
24	257.067	979.071
25	264.384	985.887
26	271.530	992.883
27	278.501	1000.052
28	285.292	1007.393
29	291.900	1014.898
30	298.320	1022.565
31	304.548	1030.389
32	310.581	1038.364
33	316.416	1046.485
34	322.047	1054.749
35	327.473	1063.149
36	332.689	1071.681
37	337.692	1080.339
38	342.480	1089.119
39	347.049	1098.014
40	351.397	1107.019
41	352.750	1110.008

Factor of Safety
*** 1.009 ***
Failure Surface Specified By 41 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.306	885.653
2	75.248	886.731
3	85.156	888.087
4	95.021	889.719
5	104.838	891.627
6	114.597	893.809
7	124.291	896.264
8	133.912	898.989
9	143.454	901.982
10	152.908	905.241
11	162.267	908.763
12	171.524	912.546
13	180.671	916.586
14	189.702	920.881
15	198.609	925.427
16	207.385	930.221
17	216.024	935.259
18	224.518	940.536
19	232.861	946.049
20	241.047	951.793
21	249.068	957.764
22	256.919	963.958
23	264.594	970.368
24	272.087	976.991
25	279.391	983.821
26	286.501	990.853
27	293.411	998.082
28	300.116	1005.500
29	306.611	1013.104
30	312.891	1020.886
31	318.950	1028.841
32	324.785	1036.963
33	330.389	1045.245
34	335.760	1053.680
35	340.893	1062.263
36	345.783	1070.985
37	350.427	1079.841
38	354.822	1088.824
39	358.963	1097.926
40	362.848	1107.141
41	365.759	1114.624

Factor of Safety

*** 1.011 ***

Failure Surface Specified By 40 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.980	878.431
2	58.868	879.923
3	68.711	881.686
4	78.502	883.721
5	88.233	886.026
6	97.896	888.598
7	107.485	891.436
8	116.992	894.537
9	126.409	897.900
10	135.731	901.522
11	144.948	905.399
12	154.055	909.530
13	163.045	913.910
14	171.910	918.537
15	180.644	923.406
16	189.241	928.515
17	197.693	933.860
18	205.994	939.435
19	214.138	945.238

20	222.119	951.264
21	229.931	957.507
22	237.567	963.964
23	245.022	970.628
24	252.291	977.497
25	259.366	984.563
26	266.245	991.822
27	272.920	999.268
28	279.387	1006.895
29	285.641	1014.698
30	291.677	1022.671
31	297.491	1030.807
32	303.078	1039.101
33	308.433	1047.546
34	313.554	1056.135
35	318.436	1064.863
36	323.075	1073.722
37	327.467	1082.706
38	331.610	1091.807
39	335.500	1101.019
40	336.798	1104.348

Factor of Safety
*** 1.012 ***

Failure Surface Specified By 38 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.469	889.735
2	83.149	892.247
3	92.767	894.985
4	102.318	897.945
5	111.798	901.128
6	121.202	904.530
7	130.523	908.150
8	139.758	911.987
9	148.901	916.037
10	157.947	920.300
11	166.892	924.772
12	175.729	929.451
13	184.456	934.335
14	193.066	939.420
15	201.556	944.705
16	209.920	950.186
17	218.154	955.860
18	226.254	961.725
19	234.215	967.777
20	242.032	974.012
21	249.703	980.428
22	257.222	987.021
23	264.585	993.787
24	271.789	1000.723
25	278.829	1007.825
26	285.702	1015.088
27	292.404	1022.510
28	298.931	1030.086
29	305.280	1037.812
30	311.448	1045.684
31	317.430	1053.697
32	323.224	1061.848
33	328.827	1070.131
34	334.235	1078.542
35	339.446	1087.077
36	344.456	1095.731
37	349.264	1104.500
38	351.977	1109.734

Factor of Safety
*** 1.015 ***

Failure Surface Specified By 42 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.980	878.431
2	58.776	880.441
3	68.525	882.667
4	78.222	885.108
5	87.864	887.762
6	97.444	890.629
7	106.958	893.707
8	116.402	896.994
9	125.772	900.490
10	135.061	904.191
11	144.267	908.097
12	153.384	912.206
13	162.408	916.515
14	171.335	921.022
15	180.159	925.725
16	188.878	930.623
17	197.486	935.712
18	205.980	940.990
19	214.355	946.454
20	222.608	952.102
21	230.733	957.931
22	238.727	963.938
23	246.587	970.121
24	254.309	976.475
25	261.888	982.999
26	269.321	989.689
27	276.604	996.541
28	283.734	1003.552
29	290.707	1010.720
30	297.521	1018.040
31	304.171	1025.508
32	310.654	1033.122
33	316.967	1040.877
34	323.107	1048.770
35	329.072	1056.796
36	334.857	1064.953
37	340.461	1073.235
38	345.881	1081.639
39	351.113	1090.161
40	356.156	1098.796
41	361.007	1107.541
42	364.498	1114.177

Factor of Safety

*** 1.015 ***

Failure Surface Specified By 42 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.143	881.571
2	66.879	883.852
3	76.566	886.337
4	86.197	889.026
5	95.770	891.917
6	105.280	895.010
7	114.723	898.302
8	124.094	901.793
9	133.389	905.480
10	142.604	909.363
11	151.736	913.439
12	160.779	917.707
13	169.731	922.164
14	178.587	926.810
15	187.342	931.640
16	195.994	936.655
17	204.538	941.851
18	212.971	947.225

19	221.289	952.777
20	229.488	958.502
21	237.564	964.399
22	245.514	970.465
23	253.334	976.697
24	261.021	983.093
25	268.572	989.650
26	275.983	996.364
27	283.250	1003.233
28	290.372	1010.254
29	297.343	1017.423
30	304.162	1024.738
31	310.825	1032.194
32	317.329	1039.790
33	323.672	1047.521
34	329.850	1055.384
35	335.862	1063.376
36	341.703	1071.492
37	347.372	1079.730
38	352.866	1088.086
39	358.182	1096.555
40	363.319	1105.135
41	368.274	1113.821
42	369.414	1115.921

Factor of Safety
*** 1.016 ***

Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.306	885.653
2	75.303	885.908
3	85.284	886.518
4	95.238	887.483
5	105.150	888.801
6	115.010	890.472
7	124.804	892.491
8	134.520	894.858
9	144.145	897.569
10	153.668	900.621
11	163.076	904.010
12	172.358	907.731
13	181.502	911.780
14	190.496	916.151
15	199.328	920.840
16	207.989	925.840
17	216.466	931.145
18	224.749	936.748
19	232.827	942.642
20	240.690	948.820
21	248.329	955.273
22	255.733	961.995
23	262.894	968.975
24	269.802	976.206
25	276.448	983.678
26	282.824	991.381
27	288.922	999.307
28	294.735	1007.444
29	300.254	1015.783
30	305.473	1024.313
31	310.385	1033.023
32	314.985	1041.903
33	319.265	1050.940
34	323.222	1060.124
35	326.849	1069.443
36	330.142	1078.885
37	333.098	1088.439
38	335.712	1098.091

39	337.203	1104.491

Factor of Safety
*** 1.018 ***

Failure Surface Specified By 44 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.816	875.880
2	50.814	876.116
3	60.799	876.649
4	70.765	877.477
5	80.702	878.600
6	90.601	880.018
7	100.453	881.728
8	110.251	883.730
9	119.985	886.021
10	129.647	888.600
11	139.228	891.464
12	148.720	894.611
13	158.114	898.039
14	167.403	901.743
15	176.577	905.721
16	185.630	909.969
17	194.553	914.484
18	203.338	919.261
19	211.977	924.297
20	220.464	929.587
21	228.790	935.126
22	236.948	940.909
23	244.930	946.932
24	252.731	953.189
25	260.343	959.674
26	267.759	966.382
27	274.973	973.307
28	281.979	980.443
29	288.770	987.784
30	295.340	995.323
31	301.684	1003.053
32	307.796	1010.968
33	313.670	1019.061
34	319.302	1027.324
35	324.686	1035.750
36	329.819	1044.333
37	334.694	1053.064
38	339.309	1061.936
39	343.658	1070.940
40	347.738	1080.070
41	351.546	1089.317
42	355.079	1098.672
43	358.332	1108.128
44	359.682	1112.468

Factor of Safety
*** 1.018 ***

**** END OF GSTABL7 OUTPUT ****

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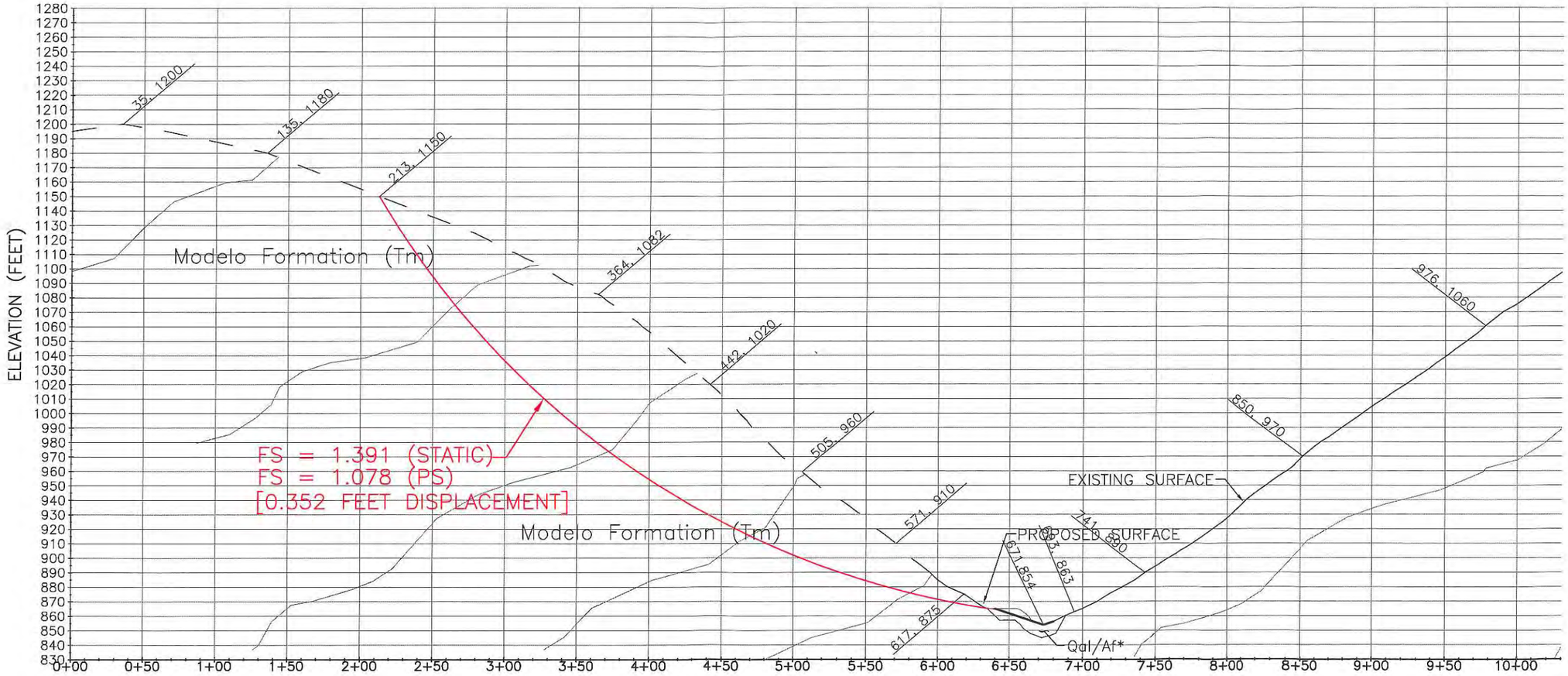
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 1_north_9_1_11_ps_overall.in Version G7v2
Tract 71546 / Calabasas                Geo Section 1' (North)
12 12
0. 870. 22. 870. 1
22. 870. 54. 880. 1
54. 880. 74. 890. 1
74. 890. 174. 970. 1
174. 970. 222. 1020. 1
222. 1020. 288. 1070. 1
288. 1070. 302. 1092. 1
302. 1092. 395. 1125. 1
395. 1125. 535. 1180. 1
535. 1180. 605. 1195. 1
605. 1195. 635. 1200. 1
635. 1200. 670. 1195. 1
0. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
74. 850.
670. 995.
EQUAKE
0.44 0.15 0.0 0. 1
CIRCLE
50 50
0. 200. 300. 670.
0. 10. 0. 0.
```

Analysis 4

1



SECTION 1–1'

GRAPHIC SCALE

0 1" 2"

0 40 80 160

1" = 80'

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3835 (805) 485-8498 FAX
890 Oaps Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0258 FAX
E-mail: rjr@rjreng.com

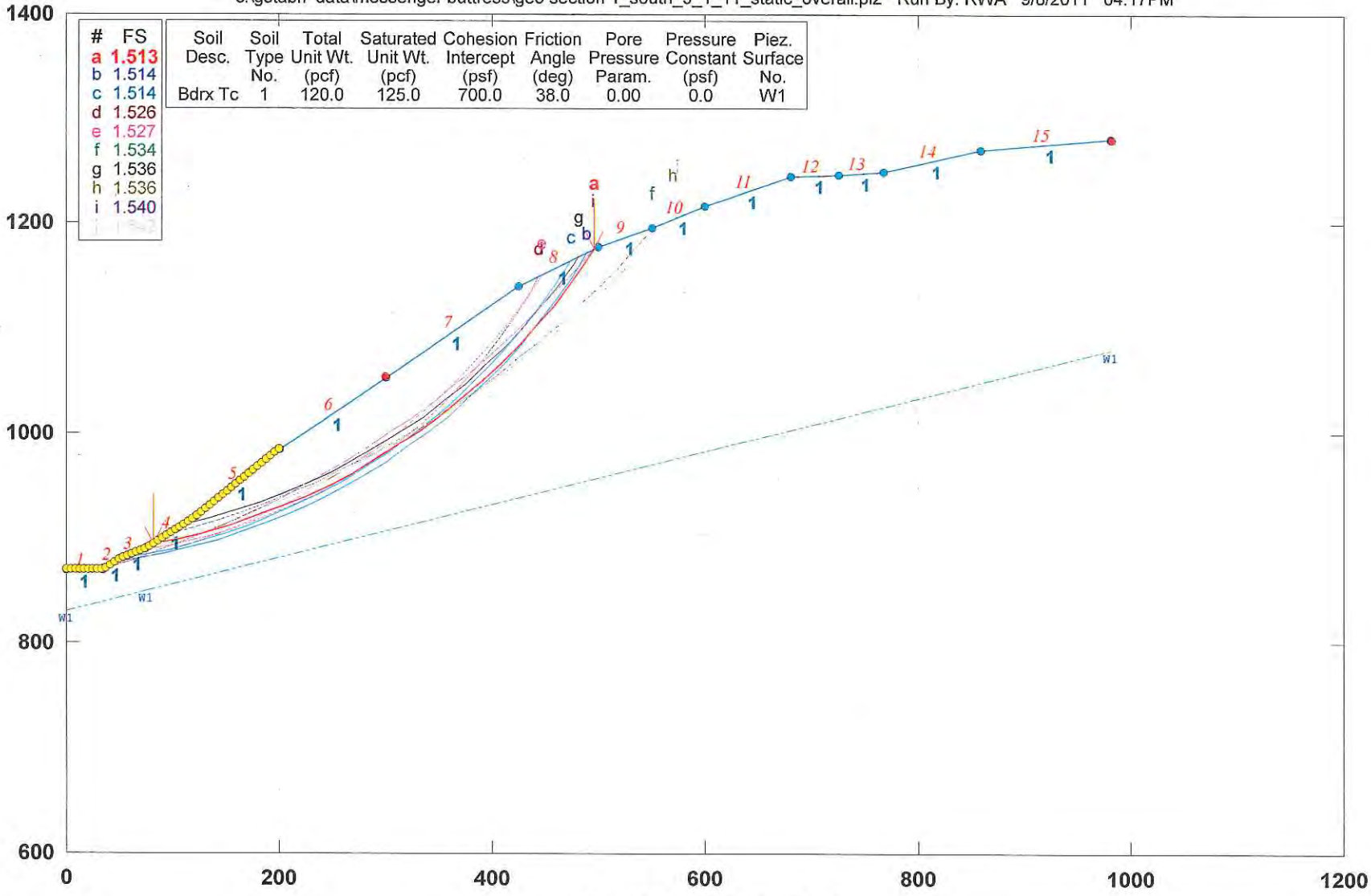
DESILTING BASIN - NORTH SLOPE
GEOLOGIC X-SECTION 1A-1A'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

NATURAL SLOPES & DESILTING BASIN

Tract 71546 / Calabasas Geo Section 1 (South)

c:\gstabl7 data\messenger buttress\geo section 1_south_9_1_11_static_overall.pl2 Run By: RWA 9/8/2011 04:17PM



GSTABL7 v.2 FSmin=1.513

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 9/8/2011
Time of Run: 04:17PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_Static_overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_Static_overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_Static_overall.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1 (South)

BOUNDARY COORDINATES
15 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	35.00	870.00	1
2	35.00	870.00	50.00	880.00	1
3	50.00	880.00	75.00	890.00	1
4	75.00	890.00	121.00	920.00	1
5	121.00	920.00	200.00	985.00	1
6	200.00	985.00	300.00	1054.00	1
7	300.00	1054.00	425.00	1140.00	1
8	425.00	1140.00	500.00	1178.00	1
9	500.00	1178.00	550.00	1195.00	1
10	550.00	1195.00	600.00	1217.00	1
11	600.00	1217.00	680.00	1245.00	1
12	680.00	1245.00	725.00	1247.00	1
13	725.00	1247.00	768.00	1250.00	1
14	768.00	1250.00	858.00	1270.00	1
15	858.00	1270.00	982.00	1280.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	75.00	850.00
3	982.00	1080.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 982.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 7.027 FS Min = 1.513 FS Ave = 2.377
Standard Deviation = 0.541 Coefficient of Variation = 22.75 %
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	894.326
2	106.076	899.571
3	130.296	905.770
4	154.253	912.914
5	177.912	920.991
6	201.236	929.990
7	224.190	939.897
8	246.737	950.696
9	268.844	962.370
10	290.476	974.903
11	311.600	988.274
12	332.183	1002.462
13	352.195	1017.447
14	371.603	1033.205
15	390.379	1049.711
16	408.493	1066.941
17	425.918	1084.868
18	442.627	1103.465
19	458.593	1122.702
20	473.793	1142.550
21	488.204	1162.979
22	496.933	1176.446

Circle Center At X = -39.611 ; Y = 1519.541 ; and Radius = 636.862
Factor of Safety
*** 1.513 ***
Individual data on the 25 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	24.4	15687.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.9	24450.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.3	21466.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.0	80964.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	23.7	113963.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	22.1	134278.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.2	8259.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.0	162037.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	22.5	173632.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.1	181297.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.6	185157.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.5	83201.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.6	102152.6	0.0	0.0	0.	0.	0.0	0.0	0.0

14	20.6	182024.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.0	175471.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	19.4	165967.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	18.8	153805.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	18.1	139303.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	16.5	116648.6	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.9	6150.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	16.7	101317.0	0.0	0.0	0.	0.	0.0	0.0	0.0
22	16.0	76434.1	0.0	0.0	0.	0.	0.0	0.0	0.0
23	15.2	51520.2	0.0	0.0	0.	0.	0.0	0.0	0.0
24	14.4	26990.2	0.0	0.0	0.	0.	0.0	0.0	0.0
25	8.7	4737.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.898	876.599
2	69.589	880.518
3	94.100	885.439
4	118.390	891.353
5	142.420	898.251
6	166.149	906.121
7	189.538	914.949
8	212.549	924.722
9	235.142	935.424
10	257.282	947.035
11	278.931	959.538
12	300.053	972.912
13	320.614	987.134
14	340.579	1002.180
15	359.915	1018.027
16	378.590	1034.647
17	396.574	1052.013
18	413.836	1070.097
19	430.348	1088.868
20	446.082	1108.296
21	461.013	1128.347
22	475.116	1148.990
23	488.367	1170.189
24	489.903	1172.884

Circle Center At X = -38.944 ; Y = 1484.854 ; and Radius = 614.007

Factor of Safety

*** 1.514 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.980	879.320
2	73.562	883.870
3	97.940	889.412
4	122.074	895.936
5	145.923	903.432
6	169.450	911.888
7	192.615	921.289
8	215.380	931.621
9	237.708	942.866
10	259.563	955.006
11	280.908	968.021
12	301.708	981.890
13	321.930	996.589
14	341.540	1012.096
15	360.506	1028.384
16	378.797	1045.426
17	396.383	1063.195
18	413.235	1081.661
19	429.325	1100.795
20	444.628	1120.564
21	459.117	1140.937
22	472.770	1161.880

```
   23        474.751     1165.207
Circle Center At X =   -51.051 ; Y =  1488.433 ; and Radius =   617.272
      Factor of Safety
     ***    1.514   ***
Failure Surface Specified By 20 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         73.469      889.388
    2         98.096      893.690
    3        122.482      899.200
    4        146.566      905.904
    5        170.291      913.786
    6        193.599      922.828
    7        216.433      933.006
    8        238.738      944.297
    9        260.459      956.673
   10        281.545      970.104
   11        301.944      984.557
   12        321.606      999.998
   13        340.483     1016.388
   14        358.531     1033.688
   15        375.704     1051.856
   16        391.962     1070.848
   17        407.264     1090.618
   18        421.574     1111.117
   19        434.857     1132.297
   20        444.796     1150.030
Circle Center At X =    -1.344 ; Y =  1390.800 ; and Radius =   506.963
      Factor of Safety
     ***    1.526   ***
Failure Surface Specified By 22 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         40.816      873.878
    2         65.188      879.446
    3         89.325      885.957
    4        113.191      893.402
    5        136.750      901.768
    6        159.965      911.044
    7        182.803      921.216
    8        205.227      932.267
    9        227.206      944.182
   10        248.704      956.941
   11        269.690      970.527
   12        290.133      984.918
   13        310.000     1000.093
   14        329.263     1016.029
   15        347.892     1032.701
   16        365.859     1050.085
   17        383.136     1068.154
   18        399.698     1086.881
   19        415.520     1106.238
   20        430.577     1126.195
   21        444.848     1146.722
   22        447.999     1151.653
Circle Center At X =   -89.979 ; Y =  1502.932 ; and Radius =   642.509
      Factor of Safety
     ***    1.527   ***
Failure Surface Specified By 24 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         93.878      902.311
    2        117.890      909.268
    3        141.704      916.878
    4        165.300      925.136
    5        188.662      934.037
    6        211.772      943.574
```

7	234.612	953.739
8	257.166	964.524
9	279.416	975.923
10	301.346	987.926
11	322.940	1000.524
12	344.181	1013.708
13	365.053	1027.468
14	385.541	1041.794
15	405.630	1056.675
16	425.305	1072.100
17	444.550	1088.057
18	463.351	1104.534
19	481.695	1121.519
20	499.568	1139.000
21	516.955	1156.963
22	533.845	1175.395
23	550.225	1194.281
24	551.274	1195.561

Circle Center At X = -148.310 ; Y = 1783.402 ; and Radius = 913.770

Factor of Safety

*** 1.534 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	110.204	912.959
2	134.445	919.075
3	158.416	926.171
4	182.079	934.238
5	205.394	943.260
6	228.323	953.223
7	250.827	964.112
8	272.870	975.906
9	294.415	988.589
10	315.425	1002.137
11	335.867	1016.528
12	355.707	1031.740
13	374.911	1047.746
14	393.448	1064.521
15	411.287	1082.035
16	428.399	1100.261
17	444.755	1119.169
18	460.328	1138.726
19	475.092	1158.900
20	481.681	1168.719

Circle Center At X = -27.553 ; Y = 1510.700 ; and Radius = 613.409

Factor of Safety

*** 1.536 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.143	882.857
2	81.108	889.975
3	104.904	897.641
4	128.516	905.853
5	151.934	914.606
6	175.144	923.896
7	198.134	933.716
8	220.893	944.063
9	243.407	954.931
10	265.666	966.313
11	287.656	978.205
12	309.368	990.599
13	330.788	1003.490
14	351.907	1016.869
15	372.712	1030.731
16	393.192	1045.068
17	413.338	1059.872

18	433.138	1075.135
19	452.581	1090.850
20	471.658	1107.008
21	490.358	1123.600
22	508.672	1140.618
23	526.589	1158.053
24	544.100	1175.895
25	561.197	1194.135
26	569.747	1203.689

Circle Center At X = -239.912 ; Y = 1927.391 ; and Radius = 1085.952

Factor of Safety

*** 1.536 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.735	871.156
2	60.542	878.787
3	84.144	887.030
4	107.525	895.881
5	130.669	905.333
6	153.561	915.380
7	176.186	926.015
8	198.529	937.232
9	220.574	949.022
10	242.306	961.379
11	263.713	974.293
12	284.778	987.756
13	305.488	1001.759
14	325.830	1016.293
15	345.788	1031.348
16	365.351	1046.913
17	384.506	1062.979
18	403.238	1079.535
19	421.536	1096.569
20	439.388	1114.071
21	456.781	1132.029
22	473.705	1150.430
23	490.147	1169.262
24	495.496	1175.718

Circle Center At X = -246.133 ; Y = 1795.037 ; and Radius = 966.214

Factor of Safety

*** 1.540 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.796	899.650
2	114.147	905.307
3	138.319	911.691
4	162.288	918.793
5	186.035	926.609
6	209.538	935.131
7	232.776	944.351
8	255.727	954.262
9	278.372	964.854
10	300.691	976.118
11	322.663	988.045
12	344.269	1000.622
13	365.489	1013.840
14	386.305	1027.685
15	406.697	1042.147
16	426.649	1057.211
17	446.141	1072.865
18	465.157	1089.095
19	483.679	1105.886
20	501.691	1123.222
21	519.178	1141.090
22	536.122	1159.471

```
          23        552.509     1178.351
          24        568.325     1197.712
          25        574.535     1205.795
      Circle Center At X =   -87.316 ; Y =  1717.159 ; and Radius =   836.474
            Factor of Safety
         ***    1.542   ***
             **** END OF GSTABL7 OUTPUT ****
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Tract 71546 / Calabasas                  Geo Section 1 (South)
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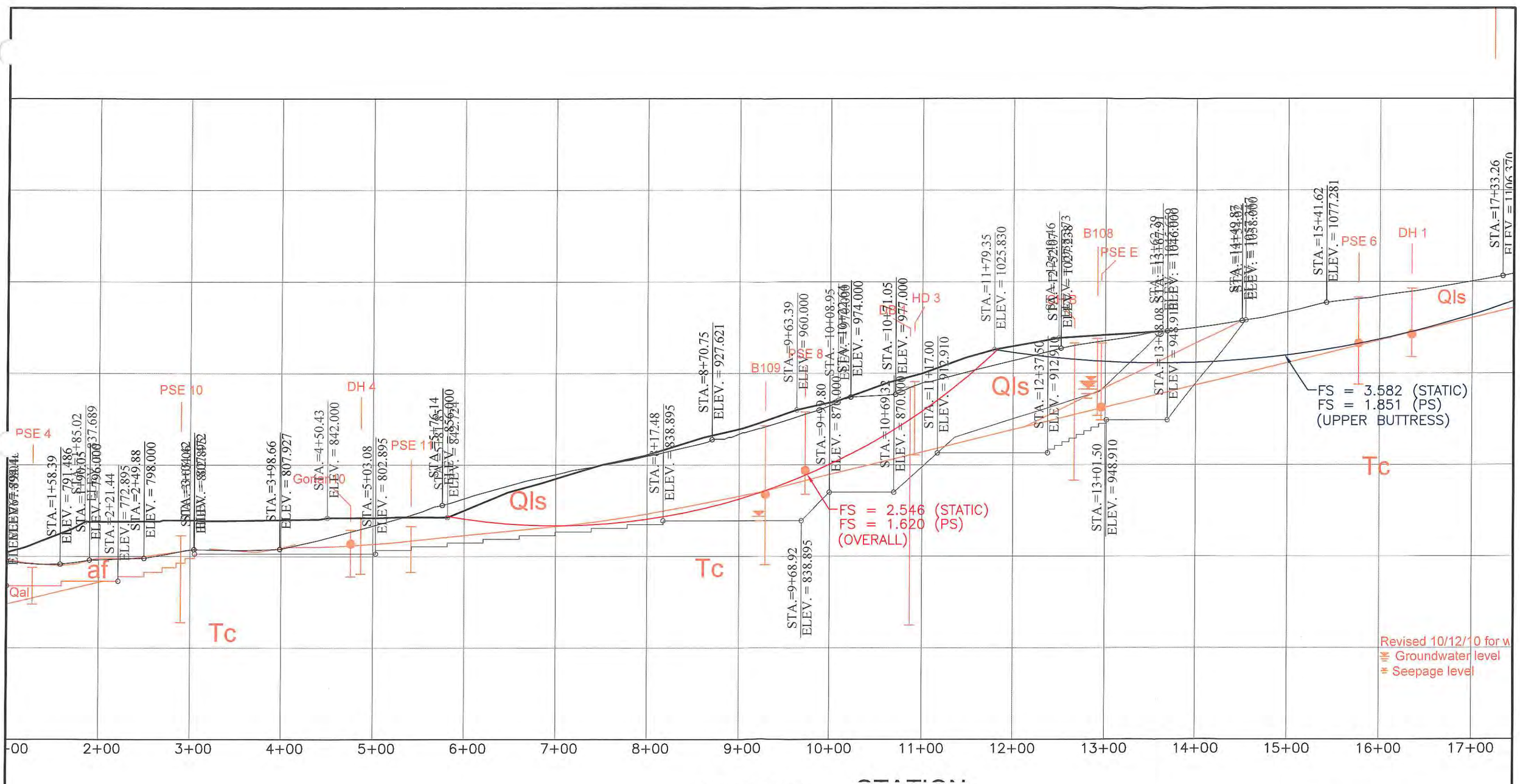
35. 870. 50. 880. 1
50. 880. 75. 890. 1
75. 890. 121. 920. 1
121. 920. 200. 985. 1
200. 985. 300. 1054. 1
300. 1054. 425. 1140. 1
425. 1140. 500. 1178. 1
500. 1178. 550. 1195. 1
550. 1195. 600. 1217. 1
600. 1217. 680. 1245. 1
680. 1245. 725. 1247. 1
725. 1247. 768. 1250. 1
768. 1250. 858. 1270. 1
858. 1270. 982. 1280. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
75. 850.
982. 1080.
EQUAKE
0.44 0.2 0.0 0. 1
EQUAKE
0.
CIRCL2
50 50
0. 200. 300. 982.
0. 25. 0. 0.
```

Analysis 14



GRAPHIC SCALE

0 1" 2"

0 50 100 200

1" = 100'

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6498 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

SOUTHERN SLOPE
GEOLOGIC X-SECTION 2-2'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

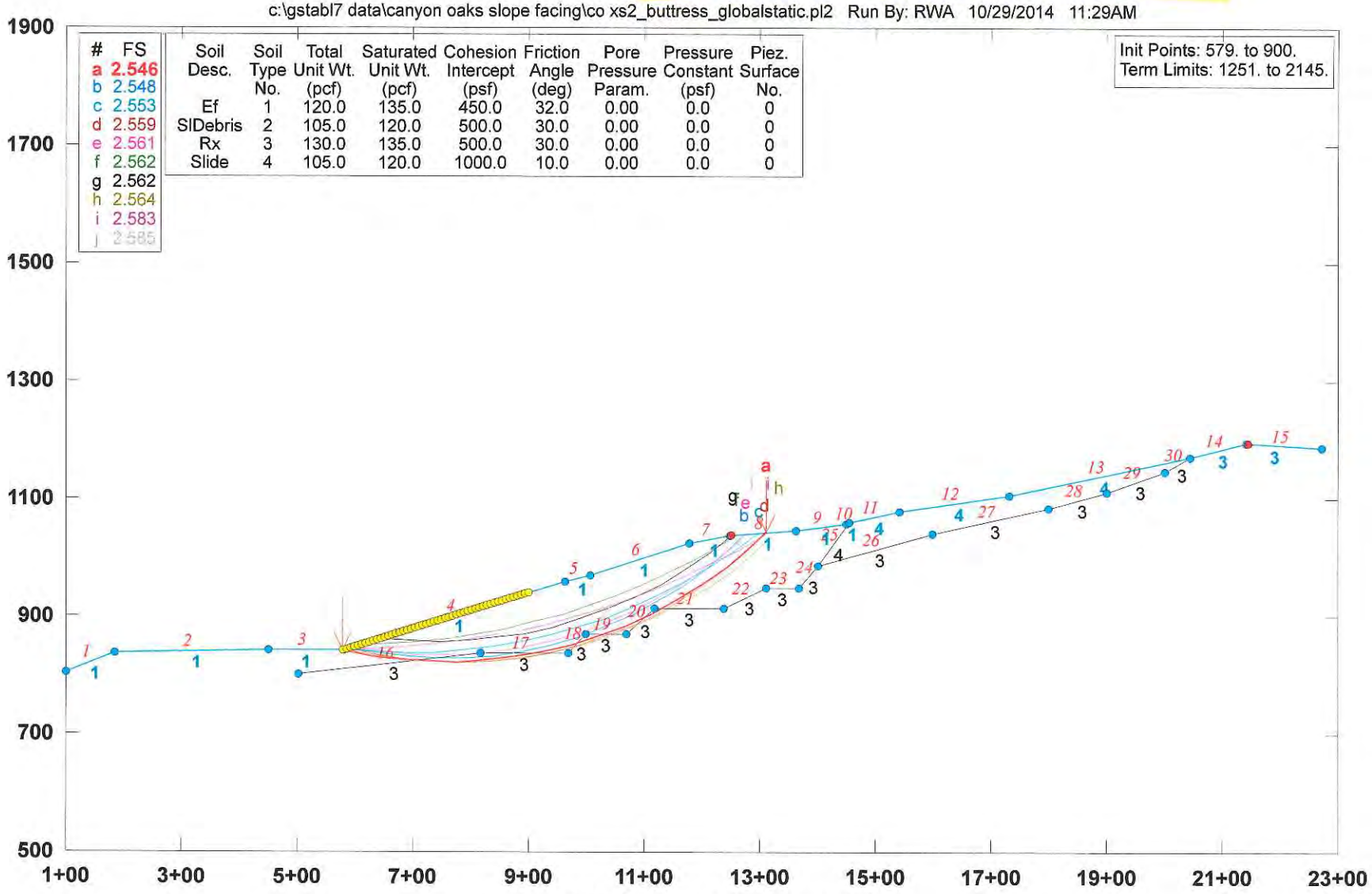
Canyon Oaks Section 2 - 2' - Southern Slope Buttress (GLOBAL)

c:\gstabl7 data\canyon oaks slope facing\co xs2_buttress_globalstatic.pl2 Run By: RWA 10/29/2014 11:29AM

#	FS
a	2.546
b	2.548
c	2.553
d	2.559
e	2.561
f	2.562
g	2.562
h	2.564
i	2.583
j	2.585

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Init Points: 579. to 900.
Term Limits: 1251. to 2145.



GSTABL7 v.2 FSmin=2.546

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_GlobalStatic.in Version G7v2.005
Canyon Oaks                                Section 2 - 2' - Southern Slope Buttress
30 15
100. 804. 185. 837. 1
185. 837. 450. 842. 1
450. 842. 581. 842. 1
581. 842. 963. 960. 1
963. 960. 1008. 970. 1
1008. 970. 1179. 1025. 1
1179. 1025. 1249. 1038. 1
1249. 1038. 1362. 1045. 1
1362. 1045. 1449. 1057. 1
1449. 1057. 1454. 1058. 1
1454. 1058. 1541. 1077. 4
1541. 1077. 1733. 1106. 4
1733. 1106. 2045. 1170. 4
2045. 1170. 2141. 1195. 3
2141. 1195. 2272. 1188. 3
503. 802. 817. 838. 3
817. 838. 968. 838. 3
968. 838. 999. 870. 3
999. 870. 1069. 870. 3
1069. 870. 1117. 912. 3
1117. 912. 1237. 912. 3
1237. 912. 1310. 948. 3
1310. 948. 1368. 948. 3
1368. 948. 1400. 985. 3
1400. 985. 1454. 1058. 4
1400. 985. 1600. 1040. 3
1600. 1040. 1800. 1085. 3
1800. 1085. 1900. 1110. 3
1900. 1110. 2000. 1145. 3
2000. 1145. 2045. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
EQUAKE
0.
CIRCL2
50 50
579. 900. 1251. 2145.
0. 50. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
(All Rights Reserved-Unauthorized Use Prohibited)

****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 11:29AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_GlobalStatic.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_GlobalStatic.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_GlobalStatic.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 2 - 2' - Southern Slope Buttress

BOUNDARY COORDINATES
15 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	804.00	185.00	837.00	1
2	185.00	837.00	450.00	842.00	1
3	450.00	842.00	581.00	842.00	1
4	581.00	842.00	963.00	960.00	1
5	963.00	960.00	1008.00	970.00	1
6	1008.00	970.00	1179.00	1025.00	1
7	1179.00	1025.00	1249.00	1038.00	1
8	1249.00	1038.00	1362.00	1045.00	1
9	1362.00	1045.00	1449.00	1057.00	1
10	1449.00	1057.00	1454.00	1058.00	1
11	1454.00	1058.00	1541.00	1077.00	4
12	1541.00	1077.00	1733.00	1106.00	4
13	1733.00	1106.00	2045.00	1170.00	4
14	2045.00	1170.00	2141.00	1195.00	3
15	2141.00	1195.00	2272.00	1188.00	3
16	503.00	802.00	817.00	838.00	3
17	817.00	838.00	968.00	838.00	3
18	968.00	838.00	999.00	870.00	3
19	999.00	870.00	1069.00	870.00	3
20	1069.00	870.00	1117.00	912.00	3
21	1117.00	912.00	1237.00	912.00	3
22	1237.00	912.00	1310.00	948.00	3
23	1310.00	948.00	1368.00	948.00	3
24	1368.00	948.00	1400.00	985.00	3
25	1400.00	985.00	1454.00	1058.00	4
26	1400.00	985.00	1600.00	1040.00	3
27	1600.00	1040.00	1800.00	1085.00	3
28	1800.00	1085.00	1900.00	1110.00	3
29	1900.00	1110.00	2000.00	1145.00	3
30	2000.00	1145.00	2045.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 579.00(ft)
and X = 900.00(ft)
Each Surface Terminates Between X =1251.00(ft)
and X =2145.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 5.236 FS Min = 2.546 FS Ave = 3.735
Standard Deviation = 0.594 Coefficient of Variation = 15.90 %
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	579.000	842.000
2	628.046	832.281
3	677.604	825.646
4	727.480	822.121
5	777.478	821.719
6	827.404	824.443
7	877.062	830.280
8	926.258	839.209
9	974.800	851.195
10	1022.499	866.191
11	1069.167	884.138
12	1114.622	904.966
13	1158.687	928.593
14	1201.190	954.928
15	1241.964	983.867
16	1280.850	1015.298
17	1309.697	1041.760

Circle Center At X = 758.903 ; Y = 1621.281 ; and Radius = 799.777
Factor of Safety
*** 2.546 ***
Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	47.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	47.0	69574.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	49.6	209469.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	19.6	117245.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	30.3	216738.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	50.0	442625.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	39.5	412974.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	10.4	116734.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	49.7	591780.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	42.5	542070.8	0.0	0.0	0.	0.	0.0	0.0	0.0

11	6.7	87161.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	36.7	487548.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.8	157991.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.6	114615.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	15.6	206599.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.0	118365.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	14.5	189516.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.9	128752.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	36.8	470678.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	33.6	415907.1	0.0	0.0	0.	0.	0.0	0.0	0.0
21	11.9	143118.1	0.0	0.0	0.	0.	0.0	0.0	0.0
22	2.4	28396.6	0.0	0.0	0.	0.	0.0	0.0	0.0
23	10.7	126194.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	30.9	346077.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	20.3	211691.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	22.2	210379.0	0.0	0.0	0.	0.	0.0	0.0	0.0
27	40.8	310742.7	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.0	42753.5	0.0	0.0	0.	0.	0.0	0.0	0.0
29	31.8	139731.9	0.0	0.0	0.	0.	0.0	0.0	0.0
30	28.8	42708.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	592.102	845.429
2	641.211	836.035
3	690.844	829.984
4	740.772	827.305
5	790.767	828.010
6	840.600	832.095
7	890.042	839.543
8	938.867	850.319
9	986.851	864.373
10	1033.775	881.641
11	1079.422	902.044
12	1123.585	925.489
13	1166.061	951.868
14	1206.654	981.060
15	1245.179	1012.932
16	1273.195	1039.499

Circle Center At X = 755.379 ; Y = 1564.598 ; and Radius = 737.470

Factor of Safety

*** 2.548 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	635.358	839.017
3	685.324	837.163
4	735.319	837.848
5	785.215	841.070
6	834.883	846.822
7	884.195	855.088
8	933.024	865.846
9	981.244	879.070
10	1028.730	894.725
11	1075.360	912.771
12	1121.013	933.160
13	1165.573	955.842
14	1208.923	980.756
15	1250.953	1007.839
16	1291.554	1037.021
17	1296.459	1040.940

Circle Center At X = 696.838 ; Y = 1821.604 ; and Radius = 984.508

Factor of Safety

*** 2.553 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	592.102	845.429
2	640.846	834.292
3	690.229	826.463
4	740.027	821.976
5	790.015	820.854
6	839.964	823.100
7	889.649	828.705
8	938.844	837.642
9	987.325	849.873
10	1034.872	865.340
11	1081.270	883.974
12	1126.308	905.690
13	1169.781	930.390
14	1211.493	957.962
15	1251.252	988.279
16	1288.880	1021.206
17	1309.380	1041.740

Circle Center At X = 781.673 ; Y = 1562.875 ; and Radius = 742.068

Factor of Safety

*** 2.559 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	598.653	847.453
2	647.989	839.333
3	697.747	834.420
4	747.719	832.736
5	797.695	834.287
6	847.466	839.067
7	896.823	847.056
8	945.561	858.221
9	993.475	872.514
10	1040.363	889.876
11	1086.031	910.235
12	1130.286	933.504
13	1172.944	959.587
14	1213.825	988.374
15	1252.760	1019.745
16	1274.343	1039.570

Circle Center At X = 748.802 ; Y = 1603.651 ; and Radius = 770.961

Factor of Safety

*** 2.561 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	611.755	851.500
2	661.736	852.888
3	711.621	856.280
4	761.329	861.671
5	810.781	869.053
6	859.897	878.414
7	908.598	889.738
8	956.805	903.007
9	1004.441	918.201
10	1051.428	935.294
11	1097.692	954.259
12	1143.157	975.065
13	1187.751	997.679
14	1231.401	1022.065
15	1258.362	1038.580

Circle Center At X = 602.190 ; Y = 2097.093 ; and Radius = 1245.629

Factor of Safety

*** 2.562 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	644.510	861.618
2	694.319	857.250

3	744.302	855.954
4	794.271	857.734
5	844.035	862.585
6	893.406	870.488
7	942.198	881.412
8	990.226	895.317
9	1037.307	912.150
10	1083.264	931.846
11	1127.923	954.333
12	1171.113	979.523
13	1212.673	1007.323
14	1252.443	1037.626
15	1253.176	1038.259

Circle Center At X = 740.366 ; Y = 1668.442 ; and Radius = 812.498

Factor of Safety

*** 2.562 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	634.507	833.241
3	683.997	826.117
4	733.832	822.061
5	783.822	821.090
6	833.778	823.206
7	883.507	828.401
8	932.821	836.657
9	981.531	847.941
10	1029.452	862.210
11	1076.400	879.410
12	1122.197	899.475
13	1166.669	922.329
14	1209.644	947.884
15	1250.961	976.044
16	1290.460	1006.700
17	1327.992	1039.736
18	1331.371	1043.103

Circle Center At X = 774.557 ; Y = 1630.091 ; and Radius = 809.072

Factor of Safety

*** 2.564 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	635.540	844.464
3	685.463	847.233
4	735.262	851.711
5	784.879	857.890
6	834.255	865.765
7	883.332	875.327
8	932.053	886.563
9	980.361	899.460
10	1028.199	914.005
11	1075.511	930.178
12	1122.241	947.963
13	1168.335	967.337
14	1213.738	988.278
15	1258.398	1010.761
16	1302.262	1034.761
17	1314.586	1042.063

Circle Center At X = 579.648 ; Y = 2303.397 ; and Radius = 1460.003

Factor of Safety

*** 2.583 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	651.061	863.642
2	701.016	861.504

```
     3        751.014      861.887
     4        800.930      864.791
     5        850.635      870.208
     6        900.005      878.125
     7        948.912      888.521
     8        997.233      901.369
     9       1044.844      916.638
    10       1091.626      934.289
    11       1137.457      954.275
    12       1182.223      976.548
    13       1225.808     1001.049
    14       1268.103     1027.716
    15       1285.979     1040.291
Circle Center At X =   718.417 ; Y =  1852.636 ; and Radius =   991.285
      Factor of Safety
     ***    2.585   ***
         **** END OF GSTABL7 OUTPUT ****
```

Analysis 15

Canyon Oaks Section 2 - 2' - Southern Slope Buttress (GLOBAL)

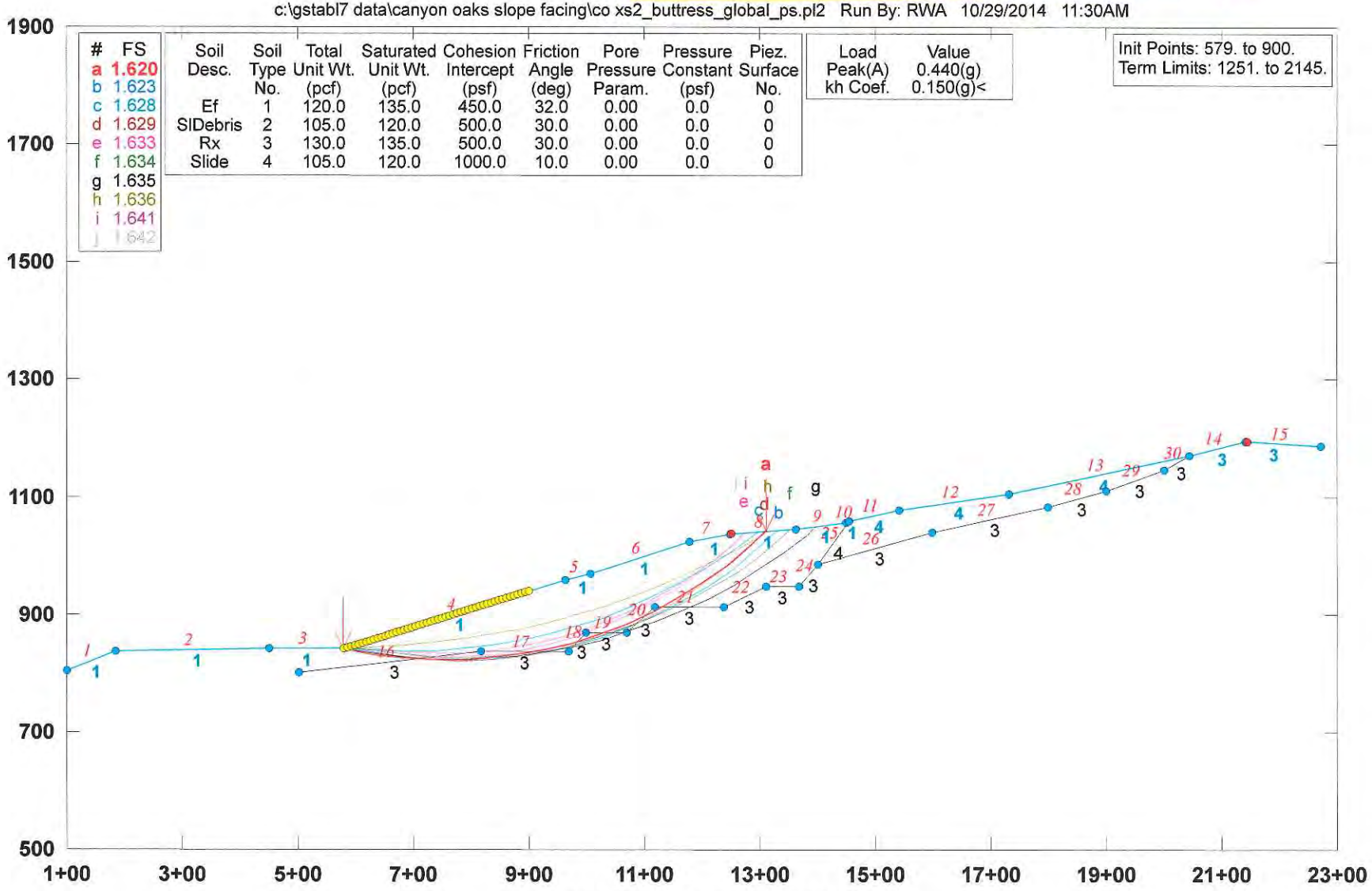
c:\gstabl7 data\canyon oaks slope facing\co xs2_buttress_global_ps.pl2 Run By: RWA 10/29/2014 11:30AM

#	FS
a	1.620
b	1.623
c	1.628
d	1.629
e	1.633
f	1.634
g	1.635
h	1.636
i	1.641
j	1.642

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

Init Points: 579. to 900.
Term Limits: 1251. to 2145.



GSTABL7 v.2 FSmin=1.620

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Global_PS.in Version G7v2.005.1
Canyon Oaks                                Section 2 - 2' - Southern Slope Buttress
30 15
100. 804. 185. 837. 1
185. 837. 450. 842. 1
450. 842. 581. 842. 1
581. 842. 963. 960. 1
963. 960. 1008. 970. 1
1008. 970. 1179. 1025. 1
1179. 1025. 1249. 1038. 1
1249. 1038. 1362. 1045. 1
1362. 1045. 1449. 1057. 1
1449. 1057. 1454. 1058. 1
1454. 1058. 1541. 1077. 4
1541. 1077. 1733. 1106. 4
1733. 1106. 2045. 1170. 4
2045. 1170. 2141. 1195. 3
2141. 1195. 2272. 1188. 3
503. 802. 817. 838. 3
817. 838. 968. 838. 3
968. 838. 999. 870. 3
999. 870. 1069. 870. 3
1069. 870. 1117. 912. 3
1117. 912. 1237. 912. 3
1237. 912. 1310. 948. 3
1310. 948. 1368. 948. 3
1368. 948. 1400. 985. 3
1400. 985. 1454. 1058. 4
1400. 985. 1600. 1040. 3
1600. 1040. 1800. 1085. 3
1800. 1085. 1900. 1110. 3
1900. 1110. 2000. 1145. 3
2000. 1145. 2045. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
CIRCL2
50 50
579. 900. 1251. 2145.
0. 50. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 11:30AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Global_PS.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Global_PS.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Global_PS.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 2 - 2' - Southern Slope Buttress

BOUNDARY COORDINATES
15 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	804.00	185.00	837.00	1
2	185.00	837.00	450.00	842.00	1
3	450.00	842.00	581.00	842.00	1
4	581.00	842.00	963.00	960.00	1
5	963.00	960.00	1008.00	970.00	1
6	1008.00	970.00	1179.00	1025.00	1
7	1179.00	1025.00	1249.00	1038.00	1
8	1249.00	1038.00	1362.00	1045.00	1
9	1362.00	1045.00	1449.00	1057.00	1
10	1449.00	1057.00	1454.00	1058.00	1
11	1454.00	1058.00	1541.00	1077.00	4
12	1541.00	1077.00	1733.00	1106.00	4
13	1733.00	1106.00	2045.00	1170.00	4
14	2045.00	1170.00	2141.00	1195.00	3
15	2141.00	1195.00	2272.00	1188.00	3
16	503.00	802.00	817.00	838.00	3
17	817.00	838.00	968.00	838.00	3
18	968.00	838.00	999.00	870.00	3
19	999.00	870.00	1069.00	870.00	3
20	1069.00	870.00	1117.00	912.00	3
21	1117.00	912.00	1237.00	912.00	3
22	1237.00	912.00	1310.00	948.00	3
23	1310.00	948.00	1368.00	948.00	3
24	1368.00	948.00	1400.00	985.00	3
25	1400.00	985.00	1454.00	1058.00	4
26	1400.00	985.00	1600.00	1040.00	3
27	1600.00	1040.00	1800.00	1085.00	3
28	1800.00	1085.00	1900.00	1110.00	3
29	1900.00	1110.00	2000.00	1145.00	3
30	2000.00	1145.00	2045.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 579.00(ft)
and X = 900.00(ft)
Each Surface Terminates Between X =1251.00(ft)
and X =2145.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 2.833 FS Min = 1.620 FS Ave = 2.181
Standard Deviation = 0.304 Coefficient of Variation = 13.92 %
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	579.000	842.000
2	628.046	832.281
3	677.604	825.646
4	727.480	822.121
5	777.478	821.719
6	827.404	824.443
7	877.062	830.280
8	926.258	839.209
9	974.800	851.195
10	1022.499	866.191
11	1069.167	884.138
12	1114.622	904.966
13	1158.687	928.593
14	1201.190	954.928
15	1241.964	983.867
16	1280.850	1015.298
17	1309.697	1041.760

Circle Center At X = 758.903 ; Y = 1621.281 ; and Radius = 799.777
Factor of Safety
*** 1.620 ***
Individual data on the 30 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	47.6	0.0	0.0	0.	0.	7.1	0.0	0.0
2	47.0	69574.8	0.0	0.0	0.	0.	10436.2	0.0	0.0
3	49.6	209469.4	0.0	0.0	0.	0.	31420.4	0.0	0.0
4	19.6	117245.1	0.0	0.0	0.	0.	17586.8	0.0	0.0
5	30.3	216738.2	0.0	0.0	0.	0.	32510.7	0.0	0.0
6	50.0	442625.7	0.0	0.0	0.	0.	66393.9	0.0	0.0
7	39.5	412974.8	0.0	0.0	0.	0.	61946.2	0.0	0.0
8	10.4	116734.7	0.0	0.0	0.	0.	17510.2	0.0	0.0
9	49.7	591780.7	0.0	0.0	0.	0.	88767.1	0.0	0.0
10	42.5	542070.8	0.0	0.0	0.	0.	81310.6	0.0	0.0
11	6.7	87161.8	0.0	0.0	0.	0.	13074.3	0.0	0.0

12	36.7	487548.0	0.0	0.0	0.	0.	73132.2	0.0	0.0
13	11.8	157991.9	0.0	0.0	0.	0.	23698.8	0.0	0.0
14	8.6	114615.1	0.0	0.0	0.	0.	17192.3	0.0	0.0
15	15.6	206599.4	0.0	0.0	0.	0.	30989.9	0.0	0.0
16	9.0	118365.1	0.0	0.0	0.	0.	17754.8	0.0	0.0
17	14.5	189516.0	0.0	0.0	0.	0.	28427.4	0.0	0.0
18	9.9	128752.2	0.0	0.0	0.	0.	19312.8	0.0	0.0
19	36.8	470678.1	0.0	0.0	0.	0.	70601.7	0.0	0.0
20	33.6	415907.1	0.0	0.0	0.	0.	62386.1	0.0	0.0
21	11.9	143118.1	0.0	0.0	0.	0.	21467.7	0.0	0.0
22	2.4	28396.6	0.0	0.0	0.	0.	4259.5	0.0	0.0
23	10.7	126194.9	0.0	0.0	0.	0.	18929.2	0.0	0.0
24	30.9	346077.0	0.0	0.0	0.	0.	51911.6	0.0	0.0
25	20.3	211691.2	0.0	0.0	0.	0.	31753.7	0.0	0.0
26	22.2	210379.0	0.0	0.0	0.	0.	31556.9	0.0	0.0
27	40.8	310742.7	0.0	0.0	0.	0.	46611.4	0.0	0.0
28	7.0	42753.5	0.0	0.0	0.	0.	6413.0	0.0	0.0
29	31.8	139731.9	0.0	0.0	0.	0.	20959.8	0.0	0.0
30	28.8	42708.3	0.0	0.0	0.	0.	6406.2	0.0	0.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	634.507	833.241
3	683.997	826.117
4	733.832	822.061
5	783.822	821.090
6	833.778	823.206
7	883.507	828.401
8	932.821	836.657
9	981.531	847.941
10	1029.452	862.210
11	1076.400	879.410
12	1122.197	899.475
13	1166.669	922.329
14	1209.644	947.884
15	1250.961	976.044
16	1290.460	1006.700
17	1327.992	1039.736
18	1331.371	1043.103

Circle Center At X = 774.557 ; Y = 1630.091 ; and Radius = 809.072

Factor of Safety

*** 1.623 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	635.358	839.017
3	685.324	837.163
4	735.319	837.848
5	785.215	841.070
6	834.883	846.822
7	884.195	855.088
8	933.024	865.846
9	981.244	879.070
10	1028.730	894.725
11	1075.360	912.771
12	1121.013	933.160
13	1165.573	955.842
14	1208.923	980.756
15	1250.953	1007.839
16	1291.554	1037.021
17	1296.459	1040.940

Circle Center At X = 696.838 ; Y = 1821.604 ; and Radius = 984.508

Factor of Safety

*** 1.628 ***

Failure Surface Specified By 17 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	592.102	845.429
2	640.846	834.292
3	690.229	826.463
4	740.027	821.976
5	790.015	820.854
6	839.964	823.100
7	889.649	828.705
8	938.844	837.642
9	987.325	849.873
10	1034.872	865.340
11	1081.270	883.974
12	1126.308	905.690
13	1169.781	930.390
14	1211.493	957.962
15	1251.252	988.279
16	1288.880	1021.206
17	1309.380	1041.740

Circle Center At X = 781.673 ; Y = 1562.875 ; and Radius = 742.068

Factor of Safety

*** 1.629 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	592.102	845.429
2	641.211	836.035
3	690.844	829.984
4	740.772	827.305
5	790.767	828.010
6	840.600	832.095
7	890.042	839.543
8	938.867	850.319
9	986.851	864.373
10	1033.775	881.641
11	1079.422	902.044
12	1123.585	925.489
13	1166.061	951.868
14	1206.654	981.060
15	1245.179	1012.932
16	1273.195	1039.499

Circle Center At X = 755.379 ; Y = 1564.598 ; and Radius = 737.470

Factor of Safety

*** 1.633 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	592.102	845.429
2	641.254	836.257
3	690.851	829.926
4	740.731	826.458
5	790.727	825.864
6	840.675	828.146
7	890.409	833.296
8	939.765	841.297
9	988.579	852.124
10	1036.689	865.739
11	1083.937	882.099
12	1130.166	901.148
13	1175.223	922.824
14	1218.959	947.055
15	1261.230	973.761
16	1301.894	1002.854
17	1340.819	1034.237
18	1352.017	1044.382

Circle Center At X = 776.078 ; Y = 1693.474 ; and Radius = 867.771

Factor of Safety

*** 1.634 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	579.000	842.000
2	628.277	833.527
3	677.920	827.565
4	727.802	824.130
5	777.794	823.230
6	827.767	824.868
7	877.593	829.040
8	927.142	835.735
9	976.289	844.935
10	1024.905	856.617
11	1072.865	870.752
12	1120.047	887.301
13	1166.328	906.224
14	1211.589	927.470
15	1255.714	950.986
16	1298.589	976.710
17	1340.104	1004.577
18	1380.150	1034.515
19	1398.921	1050.093

Circle Center At X = 770.517 ; Y = 1808.254 ; and Radius = 985.051

Factor of Safety

*** 1.635 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	585.551	843.406
2	635.540	844.464
3	685.463	847.233
4	735.262	851.711
5	784.879	857.890
6	834.255	865.765
7	883.332	875.327
8	932.053	886.563
9	980.361	899.460
10	1028.199	914.005
11	1075.511	930.178
12	1122.241	947.963
13	1168.335	967.337
14	1213.738	988.278
15	1258.398	1010.761
16	1302.262	1034.761
17	1314.586	1042.063

Circle Center At X = 579.648 ; Y = 2303.397 ; and Radius = 1460.003

Factor of Safety

*** 1.636 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	598.653	847.453
2	647.989	839.333
3	697.747	834.420
4	747.719	832.736
5	797.695	834.287
6	847.466	839.067
7	896.823	847.056
8	945.561	858.221
9	993.475	872.514
10	1040.363	889.876
11	1086.031	910.235
12	1130.286	933.504
13	1172.944	959.587
14	1213.825	988.374
15	1252.760	1019.745
16	1274.343	1039.570

Circle Center At X = 748.802 ; Y = 1603.651 ; and Radius = 770.961

Factor of Safety

```
     ***    1.641   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        611.755     851.500
    2        661.736     852.888
    3        711.621     856.280
    4        761.329     861.671
    5        810.781     869.053
    6        859.897     878.414
    7        908.598     889.738
    8        956.805     903.007
    9       1004.441     918.201
   10       1051.428     935.294
   11       1097.692     954.259
   12       1143.157     975.065
   13       1187.751     997.679
   14       1231.401    1022.065
   15       1258.362    1038.580
Circle Center At X =   602.190 ; Y =  2097.093 ; and Radius =  1245.629
      Factor of Safety
     ***    1.642   ***
         **** END OF GSTABL7 OUTPUT ****
```

Analysis 16

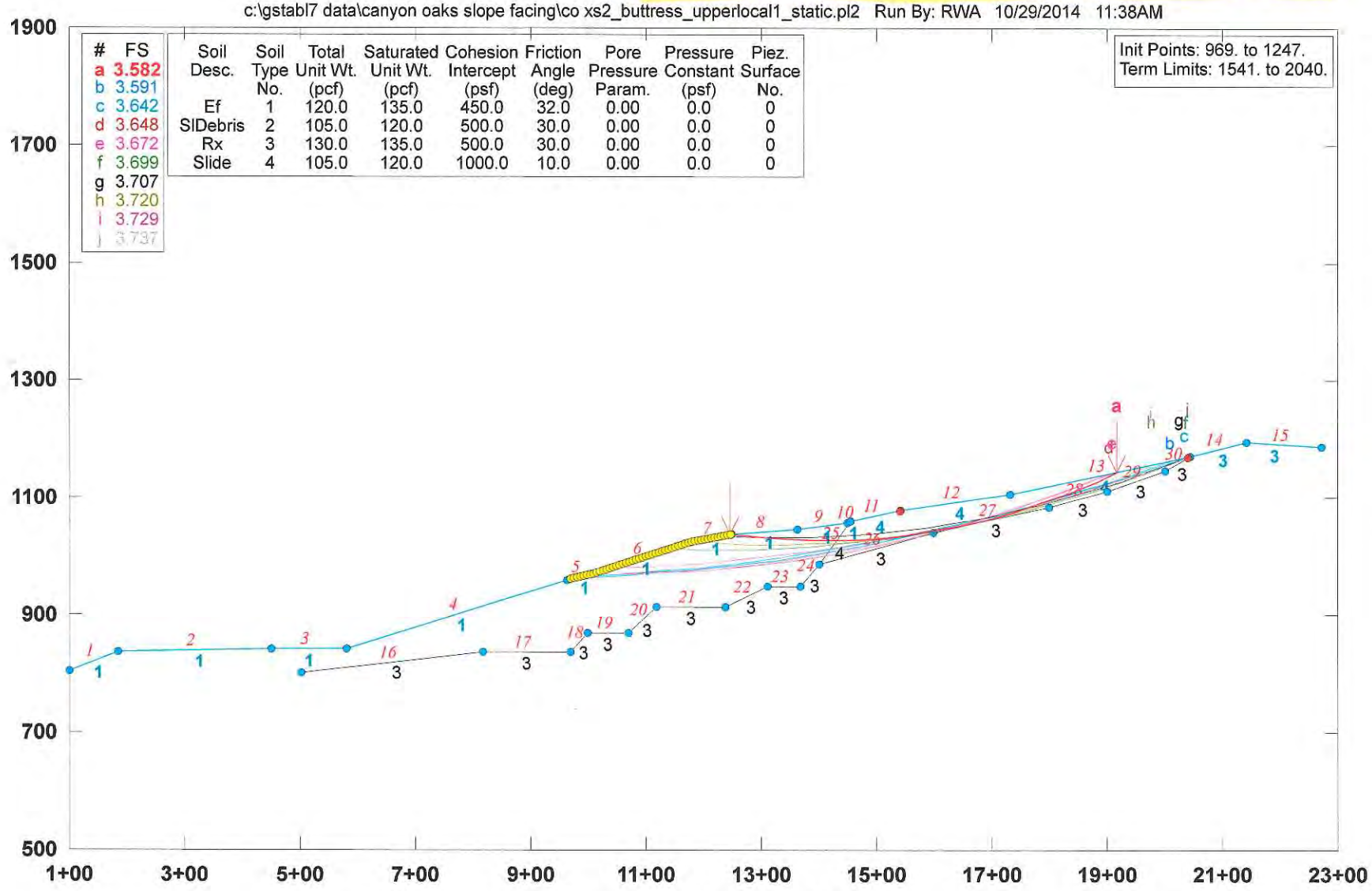
Canyon Oaks Section 2 - 2' - Southern Slope Buttress - Upper Local

c:\gstabl7 data\canyon oaks slope facing\co xs2_buttress_upperlocal1_static.pl2 Run By: RWA 10/29/2014 11:38AM

#	FS
a	3.582
b	3.591
c	3.642
d	3.648
e	3.672
f	3.699
g	3.707
h	3.720
i	3.729
j	3.737

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Init Points: 969. to 1247.
Term Limits: 1541. to 2040.



GSTABL7 v.2 FSmin=3.582

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_Static.in Version G7
Canyon Oaks                                Section 2 - 2' - Southern Slope Buttress
30 15
100. 804. 185. 837. 1
185. 837. 450. 842. 1
450. 842. 581. 842. 1
581. 842. 963. 960. 1
963. 960. 1008. 970. 1
1008. 970. 1179. 1025. 1
1179. 1025. 1249. 1038. 1
1249. 1038. 1362. 1045. 1
1362. 1045. 1449. 1057. 1
1449. 1057. 1454. 1058. 1
1454. 1058. 1541. 1077. 4
1541. 1077. 1733. 1106. 4
1733. 1106. 2045. 1170. 4
2045. 1170. 2141. 1195. 3
2141. 1195. 2272. 1188. 3
503. 802. 817. 838. 3
817. 838. 968. 838. 3
968. 838. 999. 870. 3
999. 870. 1069. 870. 3
1069. 870. 1117. 912. 3
1117. 912. 1237. 912. 3
1237. 912. 1310. 948. 3
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1400. 985. 1454. 1058. 4
1400. 985. 1600. 1040. 3
1600. 1040. 1800. 1085. 3
1800. 1085. 1900. 1110. 3
1900. 1110. 2000. 1145. 3
2000. 1145. 2045. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
EQUAKE
0.
CIRCL2
50 50
969. 1247. 1541. 2040.
0. 50. 0. 0.
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***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 11:38AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_Static.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_Static.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_Static.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 2 - 2' - Southern Slope Buttress

BOUNDARY COORDINATES
15 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	804.00	185.00	837.00	1
2	185.00	837.00	450.00	842.00	1
3	450.00	842.00	581.00	842.00	1
4	581.00	842.00	963.00	960.00	1
5	963.00	960.00	1008.00	970.00	1
6	1008.00	970.00	1179.00	1025.00	1
7	1179.00	1025.00	1249.00	1038.00	1
8	1249.00	1038.00	1362.00	1045.00	1
9	1362.00	1045.00	1449.00	1057.00	1
10	1449.00	1057.00	1454.00	1058.00	1
11	1454.00	1058.00	1541.00	1077.00	4
12	1541.00	1077.00	1733.00	1106.00	4
13	1733.00	1106.00	2045.00	1170.00	4
14	2045.00	1170.00	2141.00	1195.00	3
15	2141.00	1195.00	2272.00	1188.00	3
16	503.00	802.00	817.00	838.00	3
17	817.00	838.00	968.00	838.00	3
18	968.00	838.00	999.00	870.00	3
19	999.00	870.00	1069.00	870.00	3
20	1069.00	870.00	1117.00	912.00	3
21	1117.00	912.00	1237.00	912.00	3
22	1237.00	912.00	1310.00	948.00	3
23	1310.00	948.00	1368.00	948.00	3
24	1368.00	948.00	1400.00	985.00	3
25	1400.00	985.00	1454.00	1058.00	4
26	1400.00	985.00	1600.00	1040.00	3
27	1600.00	1040.00	1800.00	1085.00	3
28	1800.00	1085.00	1900.00	1110.00	3
29	1900.00	1110.00	2000.00	1145.00	3
30	2000.00	1145.00	2045.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 969.00(ft)
and X =1247.00(ft)
Each Surface Terminates Between X =1541.00(ft)
and X =2040.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 22.865 FS Min = 3.582 FS Ave = 5.505
Standard Deviation = 1.389 Coefficient of Variation = 25.23 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1247.000	1037.629
2	1296.687	1032.045
3	1346.565	1028.557
4	1396.546	1027.171
5	1446.541	1027.889
6	1496.461	1030.709
7	1546.219	1035.628
8	1595.725	1042.636
9	1644.893	1051.721
10	1693.635	1062.867
11	1741.865	1076.053
12	1789.497	1091.258
13	1836.447	1108.453
14	1882.632	1127.608
15	1917.599	1143.866

Circle Center At X = 1404.488 ; Y = 2215.213 ; and Radius = 1188.069
Factor of Safety
*** 3.582 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	71.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	47.7	27196.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	49.9	73009.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	15.4	29966.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	34.5	81801.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	35.0	104045.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	15.0	47788.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.5	7722.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.0	15614.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	42.5	147693.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	44.5	183442.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	5.2	23027.2	0.0	0.0	0.	0.	0.0	0.0	0.0

13	49.5	220375.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	49.2	215798.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	48.7	200003.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	39.4	143753.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	8.9	29848.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	47.6	145281.8	0.0	0.0	0.	0.	0.0	0.0	0.0
19	47.0	111164.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	46.2	67537.8	0.0	0.0	0.	0.	0.0	0.0	0.0
21	35.0	16680.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	974.673	962.594
2	1024.630	964.685
3	1074.550	967.515
4	1124.422	971.084
5	1174.236	975.391
6	1223.981	980.436
7	1273.646	986.217
8	1323.219	992.732
9	1372.691	999.981
10	1422.050	1007.962
11	1471.285	1016.673
12	1520.386	1026.113
13	1569.342	1036.278
14	1618.142	1047.167
15	1666.775	1058.778
16	1715.231	1071.108
17	1763.499	1084.154
18	1811.568	1097.914
19	1859.429	1112.383
20	1907.069	1127.560
21	1954.480	1143.441
22	2001.651	1160.023
23	2008.303	1162.473

Circle Center At X = 858.499 ; Y = 4336.667 ; and Radius = 3376.072

Factor of Safety

*** 3.591 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	980.347	963.855
2	1030.277	966.499
3	1080.167	969.816
4	1130.007	973.805
5	1179.790	978.465
6	1229.505	983.796
7	1279.144	989.795
8	1328.697	996.463
9	1378.156	1003.798
10	1427.512	1011.799
11	1476.755	1020.463
12	1525.878	1029.791
13	1574.870	1039.779
14	1623.723	1050.427
15	1672.428	1061.732
16	1720.977	1073.692
17	1769.360	1086.305
18	1817.568	1099.568
19	1865.594	1113.480
20	1913.428	1128.038
21	1961.061	1143.239
22	2008.485	1159.080
23	2032.309	1167.397

Circle Center At X = 809.032 ; Y = 4670.983 ; and Radius = 3711.084

Factor of Safety

*** 3.642 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1008.714	970.230
2	1058.714	970.112
3	1108.704	971.095
4	1158.661	973.180
5	1208.559	976.364
6	1258.376	980.647
7	1308.085	986.027
8	1357.665	992.500
9	1407.089	1000.064
10	1456.335	1008.715
11	1505.378	1018.449
12	1554.195	1029.261
13	1602.762	1041.146
14	1651.056	1054.098
15	1699.052	1068.111
16	1746.728	1083.177
17	1794.060	1099.291
18	1841.026	1116.443
19	1887.603	1134.626
20	1902.245	1140.717

Circle Center At X = 1039.324 ; Y = 3236.566 ; and Radius = 2266.543

Factor of Safety

*** 3.648 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1003.041	968.898
2	1053.039	969.327
3	1103.018	970.783
4	1152.956	973.267
5	1202.833	976.777
6	1252.627	981.311
7	1302.317	986.869
8	1351.882	993.446
9	1401.302	1001.042
10	1450.555	1009.652
11	1499.621	1019.273
12	1548.478	1029.900
13	1597.107	1041.530
14	1645.486	1054.157
15	1693.595	1067.777
16	1741.415	1082.382
17	1788.924	1097.968
18	1836.102	1114.526
19	1882.930	1132.052
20	1907.329	1141.760

Circle Center At X = 1007.511 ; Y = 3397.235 ; and Radius = 2428.341

Factor of Safety

*** 3.672 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1139.204	1012.200
2	1189.182	1010.713
3	1239.181	1010.390
4	1289.174	1011.232
5	1339.133	1013.237
6	1389.033	1016.405
7	1438.845	1020.735
8	1488.543	1026.223
9	1538.100	1032.866
10	1587.488	1040.662
11	1636.682	1049.606
12	1685.654	1059.693
13	1734.377	1070.918
14	1782.827	1083.274

15	1830.975	1096.755
16	1878.796	1111.353
17	1926.265	1127.061
18	1973.355	1143.870
19	2020.040	1161.771
20	2035.185	1167.987

Circle Center At X = 1228.221 ; Y = 3154.673 ; and Radius = 2144.321

Factor of Safety

*** 3.699 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1235.653	1035.521
2	1285.602	1033.280
3	1335.595	1032.414
4	1385.592	1032.923
5	1435.557	1034.808
6	1485.451	1038.067
7	1535.236	1042.697
8	1584.875	1048.695
9	1634.330	1056.057
10	1683.563	1064.777
11	1732.539	1074.848
12	1781.219	1086.262
13	1829.566	1099.011
14	1877.544	1113.086
15	1925.117	1128.475
16	1972.248	1145.168
17	2018.902	1163.151
18	2025.950	1166.092

Circle Center At X = 1342.171 ; Y = 2847.778 ; and Radius = 1815.384

Factor of Safety

*** 3.707 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1184.592	1026.038
2	1234.443	1022.181
3	1284.390	1019.897
4	1334.385	1019.189
5	1384.378	1020.058
6	1434.318	1022.502
7	1484.156	1026.520
8	1533.843	1032.107
9	1583.329	1039.259
10	1632.565	1047.966
11	1681.502	1058.222
12	1730.091	1070.016
13	1778.284	1083.336
14	1826.034	1098.168
15	1873.291	1114.499
16	1920.011	1132.312
17	1966.146	1151.589
18	1975.080	1155.657

Circle Center At X = 1331.899 ; Y = 2602.906 ; and Radius = 1583.733

Factor of Safety

*** 3.720 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1037.082	979.354
2	1087.048	981.180
3	1136.981	983.778
4	1186.867	987.145
5	1236.696	991.282
6	1286.455	996.187
7	1336.132	1001.859
8	1385.716	1008.298

9	1435.194	1015.500
10	1484.556	1023.465
11	1533.788	1032.191
12	1582.880	1041.676
13	1631.820	1051.917
14	1680.597	1062.911
15	1729.197	1074.657
16	1777.611	1087.152
17	1825.826	1100.392
18	1873.831	1114.375
19	1921.615	1129.096
20	1969.166	1144.554
21	2016.472	1160.743
22	2038.526	1168.672

Circle Center At X = 944.098 ; Y = 4214.561 ; and Radius = 3236.543

Factor of Safety

*** 3.729 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1003.041	968.898
2	1052.996	971.010
3	1102.912	973.902
4	1152.777	977.575
5	1202.579	982.026
6	1252.305	987.256
7	1301.943	993.262
8	1351.480	1000.044
9	1400.906	1007.599
10	1450.208	1015.926
11	1499.374	1025.023
12	1548.391	1034.887
13	1597.248	1045.516
14	1645.933	1056.908
15	1694.434	1069.059
16	1742.739	1081.968
17	1790.837	1095.629
18	1838.714	1110.041
19	1886.361	1125.200
20	1933.765	1141.102
21	1974.905	1155.622

Circle Center At X = 892.941 ; Y = 4165.250 ; and Radius = 3198.248

Factor of Safety

*** 3.737 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 17

Canyon Oaks Section 2 - 2' - Southern Slope Buttress - Upper Local

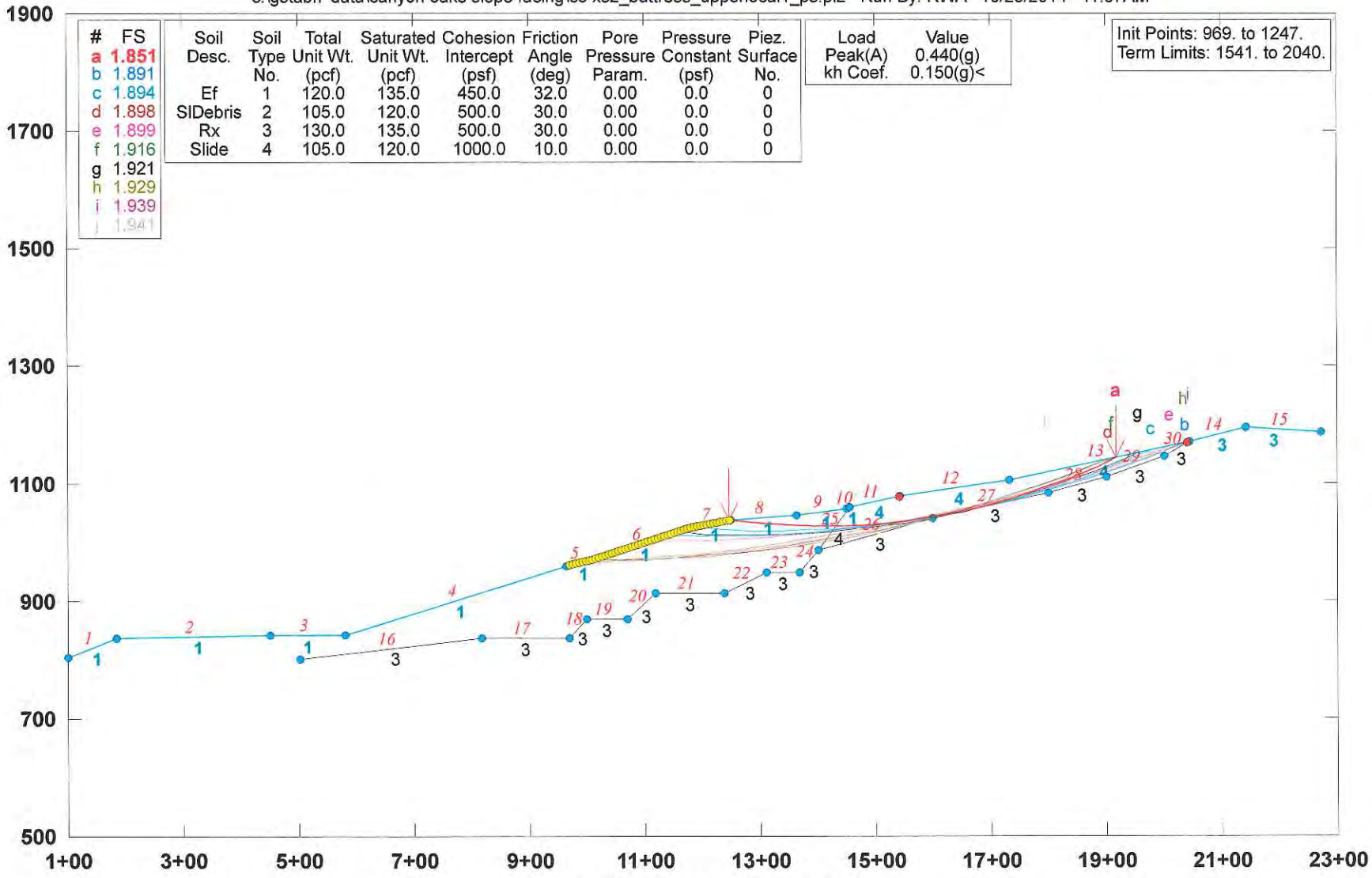
c:\gstabl7 data\canyon oaks slope facing\co xs2_buttress_upperlocal1_ps.pl2 Run By: RWA 10/29/2014 11:37AM

#	FS
a	1.851
b	1.891
c	1.894
d	1.898
e	1.899
f	1.916
g	1.921
h	1.929
i	1.939
j	1.941

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SIDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

Init Points: 969. to 1247.
Term Limits: 1541. to 2040.



GSTABL7 v.2 FSmin=1.851

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_PS.in Version G7v2.0
Canyon Oaks                                  Section 2 - 2' - Southern Slope Buttress
30 15
100. 804. 185. 837. 1
185. 837. 450. 842. 1
450. 842. 581. 842. 1
581. 842. 963. 960. 1
963. 960. 1008. 970. 1
1008. 970. 1179. 1025. 1
1179. 1025. 1249. 1038. 1
1249. 1038. 1362. 1045. 1
1362. 1045. 1449. 1057. 1
1449. 1057. 1454. 1058. 1
1454. 1058. 1541. 1077. 4
1541. 1077. 1733. 1106. 4
1733. 1106. 2045. 1170. 4
2045. 1170. 2141. 1195. 3
2141. 1195. 2272. 1188. 3
503. 802. 817. 838. 3
817. 838. 968. 838. 3
968. 838. 999. 870. 3
999. 870. 1069. 870. 3
1069. 870. 1117. 912. 3
1117. 912. 1237. 912. 3
1237. 912. 1310. 948. 3
1310. 948. 1368. 948. 3
1368. 948. 1400. 985. 3
1400. 985. 1454. 1058. 4
1400. 985. 1600. 1040. 3
1600. 1040. 1800. 1085. 3
1800. 1085. 1900. 1110. 3
1900. 1110. 2000. 1145. 3
2000. 1145. 2045. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
CIRCL2
50 50
969. 1247. 1541. 2040.
0. 50. 0. 0.
```

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 11:37AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_PS.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_PS.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS2_Buttress_Upperlocal1_PS.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 2 - 2' - Southern Slope Buttress

BOUNDARY COORDINATES
15 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	804.00	185.00	837.00	1
2	185.00	837.00	450.00	842.00	1
3	450.00	842.00	581.00	842.00	1
4	581.00	842.00	963.00	960.00	1
5	963.00	960.00	1008.00	970.00	1
6	1008.00	970.00	1179.00	1025.00	1
7	1179.00	1025.00	1249.00	1038.00	1
8	1249.00	1038.00	1362.00	1045.00	1
9	1362.00	1045.00	1449.00	1057.00	1
10	1449.00	1057.00	1454.00	1058.00	1
11	1454.00	1058.00	1541.00	1077.00	4
12	1541.00	1077.00	1733.00	1106.00	4
13	1733.00	1106.00	2045.00	1170.00	4
14	2045.00	1170.00	2141.00	1195.00	3
15	2141.00	1195.00	2272.00	1188.00	3
16	503.00	802.00	817.00	838.00	3
17	817.00	838.00	968.00	838.00	3
18	968.00	838.00	999.00	870.00	3
19	999.00	870.00	1069.00	870.00	3
20	1069.00	870.00	1117.00	912.00	3
21	1117.00	912.00	1237.00	912.00	3
22	1237.00	912.00	1310.00	948.00	3
23	1310.00	948.00	1368.00	948.00	3
24	1368.00	948.00	1400.00	985.00	3
25	1400.00	985.00	1454.00	1058.00	4
26	1400.00	985.00	1600.00	1040.00	3
27	1600.00	1040.00	1800.00	1085.00	3
28	1800.00	1085.00	1900.00	1110.00	3
29	1900.00	1110.00	2000.00	1145.00	3
30	2000.00	1145.00	2045.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type	Total Unit Wt.	Saturated Unit Wt.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 969.00(ft)
and X =1247.00(ft)
Each Surface Terminates Between X =1541.00(ft)
and X =2040.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
50.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 11.732 FS Min = 1.851 FS Ave = 2.744
Standard Deviation = 0.610 Coefficient of Variation = 22.24 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1247.000	1037.629
2	1296.687	1032.045
3	1346.565	1028.557
4	1396.546	1027.171
5	1446.541	1027.889
6	1496.461	1030.709
7	1546.219	1035.628
8	1595.725	1042.636
9	1644.893	1051.721
10	1693.635	1062.867
11	1741.865	1076.053
12	1789.497	1091.258
13	1836.447	1108.453
14	1882.632	1127.608
15	1917.599	1143.866

Circle Center At X = 1404.488 ; Y = 2215.213 ; and Radius = 1188.069
Factor of Safety
*** 1.851 ***
Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.0	71.6	0.0	0.0	0.	0.	10.7	0.0	0.0
2	47.7	27196.9	0.0	0.0	0.	0.	4079.5	0.0	0.0
3	49.9	73009.7	0.0	0.0	0.	0.	10951.5	0.0	0.0
4	15.4	29966.8	0.0	0.0	0.	0.	4495.0	0.0	0.0
5	34.5	81801.9	0.0	0.0	0.	0.	12270.3	0.0	0.0
6	35.0	104045.9	0.0	0.0	0.	0.	15606.9	0.0	0.0
7	15.0	47788.6	0.0	0.0	0.	0.	7168.3	0.0	0.0
8	2.5	7722.9	0.0	0.0	0.	0.	1158.4	0.0	0.0
9	5.0	15614.8	0.0	0.0	0.	0.	2342.2	0.0	0.0
10	42.5	147693.5	0.0	0.0	0.	0.	22154.0	0.0	0.0
11	44.5	183442.0	0.0	0.0	0.	0.	27516.3	0.0	0.0
12	5.2	23027.2	0.0	0.0	0.	0.	3454.1	0.0	0.0
13	49.5	220375.0	0.0	0.0	0.	0.	33056.3	0.0	0.0

14	49.2	215798.7	0.0	0.0	0.	0.	32369.8	0.0	0.0
15	48.7	200003.7	0.0	0.0	0.	0.	30000.6	0.0	0.0
16	39.4	143753.0	0.0	0.0	0.	0.	21562.9	0.0	0.0
17	8.9	29848.1	0.0	0.0	0.	0.	4477.2	0.0	0.0
18	47.6	145281.8	0.0	0.0	0.	0.	21792.3	0.0	0.0
19	47.0	111164.4	0.0	0.0	0.	0.	16674.7	0.0	0.0
20	46.2	67537.8	0.0	0.0	0.	0.	10130.7	0.0	0.0
21	35.0	16680.0	0.0	0.0	0.	0.	2502.0	0.0	0.0

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1139.204	1012.200
2	1189.182	1010.713
3	1239.181	1010.390
4	1289.174	1011.232
5	1339.133	1013.237
6	1389.033	1016.405
7	1438.845	1020.735
8	1488.543	1026.223
9	1538.100	1032.866
10	1587.488	1040.662
11	1636.682	1049.606
12	1685.654	1059.693
13	1734.377	1070.918
14	1782.827	1083.274
15	1830.975	1096.755
16	1878.796	1111.353
17	1926.265	1127.061
18	1973.355	1143.870
19	2020.040	1161.771
20	2035.185	1167.987

Circle Center At X = 1228.221 ; Y = 3154.673 ; and Radius = 2144.321

Factor of Safety

*** 1.891 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1184.592	1026.038
2	1234.443	1022.181
3	1284.390	1019.897
4	1334.385	1019.189
5	1384.378	1020.058
6	1434.318	1022.502
7	1484.156	1026.520
8	1533.843	1032.107
9	1583.329	1039.259
10	1632.565	1047.966
11	1681.502	1058.222
12	1730.091	1070.016
13	1778.284	1083.336
14	1826.034	1098.168
15	1873.291	1114.499
16	1920.011	1132.312
17	1966.146	1151.589
18	1975.080	1155.657

Circle Center At X = 1331.899 ; Y = 2602.906 ; and Radius = 1583.733

Factor of Safety

*** 1.894 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1008.714	970.230
2	1058.714	970.112
3	1108.704	971.095
4	1158.661	973.180
5	1208.559	976.364
6	1258.376	980.647
7	1308.085	986.027

8	1357.665	992.500
9	1407.089	1000.064
10	1456.335	1008.715
11	1505.378	1018.449
12	1554.195	1029.261
13	1602.762	1041.146
14	1651.056	1054.098
15	1699.052	1068.111
16	1746.728	1083.177
17	1794.060	1099.291
18	1841.026	1116.443
19	1887.603	1134.626
20	1902.245	1140.717

Circle Center At X = 1039.324 ; Y = 3236.566 ; and Radius = 2266.543

Factor of Safety

*** 1.898 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	974.673	962.594
2	1024.630	964.685
3	1074.550	967.515
4	1124.422	971.084
5	1174.236	975.391
6	1223.981	980.436
7	1273.646	986.217
8	1323.219	992.732
9	1372.691	999.981
10	1422.050	1007.962
11	1471.285	1016.673
12	1520.386	1026.113
13	1569.342	1036.278
14	1618.142	1047.167
15	1666.775	1058.778
16	1715.231	1071.108
17	1763.499	1084.154
18	1811.568	1097.914
19	1859.429	1112.383
20	1907.069	1127.560
21	1954.480	1143.441
22	2001.651	1160.023
23	2008.303	1162.473

Circle Center At X = 858.499 ; Y = 4336.667 ; and Radius = 3376.072

Factor of Safety

*** 1.899 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1003.041	968.898
2	1053.039	969.327
3	1103.018	970.783
4	1152.956	973.267
5	1202.833	976.777
6	1252.627	981.311
7	1302.317	986.869
8	1351.882	993.446
9	1401.302	1001.042
10	1450.555	1009.652
11	1499.621	1019.273
12	1548.478	1029.900
13	1597.107	1041.530
14	1645.486	1054.157
15	1693.595	1067.777
16	1741.415	1082.382
17	1788.924	1097.968
18	1836.102	1114.526
19	1882.930	1132.052
20	1907.329	1141.760

Circle Center At X = 1007.511 ; Y = 3397.235 ; and Radius = 2428.341

Factor of Safety

*** 1.916 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1156.224	1017.674
2	1206.114	1014.350
3	1256.081	1012.539
4	1306.080	1012.243
5	1356.065	1013.462
6	1405.990	1016.195
7	1455.810	1020.439
8	1505.478	1026.192
9	1554.949	1033.447
10	1604.177	1042.197
11	1653.118	1052.435
12	1701.726	1064.152
13	1749.956	1077.336
14	1797.765	1091.975
15	1845.108	1108.056
16	1891.942	1125.565
17	1938.225	1144.485
18	1953.310	1151.192

Circle Center At X = 1290.960 ; Y = 2659.333 ; and Radius = 1647.179

Factor of Safety

*** 1.921 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	980.347	963.855
2	1030.277	966.499
3	1080.167	969.816
4	1130.007	973.805
5	1179.790	978.465
6	1229.505	983.796
7	1279.144	989.795
8	1328.697	996.463
9	1378.156	1003.798
10	1427.512	1011.799
11	1476.755	1020.463
12	1525.878	1029.791
13	1574.870	1039.779
14	1623.723	1050.427
15	1672.428	1061.732
16	1720.977	1073.692
17	1769.360	1086.305
18	1817.568	1099.568
19	1865.594	1113.480
20	1913.428	1128.038
21	1961.061	1143.239
22	2008.485	1159.080
23	2032.309	1167.397

Circle Center At X = 809.032 ; Y = 4670.983 ; and Radius = 3711.084

Factor of Safety

*** 1.929 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1110.837	1003.076
2	1160.836	1002.850
3	1210.830	1003.630
4	1260.798	1005.418
5	1310.720	1008.211
6	1360.575	1012.010
7	1410.344	1016.812
8	1460.006	1022.615
9	1509.541	1029.417

10	1558.929	1037.216
11	1608.150	1046.009
12	1657.184	1055.790
13	1706.011	1066.558
14	1754.611	1078.307
15	1802.965	1091.032
16	1851.052	1104.729
17	1898.854	1119.391
18	1946.351	1135.013
19	1993.523	1151.589
20	2039.965	1168.967

Circle Center At X = 1147.092 ; Y = 3484.909 ; and Radius = 2482.098

Factor of Safety

*** 1.939 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1025.735	975.704
2	1075.637	972.589
3	1125.616	971.135
4	1175.616	971.343
5	1225.581	973.212
6	1275.456	976.741
7	1325.187	981.926
8	1374.717	988.761
9	1423.993	997.239
10	1472.960	1007.349
11	1521.564	1019.082
12	1569.751	1032.424
13	1617.468	1047.360
14	1664.663	1063.874
15	1711.282	1081.948
16	1757.275	1101.561
17	1793.337	1118.377

Circle Center At X = 1144.371 ; Y = 2475.091 ; and Radius = 1504.073

Factor of Safety

*** 1.941 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 18

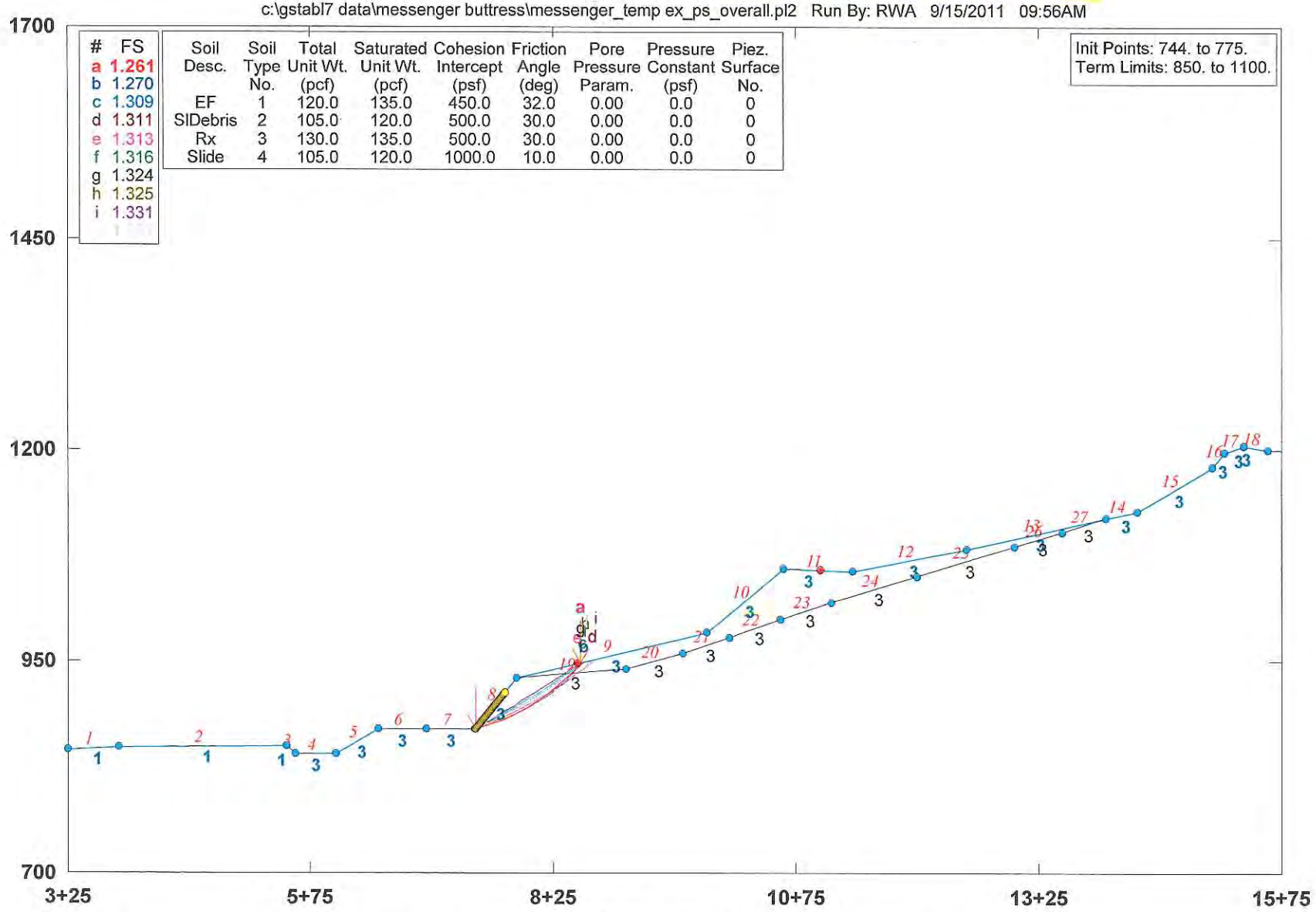
Cross Section AA - AA' - Temporary Ex

c:\gstabl7 data\messenger buttress\messenger_temp ex_ps_overall.pl2 Run By: RWA 9/15/2011 09:56AM

#	FS
a	1.261
b	1.270
c	1.309
d	1.311
e	1.313
f	1.316
g	1.324
h	1.325
i	1.331

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
EF	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Init Points: 744. to 775.
Term Limits: 850. to 1100.



GSTABL7 v.2 FSmin=1.261
Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 9/15/2011
Time of Run: 09:56AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_PS_Overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_PS_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_PS_Overall.PLT
PROBLEM DESCRIPTION: Messenger Calabasas LLC
Cross Section AA - AA' - Temporary Ex

BOUNDARY COORDINATES
18 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	325.00	846.00	377.00	848.00	1
2	377.00	848.00	550.00	850.00	1
3	550.00	850.00	560.00	840.00	1
4	560.00	840.00	601.00	840.00	3
5	601.00	840.00	645.00	870.00	3
6	645.00	870.00	695.00	870.00	3
7	695.00	870.00	745.00	870.00	3
8	745.00	870.00	787.00	930.00	3
9	787.00	930.00	983.00	985.00	3
10	983.00	985.00	1062.00	1060.00	3
11	1062.00	1060.00	1133.00	1057.00	3
12	1133.00	1057.00	1250.00	1083.00	3
13	1250.00	1083.00	1394.00	1120.00	3
14	1394.00	1120.00	1426.00	1128.00	3
15	1426.00	1128.00	1504.00	1180.00	3
16	1504.00	1180.00	1516.00	1197.00	3
17	1516.00	1197.00	1537.00	1205.00	3
18	1537.00	1205.00	1561.00	1200.00	3
19	787.00	930.00	900.00	941.00	3
20	900.00	941.00	958.00	960.00	3
21	958.00	960.00	1006.00	978.00	3
22	1006.00	978.00	1059.00	1000.00	3
23	1059.00	1000.00	1111.00	1020.00	3
24	1111.00	1020.00	1200.00	1050.00	3
25	1200.00	1050.00	1300.00	1086.00	3
26	1300.00	1086.00	1350.00	1104.00	3
27	1350.00	1104.00	1394.00	1120.00	3

User Specified Y-Origin = 700.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0

```
   3   130.0    135.0     500.0     30.0    0.00       0.0       0
   4   105.0    120.0    1000.0     10.0    0.00       0.0       0
 Specified Peak Ground Acceleration Coefficient (A) =   0.440(g)
 Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
 Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
 Specified Seismic Pore-Pressure Factor =   0.000
 EARTHQUAKE DATA HAS BEEN SUPPRESSED
PIER/PILE LOAD(S)
    1 Pier/Pile Load(s) Specified
Pier/Pile  X-Pos    Y-Pos     Load     Spacing  Inclination  Length
   No.      (ft)     (ft)     (lbs)      (ft)      (deg)      (ft)
    1     795.00   932.24   30000.0    15.0      90.00       50.0
 NOTE - An Equivalent Line Load Is Calculated For Each Row Of Piers/Piles
        Assuming A Uniform Distribution Of Load Horizontally Between
        Individual Piers/Piles.
 PIER/PILE LOAD DATA HAS BEEN SUPPRESSED
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 2500 Trial Surfaces Have Been Generated.
   50 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
 Along The Ground Surface Between  X = 744.00(ft)
                                 and  X = 775.00(ft)
 Each Surface Terminates Between   X = 850.00(ft)
                                 and   X =1100.00(ft)
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is  Y =      0.00(ft)
 15.00(ft) Line Segments Define Each Trial Failure Surface.
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Modified Bishop Method * *
       Total Number of Trial Surfaces Attempted =  2500
       Number of Trial Surfaces With Valid FS = 2500
       Statistical Data On All Valid FS Values:
          FS Max =   4.769   FS Min =   1.261   FS Ave =   2.370
          Standard Deviation =    0.571   Coefficient of Variation =   24.08 %
       Failure Surface Specified By 11 Coordinate Points
         Point      X-Surf      Y-Surf
          No.        (ft)        (ft)
           1       745.265     870.379
           2       759.411     875.370
           3       773.169     881.346
           4       786.471     888.278
           5       799.250     896.132
           6       811.444     904.868
           7       822.991     914.443
           8       833.833     924.808
           9       843.916     935.913
          10       853.191     947.702
          11       853.922     948.779
       Circle Center At X =   681.708 ; Y =  1073.073 ; and Radius =   212.426
            Factor of Safety
           ***    1.261   ***
          Individual data on the    12  slices
                          Water  Water    Tie     Tie     Earthquake
                          Force  Force    Force   Force     Force   Surcharge
Slice  Width   Weight     Top    Bot      Norm    Tan      Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)    (lbs)   (lbs)  (lbs)
  1     14.1   13991.5     0.0    0.0       0.      0.      0.0     0.0     0.0
  2     13.8   39448.6     0.0    0.0       0.      0.      0.0     0.0     0.0
  3     13.3   60403.9     0.0    0.0       0.      0.      0.0     0.0     0.0
  4      0.5    2833.3     0.0    0.0       0.      0.      0.0     0.0     0.0
  5     12.3   62668.7     0.0    0.0       0.      0.      0.0     0.0     0.0
  6     12.2   54923.4     0.0    0.0       0.      0.      0.0     0.0     0.0
  7     11.5   43266.7     0.0    0.0       0.      0.      0.0     0.0     0.0
  8     10.8   31001.7     0.0    0.0       0.      0.      0.0     0.0     0.0
  9      9.7   18116.2     0.0    0.0       0.      0.      0.0     0.0     0.0
```

10	0.4	492.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	9.3	6589.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.7	41.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	745.265	870.379
2	759.413	875.363
3	773.189	881.299
4	786.529	888.157
5	799.371	895.908
6	811.657	904.513
7	823.329	913.935
8	834.333	924.129
9	844.618	935.047
10	854.137	946.640
11	856.097	949.389

Circle Center At X = 679.146 ; Y = 1080.615 ; and Radius = 220.388

Factor of Safety

*** 1.270 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	745.898	871.283
2	758.746	879.024
3	771.444	887.009
4	783.986	895.237
5	796.368	903.703
6	808.586	912.405
7	820.635	921.339
8	832.511	930.503
9	844.209	939.892
10	855.331	949.174

Circle Center At X = 348.592 ; Y = 1545.290 ; and Radius = 782.393

Factor of Safety

*** 1.309 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	745.265	870.379
2	758.873	876.690
3	772.242	883.492
4	785.356	890.774
5	798.197	898.527
6	810.748	906.742
7	822.992	915.406
8	834.914	924.509
9	846.498	934.039
10	857.728	943.983
11	866.455	952.296

Circle Center At X = 578.249 ; Y = 1248.288 ; and Radius = 413.171

Factor of Safety

*** 1.311 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	746.531	872.186
2	759.191	880.231
3	771.717	888.483
4	784.105	896.942
5	796.351	905.604
6	808.452	914.467
7	820.405	923.529
8	832.207	932.788
9	843.854	942.240
10	850.500	947.819

Circle Center At X = 269.431 ; Y = 1637.319 ; and Radius = 901.694

Factor of Safety
*** 1.313 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	747.163	873.090
2	760.561	879.836
3	773.716	887.043
4	786.612	894.704
5	799.234	902.809
6	811.566	911.348
7	823.594	920.311
8	835.302	929.687
9	846.677	939.465
10	857.705	949.633
11	857.999	949.923

Circle Center At X = 560.048 ; Y = 1261.413 ; and Radius = 431.053

Factor of Safety
*** 1.316 ***
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	745.898	871.283
2	758.414	879.551
3	770.842	887.949
4	783.183	896.476
5	795.433	905.132
6	807.593	913.915
7	819.660	922.825
8	831.633	931.860
9	843.512	941.020
10	853.049	948.534

Circle Center At X = -36.641 ; Y = 2069.632 ; and Radius = 1431.225

Factor of Safety
*** 1.324 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	747.796	873.994
2	762.097	878.518
3	776.026	884.084
4	789.506	890.664
5	802.464	898.220
6	814.829	906.711
7	826.534	916.092
8	837.515	926.311
9	847.712	937.312
10	857.069	949.035
11	857.599	949.811

Circle Center At X = 693.719 ; Y = 1069.820 ; and Radius = 203.155

Factor of Safety
*** 1.325 ***
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	745.898	871.283
2	759.538	877.523
3	772.949	884.243
4	786.113	891.434
5	799.013	899.087
6	811.635	907.193
7	823.961	915.740
8	835.977	924.719
9	847.667	934.119
10	859.016	943.926
11	868.720	952.932

Circle Center At X = 576.680 ; Y = 1259.179 ; and Radius = 423.200

```
      Factor of Safety
     ***    1.331   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        747.163     873.090
    2        760.241     880.437
    3        773.149     888.077
    4        785.882     896.007
    5        798.432     904.222
    6        810.793     912.719
    7        822.960     921.493
    8        834.925     930.539
    9        846.683     939.853
   10        858.228     949.430
   11        859.176     950.253
Circle Center At X =   428.403 ; Y =  1455.808 ; and Radius =   664.205
      Factor of Safety
     ***    1.337   ***
         **** END OF GSTABL7 OUTPUT ****
```

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SOIL  EF      SlDebrisRx      Slide
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EQUAKE
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PIERS
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CIRCL2
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744. 775. 850. 1100.
0. 15. 0. 0.
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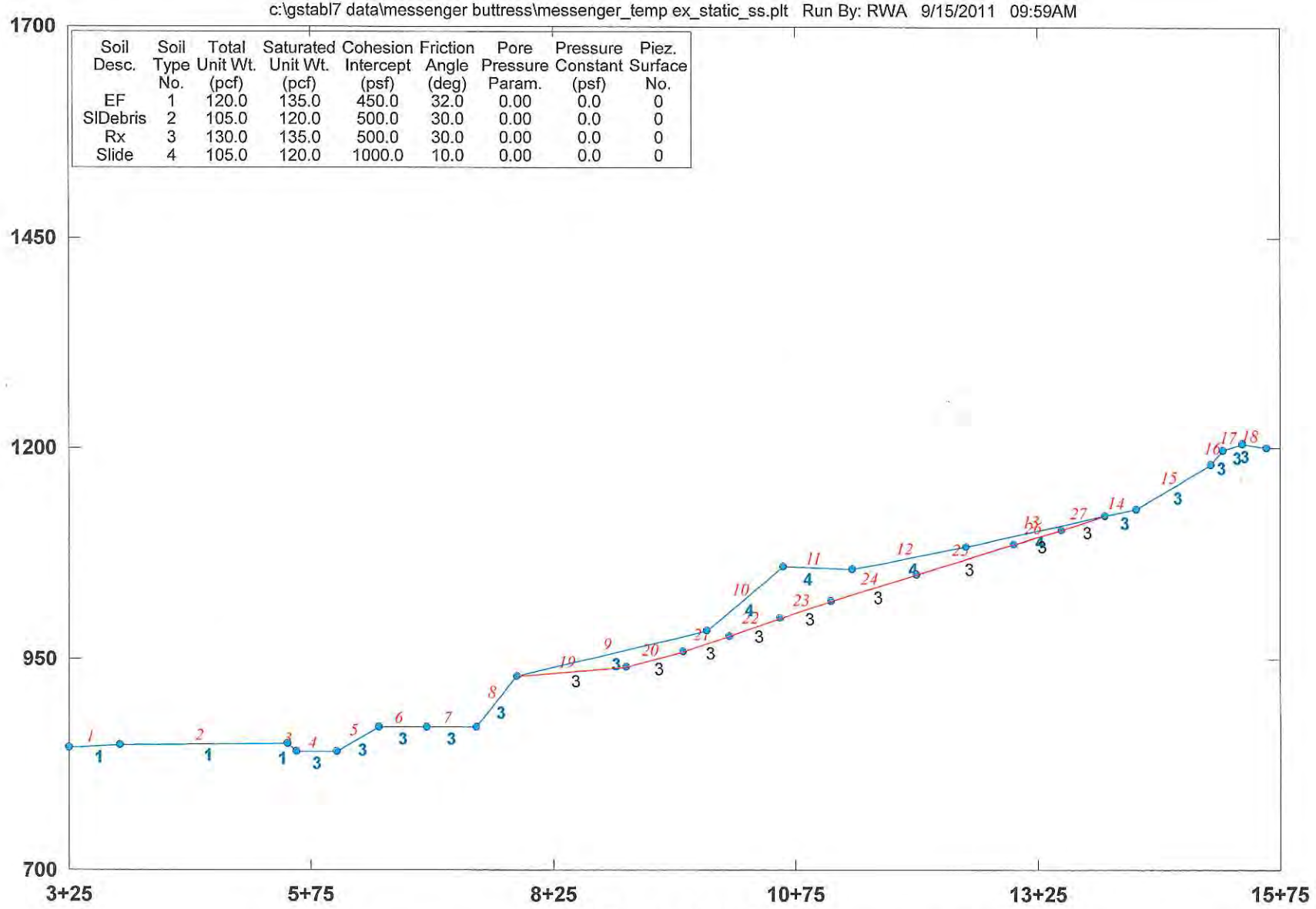
Analysis 19

Cross Section AA - AA' - SS Temp Ex

c:\gstabl7 data\messenger buttress\messenger_temp ex_static_ss.plt Run By: RWA 9/15/2011 09:59AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
EF	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0



GSTABL7 v.2 FSmin=2.037

Factor Of Safety Is Calculated By The Simplified Janbu Method

*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/15/2011
Time of Run: 09:59AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_static_ss.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_static_ss.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\messenger_temp ex_static_ss.PLT
PROBLEM DESCRIPTION: Messenger Calabasas LLC
Cross Section AA - AA' - SS Temp Ex

BOUNDARY COORDINATES
18 Top Boundaries
27 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	325.00	846.00	377.00	848.00	1
2	377.00	848.00	550.00	850.00	1
3	550.00	850.00	560.00	840.00	1
4	560.00	840.00	601.00	840.00	3
5	601.00	840.00	645.00	870.00	3
6	645.00	870.00	695.00	870.00	3
7	695.00	870.00	745.00	870.00	3
8	745.00	870.00	787.00	930.00	3
9	787.00	930.00	983.00	985.00	3
10	983.00	985.00	1062.00	1060.00	4
11	1062.00	1060.00	1133.00	1057.00	4
12	1133.00	1057.00	1250.00	1083.00	4
13	1250.00	1083.00	1394.00	1120.00	4
14	1394.00	1120.00	1426.00	1128.00	3
15	1426.00	1128.00	1504.00	1180.00	3
16	1504.00	1180.00	1516.00	1197.00	3
17	1516.00	1197.00	1537.00	1205.00	3
18	1537.00	1205.00	1561.00	1200.00	3
19	787.00	930.00	900.00	941.00	3
20	900.00	941.00	958.00	960.00	3
21	958.00	960.00	1006.00	978.00	3
22	1006.00	978.00	1059.00	1000.00	3
23	1059.00	1000.00	1111.00	1020.00	3
24	1111.00	1020.00	1200.00	1050.00	3
25	1200.00	1050.00	1300.00	1086.00	3
26	1300.00	1086.00	1350.00	1104.00	3
27	1350.00	1104.00	1394.00	1120.00	3

User Specified Y-Origin = 700.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0

3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.680(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
Trial Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	787.000	930.000
2	900.000	941.000
3	958.000	960.000
4	1006.000	978.000
5	1059.000	1000.000
6	1111.000	1020.000
7	1200.000	1050.000
8	1300.000	1086.000
9	1350.000	1104.000
10	1394.000	1120.000

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 2.037

Table 1 - Individual Data on the 13 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	113.0	152109.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	58.0	145875.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	25.0	54615.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	23.0	53686.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	53.0	239259.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.0	18269.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	49.0	248956.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	22.0	77978.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	67.0	181056.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	50.0	96833.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	50.0	65223.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	50.0	38172.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	44.0	10843.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Base Stress Data on the 13 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	5.56	843.50	113.53	1248.76	130.42
2	18.14	929.00	61.03	1879.66	782.97
3	20.56	970.50	26.70	1700.36	767.08
4	20.56	994.50	24.56	1460.17	819.58
5	22.54	1032.50	57.38	1877.14	1730.69
6	21.04	1060.50	3.21	2150.33	2186.15
7	21.04	1086.50	52.50	1965.82	1823.88
8	18.63	1122.00	23.22	1666.21	1132.18
9	18.63	1166.50	70.70	1513.95	863.18
10	19.80	1225.00	53.14	1382.68	655.99
11	19.80	1275.00	53.14	1267.79	441.85
12	19.80	1325.00	53.14	1169.46	258.59
13	19.98	1372.00	46.82	1076.42	84.22

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 954696.56 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 1493.83(psf)
Sum of the Driving Forces = 468642.66 (lbs)
Average Mobilized Shear Stress = 733.29(psf)
Total length of the failure surface = 639.09(ft)

**** END OF GSTABL7 OUTPUT ****

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SOIL  EF      SlDebrisRx      Slide
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EQUAKE
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1350. 1104.
1394. 1120.
EXECUT
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APPENDIX E

RJR ENGINEERING GROUP

SURFICIAL STABILITY ANALYSIS - PROPOSED ENGINEERED FILL SLOPES

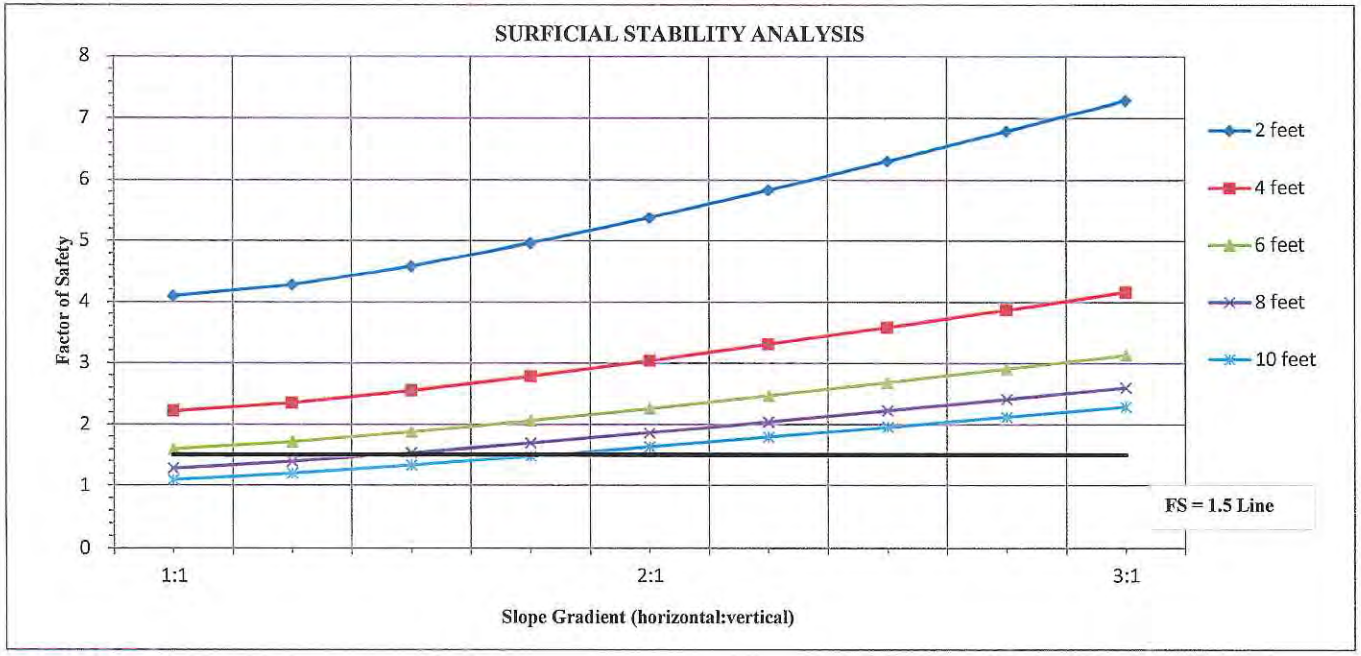
$$\text{Factor of Safety} \quad \frac{\text{Cohesion} + (\text{Soil Density} - \text{Water Density})(\text{depth})[\cos^2(\text{Slope Angle})](\tan\phi)}{(\text{Soil Density})(\text{depth})[\cos(\text{Slope Angle})][\sin(\text{Slope Angle})]}$$

SOIL PARAMETERS:

Soil Density - ULTIMATE: Terrace	120 pcf
Water Density	62.4 pcf
Ultimate Phi (ø) - 90% Compacted Fill (RJR, 2011)	36.0 degrees
Cohesion (Fully Mobilized)	450.0 psf

SLOPE GRADIENT (H:V)	SLOPE ANGLE (degrees)	SOIL THICKNESS (feet) 2	3	4	5	6	7	8	9	10
1:1	45.00	4.10	2.85	2.22	1.85	1.60	1.42	1.29	1.18	1.10
1.25:1	38.66	4.28	3.00	2.36	1.97	1.72	1.53	1.40	1.29	1.20
1.50:1	33.69	4.59	3.23	2.55	2.15	1.88	1.68	1.54	1.43	1.34
1.75:1	29.74	4.96	3.51	2.79	2.35	2.06	1.85	1.70	1.58	1.48
2:1	26.56	5.39	3.82	3.04	2.57	2.26	2.04	1.87	1.74	1.64
2.25:1	23.96	5.84	4.15	3.31	2.81	2.47	2.23	2.05	1.91	1.80
2.50:1	21.80	6.31	4.50	3.59	3.05	2.68	2.43	2.23	2.08	1.96
2.75:1	19.98	6.80	4.85	3.88	3.29	2.91	2.63	2.42	2.26	2.13
3:1	18.44	7.29	5.21	4.17	3.55	3.13	2.83	2.61	2.43	2.30

Project: TRACT 71346 P.N.: 1344.12



RJR ENGINEERING GROUP

SURFICIAL STABILITY ANALYSIS - EXISTING SLOPE

$$\text{Factor of Safety} \quad \frac{\text{Cohesion} + (\text{Soil Density} - \text{Water Density})(\text{depth})[\cos^2(\text{Slope Angle})](\tan\phi)}{(\text{Soil Density})(\text{depth})[\cos(\text{Slope Angle})][\sin(\text{Slope Angle})]}$$

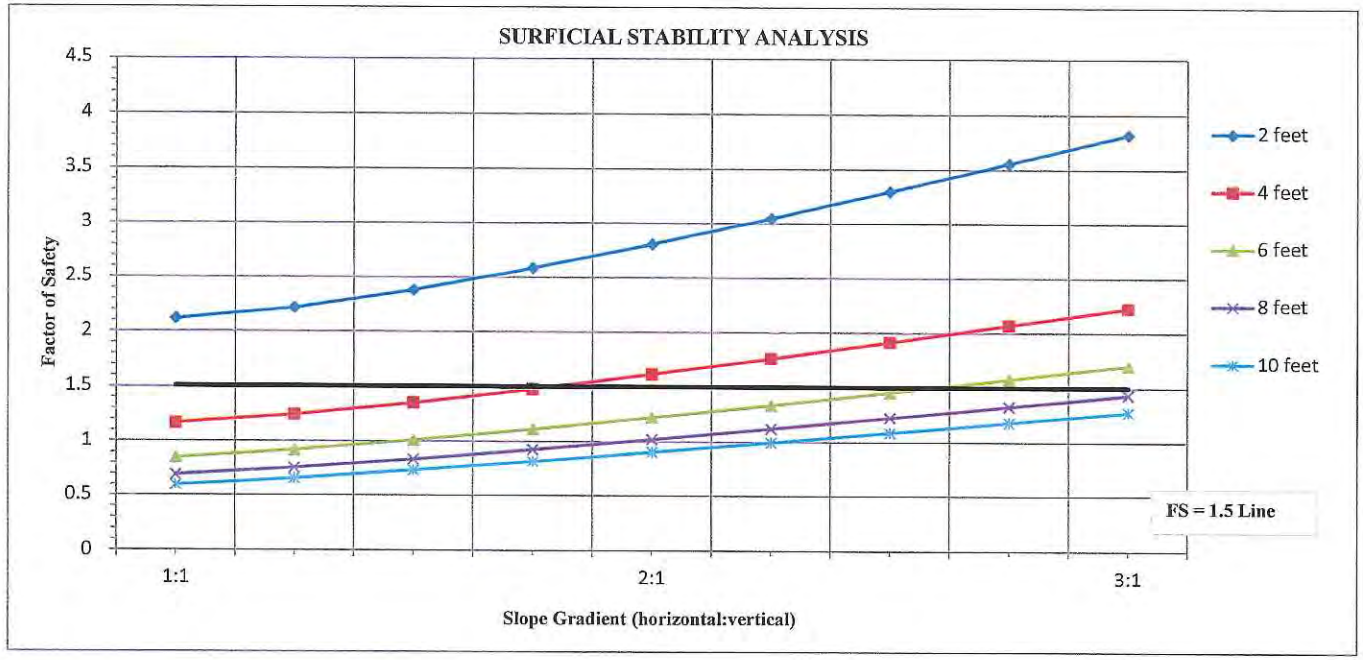
SOIL PARAMETERS:

Soil Density - ULTIMATE: Terrace	105	pcf
Water Density	62.4	pcf
Ultimate Phi (ø)	28.0	degrees
Cohesion (Fully Mobilized)	200.0	psf

SLOPE GRADIENT (H:V)	SLOPE ANGLE (degrees)	SOIL THICKNESS (feet) 2	3	4	5	6	7	8	9	10
1:1	45.00	2.12	1.49	1.17	0.98	0.85	0.76	0.69	0.64	0.60
1.25:1	38.66	2.22	1.57	1.25	1.05	0.92	0.83	0.76	0.70	0.66
1.50:1	33.69	2.39	1.70	1.36	1.15	1.01	0.91	0.84	0.78	0.74
1.75:1	29.74	2.59	1.85	1.48	1.26	1.11	1.01	0.93	0.87	0.82
2:1	26.56	2.81	2.02	1.62	1.38	1.23	1.11	1.03	0.96	0.91
2.25:1	23.96	3.05	2.20	1.77	1.51	1.34	1.22	1.13	1.06	1.00
2.50:1	21.80	3.30	2.38	1.92	1.64	1.46	1.33	1.23	1.15	1.09
2.75:1	19.98	3.56	2.57	2.08	1.78	1.58	1.44	1.33	1.25	1.19
3:1	18.44	3.82	2.76	2.23	1.92	1.70	1.55	1.44	1.35	1.28

Project: TRACT 71346

P.N.: 1344.12



RJR ENGINEERING GROUP

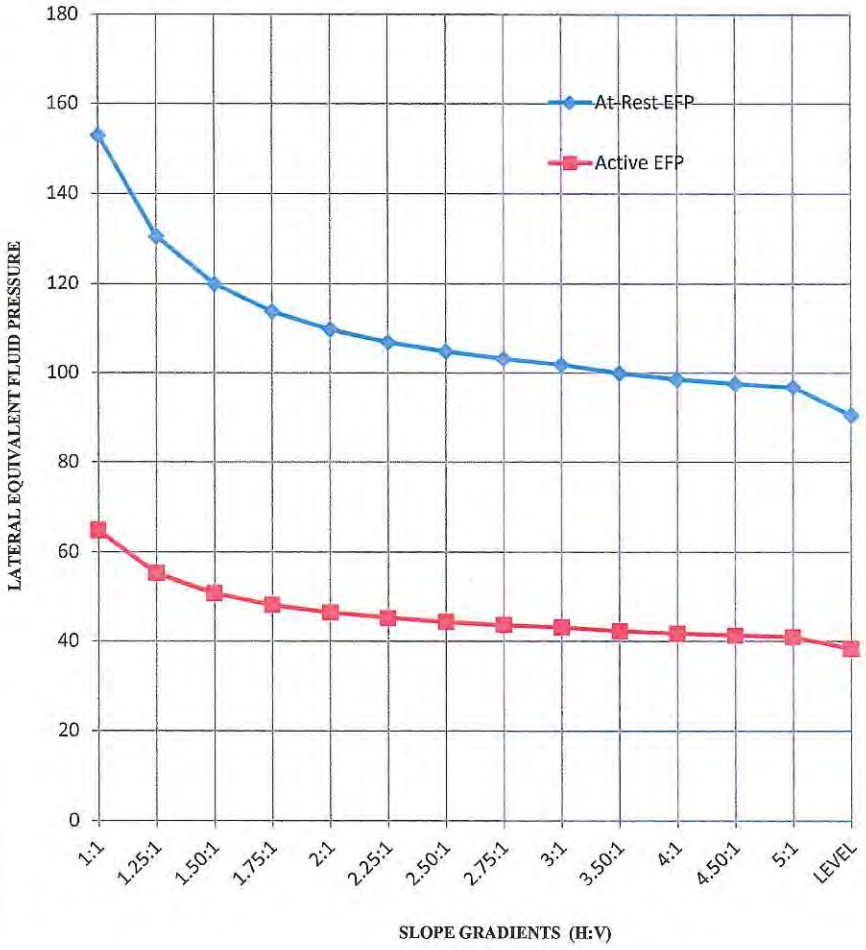
LATERAL EARTH PRESSURE ANALYSIS

SOIL TYPE:	Engineered Fill		90-(45+PHI/2):	**29** DEGREES
Phi Angle:	**32** DEGREES		90-(45-PHI/2):	**61** DEGREES
Cohesion:	**0** PSF			
Bulk Wt:	**125** PCF		COEF. OF VERTICAL	
			FRICTION:	**0.47** ULTIMATE
kp:	**3.25** (Cohesionless)			
PASSIVE RESIST.:	**407** PCF		COEF. OF FRICTION	
kp:	**1.80** (Cohesive)		BELOW FOOTING:	**0.62** ULTIMATE
PASSIVE RESIST.:	**226** PCF			**0.41** ALLOW.
COMBINED PASSIVE:	**407** PCF (Ult)		TENSION CRACK	
	136 PCF Allowable)		DEPTH (z):	**1.8** FEET

GRADIENT SLOPE	SLOPE VALUE	SLOPE ANGLE	FACTOR SLOPE	K_o	AT-REST DRAINED	AT-REST UNDRAINED	K_a	ACTIVE DRAINED	ACTIVE UNDRAINED
1:1	1.00	45.00	1.689	0.724	**153**	182	0.519	**65**	95
1.25:1	1.25	38.66	1.442	0.724	**131**	155	0.443	**55**	90
1.50:1	1.50	33.69	1.325	0.724	**120**	143	0.407	**51**	88
1.75:1	1.75	29.74	1.257	0.724	**114**	135	0.386	**48**	87
2:1	2.00	26.57	1.213	0.724	**110**	131	0.373	**47**	86
2.25:1	2.25	23.96	1.181	0.724	**107**	127	0.363	**45**	85
2.50:1	2.50	21.80	1.158	0.724	**105**	125	0.356	**44**	85
2.75:1	2.75	19.98	1.140	0.724	**103**	123	0.350	**44**	84
3:1	3.00	18.43	1.126	0.724	**102**	121	0.346	**43**	84
3.50:1	3.50	15.95	1.104	0.724	**100**	119	0.339	**42**	84
4:1	4.00	14.04	1.089	0.724	**99**	117	0.335	**42**	83
4.50:1	4.50	12.53	1.078	0.724	**98**	116	0.331	**41**	83
5:1	5.00	11.31	1.069	0.724	**97**	115	0.328	**41**	83
LEVEL	INF	0.00	1.000	0.724	**91**	108	0.307	**38**	82

PROJECT: TRACT 71546 PROJECT NO.: 1344.12

RETAINING WALL
EQUIVALENT FLUID PRESSURES



GEOTECHNICAL PROGRAMMING SYSTEMS

SLOT CUT WIDTH ANALYSIS

1.0. Design Criteria

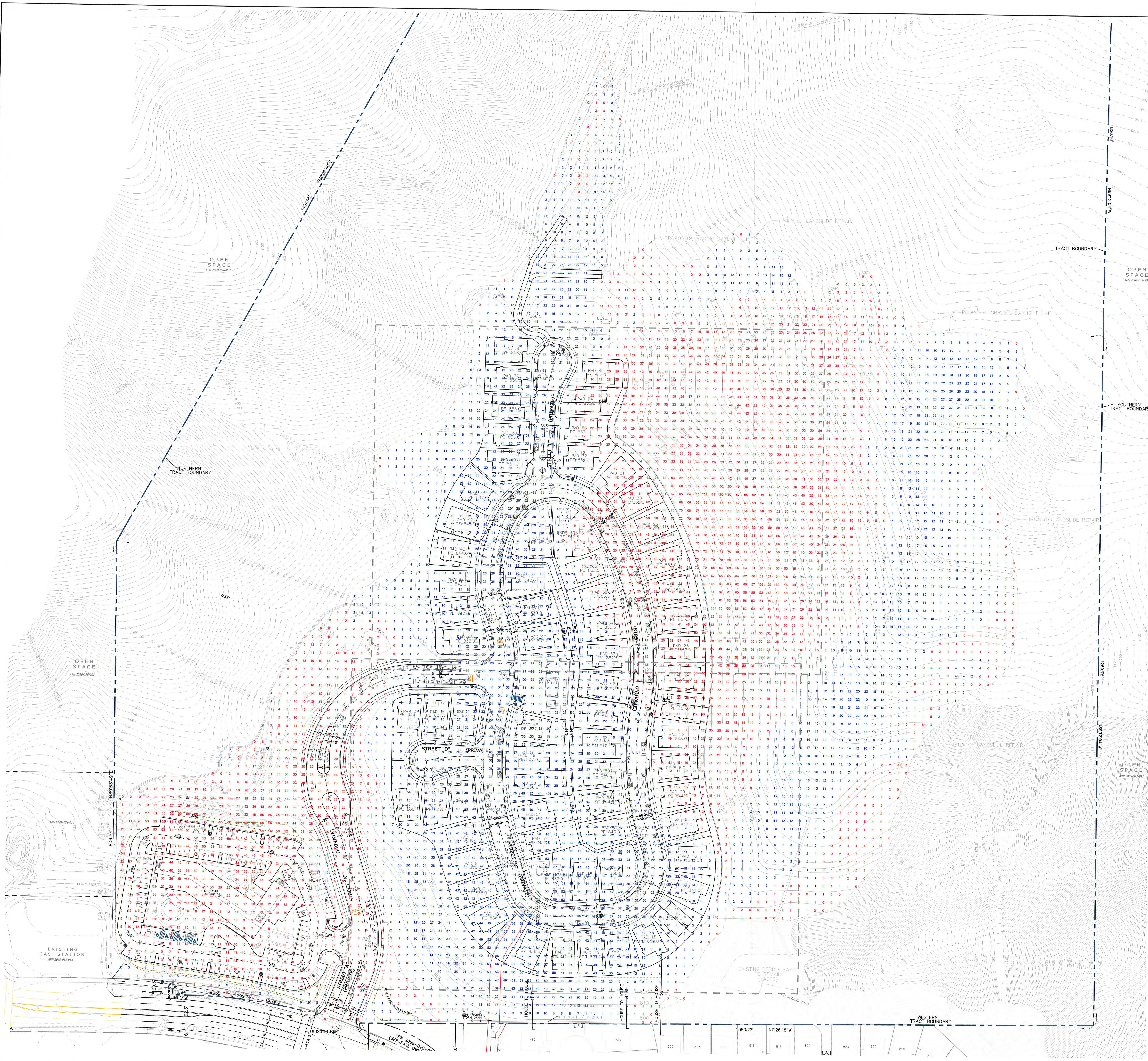
MATERIAL TYPE		Bedrock	
Cohesion (c) - Mobilized	=	200	PSF
Phi (p)	=	28	DEGREES
Dry Bulk Weight (B.W.)	=	105	PCF
SURCHARGE (S)	=	0.0	PSF
MAX. BANK HEIGHT (h)	=	15.00	FEET
CRITICAL ANGLE ANALYZED (ALPHA)	=	59.0	DEGREES
SLOPE ANGLE (B <= 45 degrees)	=	26.4	DEGREES
FACTOR OF SAFETY REQUIRED (F.S.)	=	1.25	

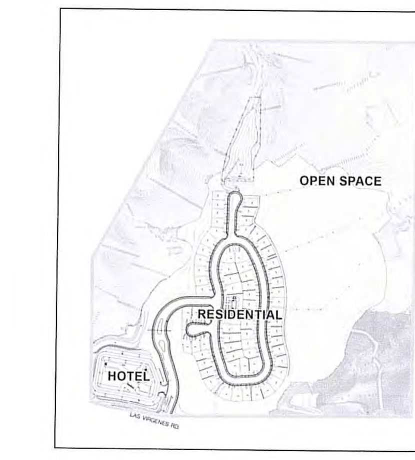
2.0. SLOT CUT CALCULATIONS FOR STATIC CONDITIONS

SIDE AREA (A)	=	339.44	SQ. FEET
SUPPORTED AREA	=	449.99	SQ. FEET
SLOPE FACTOR	=	1.26	
COEF. OF AT REST EARTH PRESSURE (Ko)	=	0.41	
SLOT SIDE LENGTH (b)	=	7.73	FEET
WEIGHT OF MATERIAL TO SUPPORT	=	47249.12	LBS/FT
TOTAL WEIGHT (including Surcharge)	=	47249.12	LBS/FT
TOTAL SIDE SHEAR FORCE (F)	=	213,589.38	LBS/FT
ALLOWABLE SLOT WIDTH	=	12.0	FEET

Project: TRACT 71346 P.N. 1344.12

APPENDIX F





NTS

Non-Remedial Earthwork Quantities

Overall Rough Grade Earthwork Quantities*		
Cut	613,183	c.y.
Fill	569,544	c.y.
Net	43,639	c.y.

*OVERALL ROUGH GRADE EARTHWORK NUMBERS REPRESENT ONLY THE GRADING FROM THE EXISTING TO THE PROPOSED WHERE NO LAND SLIDE OR ALLUVIAL REMOVALS ARE PRESENT AND WHERE LANDSLIDE OR ALLUVIAL REMOVALS ARE PRESENT THE NUMBERS REPRESENT GRADING FROM BOTTOMS OF REMEDIAL SURFACE TO THE PROPOSED. ANY AREA WHERE ADDITIONAL CUT IS REQUIRED IN EXCESS OF ALLUVIAL OR LANDSLIDE BOTTOM HAS ALSO BEEN REMOVED TO ENSURE NO EARTHWORK HAS BEEN COUNTED DOUBLE.

GRAPHIC SCALE

0 1" 2" 3"

0 30 60 120 180

1" = 60'

OVERALL ROUGHT GRADE EARTHWORK

CANYON OAKS
THE NEW HOME COMPANY

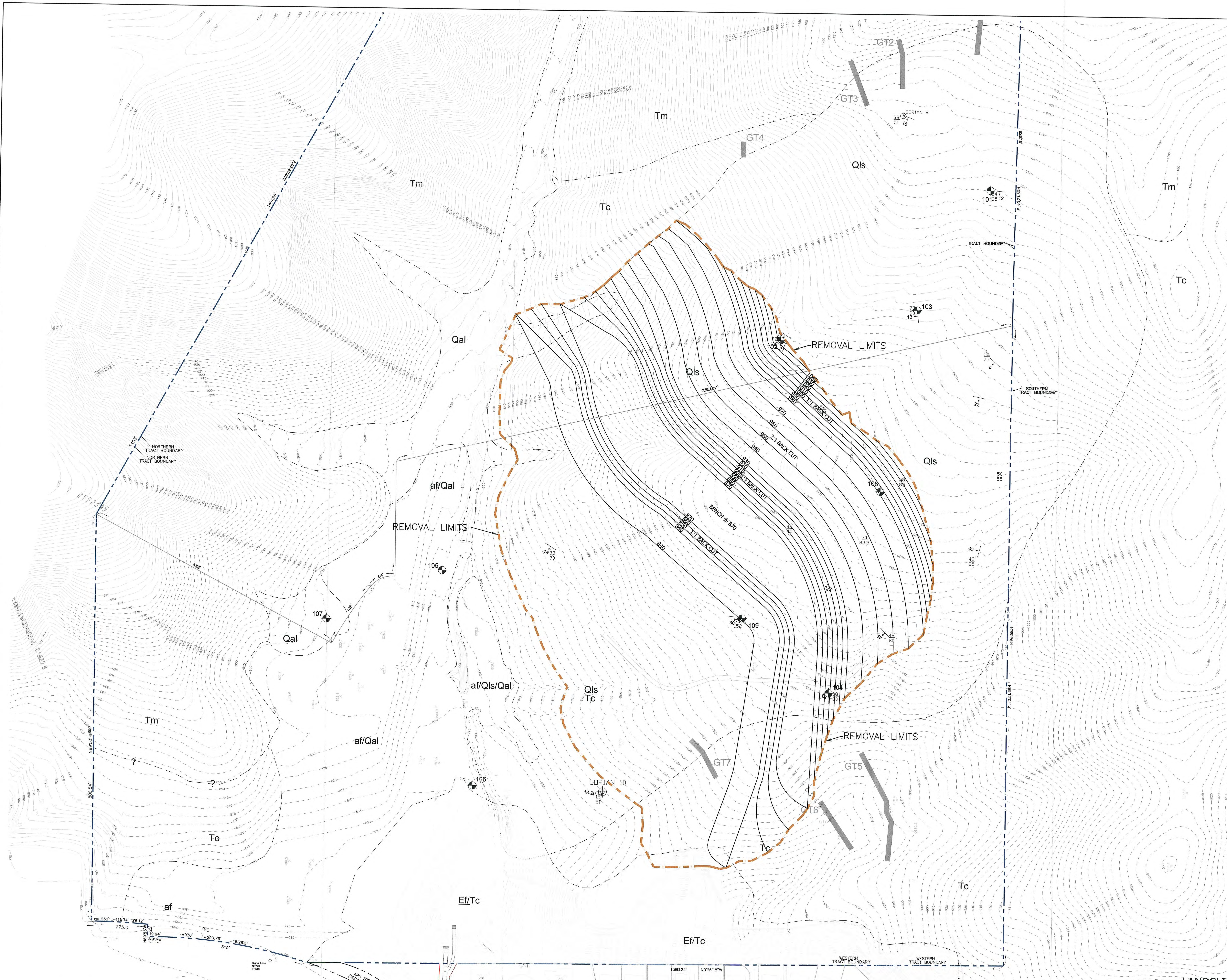
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

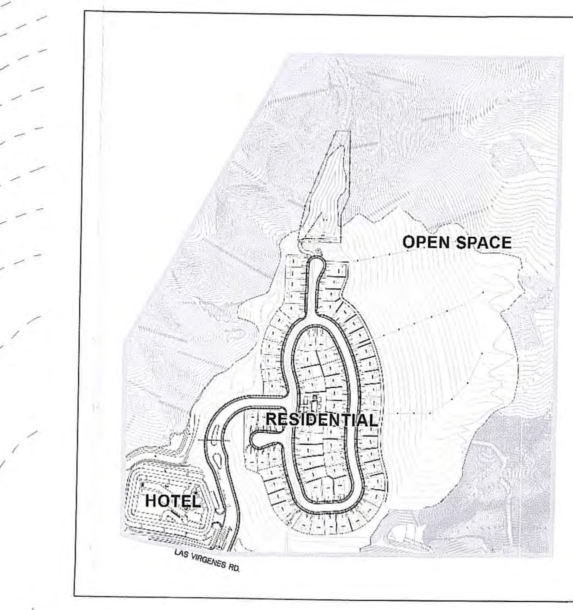
PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
San Luis Obispo, CA
Sacramento, CA Malibu, CA

APPENDIX G





GRAPHIC SCALE
0 30 60 120 180
1" = 60'

PREPARED BY:

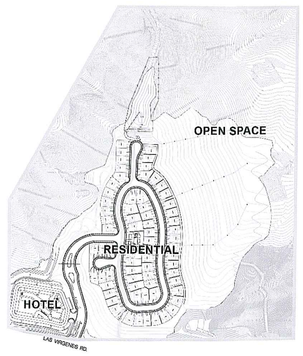
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
890 Osos Street, Suite A. San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

LANDSLIDE MITIGATION PLAN

CANYON OAKS

THE NEW HOME COMPANY

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA



NTS

Remedial Earthwork Quantities	
Landslide Removal / Replacement to Rough Grade	
Cut	1,308,144 c.y.
Fill	988,430 c.y.
Net	319,714 c.y.
Alluvial Removal / Replacement to Rough Grade	
Cut	269,755 c.y.
Fill	251,755 c.y.
Net	18,000 c.y. **
Total Remedial Removal / Replacement	
Cut	1,577,899 c.y.
Fill	1,240,185 c.y.
Net	337,714 c.y. ***

*OVERALL ROUGH GRADE EARTHWORK NUMBERS REPRESENT ONLY THE GRADING FROM THE EXISTING TO THE PROPOSED WHERE NO LAND SLIDE OR ALLUVIAL REMOVALS ARE PRESENT AND WHERE LANDSLIDE OR ALLUVIAL REMOVALS ARE PRESENT THE NUMBERS REPRESENT GRADING FROM BOTTOMS OF REMEDIAL SURFACE TO THE PROPOSED. ANY AREA WHERE ADDITIONAL CUT IS REQUIRED IN EXCESS OF ALLUVIAL OR LANDSLIDE BOTTOM HAS ALSO BEEN REMOVED TO ENSURE NO EARTHWORK HAS BEEN COUNTED DOUBLE.

**VOLUME OF EARTHWORK REDUCED FOR AREAS OF DOUBLE CUT UNDER THE ALLUVIAL / LANDSLIDE REMOVAL BOTTOMS

***TOTAL VOLUME OF EARTHWORK CREDIT APPLIED TO THE REDUCTION OF CUT IN THE OVERALL ROUGH GRADE EARTHWORK QUANTITIES

GRAPHIC SCALE
0 1" 2" 3"
0 30 60 120 180
1" = 60'

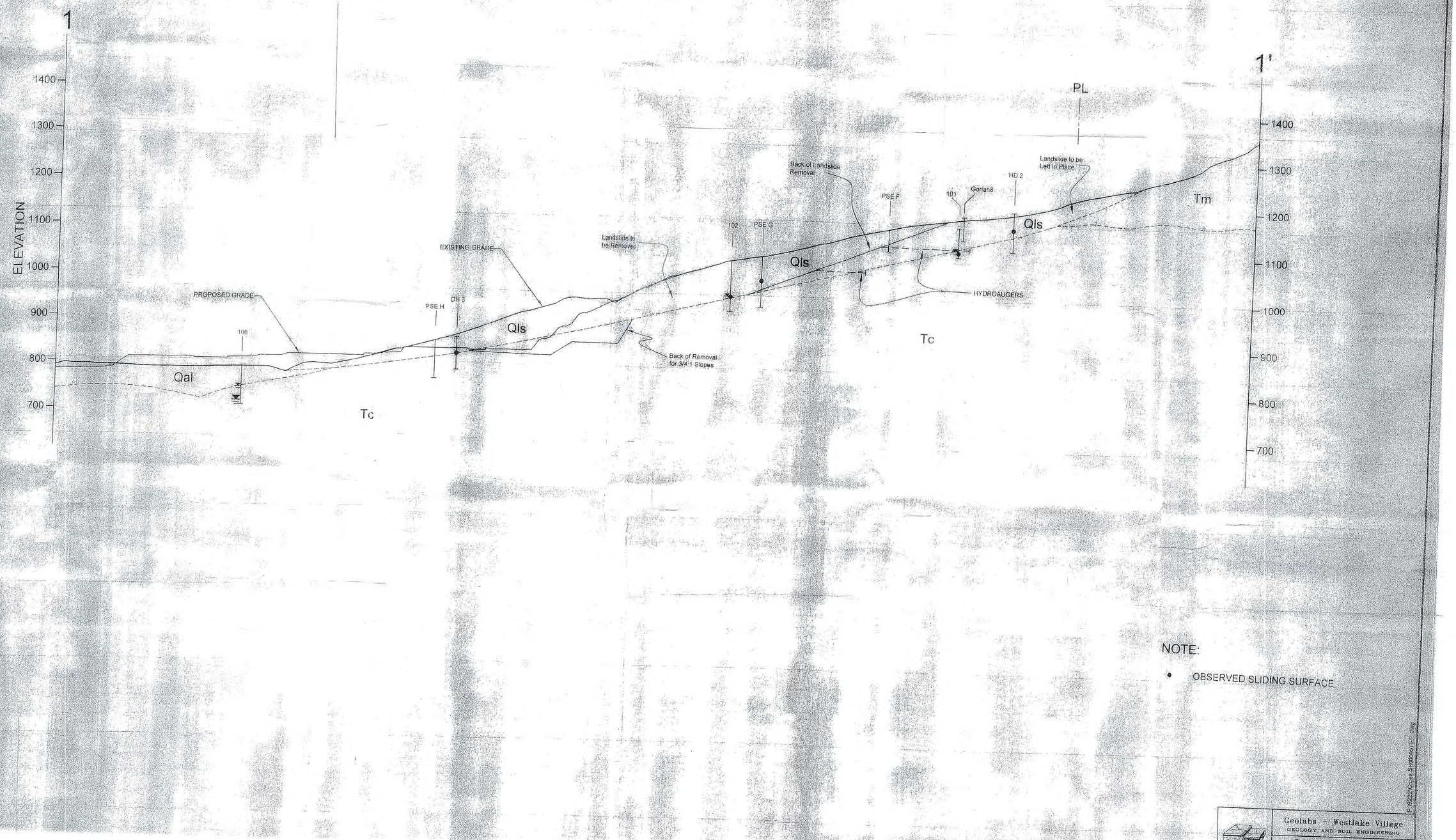
PREPARED BY:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-8496 FAX
San Luis Obispo, CA
(805) 596-0016 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7356 (310) 456-9085
E-mail: rjr@rjreng.com

REMEDIAL REMOVAL EARTHWORK MAP

CANYON OAKS

THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

APPENDIX H

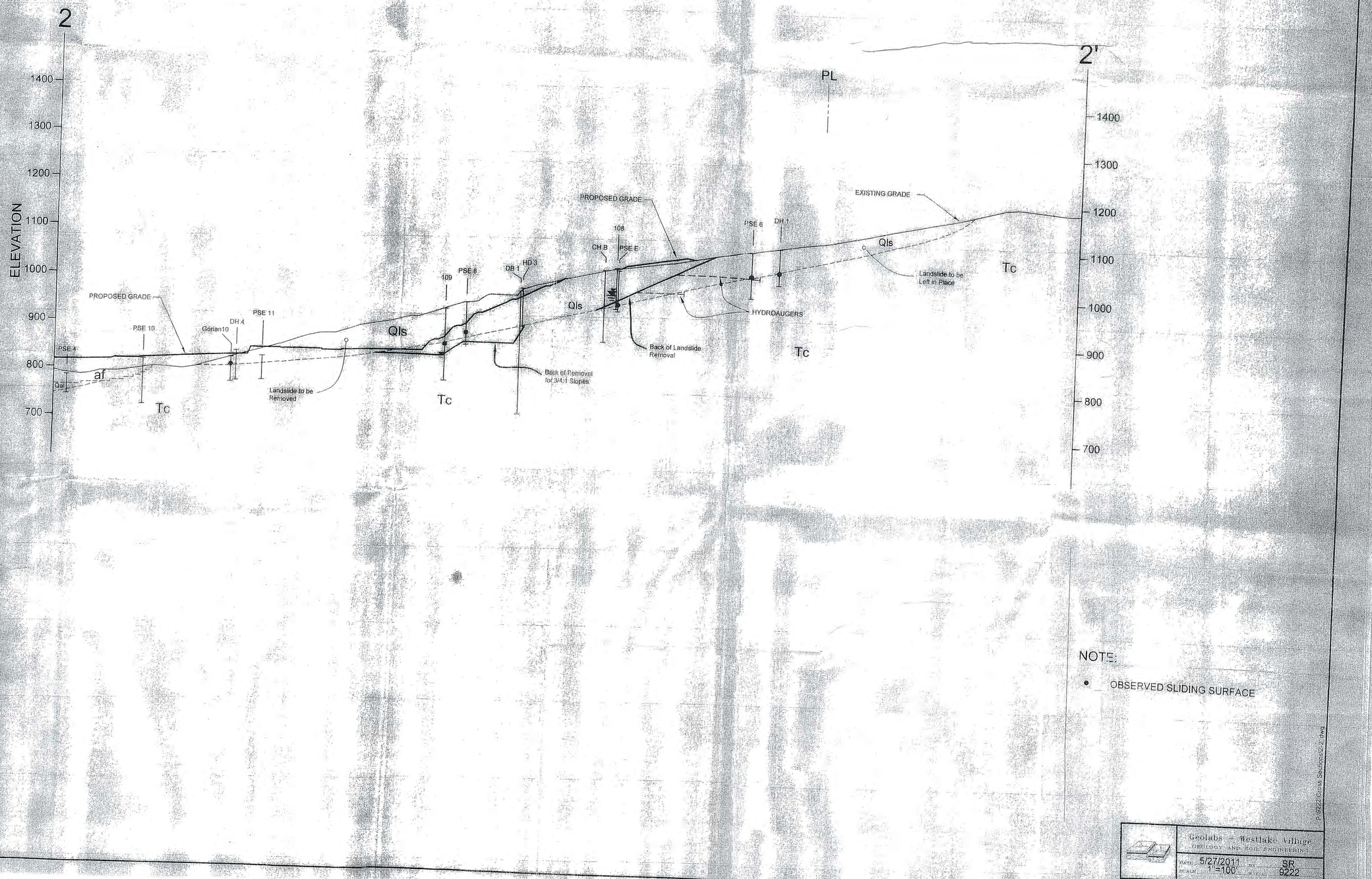


NOTE:

- OBSERVED SLIDING SURFACE

P-1022/Cross Sections1-1.dwg

Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING
DATE 5/27/2011 BY TC



NOTE:

- OBSERVED SLIDING SURFACE

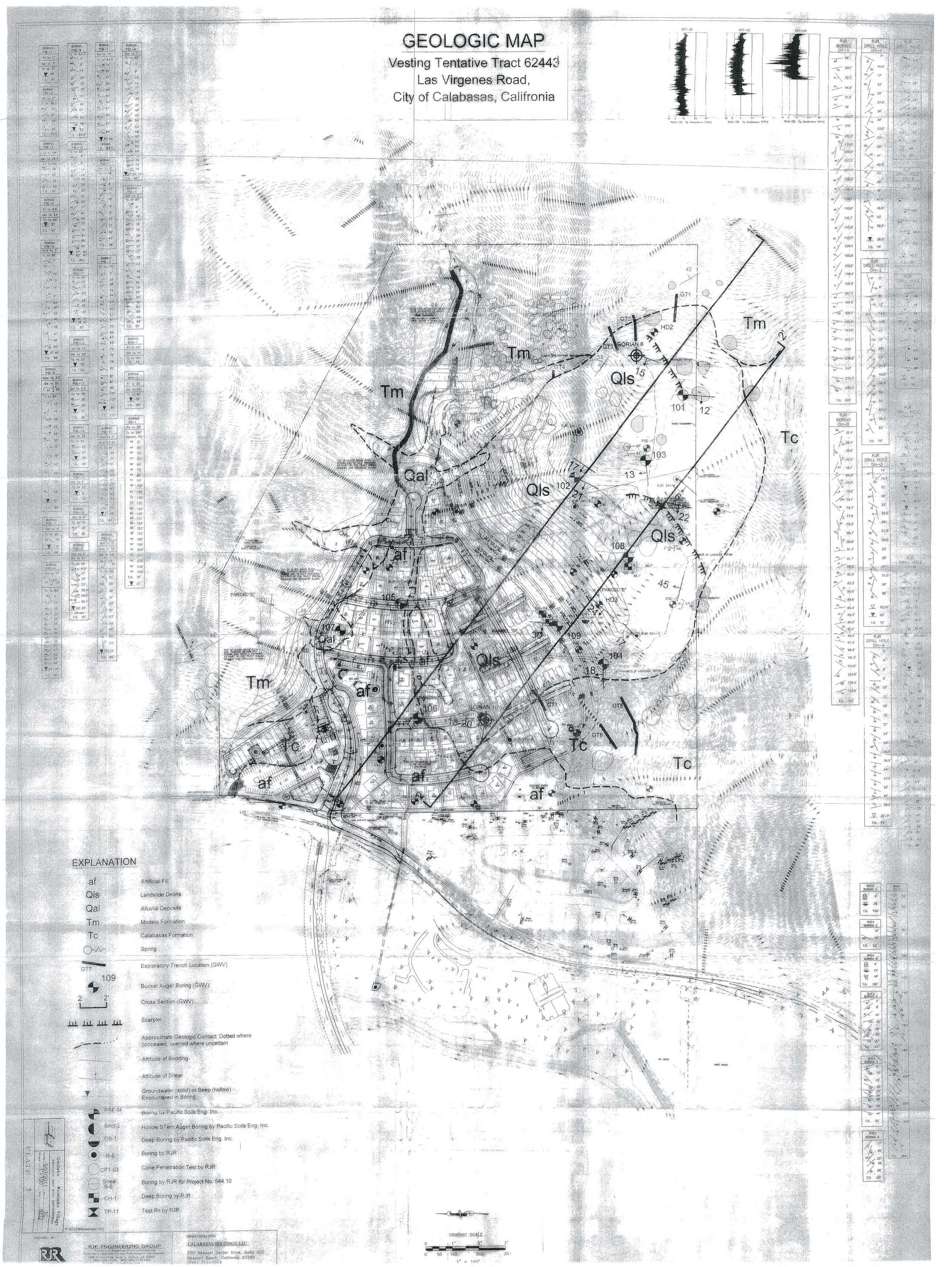
P:\9222\Cross Sections\2.dwg

Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE 5/27/2011 BY SR
SCALE 1"=100' JOB NO. 9222

GEOLOGIC MAP

Vesting Tentative Tract 62443
Las Virgenes Road,
City of Calabasas, Califronia



EXPLANATION

af	Artificial Fill
Qls	Landslide Debris
Qal	Alluvial Deposits
Tm	Modelo Formation
Tc	Calabasas Formation
	Spring
GT7	Exploratory Trench Location (GWV)
109	Bucket Auger Boring (GWV)
2 2'	Cross Section (GWV)
	Scarplet
	Approximate Geologic Contact: Dotted where concealed, queried where uncertain
	Attitude of Bedding
	Attitude of Shear
	Groundwater (solid) or Seep (hollow) Encountered in Boring
PSE-M	Boring by Pacific Soils Eng. Inc.
BHS-2	Hollow STem Auger Boring by Pacific Soils Eng. Inc.
DB-1	Deep Boring by Pacific Soils Eng. Inc.
B-6	Boring by RJR
CPT-03	Cone Penetration Test by RJR
Shea B-6	Boring by RJR for Project No. 544.10
CH-1	Deep Boring by RJR
TP-11	Test Pit by RJR

GRAPHIC SCALE
0 50 100 200 300
1" = 100'

PLATE 1

Geolabs - Westlake Village
GEOLOGY AND SOIL ENGINEERING
DATE 5/27/2011 BY TC
SCALE 1"=100' W.O. 9222
P:\9222\Messenger.dwg

PREPARED BY:
RJR ENGINEERING GROUP
Planning, Civil Engineering, Water Resource Engineering
Geotechnical, Engineering Geology, Water Resource, Environmental
1956 Point Drive, Suite G, Ventura, CA 93003
(805) 650-0125 (805) 650-0123 FAX

OWNER/DEVELOPER:
CALABASAS HOLDINGS, LLC
250 Newport Center Drive, Suite 200
Newport Beach, California 92260
(949) 721-0013

GEOLABS-WESTLAKE VILLAGE
Foundation and Soils Engineering, Geology
31119 Via Colinas, Suite 502 • Westlake Village, CA 91362
Voice: (818) 889-2562 (805) 495-2197
Fax: (818) 889-2995 (805) 379-2603
a dba of
R & R Services
Corporation

May 27, 2011
W. O. 9222

Messenger Calabasas, LLC
c/o Arnel Development Company
949 South Coast Drive, Suite 600
Costa Mesa, California 92626

Attention: Mr. David L. Ball

Subject: Supplemental Landslide Evaluation,
Tentative Tract 62443,
City of Calabasas, California

Mr. Ball:

In accordance with your request we have prepared this report regarding the landslide present within the southern slope of the subject property. More specifically, we take this opportunity to (1) provide a brief background for the recent work, (2) summarize the additional studies that have been completed, (3) present our findings, and (4) offer a modified mitigation program. Representatives of Leighton Group, Inc. (LGI) and RJR Engineering Group (RJR) collaborated with representatives of Geolabs-Westlake Village (forming the "Project Team") throughout development and execution of this study. The scope of this study was focused upon the landslide; other geotechnical elements pertinent to site development were not studied. This report establishes feasibility of the landslide mitigation; design-level (i.e. 40-scale grading/improvement plan development and processing) verification and/or detailing of the mitigation, including removal extent, temporary stability, subsurface water control, etc., should be based on the final planned grading configuration. Readers interested in the status of other elements are directed to the referenced reports by RJR.

BACKGROUND

The occurrence of a landslide complex on the southern portion of the subject property has long been debated, both as to its existence and areal extent, as well as the mechanism of sliding. Numerous investigators have examined the site and its environs since about 1980. Some of these studies were performed on a regional basis, such as those by F.H. Weber, Jr. (1984), T.W. Dibblee, Jr. and H.E. Ehrenspeck (1992), and McCrink, Irvine, et al (2001). Those workers primarily utilized geomorphic evidence and geologic mapping.

Other studies have been more site specific, such as those by Envicom Corp. (1980), Gorian and Associates, Inc. (1980), West Coast Soils (1989-1992), Pacific Soils Engineering (1993-1995), and RJR Engineering Group (1995-2009). The latter group supplemented surficial geologic mapping with various subsurface investigative techniques, laboratory testing, and geotechnical analysis to characterize the impact of the landslide hazard upon various land development scenarios. RJR Engineering produced the most comprehensive study to date. Their work provided the basis for approval of the current Tentative Tract map.

Review of the previous reports made it clear that RJR (as well as some of the other consultants) had encountered difficult drilling and coring conditions that led to ambiguities in characterizing the landslide configuration. That, in turn, resulted in a conservative interpretation of the depth of sliding. It also appeared that unresolved issues remained as to the areal extent of the landslide. An exploratory program was developed with the express purpose of developing a consensus among members of the Project Team regarding resolution of the aforementioned ambiguities and unresolved issues.

PROPOSED PROJECT

The base map to our Geologic Map (attached as Plate 1) was prepared by RJR and illustrates the current project concept. The project will consist of a mixed-use residential and

commercial development composed of single family residential lots, townhouse units, and a commercial site. Principal access will be from Las Virgenes Road while several curvilinear streets will provide access within the development.

The project will be constructed by conventional earthwork consisting of filling the main east-west trending canyon. Potential hazards represented by the landslide are to be mitigated through on-site grading that will include removal of significant portions of the landslide. Replacement of the removed landslide will establish a vertically and horizontally undulating slope across the northerly-facing slope which ascends from the south side of the development area that lies within the main canyon. Some of the grade changes will be accommodated by retaining walls. The maximum depth of cut will be on the order of 100', and the main fill will be up to about 25' deep. The attached Cross Sections 1-1' and 2-2' illustrate the typical proposed grading.

SCOPE OF INVESTIGATION

Our study consisted of the following:

- A review of pertinent and available, published and unpublished reports by various agencies and consultants. Appendix R provides a list of those references.
- Resolution of the issue of the landslide's areal extent by identification of graben and side-margin features using excavator-cut-trenches. We excavated and logged seven exploratory trenches for the purpose of locating the margins of the slide complex (see Plate 1). The trenches were logged at a scale of either 1"=10'or 1"=20', and were backfilled and wheel-rolled after logging. All Project Team members were given access to the trenches for independent logging. The attached graphic logs (Appendix A) represent the consensus of the Project Team members.

- Resolution of ambiguities regarding the landslide's depth by drilling through the landslide and developing criteria for distinguishing between landslide-affected and in-place materials. We excavated and logged nine, 24"-diameter bucket auger borings at locations selected by a consensus of the Project Team (see Plate 1). The selection of boring locations was facilitated by tabulating the previous borings and identifying ambiguities. The borings ranged from 65' to 152' deep and were backfilled and tamped after logging. Each of the borings was entered by our geologist for detailed downhole logging. Other members of the Project Team also carried out downhole logging as safety permitted (boring 108 was not logged by other Project Team members due to water). Logs of the borings are presented herein as Plates B101.1 – B109.3 in Appendix A. After backfilling, the boring sites were restored so as to approximate the natural contours, as requested by the City of Calabasas.
- Laboratory testing of selected samples to determine their mechanical properties. Both LGI and RJR also conducted pertinent testing. The majority of the laboratory testing involved determining shearing strengths of slide plane and/or shear zone material. The laboratory testing is more thoroughly discussed in following sections and the results are presented in Appendix B.
- Geotechnical analysis of the assembled data and preparation of this report.

FINDINGS

Calabasas Formation Lithology and Structure

Previous consultants on the project have attempted to interpret the structure of the Calabasas Formation, and then relate it to the failure mechanism of the landslide complex. In the case of RJR's latest report, this type of analysis led to their interpretation of a deep-seated, relatively narrow slide mass.

After the additional field work and analysis for this investigation, the Project Team could find no correlation between internal geologic structure within the Calabasas Formation and the depth of sliding. For the most part, the Calabasas Formation here, consists of thickly to thinly interbedded claystone, clayey siltstone, and sandstone that, during deposition, was apparently subjected to soft-sediment deformation through submarine slumping and sliding. It is likely that these deformed units occur in nested "packets" with relict sliding surfaces between them. After lithification, ensuing Late Cenozoic regional tectonic processes created secondary folding and shearing of these already deformed sediment packets.

The zones of fracturing and multidirectional shearing observed in the borings and trenches allow efficient pathways for rainfall and oxygen to penetrate the bedrock, weakening it as it weathers relatively quickly and deeply. The lack of coherent structure produces a sort of general homogeneity to the formation.

Areal Extent of Landsliding

Defining the margins of the landslide was accomplished by excavating a series of observation trenches at locations selected after reviewing aerial photographs and the references listed in Plate R. The trenches were observed by the Project Team members, and logged by our staff geologist. Well-defined graben features and/or slide margins were observed in trenches GT1-GT4 and GT7. Trenches GT5 and GT6 exposed continuously bedded, albeit profoundly contorted, Calabasas Formation bedrock with no evidence of landsliding. Graphic logs of these trenches are included in Appendix A.

The resulting boundaries appear to be a good fit with the local geomorphology, particularly in the vicinity of the head of the landslide complex, where the terrain appears to be low-lying and hummocky (see Plate 1).

Slide Debris Characterization

Differentiating the landslide debris from the in-place bedrock was accomplished at the near-surface with the trenching procedure discussed above. That exercise involved trenching across the highly disturbed, colluvial-filled graben or slide margin zones that differed markedly from both the in-place bedrock and the bedrock component of the landslide.

In the borings within the body of the landslide, differentiating the landslide debris from the in-place bedrock centered on locating the base of the slide by finding the actual sliding surface (the slide plane). Where no discrete slide plane could be identified, a shallow-dipping zone of intensely sheared bedrock was found. In borings where a discrete slide plane could be identified (Borings 101-104, and 109), the sliding surface occurred in soft, sheared, plastic to silty clay layers that were commonly unconformable with adjacent bedding and ranged from 1/8" to four inches thick. In some instances we were able to selectively obtain samples of sliding surfaces and return both bulk and relatively intact blocks to laboratory for subsequent testing.

In general, besides the presence of the sliding surface, the landslide debris could be differentiated from the intact bedrock by the abundance of gypsum in fractures and along bedding planes in the landslide debris, and the greater degree of fracturing in the landslide debris. In some cases there was more prolific groundwater seepage and attendant caving in the slide debris. In boring 109 the slide plane also was the demarcation between oxidized Calabasas Formation and unoxidized Calabasas Formation.

Our Cross Sections 1-1' and 2-2' (Plates 2.1 and 2.2) illustrate the relationship between the various geologic units on the parcel, including the landslide configuration.

Groundwater Occurrence

Water was encountered in a number of the exploratory borings that have been excavated within the landslide. It commonly appears in discrete zones within a boring, being absent in

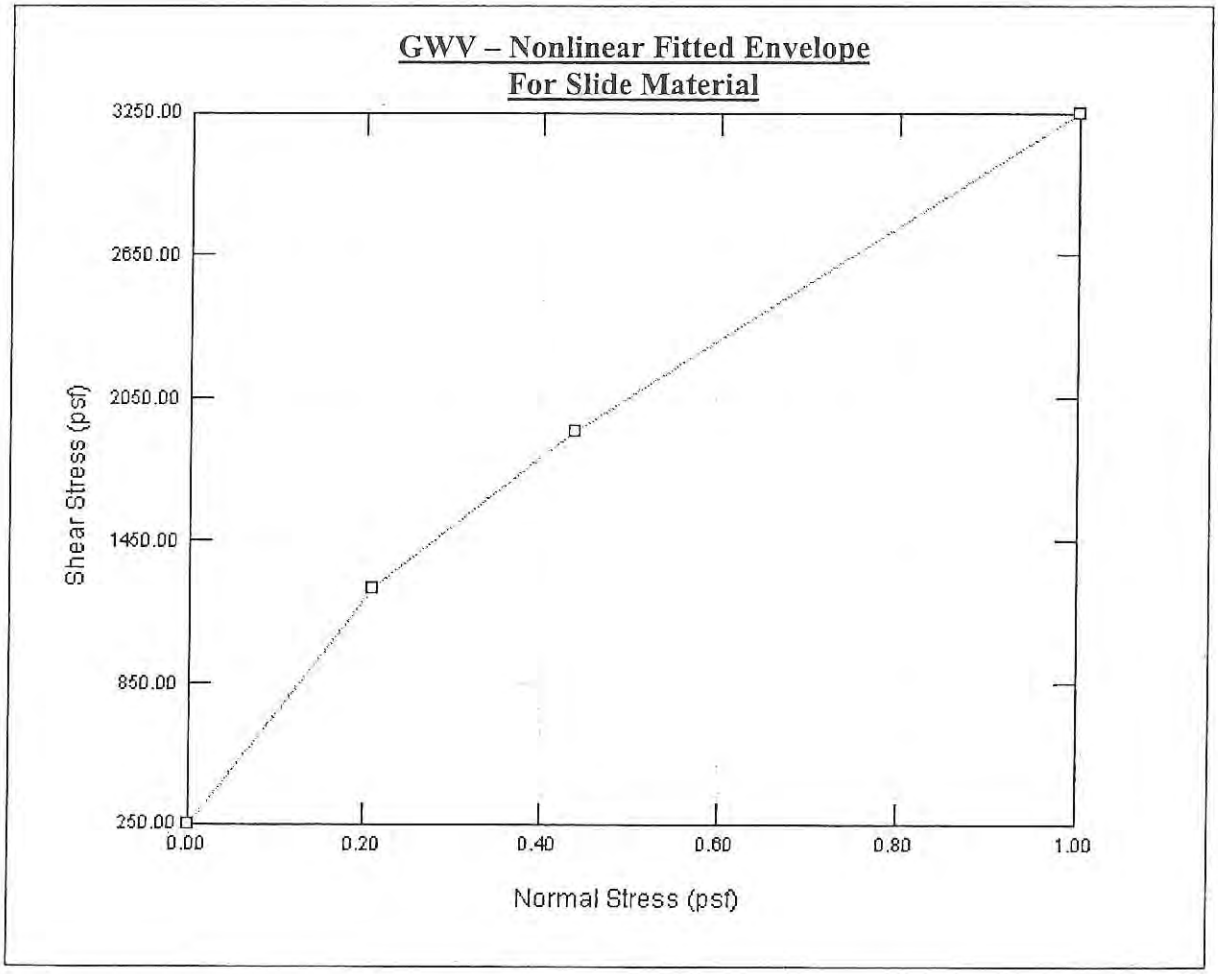
nearby borings excavated at essentially the same time. Seepage within these zones varies from light to very heavy, the latter commonly associated with moderate to severe caving from the seepage zone. The same type of occurrence has been found in other nearby projects within this bedrock formation. Experience indicates the water is present in physically separate zones of fracturing, thereby limiting its impact on slope stability.

Earth Material Strengths

The strength parameters for most of the earth materials included in the slope stability analyses followed from the previous work by RJR. The predominant material affecting the slope stability is the slide plane material. RJR had performed some ring-shear tests during the Tentative Map studies to evaluate the residual shear strength of the slide plane material. Shear strength testing on slide plane material was performed during this study by both GWV and LGI using multi-cycle direct shear tests. The main source of slide plane material was obtained from borings B101 at a depth of 53 feet and B109 at a depth of 50.3 feet. Laboratory Shear data is provided in Appendix B. Considering all the available strength information, a non-linear strength envelope was chosen to model the residual strength for the slide plane material. A graph of the non-linear strength envelope used in the slope stability analysis is presented below. The shape of the curve was developed accounting for our understanding of the nature of the materials along the slide plane as discussed in a previous section, where some material is a soft plastic clay, and other material is highly fractured stiff rock.

The artificial fill was modeled using laboratory data from this and previous studies. The estimated strength for artificial fill compacted to 90 percent relative compaction is derived from laboratory work performed by our office. The estimated strength for artificial fill compacted to 95 percent relative compaction is derived from testing performed by RJR Engineering, Inc. (RJR, 1/16/2009).

Soil Type	Total Unit Wt. (pcf)	Sat. Unit Wt. (pcf)	Cohesion (psf)	Phi (deg)	Strength Comments
Siltstone (Tc)	120	125	500	30	Ultimate
Landslide Material	120	125	500	30	Ultimate
Qal	120	125	100	30	Ultimate – GWV Entrada (nearby)
Slide Plane Material	120	125	1000	10	RJR
"	"	"	450	12	LGI
"	"	"	825	7	GWV – Entrada (nearby)
"	"	"	75	9	GWV - B101@53 (block)
"	"	"	275	16	GWV - B109@50.3
"	"	"			GWV – Nonlinear Fitted Envelope
Af	120	125	300	27	Ultimate – 90% Relative Compaction
"	120	125	400	35	Ultimate – 95% Relative Compaction



LANDSLIDE MITIGATION

Modifications to the landslide mitigation scheme that are considered herein pertain to the scope of work rather than type of work. Mass redistribution, landslide removal and replacement with engineered fill, and subsurface drainage were utilized by previous workers to mitigate potential landslide impacts. The same techniques are applied here.

We have taken this opportunity to consider one potential additional component of the mitigation program; one that bears upon temporary (in-grading) stability rather than the stability of the finished product. Temporary stability of the uppermost portion of the landslide will be influenced by the amount of water that is present at that time. Installation of a series of hydroaugers may facilitate construction.

Stability Analyses

Slope Stability analyses were performed using the Spencer's Method as coded in the computer program SLIDE v6.008 (Rocscience, 1998-2011). Spencer's Method is a limit-equilibrium method of analyses which satisfies both moment and force equilibrium. A search of postulated failure surfaces was performed in order to determine the critical failure surface. The results of the analyses are provided as a factor of safety. The factor of safety is defined as the quotient of available shear strength divided by the shear strength mobilized.

The minimum allowable factor of safety for the static permanent case is 1.5, and for the pseudostatic case it is 1.10, considering a pseudostatic coefficient of 0.15. For the temporary condition, the minimum allowable factor of safety is considered 1.25.

The slope was modeled using the geologic cross sections 1-1' and 2-2' that extends through the slope in the approximate direction of sliding. Nominal groundwater was incorporated into the analyses, to model the discontinuous nature of the groundwater. Analyses were performed to evaluate the long-term stability for both the static and seismic condition considering the grades proposed by RJR (Tentative Tract 62443 plans dated January 7, 2011). The existing slope condition does not meet the minimum allowable factors of safety, therefore, several iterations were performed to evaluate remedial grading consisting of removing slide and slide plane material to such an extent that, when replaced with engineered fill, allowable factors of safety will be accomplished.

The results of these analyses indicate that grading of the slide can increase the factors of safety to meet or exceed the minimum requirements.

SECTION	STATIC FS	SEISMIC FS	NOTES
1-1'	1.78	1.10	Non-linear strength used for slide plane. Ninety-five percent compaction for buttress fill.
	1.27		Temporary condition for removal. Top at 187' from PL with temp slope gradient of 2:1.
2-2'	1.78	1.10	Non-linear used for slide plane. Removal Toe at X=1476. Ninety-five percent compaction for buttress fill.
	1.26		Temporary Condition for Removal near X=1476. Top at 560 from end (10' within PL) and 2:1 Temporary Backcut.

Groundwater Control

Measures for long-term control of subsurface water within the landslide should be implemented. This is typically accomplished by installation of subsurface drains (typically 4" diameter perforated pipe set in 2 cubic feet of filter material or geosynthetic-wrapped rock per lineal foot) at 15 to 20 foot vertical intervals across the entire landslide removal area. Such drainage devices should be included in the project construction.

The upper-most portion of the landslide is to be left in place, as illustrated in the attached cross sections. One method of enhancing temporary (during construction) control of water within this portion of the landslide, coupled with some longer-term benefit, would be to use hydroaugers (typically 2" well screen with 0.020 inch slots). Two rows of hydroaugers, essentially breaking the backcut into three, roughly equal heights, with the hydroaugers placed at 40 to 50 foot horizontal intervals and extending at least 25 feet beyond the back of the landslide (see attached cross sections), would not only facilitate dewatering, but also enhance the degree of certainty that continuous pockets of water do not remain. Considering the isolated occurrence of water-bearing fractures, a number of the hydroaugers might not find water when they are installed. Intermediate hydroaugers should be placed (at approximately 20 foot horizontal intervals), in cases where horizontally adjacent hydroaugers encounter water-producing zones. The ends of the hydroaugers at the face of the backcut should be tied together and outlet to the finished slope face using solid pipe. Other measures, such as vertical monitoring and/or pumping wells, could be considered as an alternative to the hydroauger system.

CLOSURE

This geotechnical report has been prepared in accordance with generally accepted engineering practices at this time and location. No other warranties, either express or implied, are made as to the professional advice provided under the terms of our agreement and included in this report.

Thank you for this opportunity to be of service. Please do not hesitate to call if you have any questions regarding this report.

Respectfully submitted,
GEOLABS-WESTLAKE VILLAGE

Charles A. Swift
E.G. 948

Ronald Z. Shmerling
C.E.G. 1047
R.C.E. 35444

Lawrence K. Stark
G.E. 2772.

Enclosures: Geologic Map ..... Plate 1
Geologic Cross Sections 1-1' and 2-2' ..... Plates 2.1 and 2.2
Field Investigation Data ..... Appendix A
Laboratory Data ..... Appendix B
Slope Stability Output ..... Appendix C
References ..... Plate R

Appendix A

Field Investigation Data

Supplemental Landslide Evaluation,
Tentative Tract 62443,
City of Calabasas, California

SUBSURFACE DATA

LOG OF BORING B101

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1150'	DATE: 8/17/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Colluvium: Very dark gray brown (10YR 3/2) silty CLAY (CL), moist, fine to medium Tm clast float, minor voids to 1/16', minor roots/rootlets.	
5						@5' - Landslide Debris: Mix of yellow brown (10YR 4/3) sandy SILT (ML) and brown (10YR 4/3) silty CLAY (CL), moist, scattered angular Tm clasts to 3" dia. @7.3' - More rock-like (Tm) in a clayey matrix.	
10						10' - Landslide Debris: (Modelo Formation) Light gray brown (10YR 6/2) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, very closely spaced tight fractures, abundant iron and manganese oxidation staining.	@10.5' B N78E/52SE
15						@18' - More angular Tm fragments in a clayey matrix.	
20						@19' - Base of concretionary 12" SILTSTONE, over gray (10YR 5/1) and brown (10YR 5/3) SILTSTONE.	@19' B N30E/58SE
25						@24.3' - Laminated to thinly bedded, with scattered bentonite nodules. @26' - Tm fragments in clayey matrix.	
30						@33.1' - 1/6"-3/4" clay shear surface, soft plastic, discontinuous.	@33.3' B N57E/33SE
35						@33.3' - Discontinuous interbedded SANDSTONE. @34.6' - 12" thick discontinuous concretionary SILTSTONE on east side. @36.2' - Concretionary SILTSTONE.	@36.2' Fr N52W/±90
40						@38' - Soft, moist clay/silt.	
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B101.1

SUBSURFACE DATA

LOG OF BORING B101

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1150'	DATE: 8/17/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
45						@45' - Soft clayey incoherent Tm. 45.6' - Landslide Debris (Calabasas Formation): Gray (10YR 5/1), brown yellow (10YR 6/8)and brown (10YR 5/3) interbedded CLAYSTONE, SILTSTONE, andSANDSTONE, moist. @48.7' - Minor seeps on northeast side.	@45.6' Shear N22W/16SW
50						@50.3' - Gray plastic sheared CLAY, moderate seeps above and shear surface below. @53.5' - Brown plastic sheared CLAY.	@50.3' - Shear N7E/12NW
55						53.5' - Calabasas Formation: Dark gray (10YR 4/1) interbedded CLAYSTONE, SILTSTONE and SANDSTONE, laminated to thinly bedded, moist, scattered yellow brown sandstone at top of unit. @55.2' - Predominately SANDSTONE.	@53.5' Shear N62W/41SW @55.2' B N71W/41SW
60							
65						Total Depth - 65' No groundwater, seeps from 48.7' - 53.5' No caving	
70							
75							
80							
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B102

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1055'	DATE: 8/18/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Landslide Debris - (Modelo Formation): Very pale brown (10YR 7/4) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, thinly bedded, moderate iron oxidationstaining root hairs, closely spaced fractures and calcium carbonate staining.	
5						@5.5' - 6" SANDSTONE bed. @6' - Minor silt cross bedding.	@5.5' B N32E/14NW
10						@12.8' - Cross cutting SILTSTONE bed with NE dip	
15						@15.5' - 8" thick SANDSTONE bed.	@15.6' B N11E/17NW
20							
25						@25.1' - 1.2' thick moderately oxidized SANDSTONE bed, minor calcium carbonate in clay bed above, abundant iron oxidation staining in lower 6". @26.8' - Landslide Debris - (Calabasas Formation): Gray (10YR 6/1), G34 brown G34 (10YR 5/8), and yellow brown (10YR 5/4) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, laminated to thinly planar bedding.	@25.1' B N16E/23NW @27.6' B N23E/22NW
30						@27.6' - 1" gray SILTSTONE bed.	@32.7' B N32E/27NW
35						@32.7' - 1/8" thick soft plastic gray clay. @34.6' - Minor fault. @37.6' - Tightly folded discontinuous bedding, scattered gypsum crystals.	@34.6' Fault N32E/42NW
40						@42.5' - Randomly oriented tectonically sheared bedding.	@42.5' B N10E/31NW
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B102.1

SUBSURFACE DATA

LOG OF BORING B102

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1055'	DATE: 8/18/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
45							
						@46' - Scattered calcium carbonate nodules on east side.	
						@47.5' - Shear surface, brown soft plastic clay.	@47.5' Shear N32E/56NW
						@49.2' - Top of planar 2" thick sand bed.	@49.2' B N20E/54NW
50						@49.4' - Shear surface, 1/4"-1/2" thick soft plastic brown clay, tightly folded bedding below.	@49.4' Shear N20E/54NW
						@51' - Becoming more planar.	
						@54.5' - Scattered gypsum crystals.	
55							
						@56.3' - Tightly folded laminated to thinly planar bedding, gypsum along bedding.	@57.6' B N56W/44NE
						@57.6' - 1/8" thick sand bed, scattered vertical fractures, gypsum lining.	@58.8' B N34E/66NW
60							
						@62' - Gray (10YR 5/1) CLAYSTONE and SILTSTONE beds with scattered yellow brown (10YR 5/8) SANDSTONE beds.	
65							
						@71' - Gray (10YR 5/1) clay, silt, and sand beds.	
70							
						@74.2' - Soft plastic gray clay, sheared	
						@74.4' - Gray SANDSTONE bed.	
						@75.4' - Minor seeps in 12" thick SANDSTONE bed.	
						@75.7' - Free water on shear surfaces.	@74.2' Shear N40E/31NW
75						@76.3' - 2" soft plastic gray clay, sheared, wet, very closely spaced fractures.	@74.4' B N40E/31NW
						@77.2' - 4" soft plastic gray clay, sheared with very closely spaced fractures.	@75.7' - Shear N30E/21NW
						77.5' - Calabasas Formation: Gray 910YR 5/1 to 6/1) interbedded	@76.3' Shear N62E/72NW
80						CLAYSTONE, SILTSTONE, and SANDSTONE, moist to wet, abundant sheared (tectonic) CLAYSTONE and SILTSTONE, scattered seep intervals, laminated to thinly bedded, predominantly steeply dipping.	@77.2' Shear N40E/30NW
						@78.8' - 12" - Concretionary SILTSTONE bed on north side with adjacent sheared CLAYSTONE and SILTSTONE beds, tightly folded and discontinuous beds below.	
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B102.2

SUBSURFACE DATA

LOG OF BORING B102

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1055'	DATE: 8/18/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
80						@79' - Scattered seeps in SANDSTONE with underlying CLAYSTONE or SILTSTONE beds. @80' - Steeply dipping sheared beds.	
85							
90							
						@92' - Soft plastic clay at base of 5" SANDSTONE with seeps. @93' - Predominantly SANDSTONE with scattered cl. SILTSTONE beds.	@92' Shear N76W/42SW
95							
100							
105							
110						Total Depth - 110' No groundwater, scattered seeps below 75.4' No caving	
115							
120							
125							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA LOG OF BORING B103

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1085'	DATE: 8/20/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Colluvium: Dark gray brown (10YR 4/2) silty CLAY (CL), dry.	
						@3.3' - Landslide Debris (Modelo Formation): Yellow brown (10YR 5/4) CLAYSTONE to SILTSTONE with scattered SANDSTONE beds, moist, moderate iron oxidation staining, minor calcium carbonate stringers.	
5						6.4' - Landslide Debris (Calabasas Formation): Light yellow brown (10YR 6/4) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, oxide staining, laminated to thinly bedded, moderate iron scattered concretionary beds, tightly folded and discontinuous.	
10						@7.8' - Scattered carbon and gypsum veins.	
15						@15.3' - 1"-6" thick SANDSTONE beds.	@15.3' B N72W/20SW
20						@20.1' - 12"-15" thick SANDSTONE bed.	@20.1' B N32E/13NW
						@21.3' - ±1" thick soft, plastic, brown clay, sheared.	@21.3' Shear N8E/13NW
						@24' - Numerous planar SANDSTONE beds.	@24.4' B N36W/26SW
25						@24.4' - 1"-4" thick SANDSTONE bed.	
						@27.6' - Tightly folded with SANDSTONE fragments.	
						@28.5' - 1.5' thick concretionary, fine to coarse SANDSTONE.	
30						@30' - Gray (10YR 5/1) and brown (10YR 5/3) CLAYSTONE, SANDSTONE, and SILTSTONE.	
						@32.3' - Planar bedding.	
35							
						@39.1' - 2" thick light gray SANDSTONE bed.	@39.1' B N20W/26SW
40						@41' - 8" thick concretionary SANDSTONE bed on eastside.	
						@41.6' - Planar bedding.	
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B103

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1085'	DATE: 8/20/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@43.6' - 1/8"-1/4" thick soft, plastic, sheared brown CLAY, scattered gypsum crystals.	@43.6' Shear N21W/23SW
45						@45.2' - Slightly belled section of laminated clay, silt, and sand with very closely spaced fracrures with gypsum infilling, bedding plane gypsum.	
50						@50.2' - Soft plastic undulating gray CLAY, abundant gypsum above, 8" thick SANDSTONE thin laminations with gypsum below.	@50.2' Shear N60E/14NW
						@52.6' - Moderate gypsum crystals.	
55						@55' - 15" thick SANDSTONE block on east.	
						@56.6' - 10" thick SANDSTONE bed.	@56.6' B N13W/24SW
						@58.1' - 1/8" thick soft, plastic, sheared gray brown CLAY in a 3-4" thick CLAYSTONE bed, gypsum absent below.	@58.1' Shear N4W/23SW
60						@59' - Abundant iron oxidation staining.	
						@64' - Soft, plastic, sheared brown CLAY above concretionary bed.	@64' Shear N87W/35NW
65							
70							
75							
						@76.8' - Sheared zone of very thinly laminated clay and silt beds predominantly gray.	@76.8' Shear N82E/13NW
						@76.8' - Calabasas Formation: Gray (10YR 5/1) interbedded CLAYSTONE and SILTSTONE with scattered yellow brown (10YR 5/4) SANDSTONE, moist, laminated to thinly bedded.	
80						@81.4' - 1" thick light gray (10YR 6/1) SANDSTONE bed.	@81.4' B N33W/18SW
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B103

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1085'	DATE: 8/20/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
80							
						@82.8' - 6" thick yellow brown (10YR 5/4) SANDSTONE bed.	
						@83.7' - 2" thick yellow (10YR 5/4) SANDSTONE bed.	
85							
90						Total Depth - 90'	
						No groundwater	
						No caving	
95							
100							
105							
110							
115							
120							
125							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B104

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 940'	DATE: 8/24/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

N	U	B	M	DD	DESCRIPTION	ATTITUDES
					Colluvium: Very dark gray brown (10YR 3/2) silty CLAY (CL), dry, scattered Modelo fragments.	
					2.5' - Landslide Debris (Calabasas Formation): Dark gray brown (10YR 4/2) CLAYSTONE and SILTSTONE, and brown (10YR 5/3) SANDSTONE, moist, laminated to thinly bedded, scattered carbon flecks, scattered concretionary fragments.	
					@6' - Abundant calcium carbonate stringers and veins.	
					@8.7' - 1.3' thick sand block on east.	
					@11' - Calcium carbonate mostly absent.	
					@22' - 10" thick yellow brown SANDSTONE.	@22' B N34W/33SE
					@25.8' - 2.4' thick SANDSTONE bed with scattered CLAYSTONE beds, abundant iron oxidation staining at base.	
					@28.2' - Discontinuous concretionary bed with adjacent deformed CLAYSTONE and SILTSTONE with sand blocks.	
					@33' - Transitioning to more coherent looking Tc, laminated to thinly bedded, tightly folded.	@34.3' Shear E-W/34N
					@34.3' - 1/2" thick soft plastic gray brown clay, tightly folded below with steep dips to NW.	@35.4' Shear E-W/18N
					@35.4' - 1/4" thick soft plastic gray brown sheared CLAY.	@37.7' B N66W/62NE
					@37.7' - 1/8" thick sand bed truncating on shear surface below.	@37.8' Shear N50W/50NE
					@37.8' - Calabasas Formation : 1/8" thick soft plastic gray brown clay, over yellow brown (10YR 5/4) CLAYSTONE and SILTSTONE, very pale brown (10YR 7/3) SANDSTONE, moist, laminated to thinly bedded.	

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B104

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 940'	DATE: 8/24/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@44.2' - CLAYSTONE bed.	@44.2' B
45						@45.4' - Moderate gypsum along bedding with scattered gypsum veins.	N52W/62NE
						@48.5' - Predominantly gray with yellow brown SANDSTONE beds, minor gypsum crystals.	
50							
55							
60							
						@64.2' - 1/2" thick soft plastic gray clay in 10" thick soft plastic bed of	@64.2' Shear
65						silts and clays, steeply dipping to north with minor seeps (prob fault).	N82E/78NW
						@69' - Scattered minor seeps in SANDSTONE beds with underlying	
70						CLAYSTONE and SILTSTONE.	
75							
80						Total Depth - 80'	
						No groundwater, seeps starting at 64.2'	
						No caving	
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B104.2

SUBSURFACE DATA

LOG OF BORING B105

CLIENT: Messenger						PROJECT:	W.O.: 9222
LOCATION:						ELEVATION: 810'	DATE: 8/26/10
RIG TYPE: Bucket Auger						HAMMER WEIGHTS:	DROP:
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Artificial Fill: Brown (10YR 4/3) silty CLAY (CL), dry, abundant angular Modelo fragments, moderate roots to 1/16".	
5						7' - Alluvium/Debris Flow: Brown (10YR 4/3) silty CLAY (CL), moist, numerous voids to 1/32", calcium carbonate stringers and veins, minor to abundant angular fine gravel to small cobbles (Tm).	
10						@12.3' - Scattered carbon nodules on north side, minor angular Tm gravel, cobbles absent. @13' - Brown (10YR 4/3) to gray brown (0YR 5/2).	
15						@16' - Discontinuous sand layers.	
20							
25							
30						@29.5' - Faint sand stringers with general south dips. @30' - Transitioning to yellow brown (10YR 5/6). @31.2' - Faint stone line, below: sandy CLAY (CL) to clayey SAND (SC), gray brown (10YR 5/2) minor fine gravel, numerous voids.	@31.2' B N25E/16SE
35						@35' - Yellow brown (10YR 5/6) silty CLAY (CL) with abundant coarse sand to fine gravel, coarse sand appears to be well rounded, extremely weathered clasts.	
40						@39' - Semi concretionary, discontinuous silt interval. @39' - Calabasas Formation: Mottled brown (10YR 5/3) to dark yellow brown (10YR 4/4) CLAYSTONE, moist.	
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B105.2

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 810'	DATE: 8/26/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@44.4' - 4" thick concretionary bed.	@44.4' B
45						@45.5' - Concretionary bed with abundant seeps above and below.	N70E/4SE
						@47' - Yellow brown (10YR 5/8) SANDSTONE bed.	
50						@50.6' - 2" thick dark gray polished CLAYSTONE bed within	@50.6' B
						SANDSTONE, sandstone now yellow brown to gray.	N48W/44SW
						@51.2' - Similar CLAYSTONE bed to 50.6' bed.	
55							
60							
65							
						Total Depth - 67.5'	
						Groundwater at 65.5'	
						No caving	
70							
75							
80							
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B106

CLIENT: Messenger						PROJECT:	W.O.: 9222
LOCATION:						ELEVATION: 796'	DATE: 8/27/10
RIG TYPE: Bucket Auger						HAMMER WEIGHTS:	DROP:
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Artificial Fill: Brown (10YR 4/3) clayey SILT (ML), moist, scattered angular fine gravel.	
						@3' - Color change to dark gray brown (10YR 4/2).	
5						@5.7' - Gray brown (10YR 5/2), sandy CLAY (CL), moist, minor coarse sand to angular fine gravel, minor carbon.	
						@9.2' - Alluvium/Debris Flow: Sandy CLAY (CL), dark brown (10YR 4/3),	
10						moist, fine sand to angular fine gravel, minor calcium carbonate veins and stringers, minor carbon fragments.	
						@10.8' - Grades to a silty CLAY.	
						@14' - Grades to yellow brown (10YR 5/4).	
15						@15.7' - Increase in gravel content.	
20						@21.1' - 6"- Angular SANDSTONE block on north side.	
						@24.3' - 4" - Angular SANDSTONE block with minor carbon.	
25							
						@29.7' - 12" interval of sand and clay stringers.	
30						@30.7' - Calabasas Formation: Yellow brown (10YR 5/6) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, laminated to thinly bedded, moderate carbon flecks in claystone beds, moderate calcium carbonate.	@30.7' C N41W/38NE
						@30.7' - Contact cuts across bedding.	
35							
40						@40.7' - 1/2" thick brown yellow sandstone bed.	@40.7' B N33W/32SW
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B106.1

SUBSURFACE DATA

LOG OF BORING B106

CLIENT: Messenger						PROJECT:	W.O.: 9222
LOCATION:						ELEVATION: 796'	DATE: 8/27/10
RIG TYPE: Bucket Auger						HAMMER WEIGHTS:	DROP:
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@42.6' - Moderate seeps from SANDSTONE beds with underlying clay by SILTSTONE.	
45						@46.4' - 1/8" thick gray CLAYSTONE.	@46.4' B N33W/47SW
50							
55							
60							
65							
70							
75							
80						Downlogged to 50' Total Depth - 50' Groundwater at 71' Caving from 50'	
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B107

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 827'	DATE: 8/30/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Artificial Fill: Light gray brown (10YR 6/2) silty CLAY (CL), dry, abundant angular small to large gravel.	
						@2.8' - Mottled yellow brown and dark gray.	
5							
						@9.3' - Light gray silty sand seam.	
10						@11.2' - Modelo Formation: Strong brown (7.5YR 4/6) semi concretionary SANDSTONE, very closely spaced fractures.	
						@14.2' - Fractured CLAYSTONE with brown SILTSTONE.	
15							
20						@21.5' - CLAYSTONE beds more coherent/firmer.	
						@24.3' - Closed fracture with iron and manganese staining.	@24.3' Fr N41W/78NE
25							
						@27' - 4" thick laminated SILTSTONE interval with limonite staining along bedding.	@27' B N72E/35NW
						@27.6' - Closed fracture with limonite staining.	@27.6' Fr N30W/66NE
30							
35						@35.8' - 3' thick laminated CLAYSTONE bed with ¼" thick soft plastic clay bed, limonite staining, and angular silt fragments to ¼".	@35.8' Shear N56E/39NW
						@38.2' - 4"-6" thick bentonite bed.	@38.8' B E-W/32N
						@38.8' - Base of bentonite, tight strong brown SILTSTONE below.	
40						@42.3' - Undulating shear surface, mix of bentonite with siltstone fragments and possible glauconite.	@42.3' Shear N25W/±0NE
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B107

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 827'	DATE: 8/30/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@42.3' - Calabasas Formation: Gray (10YR 5/1) interbedded CLAYSTONE, SILTSTONE and SANDSTONE, laminated to thinly bedded.	
45						@44.2' - Sharp change from yellow brown to gray.	
						@48' - Very closely spaced fractures with seeps.	@48.8' B N32E/32NW
						@48.8' - Top of 10" SANDSTONE bed with seeps.	
50						@49.4' - Scattered seeps from sandstone beds with underlying cl. SILTSTONE beds.	@49.5' - Fr N29W/±90
						@49.5' - 1/16" thick soft plastic polished gray clay.	
						@53.6' - 1/4" thick hard gray CLAYSTONE.	@53.6' B N37E/28NW
55							
						@59.2' - Base of 2-3" SANDSTONE bed, tightly folded.	
60							
65							
						@69.3' - Top of CLAYSTONE lamination - seeps.	@69.3' B N30E/36NW
70						@71.8' - Closed, polished surface.	@71.8' Fr N53E/84NW
75							
80						Total Depth - 80'	
						Seeps from 48'	
						No caving	
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B108

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1038'	DATE: 8/31/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Colluvium: Dark gray brown (10YR 4/2) silty CLAY (CH), dry, abundant Tm float.	
						@3.9' - Landslide Debris (Modelo Formation): Gray brown (10YR 5/2) sandy SILT (ML), moist, moderate medium sand to angular small cobbles, minor roots and rootlets.	
5						@7.2' - More rock like, sandy brown thinly bedded SILTSTONE and SHALE moderate iron oxidation staining, minor limonite, very closely spaced fractures.	@8.5' Fr N14W/62NE
10						@8.5' - Closed fracture with iron oxidation staining.	
						@14' - Landslide Debris (Calabasas Formation): Pale brown (10YR 6/3) to gray (10YR 5/1) interbedded CLAYSTONE, SILTSTONE, and SANDSTONE, moist, laminated to thinly bedded, tightly folded, discontinuous in upper 3'.	
15						@17' - 3" thick laminated sandy SILTSTONE and SANDSTONE with limonite.	@17.3' B N43W/39NE
20							
25						@25.8' - Very pale brown SANDSTONE.	@25.8' B N14E/12SE
30						@32.7' - Minor gypsum along bedding and scattered crystals.	
35						@37.4' - 2" very pale brown SANDSTONE.	@37.4'B N-S/31W
40						@41.4' - Brown soft plastic polished 1/8" thick clay within 6" interval of laminated clay to very fine SANDSTONE with 3-4 sheared CLAYSTONE beds.	@41.4' Shear N84W/34SW
						@41.9' - 1/16" thick very pale brown SANDSTONE.	@41.9' B N70W/26SW
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B108

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 1038'	DATE: 8/31/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
45						@47' - Very pale brown to brown yellow SANDSTONE with scattered, discontinuous SILTSTONE laminations, moderate seeps.	
50						@53.5' - Start of caving zone in base of gray SANDSTONE with moderate seeps, caving to 30" diameter.	
55						@54' - Discontinuous concretionary SANDSTONE. @54.3' - Interlaminated to thinly bedded sheared up polished plastic soft sheared clay and silt with scattered SANDSTONE beds. <u>Surface Notes Below 55':</u>	
60							
65						@65' - Sheared CLAYSTONE and SILTSTONE	
70						@70' - 72' - Oxidized to unoxidized transition	
75						@76' - All unoxidized	
80						Total Depth - 84' Groundwater at 58.3' Caving from 63'	
85							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

Logged by: GB

Geolabs-Westlake Village

PLATE B108.2

SUBSURFACE DATA

LOG OF BORING B109

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 948'	DATE: 9/7/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
0						Colluvium: Very dark gray (10YR 3/1) silty CLAY (CH), minor Tm float, dry.	
						@3' - Landslide/Debris Flow: Brown (10YR 5/3) silty CLAY (CH), moist, minor roots to rootlets, scatterred Tm clasts.	
5						@7.2' - Transitions to sandy SILT (ML) or very fine silty SAND (SM), moderate angular fine gravel to scattered small cobbles.	
						@8.7' - Landslide Debris (Calabasas Formation); Light yellow brown (10YR 6/4) SANDSTONE and dark yellow brown (10YR 4/3) CLAYSTONE and SILTSTONE, moist, laminated to thinly bedded, abundant iron oxidation staining, scattered calcium carbonate veins and stringers, tightly folded and discontinuous bedding.	
10							
15						@17.1' - 8" thick SANDSTONE bed tightly folded	@17.1' B N8E/58NW
20						@21.7' - 3" thick sand bed. @22' - Discontinuous/fractured fine to medium concretionary SANDSTONE bed.	@21.7' B N-S/58E
25						@27.5' - 10" thick yellow brown SANDSTONE bed. Predominantly interbedded SANDSTONE	@27.5' - B N12W/58NE
30						@33.4' - Pale brown SILTSTONE bed. Predominantly interbedded CLAYSTONE and SILTSTONE.	@33.4' B N28W/50NE
35							
40						@40.7' - 2" thick SANDSTONE bed, still abundant iron oxidation staining. @40.8' - Closed fractures, polished surface.	@40.7' B N23W/50NE @40.8' Fr N57W/81SW
45							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B109

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 948'	DATE: 9/7/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
40							
						@44' - Mostly planar bedding with rip-up clasts at base of	
45						SANDSTONE beds, increase in gray CLAYSTONE and SILTSTONE	
						beds.	
						@47' - Scattered carbon chunks and flecks, increase in discontinuous	
						folded bedding.	
50							
						@54' - 12" zone of scattered gypsum crystals and along bedding.	
55							
						@56' - 2" thick SANDSTONE bed at base of folded bedding.	@56' B N17W/44NE
						@58' - Laminated to thinly bedded, mostly planar.	
60							
						@61' - 12" zone of scattered gypsum crystals and along bedding.	
						@62.7' - 12" thick SANDSTONE bed.	@62.7' B N16E/26NW
65							
70						@70.5' - Transitions from yellow brown to mostly gray CLAYSTONE,	
						SILTSTONE, and SANDSTONE beds, very tightly folded with minor	
						bedding gypsum and crystals.	
						@72.5' - Yellow brown to gray discontinuous concretionary bed,	
						scattered gypsum crystals along bedding.	
75						@75' - Near base of concretionary bed with minor gypsum along	@75' Shear N6E/30NW
						bedding, sharp oxidized/unoxidized contact	
						discontinuous soft, plastic brown sheared clay.	
						@75' - Calabasas Formation: Gray (10YR 5/1 to 6/1) interbedded	@78.8' B N15W/24NE
						CLAYSTONE, SILTSTONE and SANDSTONE, moist to wet, laminated	
80						to thinly bedded, moderate soft sediment deformation/discontinuous,	
						tightly folded.	
						@77.3' - 3" zone of scattered crystallized carbon and concretionary	@82.8' B N21W/27NE
						nodules.	
						@78.8' - 6" gray SANDSTONE bed, mostly planar bedding below.	
85						@82.8' - 2" gray SANDSTONE.	

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

LOG OF BORING B109

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 948'	DATE: 9/7/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

	N	U	B	M	DD	DESCRIPTION	ATTITUDES
80							
85						@86.5' - Bedding appears to steepen.	
						@89.7' - 1" very fine to fine gray SANDSTONE bed.	@89.7' B N27W/38NE
90						@93' - 10" very fine to medium gray SANDSTONE bed.	@93' B N40W/52NE
95						@97.5' - 8" fine to medium gray SANDSTONE bed.	@97.5' B N35E/45NW
						@98' - Minor carbon flecks in SANDSTONE bed.	
						@99' - 1/4" thick hard waxy dark gray CLAYSTONE, polished with striations minor seeps.	@99' Shear N32W/52NE (prob. fault)
100						@100' - Caving to 30" diameter.	
						@104' - Free water on bedding surface.	@104' B N18E/52NW
105						@105' - Abundant seeps from bedding and fracture surfaces and SANDSTONE beds.	
						@108' - Slightly cemented SANDSTONE.	
110						@111' - Interbedded CLAYSTONE, SILTSTONE, and SANDSTONE.	
115							
120							
125							

ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)

SUBSURFACE DATA

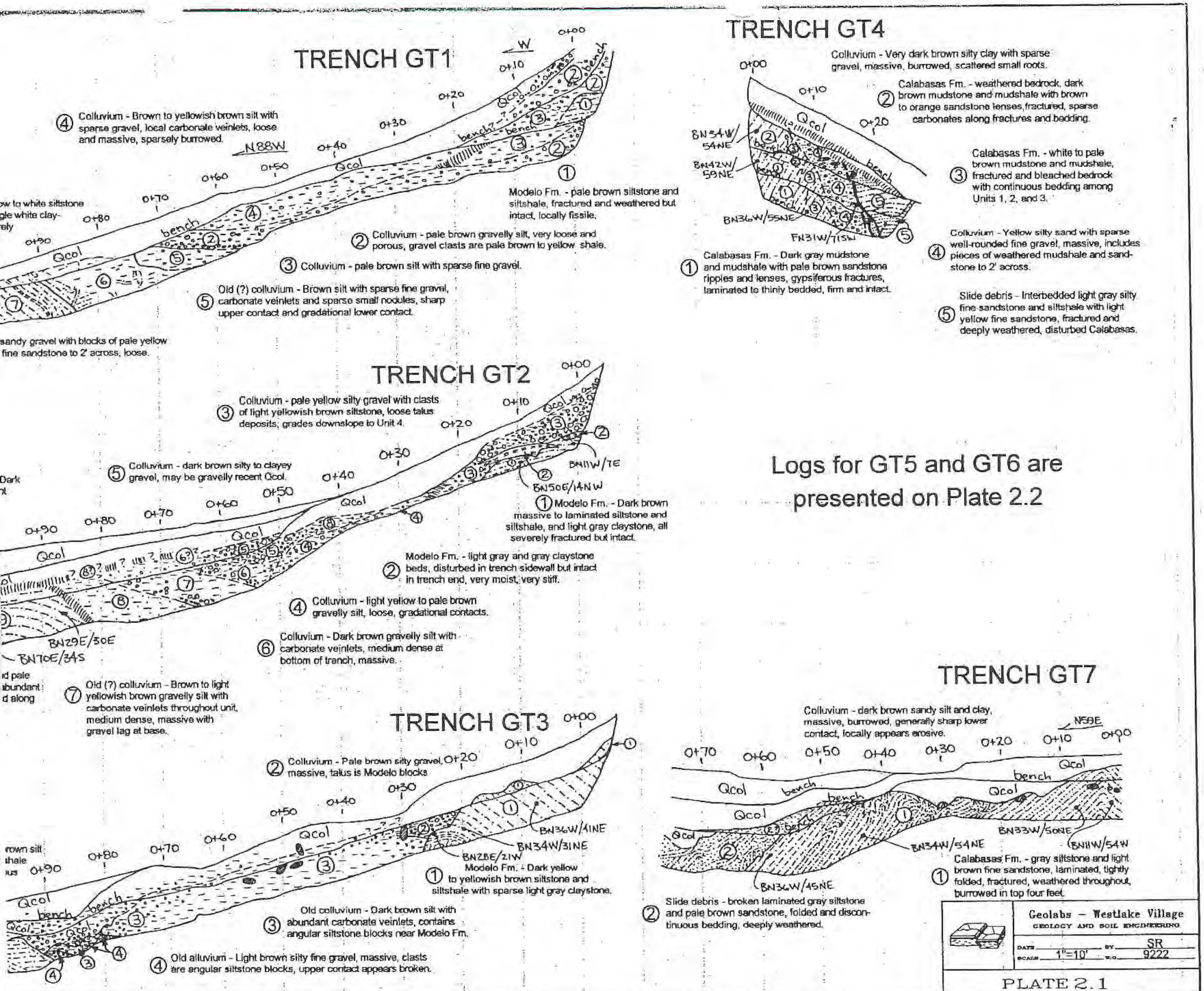
LOG OF BORING B109

CLIENT: Messenger	PROJECT:	W.O.: 9222
LOCATION:	ELEVATION: 948'	DATE: 9/7/10
RIG TYPE: Bucket Auger	HAMMER WEIGHTS:	DROP:

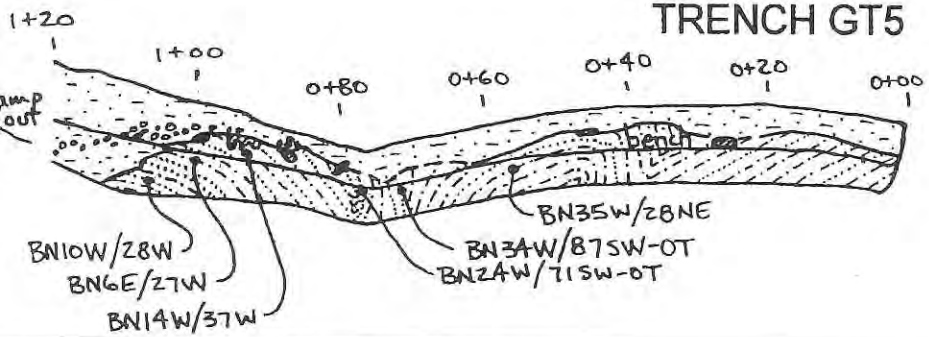
	N	U	B	M	DD	DESCRIPTION	ATTITUDES
120							
125							
130							
135							
140							
145							
150						Total Depth - 152' Seeps from 104' - 105' Caving to 138'	
155							
160							
165							

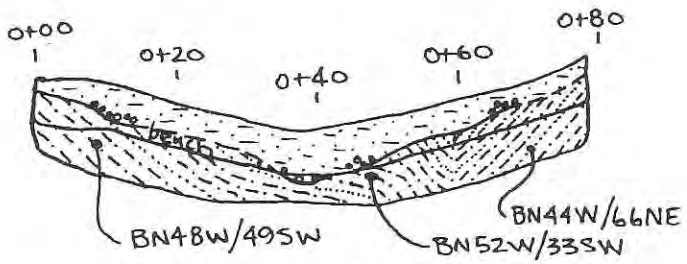
ADDITIONAL COMMENTS:

N = Field Blowcount
U = Undisturbed Sample
B = Disturbed Sample
X = Disturbed Bulk Sample
M = Moisture %
DD = Dry Density (pcf)


TRENCH GT1
Colluvium - Brown to yellowish brown silt with sparse gravel, local carbonate veinlets, loose and massive, sparsely burrowed.
Modelo Fm. - pale brown siltstone and siltshale, fractured and weathered but intact, locally fissile.
Colluvium - pale brown gravelly silt, very loose and porous, gravel clasts are pale brown to yellow shale.
Colluvium - pale brown silt with sparse fine gravel.
Old (?) colluvium - Brown silt with sparse fine gravel, carbonate veinlets and sparse small nodules, sharp upper contact and gradational lower contact.
sandy gravel with blocks of pale yellow fine sandstone to 2' across, loose.
N88W
TRENCH GT2
Colluvium - pale yellow silty gravel with clasts of light yellowish brown siltstone, loose talus deposits; grades downslope to Unit 4.
Colluvium - dark brown silty to clayey gravel, may be gravelly recent Qcol.
Modelo Fm. - Dark brown massive to laminated siltstone and siltshale, and light gray claystone, all severely fractured but intact.
Modelo Fm. - light gray and gray claystone beds, disturbed in trench sidewall but intact in trench end, very moist, very stiff.
Colluvium - light yellow to pale brown gravelly silt, loose, gradational contacts.
Colluvium - Dark brown gravelly silt with carbonate veinlets, medium dense at bottom of trench, massive.
Old (?) colluvium - Brown to light yellowish brown gravelly silt with carbonate veinlets throughout unit, medium dense, massive with gravel lag at base.
BN11W/7E
BN50E/14NW
BN29E/30E
BN70E/34S
TRENCH GT3
Colluvium - Pale brown silty gravel, massive, talus is Modelo blocks
Modelo Fm. - Dark yellow to yellowish brown siltstone and siltshale with sparse light gray claystone.
Old colluvium - Dark brown silt with abundant carbonate veinlets, contains angular siltstone blocks near Modelo Fm.
Old alluvium - Light brown silty fine gravel, massive, clasts are angular siltstone blocks, upper contact appears broken.
BN36W/41NE
BN34W/31NE
BN28E/21W
TRENCH GT4
Colluvium - Very dark brown silty clay with sparse gravel, massive, burrowed, scattered small roots.
Calabasas Fm. - weathered bedrock, dark brown mudstone and mudshale with brown to orange sandstone lenses, fractured, sparse carbonates along fractures and bedding.
Calabasas Fm. - white to pale brown mudstone and mudshale, fractured and bleached bedrock with continuous bedding among Units 1, 2, and 3.
Calabasas Fm. - Dark gray mudstone and mudshale with pale brown sandstone ripples and lenses, gypsiferous fractures, laminated to thinly bedded, firm and intact.
Colluvium - Yellow silty sand with sparse well-rounded fine gravel, massive, includes pieces of weathered mudshale and sandstone to 2' across.
Slide debris - Interbedded light gray silty fine sandstone and siltshale with light yellow fine sandstone, fractured and deeply weathered, disturbed Calabasas.
BN54W/54NE
BN42W/59NE
BN36W/55NE
FN31W/71SW
Logs for GT5 and GT6 are presented on Plate 2.2
TRENCH GT7
Colluvium - dark brown sandy silt and clay, massive, burrowed, generally sharp lower contact, locally appears erosive.
Calabasas Fm. - gray siltstone and light brown fine sandstone, laminated, tightly folded, fractured, weathered throughout, burrowed in top four feet.
Slide debris - broken laminated gray siltstone and pale brown sandstone, folded and discontinuous bedding, deeply weathered.
N59E
BN33W/50NE
BN11W/54W
BN34W/54NE
BN36W/45NE
Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING
SCALE 1"=10'
BY SR
W.O. 9222
PLATE 2.1

TRENCH GT5

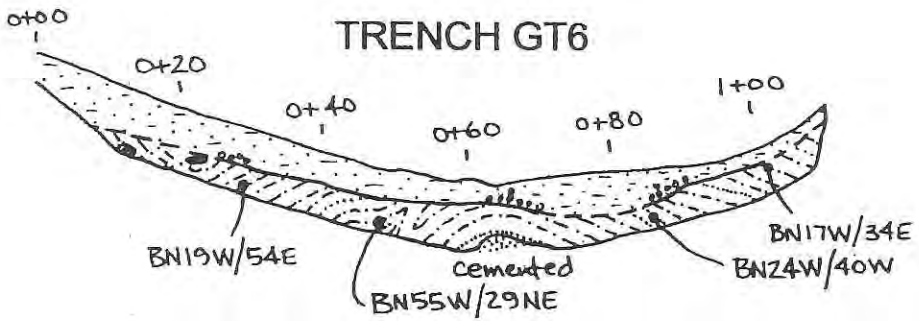




Calabasas Formation - interbedded pale brown to dark yellowish brown fine sandstone and gray laminated siltstone, locally tightly folded but intact.

Colluvium - very dark brown silt to clay with sparse gravel, generally massive but has local gravel lenses, sparse charcoal spots near base, sparse burrows.

TRENCH GT6



s Formation - interbedded pale to dark brown stone and dark gray laminated siltstone, pervasive stains along bedding and fractures, locally tightly t still intact.

Colluvium - very dark brown silt to clay with sparse gravel lenses at contact with underlying bedrock, sparsely burrowed.

Geolabs – Westlake Village
GEOLOGY AND SOIL ENGINEERING

DATE _____ BY SR
SCALE 1"=20' W.O. 9222

PLATE

Appendix B

Laboratory Data

Supplemental Landslide Evaluation,
Tentative Tract 62443,
City of Calabasas, California

LABORATORY TESTING

Undisturbed and bulk samples of rock materials encountered at the site were collected during the course of our fieldwork. Selected laboratory tests completed on the retrieved samples are described below. Testing performed during this investigation by other workers is presented at the end of this appendix.

Moisture-Density

The field moisture content and dry unit weight were determined for select undisturbed samples. Dry unit weight is expressed in pounds per cubic foot and the moisture content represents a percentage of the dry unit weight. This test data is presented in the attached Plate LS.1 and boring logs.

Compaction Tests

To determine the compaction characteristics of the onsite materials, compaction tests are performed in accordance with ASTM D 1557. The maximum dry density is reported on Plate LS.1 in pounds per cubic foot and the optimum moisture content as a percentage of the maximum dry density.

Shear Test

Shear tests were performed in a Direct Shear Machine of the strain control type. The rate of deformation is approximately 0.00225 inches per min for multicycle tests and 0.01 inches per minute for single cycle tests. Shearing occurred under a variety of confining loads in order to determine the Coulomb shear strength parameters. The test was performed on undisturbed and remolded samples in an artificially saturated condition. The test results are presented graphically in this appendix.

Shear tests were also performed by other workers during this project. Data made available to this office are presented at the end of this appendix.

Particle Size Analysis

The distribution of various particle sizes in selected representative samples were determined using both mechanical sieves and hydrometer tests. The percentage and distribution of particles larger than a #200 sieve (0.075 mm) are determined using mechanical processes. Particle distributions for fine-grained soils are determined using hydrometer methods. The particle distribution is presented as the relative percentages of

sand, silt and clay particles in each sample tested. The results are presented in this appendix.

Liquid Limit, Plastic Limit, and Plasticity Index

The Liquid Limit, Plasticity Limit, and Plasticity Index for selected cohesive soil samples were determined in the laboratory. The Standard Test Method (ASTM D4318) was utilized. These parameters are used in the classification of cohesive soils.

A cohesive plastic soil may go through four consistency states as the moisture content of the soil is increased. These states are the solid state, the semisolid state, the plastic state, and the liquid state. The limits between these consistency states are the Shrinkage limit, Plastic limit, and the Liquid Limit (respectively). These limits are often referred to as the Atterberg limits. The Plasticity Index is defined as the numeric value of the Liquid limit minus the numeric value of the Plastic limit (see Plate AL).

Laboratory Test Summary

W.O. 9222.002

Depth	Geology	Sample Description	ST	w	DD	S	Max	Opt	EI	LL	PI	e	n	WD	SD
Excavation: B 101 (TD= 65 ft, No GW)															
50	Landslide Debris	Tan sandy clayey silt	(B)				121	12		32	19				
50.3	Calabasas Fm. - shear plane	Gray clay	(B)							59	41				
53	Slide plane	Brown clay	(B)							62	40				
Excavation: B 102 (TD= 110 ft, No GW)															
77.2	Slide plane	Gray clay	(B)							44	28				
Excavation: B 107 (TD= 80 ft, GW @ 49 ft)															
38.8	Modelo Formation	Bentonite bed	(B)							100	60				
Excavation: B 109 (TD= 152 ft, GW @ 105 ft)															
108	Calabasas Formation	Gray silty clayey fine/med sandstone	(U)	13.6	118.8	89						0.41	29	135	137
113	Calabasas Formation	Siltstone	(B)							27	12				
120	Calabasas Formation	Light gray sandy clayey siltstone	(U)	11.6	127.1	98						0.32	24	142	142

LEGEND

Depth = Sample Depth (ft) below ground surface
ST = Sample Type*
w = Initial Moisture Content (%)
DD = Initial Dry Unit Weight (pcf)
Max = Maximum Dry Unit Weight (pcf)
Opt = Optimum Moisture Content (%)
EI = Expansion Index
S = Degree of Saturation (%)
LL = Liquid Limit
PI = Plasticity Index
e = Void Ratio
n = Porosity (%)
WD = Initial Wet Unit Weight (pcf)
SD = Saturated Unit Weight (pcf)
BD = Bouyant (Submerged) Unit Weight (pcf) - Assuming water unit weight of 62.4 pcf

*** Sample Types: (U) = relatively Undisturbed; (S) = SPT; (B) = Bulk; (N) = Nuclear**

GEOLABS-WESTLAKE VILLAGE

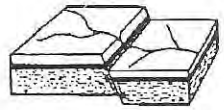
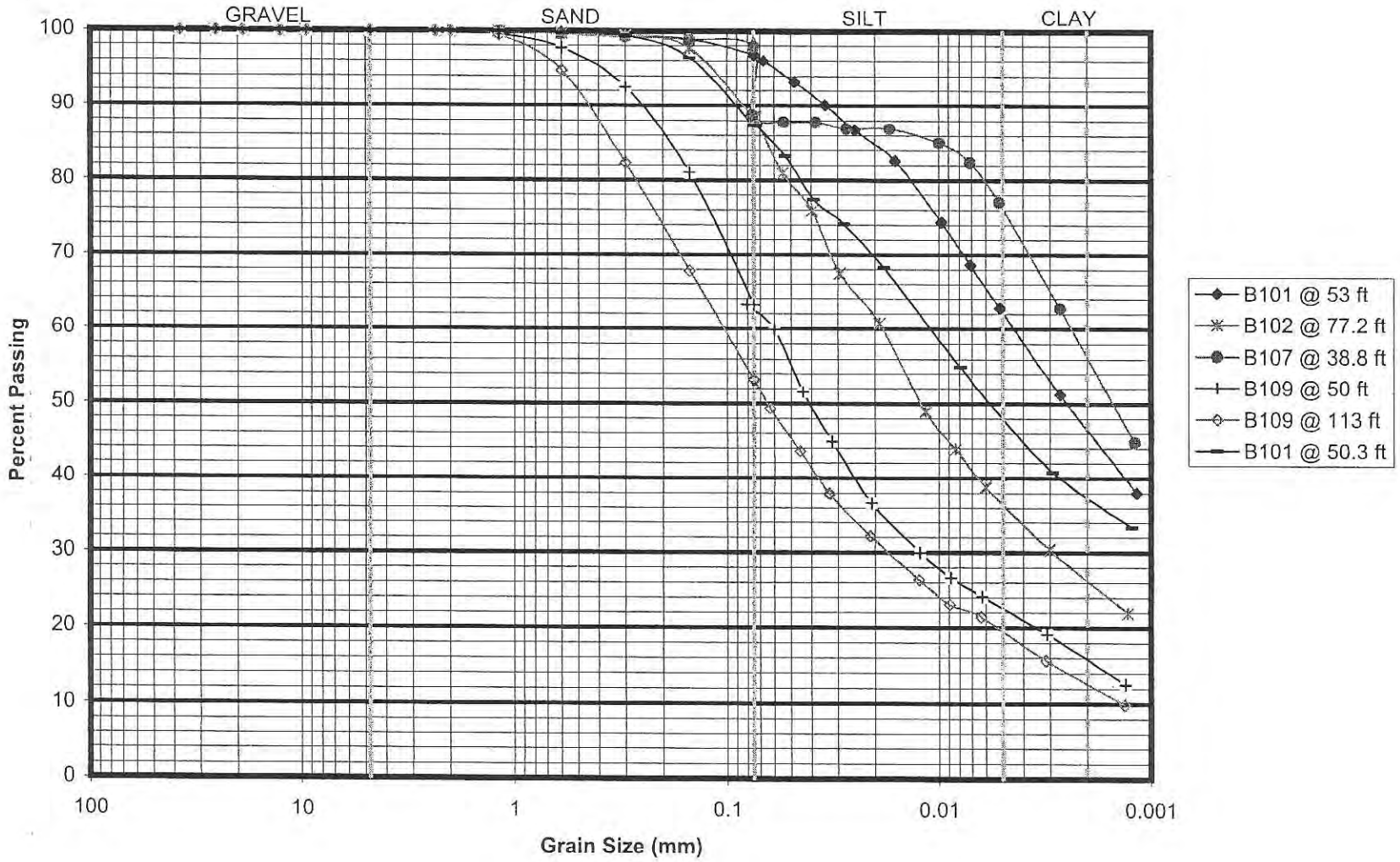


PLATE LS. 1

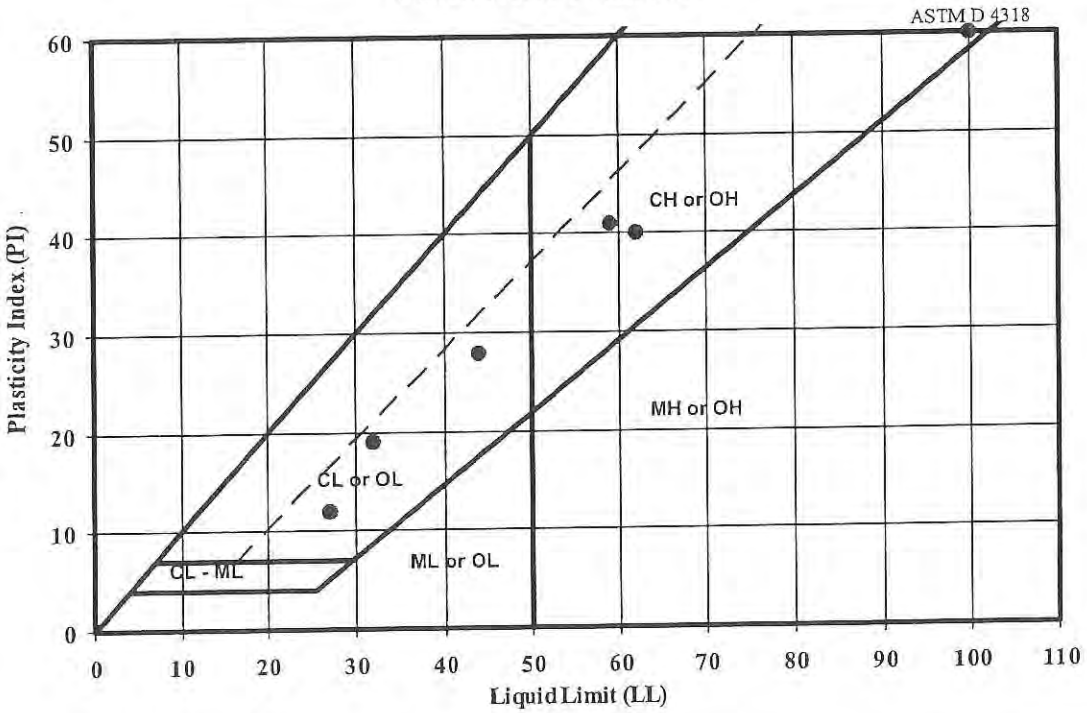
PARTICLE SIZE ANALYSIS



GEOLABS-WESTLAKE VILLAGE

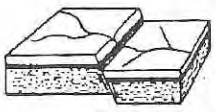
ATTERBERG LIMITS

PLASTICITY CHART



Excavation	Depth (ft)	Geology	Soil Description	LL	PI	Fines Class	w	w/LL
B 101	50.3	Tc	Gray clay	59	41	CH		
B 101	53	sp	Brown clay	62	40	CH		
B 102	77.2	sp	Gray clay	44	28	CL		
B 107	38.8	sp	Bentonite bed	100	60	CH		
B 109	50	Qls	Tan sandy clayey silt	32	19	CL		
B 109	113	Tc	Siltstone	27	12	CL		

LL = Liquid Limit, PI = Plasticity Index, NP = Non-Plastic , w = Field Moisture

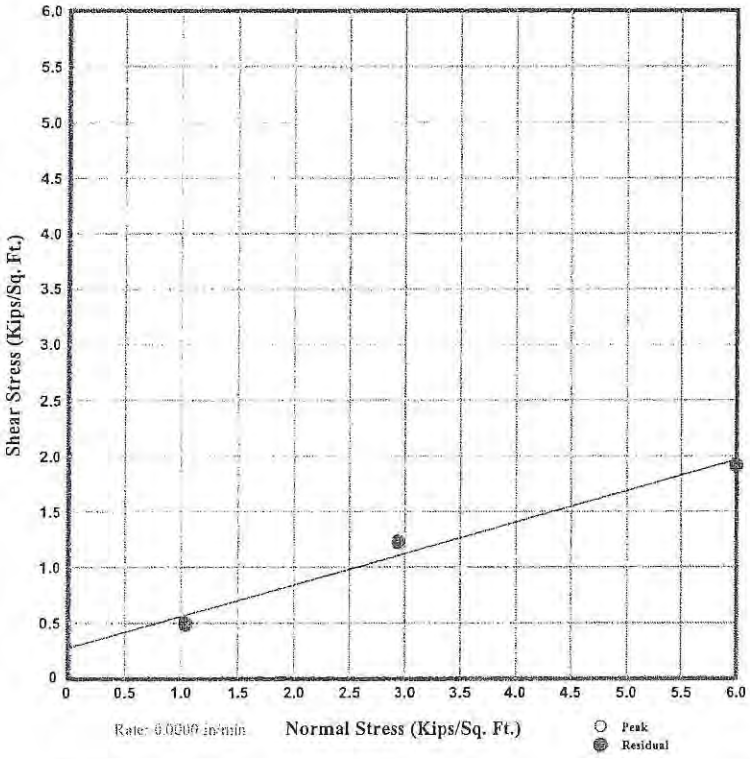


GEOLABS-WESTLAKE VILLAGE

PLATE AL.1

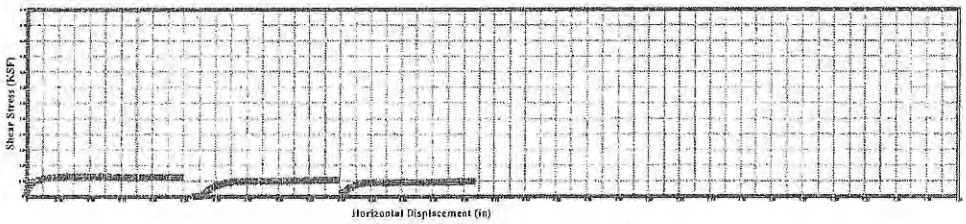
DIRECT SHEAR TEST RESULTS

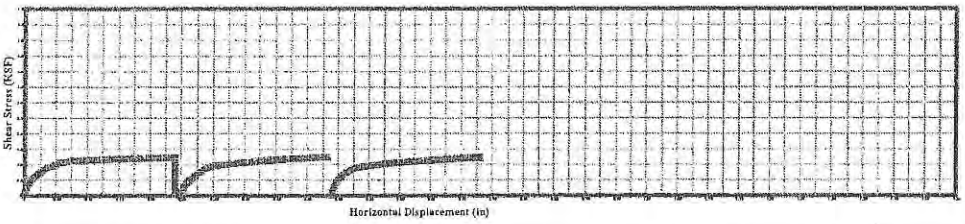
SAMPLE REMOLDED, SATURATED, AND NORMALLY CONSOLIDATED

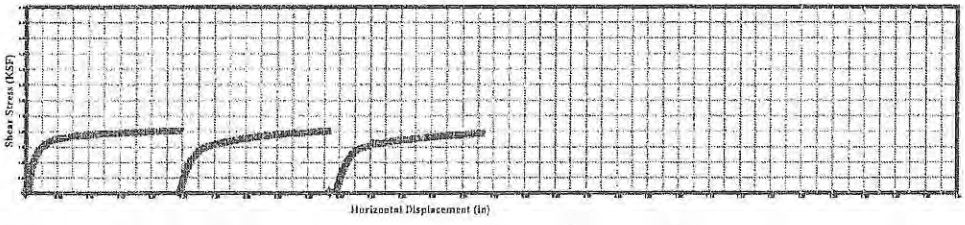


Project	Messenger, Calabasas				
W.O.	9222				
Excavation	B101				
Depth	50.3 ft				
Test Data	**#1**	**#2**	**#3**	**#4**	**#5**
Norm. Pres.(ksf)	1.0	2.9	6.0		
Shear stress (Peak/Ult. ksf)					
H. Displ. (in)					
V. Displ. (in)					
e (preshear)	0.00				
Dry Density (pcf)	93.9				
Moisture (%)	27.8				

	Peak	Ultimate	Residual
Cohesion (ksf)			0.275
Phi (deg)			16







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GEOLABS-WESTLAKE VILLAGE

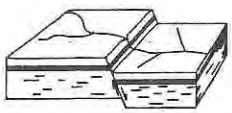
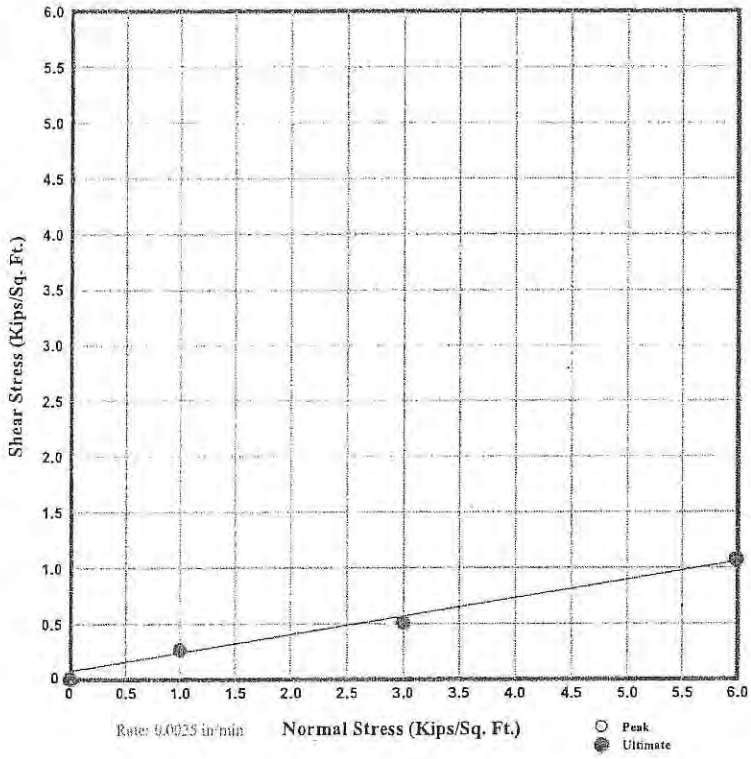


PLATE S-B101.50.3

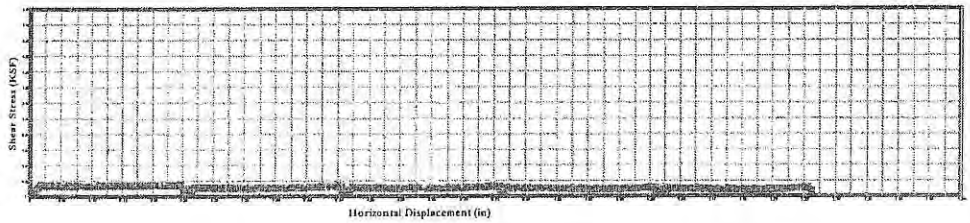
DIRECT SHEAR TEST RESULTS

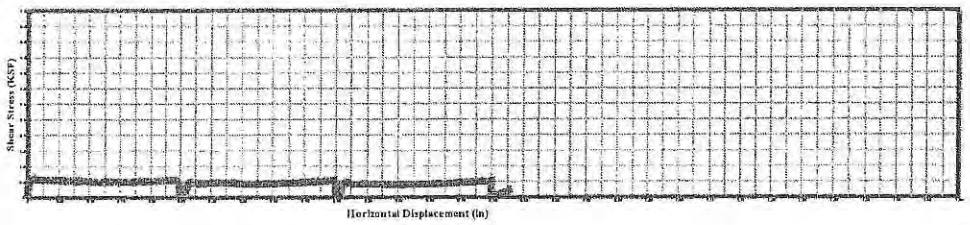
SAMPLE REMOLDED, SATURATED, AND NORMALLY CONSOLIDATED

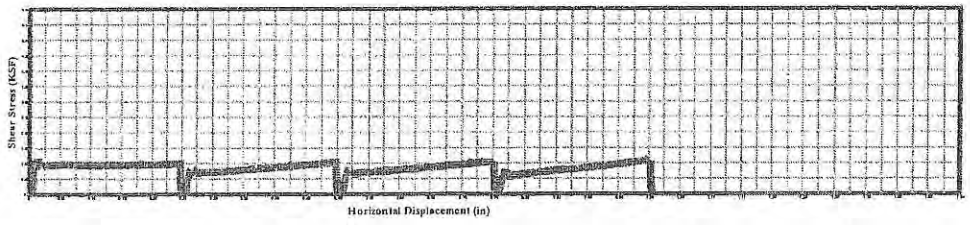


Project	Messenger, Calabasas				
W.O.	9222				
Excavation	B101				
Depth	53 ft				
Test Data	**#1**	**#2**	**#3**	**#4**	**#5**
Norm. Pres.(ksf)	1.0	3.0	6.0		
Shear stress (Peak/Ult. ksf)					
H. Displ. (in)					
V. Displ. (in)					
e (preshear)	0.98				
Dry Density (pcf)	84.4				
Moisture (%)	32.9				

	Peak	Ultimate	Residual
Cohesion (ksf)			0.075
Phi (deg)			9







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S:\GEOTEST\shears\9222.002\B101@53D.lst

GEOLABS-WESTLAKE VILLAGE

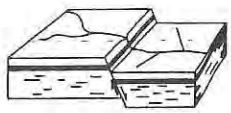
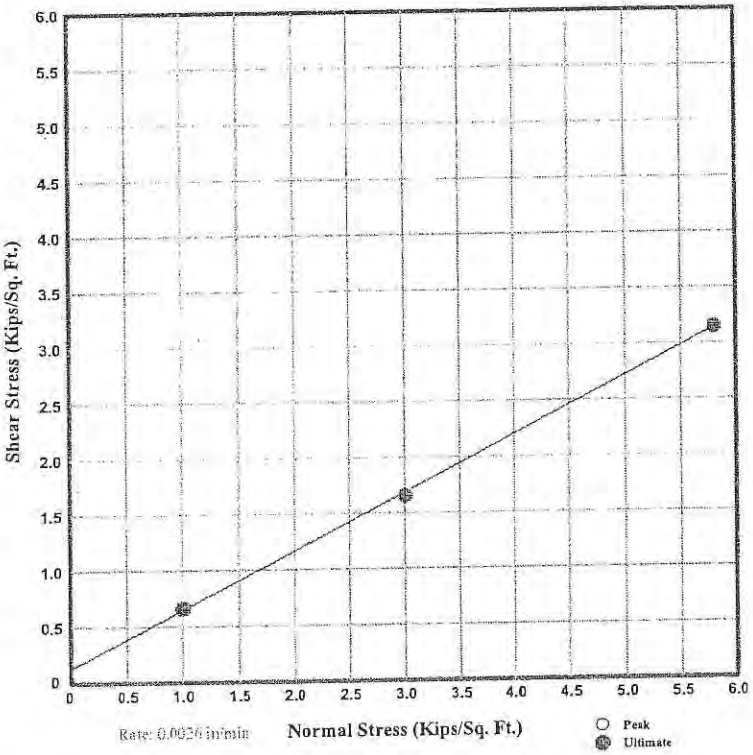


PLATE S-B101.53

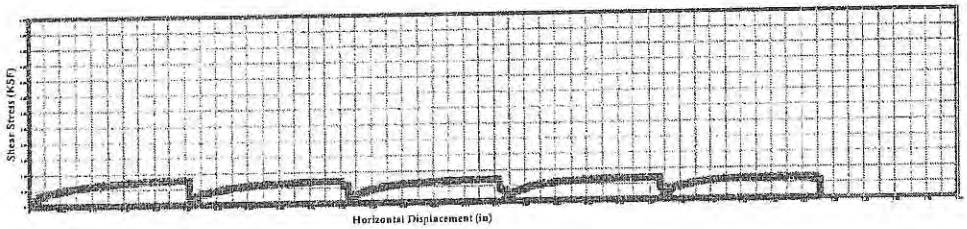
DIRECT SHEAR TEST RESULTS

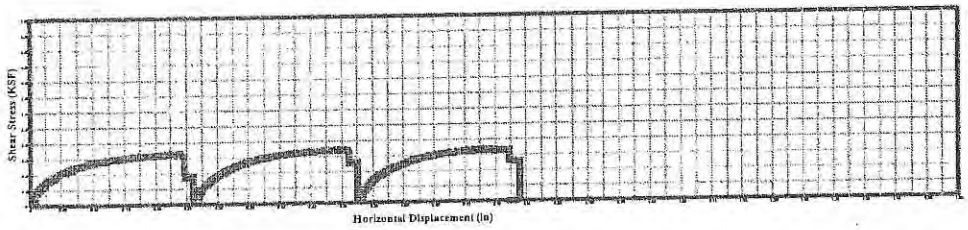
SAMPLE REMOLDED, SATURATED, AND NORMALLY CONSOLIDATED

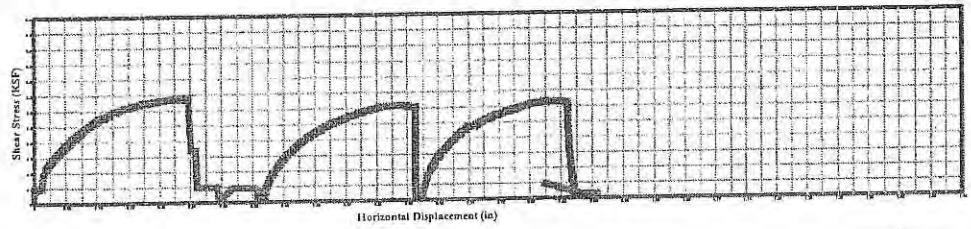


Project	Messenger, Calabasas				
W.O.	9222				
Excavation	B102				
Depth	77 ft				
Test Data	**#1**	**#2**	**#3**	**#4**	**#5**
Norm. Pres.(ksf)	1.0	3.0	5.8		
Shear stress (Peak/Ult. ksf)					
H. Displ. (in)					
V. Displ. (in)					
e (preshear)					
Dry Density (pcf)					
Moisture (%)	21.9				

	Peak	Ultimate	Residual
Cohesion (ksf)			0.125
Phi (deg)			27







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GEOLABS-WESTLAKE VILLAGE

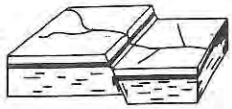
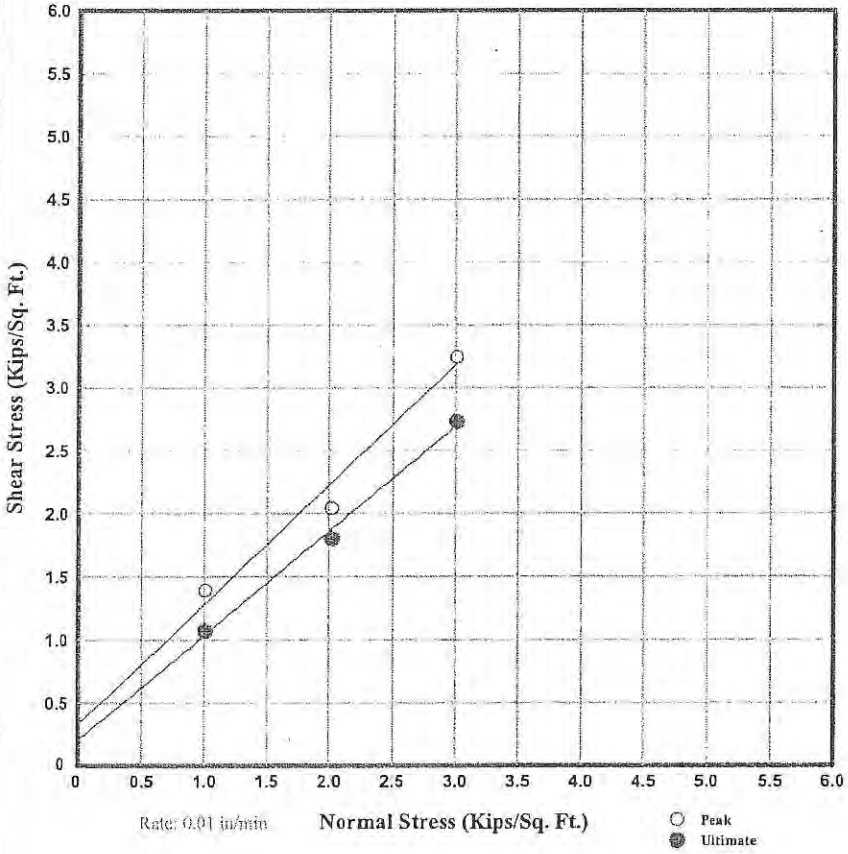
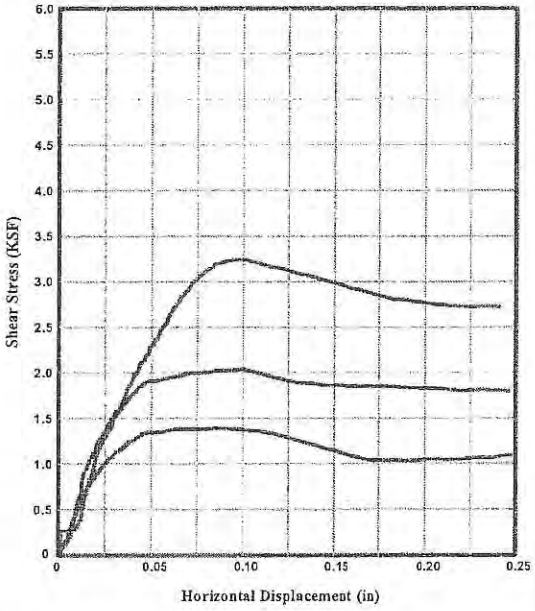


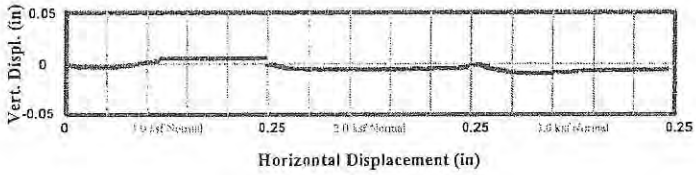
PLATE S-B102.77

DIRECT SHEAR TEST RESULTS

UNDISTURBED SAMPLE







	Peak	Ultimate	Residual
Cohesion (ksf)	0.32	0.2	
Phi (deg)	44	40	

Project	Messenger, Calabasas			
W.O.	9222			
Excavation	B109			
Depth	108 ft			
Test Data	**#1**	**#2**	**#3**	**#4**
Norm. Pres.(ksf)	1.0	2.0	3.0	
Shear stress (Peak/Ult. ksf)	1.4/1.1	--/1.8	3.2/2.7	
H. Displ. (in)	0.09/0.24	--/0.24	0.10/0.24	
V. Displ. (in)	0.00/0.01	--/0.00	-0.01/-0.01	
e (preshear)	0.52	0.51	0.50	
Dry Density (pcf)	108.9			
Moisture (%)	18.5			

S:\GEOTEST\shears\9222.002\G9@108A.lst
S:\GEOTEST\shears\9222.002\G9@108B.lst
S:\GEOTEST\shears\9222.002\G9@108C.lst

GEOLABS-WESTLAKE VILLAGE

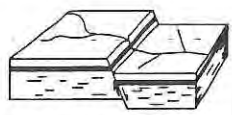
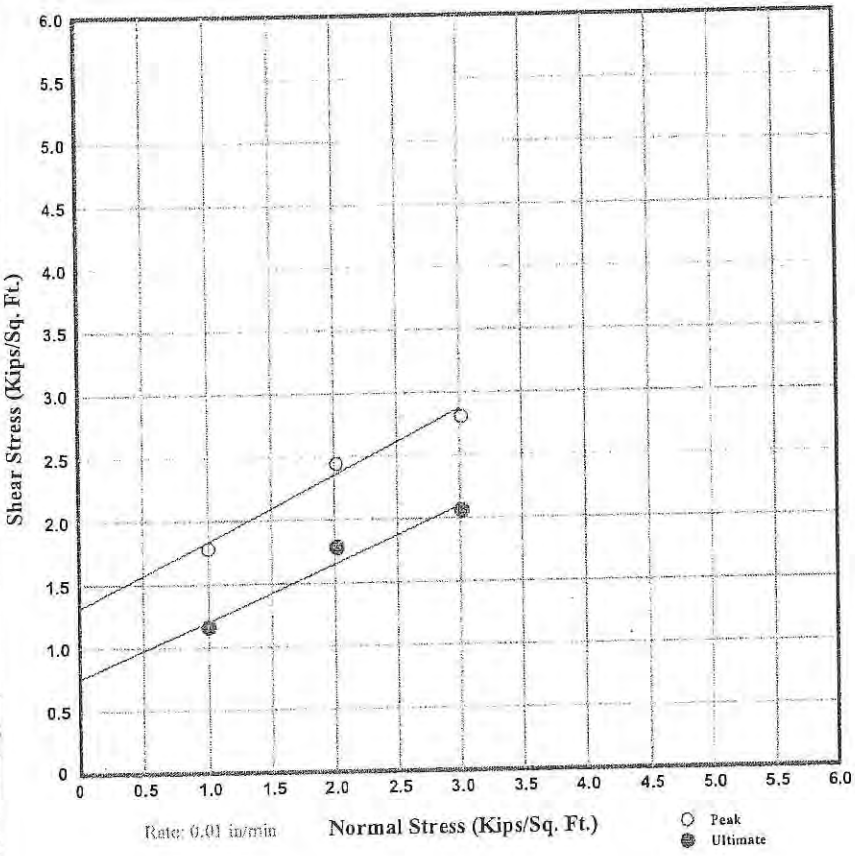
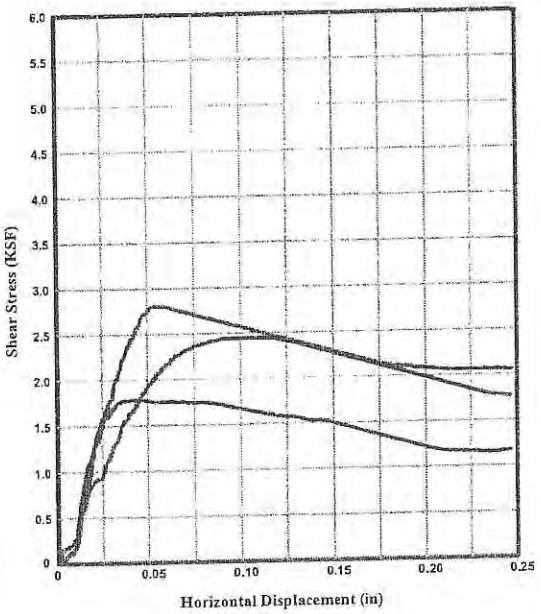


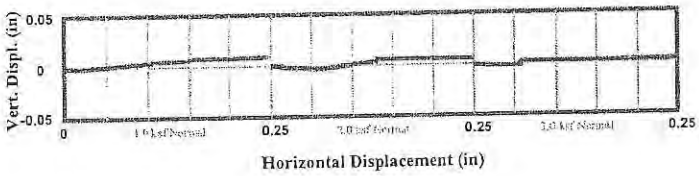
PLATE S-B109.108

DIRECT SHEAR TEST RESULTS

UNDISTURBED SAMPLE







	Peak	Ultimate	Residual
Cohesion (ksf)	1.31	0.75	
Phi (deg)	27	24	

Project	Messenger, Calabasas			
W.O.	9222			
Excavation	B109			
Depth	120 ft			
Test Data	**#1**	**#2**	**#3**	**#4**
Norm. Pres.(ksf)	1.0	2.0	3.0	
Shear stress (Peak/Ult. ksf)	1.8/1.2	2.4/1.8	2.8/2.1	
H. Displ. (in)	0.04/0.24	0.10/0.24	0.06/0.24	
V. Displ. (in)				
e (preshear)	0.31	0.30	0.28	
Dry Density (pcf)	127.1			
Moisture (%)	18.2			

S:\GEOTEST\shears\9222.002\109@120A.lst
S:\GEOTEST\shears\9222.002\109@120B.lst
S:\GEOTEST\shears\9222.002\109@120C.lst

GEOLABS-WESTLAKE VILLAGE

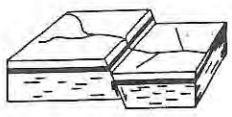
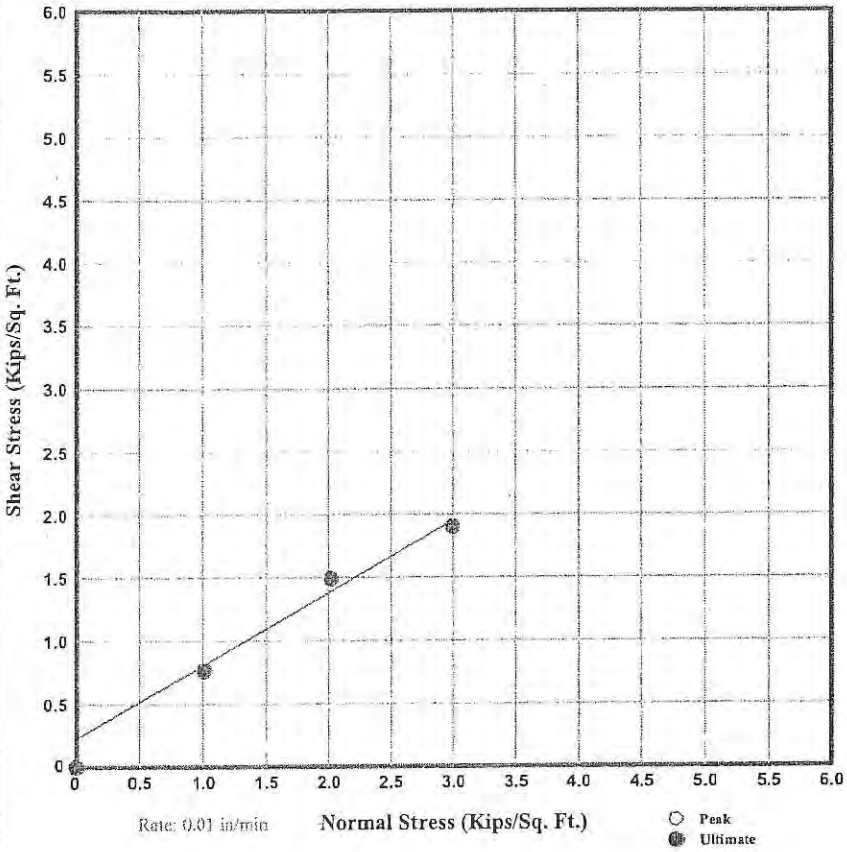
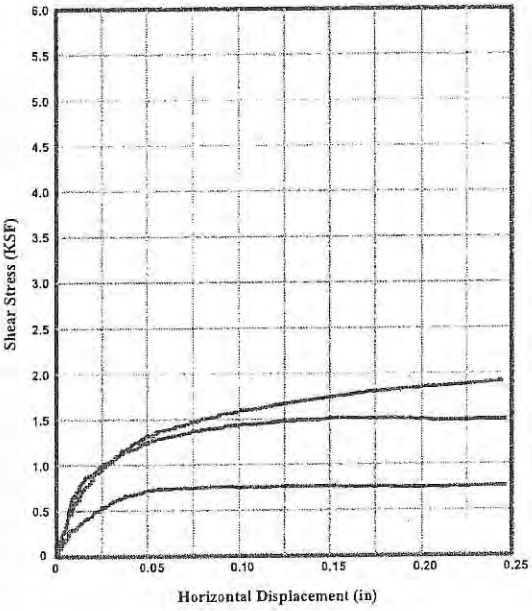


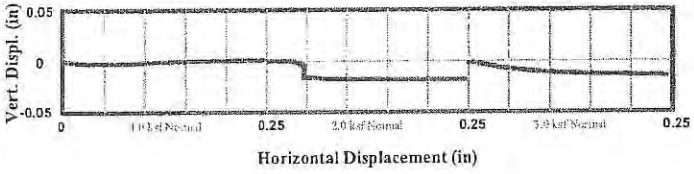
PLATE S-B109.120

DIRECT SHEAR TEST RESULTS

SAMPLE REMOLDED TO 90% RELATIVE COMPACTION







Project	Messenger. Calabasas			
W.O.	9222			
Excavation	B109			
Depth	50 ft			
Test Data	**#1**	**#2**	**#3**	**#4**
Norm. Pres.(ksf)	1.0	2.0	3.0	
Shear stress (Peak/Ult. ksf)	--/0.8	--/1.5	--/1.9	
H. Displ. (in)	--/0.24	--/0.24	--/0.24	
V. Displ. (in)	--/0.00	--/-0.02	--/-0.01	
e (preshear)	0.52	0.48	0.47	
Dry Density (pcf)	108.9			
Moisture (%)	13			

	Peak	Ultimate	Residual
Cohesion (ksf)		0.225	
Phi (deg)		30	

S:\GEOTEST\shears\9222.002\G9@50A.lst
S:\GEOTEST\shears\9222.002\G9@50B.lst
S:\GEOTEST\shears\9222.002\G9@50C.lst

GEOLABS-WESTLAKE VILLAGE

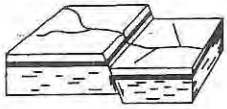
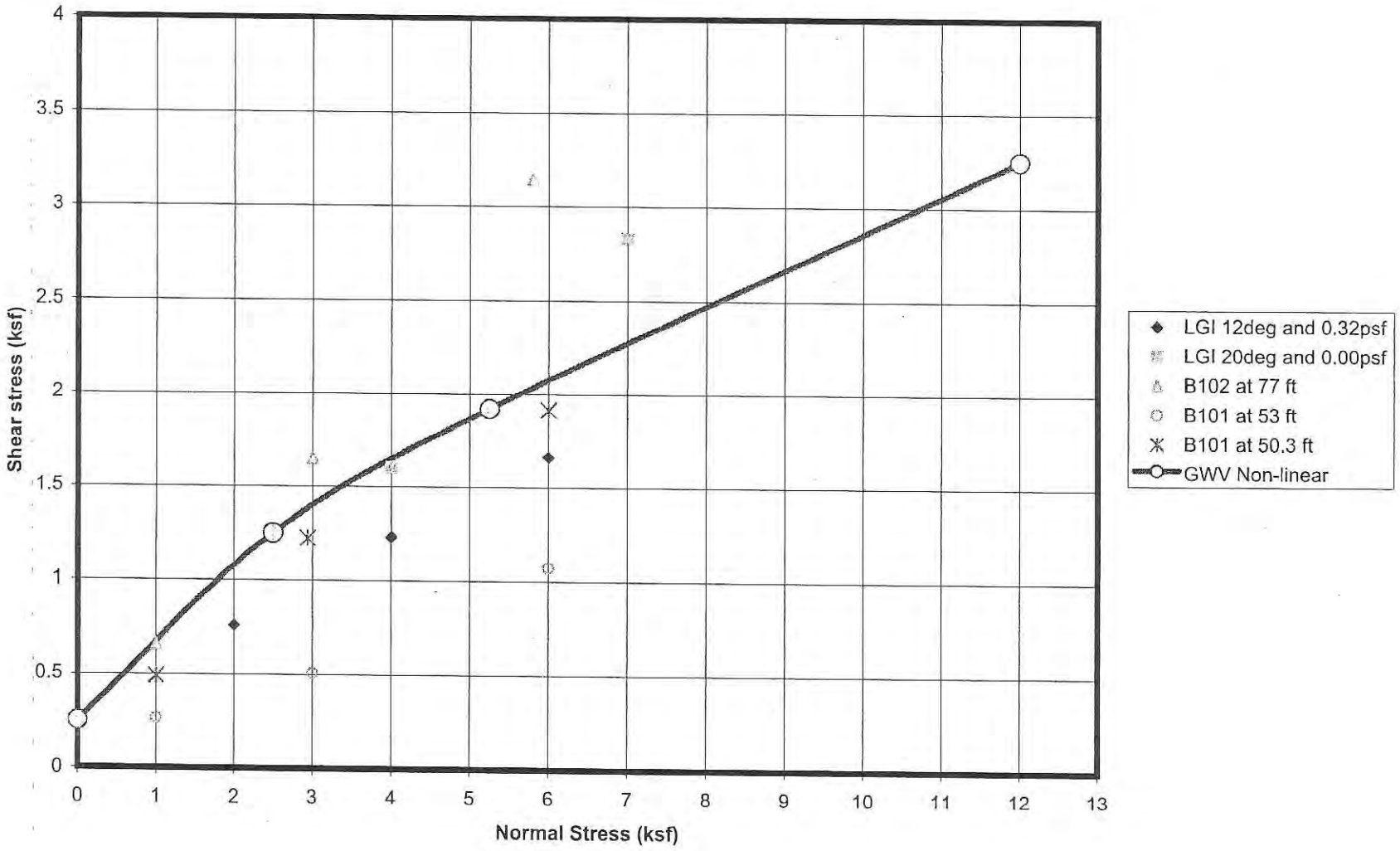


PLATE S-B109.50

Residual Shear Strength Compilation



GEOLABS-WESTLAKE VILLAGE

Leighton

Moisture Content
ASTM D 2216

Project Name: MESSENGER CALABASAS
Project No. : 032483-002

Tested By: JAP
Date: 9/21/2010

Container Number:	4	DD	R-32			
Sample Type:	SPT	SPT	SPT			
Boring No.:	B-1	B-2	B-4			
Sample No.:	**	**	**			
Depth: (ft.)	54.0	75.0	62 / 65.0			
Soil Type:	(CL)s	CL	CL			
Moisture Content (%)	**23.0**	**18.1**	**14.4**			
Wt. Wet Soil+Container (g)	132.35	133.27	123.15			
Wt. Dry Soil+Container (g)	116.87	120.41	114.03			
Weight Container (g)	49.64	49.49	50.80			

Leighton

PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 422

Project Name:	MESSENGER CALABASAS	Tested By :	JRH	Date:	09/22/10
Project No. :	032483-002	Data Input By:	JMB	Date:	09/24/10
Boring No.:	B-1	Checked By:	JMB	Date:	09/24/10
Sample No.:	**	Depth (ft.) :	54.0		

Visual Sample Description: LEAN CLAY WITH LITTLE SAND (CL)s, dark grayish brown.

				Hygroscopic Moisture Content of Soils Passing #10	Corrected Weight of Air-Dry Soil Passing #10	After Hydrometer & wet sieve ret. on #200 sieve
Liquid Limit:	42	LL,PL,PI:	42,20,22			
Plastic Limit:	20	GR:SA:FI:	0:15:85			
Plasticity Index:	22	Grp. Symbol:	(CL)s			
Specific Gravity (Assumed)	2.70	Wt.of Air-Dry Soil + Cont.(gm.)		65.06	**	**
Correction for Specific Gravity	0.99	Dry Wt. of Soil + Cont. (gm.)		62.25	51.90	168.4
Wt.of Air-Dry Soil + Cont. (gm.)	260.9	Wt. of Container No.___ (gm.)		49.67	**	162.1
Wt. of Container	0.0	Moisture Content (%)		22.3	**	**
Dry Wt. of Soil (gm.)	260.9	Wt. of Dry Soil (gm.)		12.58	42.44	6.3

Coarse Sieve

U.S. Sieve Size	Cumulative Wt.of Dry Soil Retained(gm)	% Passing
3"	0.0	100.0
1½"	0.0	100.0
3/4"	0.0	100.0
3/8"	0.0	100.0
No. 4	0.0	100.0
No. 10	0.0	100.0
Pan		

Sieve after Hydrometer & Wet Sieve

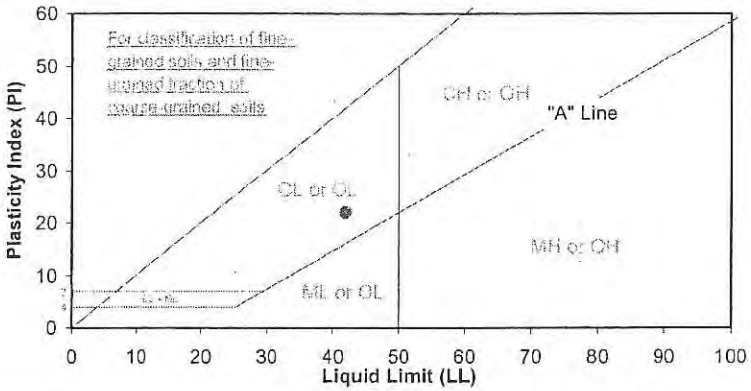
U.S. Sieve Size	Cumulative Wt. of Dry Soil Retained (gm)	% Passing	% Total Sample
No. 10	0.0	100.0	100.0
No. 20	0.3	99.3	99.3
No. 40	0.7	98.3	98.3
No. 60	1.0	97.6	97.6
No. 100	2.7	93.6	93.6
No. 200	6.2	85.4	85.4
Pan			

Hydrometer

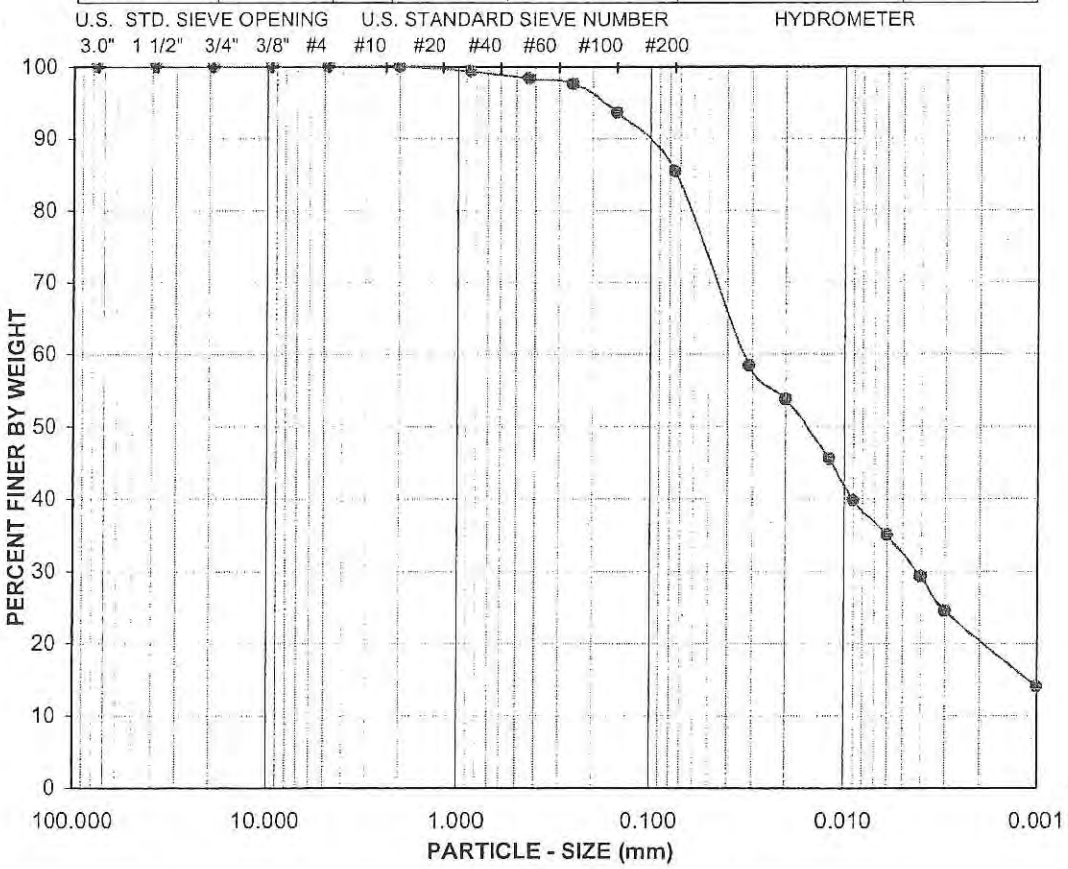
Wt. of Air-Dry Soil (gm) 51.9 Wt. of Dry Soil (gm) 42.4

Deflocculant 125 cc of 4% Solution

Date	Time	Elapsed Time (min)	Water Temperature (°c)	Composite Correction 152 H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
9/22/10	9:21	0	22	4.0			
	9:23	2	22	4.0	29.0	58.4	0.031
	9:26	5	22	4.0	27.0	53.7	0.020
	9:36	15	22	4.0	23.5	45.5	0.012
	9:51	30	23	4.0	21.0	39.7	0.009
	10:21	60	23	4.0	19.0	35.0	0.006
	11:21	120	23	4.0	16.5	29.2	0.004
	13:31	250	23	4.0	14.5	24.5	0.003
9/23/10	9:21	1440	24	4.0	10.0	14.0	0.001



GRAVEL		SAND			FINES	
COARSE	FINE	CRSE	MEDIUM	FINE	SILT	CLAY



Boring No.	Sample No.	Depth (ft.)	Soil Type	GR:SA:FI (%)	LL,PL,PI
B-1	**	54.0	(CL)s	0:15:85	42,20,22

Sample Description:
LEAN CLAY WITH LITTLE SAND (CL)s, dark grayish brown.

Project No.: 032483-002

MESSENGER CALABASAS

ATTERBERG LIMITS, PARTICLE - SIZE CURVE

ASTM D 4318, D 422

Leighton

Rev. 08-04

Leighton

PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 422

Project Name: MESSENGER CALABASAS | Tested By: JRH | Date: 09/22/10

Project No.: 032483-002 | Data Input By: JMB | Date: 09/24/10

Boring No.: B-2 | Checked By: JMB | Date: 09/24/10

Sample No.: ** | Depth (ft.): 75.0

Visual Sample Description: LEAN CLAY WITH FEW SAND (CL), gray.

Liquid Limit:	41	LL,PL,PI:	41,24,17	Hygroscopic Moisture Content of Soils Passing #10	Corrected Weight of Air-Dry Soil Passing #10	After Hydrometer & wet sieve ret. on #200 sieve
Plastic Limit:	24	GR:SA:FI:	0:10:90			
Plasticity Index:	17	Grp. Symbol:	CL			
Specific Gravity (Assumed)	2.70	Wt.of Air-Dry Soil + Cont.(gm.)		67.09	**	**
Correction for Specific Gravity	0.99	Dry Wt. of Soil + Cont. (gm.)		64.52	51.50	163.5
Wt.of Air-Dry Soil + Cont. (gm.)	329.5	Wt. of Container No.___ (gm.)		50.13	**	159.0
Wt. of Container	0.0	Moisture Content (%)		17.9	**	**
Dry Wt. of Soil (gm.)	329.5	Wt. of Dry Soil (gm.)		14.39	43.68	4.5

Coarse Sieve

U.S. Sieve Size	Cumulative Wt.of Dry Soil Retained(gm)	% Passing
3"	0.0	100.0
1½"	0.0	100.0
3/4"	0.0	100.0
3/8"	0.0	100.0
No. 4	0.0	100.0
No. 10	0.0	100.0
Pan		

Sieve after Hydrometer & Wet Sieve

U.S. Sieve Size	Cumulative Wt. of Dry Soil Retained (gm)	% Passing	% Total Sample
No. 10	0.0	100.0	100.0
No. 20	0.1	99.8	99.8
No. 40	0.3	99.3	99.3
No. 60	0.8	98.2	98.2
No. 100	1.7	96.1	96.1
No. 200	4.4	89.9	89.9
Pan			

Hydrometer

Wt. of Air-Dry Soil (gm) 51.5 | Wt. of Dry Soil (gm) 43.7

Deflocculant 125 cc of 4% Solution

Date	Time	Elapsed Time (min)	Water Temperature (°c)	Composite Correction 152 H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
9/22/10	9:14	0	22	4.0			
	9:16	2	22	4.0	31.0	61.2	0.031
	9:19	5	22	4.0	28.5	55.5	0.020
	9:29	15	22	4.0	24.0	45.3	0.012
	9:44	30	22	4.0	21.0	38.5	0.009
	10:14	60	23	4.0	19.5	35.1	0.006
	11:14	120	23	4.0	16.5	28.3	0.004
	13:24	250	23	4.0	14.5	23.8	0.003
9/23/10	9:14	1440	24	4.0	10.0	13.6	0.001

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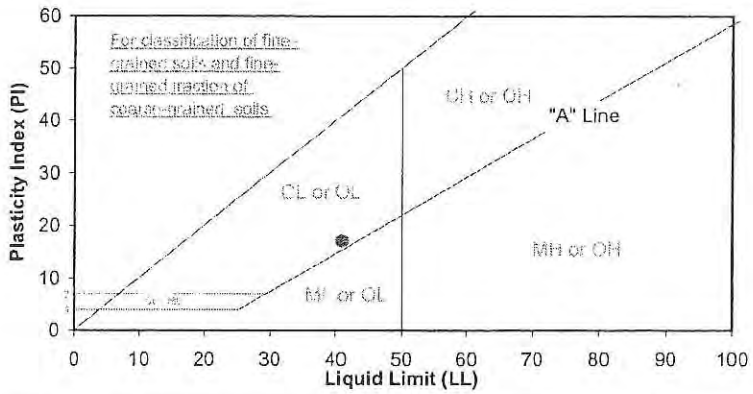

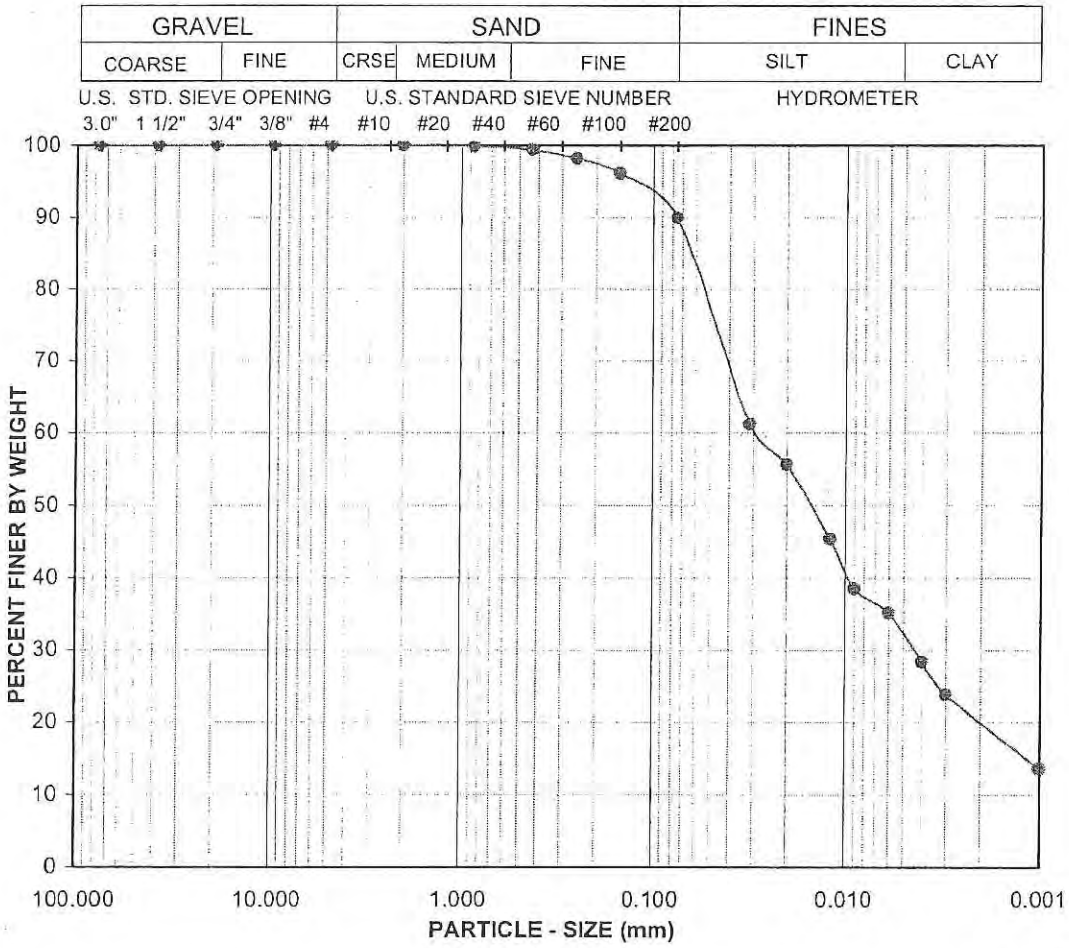

Boring No.	Sample No.	Depth (ft.)	Soil Type	GR:SA:FI (%)	LL;PL,PI
B-2	**	75.0	CL	0:10:90	41,24,17

Sample Description:
LEAN CLAY WITH FEW SAND (CL), gray.

Project No.: 032483-002
MESSENGER CALABASAS

ATTERBERG LIMITS, PARTICLE - SIZE CURVE
ASTM D 4318, D 422

Leighton

Rev. 08-04

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PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 422

Project Name: MESSENGER CALABASAS
Project No. : 032483-002
Boring No.: B-4
Sample No.: **
Visual Sample Description: LEAN CLAY WITH FEW SAND (CL), dark gray.

Tested By : JRH
Data Input By: JMB
Checked By: JMB
Depth (ft.) : 62 / 65.0

Date: 09/22/10
Date: 09/24/10
Date: 09/24/10

				Hygroscopic Moisture Content of Soils Passing #10	Corrected Weight of Air-Dry Soil Passing #10	After Hydrometer & wet sieve ret. on #200 sieve
Liquid Limit:	40	LL,PL,PI:	40,20,20			
Plastic Limit:	20	GR:SA:FI:	0:6:94			
Plasticity Index:	20	Grp. Symbol:	CL			
Specific Gravity (Assumed)	2.70	Wt.of Air-Dry Soil + Cont.(gm.)		65.99	**	**
Correction for Specific Gravity	0.99	Dry Wt. of Soil + Cont. (gm.)		64.11	51.10	154.9
Wt.of Air-Dry Soil + Cont. (gm.)	273.2	Wt. of Container No.___ (gm.)		50.80	**	151.9
Wt. of Container	0.0	Moisture Content (%)		14.1	**	**
Dry Wt. of Soil (gm.)	273.2	Wt. of Dry Soil (gm.)		13.31	44.79	3.0

Coarse Sieve

U.S. Sieve Size	Cumulative Wt.of Dry Soil Retained(gm)	% Passing
3"	0.0	100.0
1½"	0.0	100.0
3/4"	0.0	100.0
3/8"	0.0	100.0
No. 4	0.0	100.0
No. 10	0.0	100.0
Pan		

Sieve after Hydrometer & Wet Sieve

U.S. Sieve Size	Cumulative Wt. of Dry Soil Retained (gm)	% Passing	% Total Sample
No. 10	0.0	100.0	100.0
No. 20	0.0	100.0	100.0
No. 40	0.1	99.8	99.8
No. 60	0.4	99.1	99.1
No. 100	0.9	98.0	98.0
No. 200	2.9	93.5	93.5
Pan			

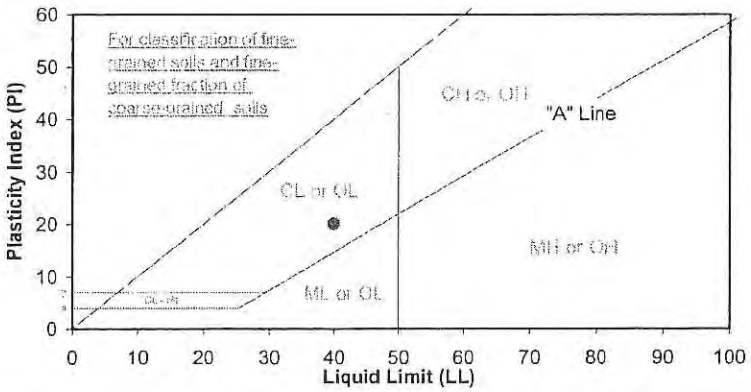
Hydrometer

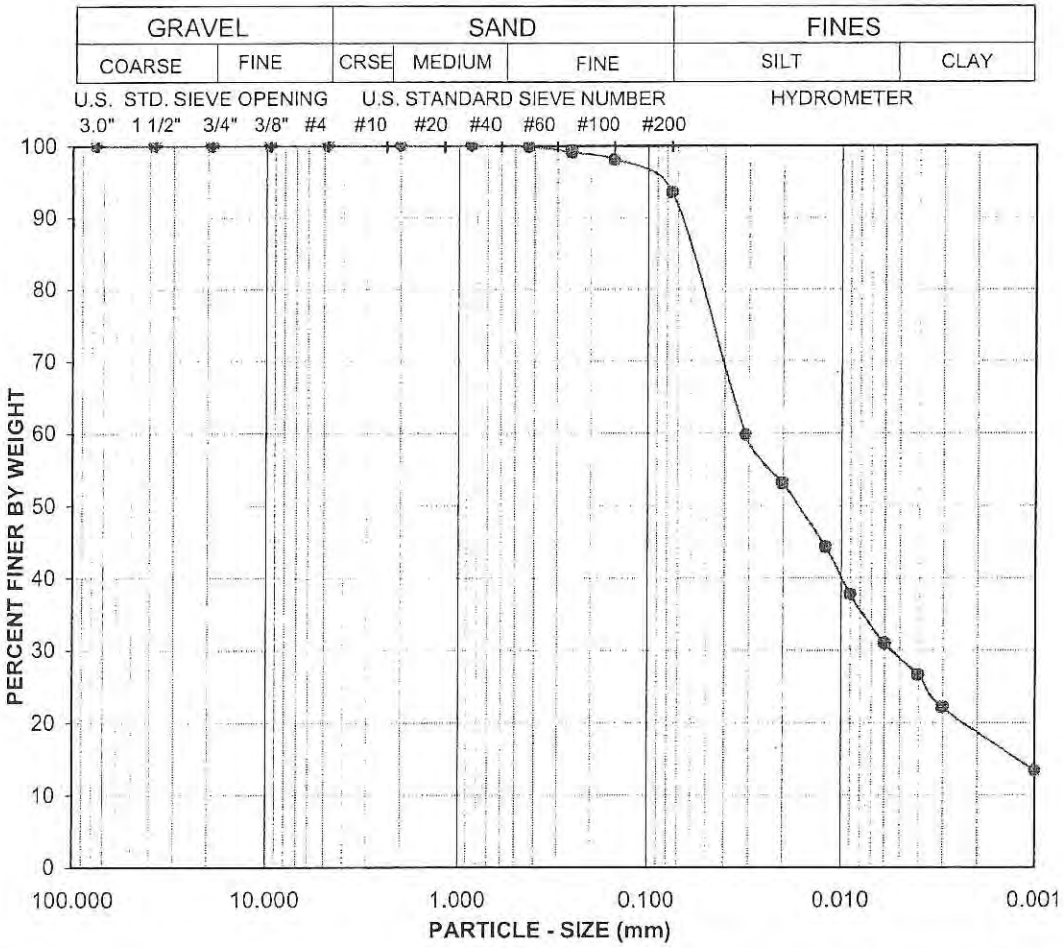
Wt. of Air-Dry Soil (gm) 51.1 Wt. of Dry Soil (gm) 44.8

Deflocculant 125 cc of 4% Solution

Date	Time	Elapsed Time (min)	Water Temperature (°c)	Composite Correction 152 H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
9/22/10	9:05	0	22	4.0			
	9:07	2	22	4.0	31.0	59.7	0.031
	9:10	5	22	4.0	28.0	53.0	0.020
	9:20	15	22	4.0	24.0	44.2	0.012
	9:35	30	22	4.0	21.0	37.6	0.009
	10:05	60	23	4.0	18.0	30.9	0.006
	11:05	120	23	4.0	16.0	26.5	0.004
	13:15	250	23	4.0	14.0	22.1	0.003
9/23/10	9:05	1440	24	4.0	10.0	13.3	0.001

Rev. 08-04





Boring No.	Sample No.	Depth (ft.)	Soil Type	GR:SA:FI (%)	LL,PL,PI
B-4	**	62 / 65.0	CL	0:6:94	40,20,20

Sample Description:
LEAN CLAY WITH FEW SAND (CL), dark gray.

Project No.. 032483-002

MESSENGER CALABASAS

ATTERBERG LIMITS, PARTICLE - SIZE CURVE
ASTM D 4318, D 422

Leighton

Rev. 08-04

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ATTERBERG LIMITS

ASTM D 4318

Project Name:	MESSENGER CALABASAS	Tested By:	JAP	Date:	9/23/10
Project No. :	032483-002	Input By:	JMB	Date:	9/24/10
Boring No.:	B-1	Checked By:	JMB	Date:	9/24/10
Sample No.:	**	Depth (ft.)	54.0		

Sample Description: LEAN CLAY WITH FEW TO LITTLE SAND (CL), dark grayish brown.

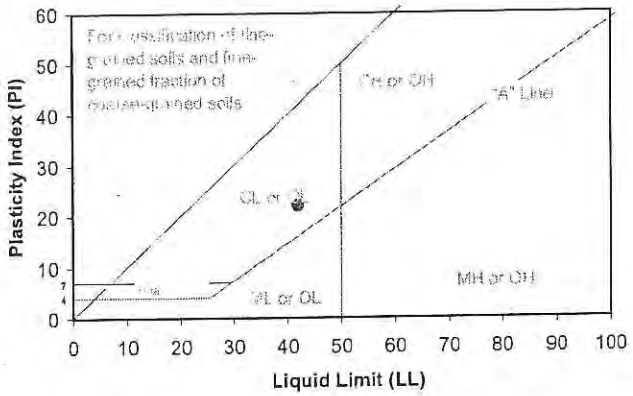
	PLASTIC LIMIT		LIQUID LIMIT			**IN-SITU
TEST NO.	1	2	1	2	3	MOISTURE
Number of Blows [N]			32	21	15	
Wet Wt. of Soil + Cont. (gm)	22.71	22.51	30.48	29.27	31.54	132.35
Dry Wt. of Soil + Cont. (gm)	21.24	21.01	25.52	24.54	25.93	116.87
Wt. of Container (gm)	13.54	13.59	13.50	13.51	13.60	49.64
Moisture Content (%) [Wn]	19.1	20.2	41.3	42.9	45.5	23.0

Liquid Limit	42
Plastic Limit	20
Plasticity Index	22
Classification	CL

PI at "A" - Line = 0.73(LL-20) = 16.06

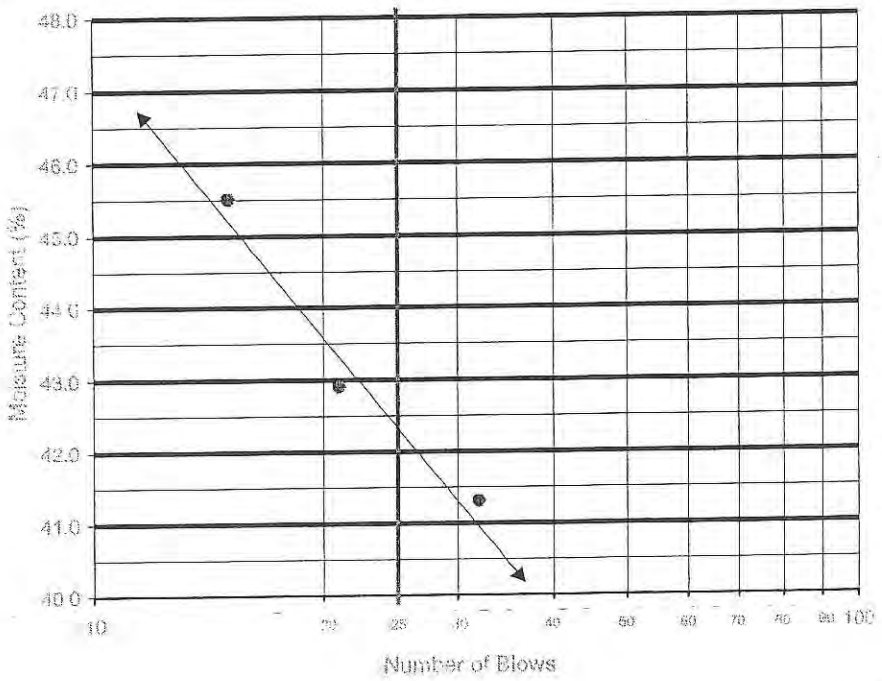
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [X] Wet Preparation
  - Multipoint - Wet
- [ ] Dry Preparation
  - Multipoint - Dry
- [X] Procedure A
  - Multipoint Test
- [ ] Procedure B
  - One-point Test



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ATTERBERG LIMITS

ASTM D 4318

Project Name:	MESSENGER CALABASAS	Tested By:	JRH	Date:	9/22/10
Project No. :	032483-002	Input By:	JMB	Date:	9/23/10
Boring No.:	B-2	Checked By:	JMB	Date:	9/23/10
Sample No.:	**	Depth (ft.)	75.0		

Sample Description: LEAN CLAY WITH FEW SAND (CL), gray.

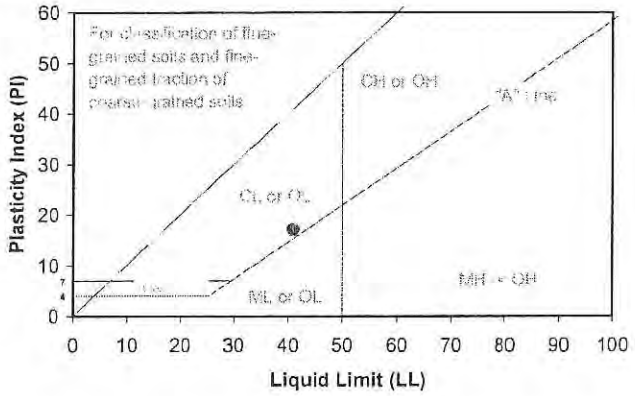
	PLASTIC LIMIT		LIQUID LIMIT			**IN-SITU
TEST NO.	1	2	1	2	3	MOISTURE
Number of Blows [N]			34	26	20	
Wet Wt. of Soil + Cont. (gm)	23.18	23.38	30.71	34.09	31.67	133.27
Dry Wt. of Soil + Cont. (gm)	21.35	21.50	25.84	28.13	26.41	120.41
Wt. of Container (gm)	13.64	13.58	13.68	13.57	13.65	49.49
Moisture Content (%) [Wn]	23.7	23.7	40.0	40.9	41.2	18.1

Liquid Limit	41
Plastic Limit	24
Plasticity Index	17
Classification	CL

PI at "A" - Line = 0.73(LL-20) = 15.33

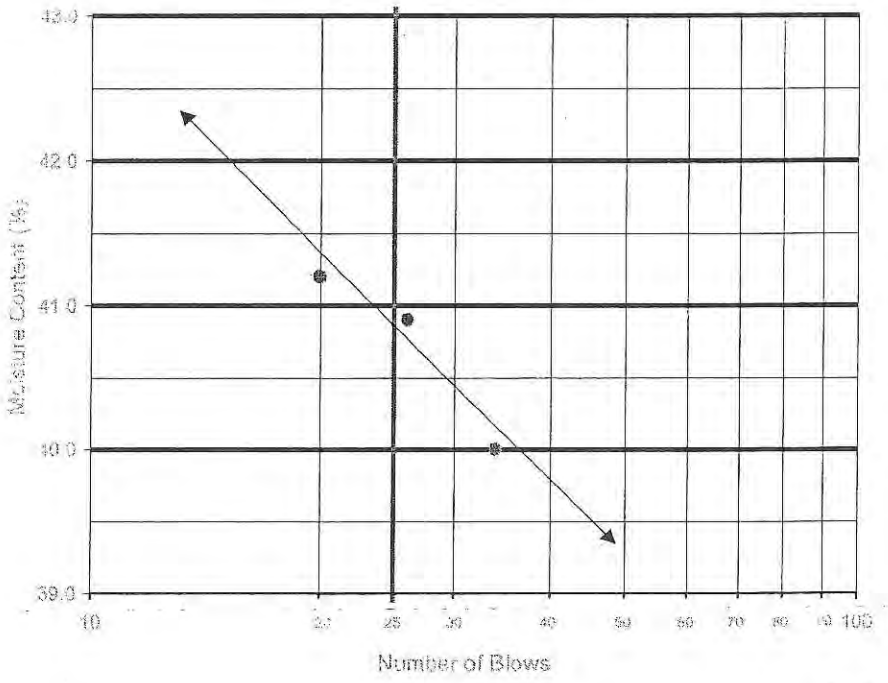
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [X] Wet Preparation
  Multipoint - Wet
- [ ] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



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Leighton

ATTERBERG LIMITS
ASTM D 4318

Project Name:	MESSENGER CALABASAS	Tested By:	JAP	Date:	9/23/10
Project No. :	032483-002	Input By:	JMB	Date:	9/24/10
Boring No.:	B-4	Checked By:	JMB	Date:	9/24/10
Sample No.:	**	Depth (ft.)	62 / 65.0		

Sample Description: LEAN CLAY WITH FEW SAND (CL), dark gray.

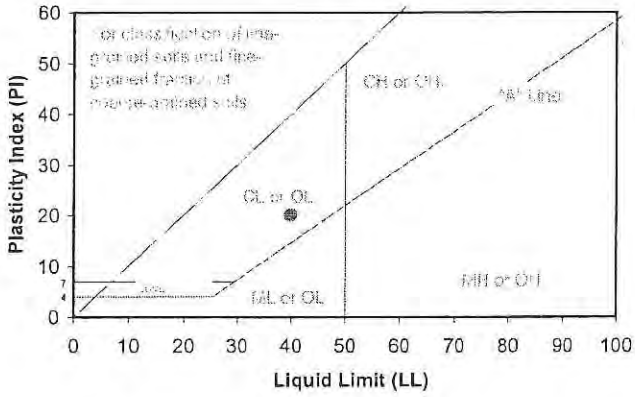
	PLASTIC LIMIT		LIQUID LIMIT			**IN-SITU
TEST NO.	1	2	1	2	3	MOISTURE
Number of Blows [N]			29	22	16	
Wet Wt. of Soil + Cont. (gm)	23.41	22.30	29.84	29.91	28.55	123.15
Dry Wt. of Soil + Cont. (gm)	21.79	20.87	25.36	25.19	24.06	114.03
Wt. of Container (gm)	13.51	13.54	13.61	13.63	13.60	50.80
Moisture Content (%) [Wn]	19.6	19.5	38.1	40.8	42.9	14.4

Liquid Limit	40
Plastic Limit	20
Plasticity Index	20
Classification	CL

PI at "A" - Line = 0.73(LL-20) = 14.6

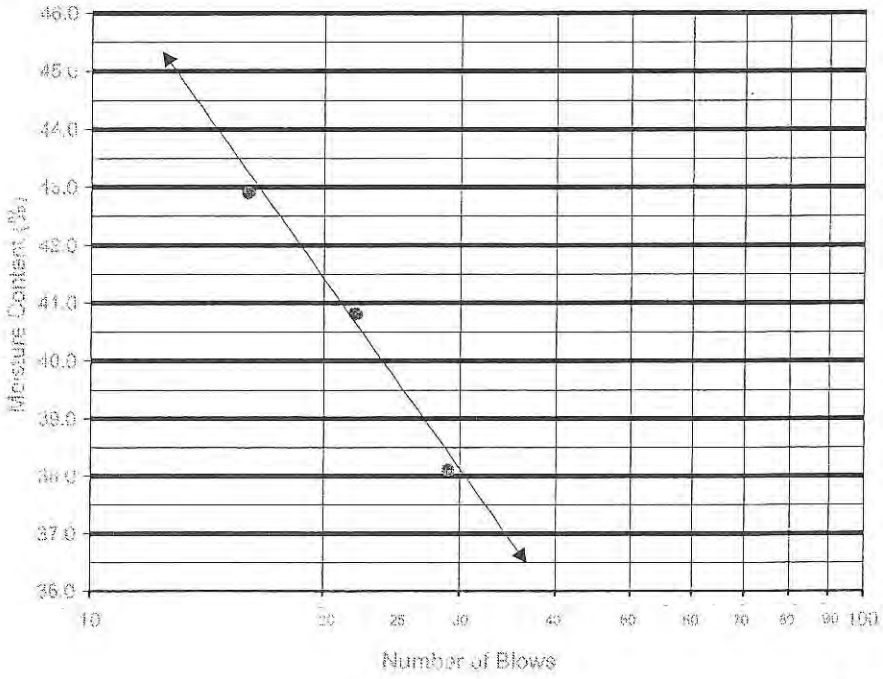
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [X] Wet Preparation
  Multipoint - Wet
- [ ] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



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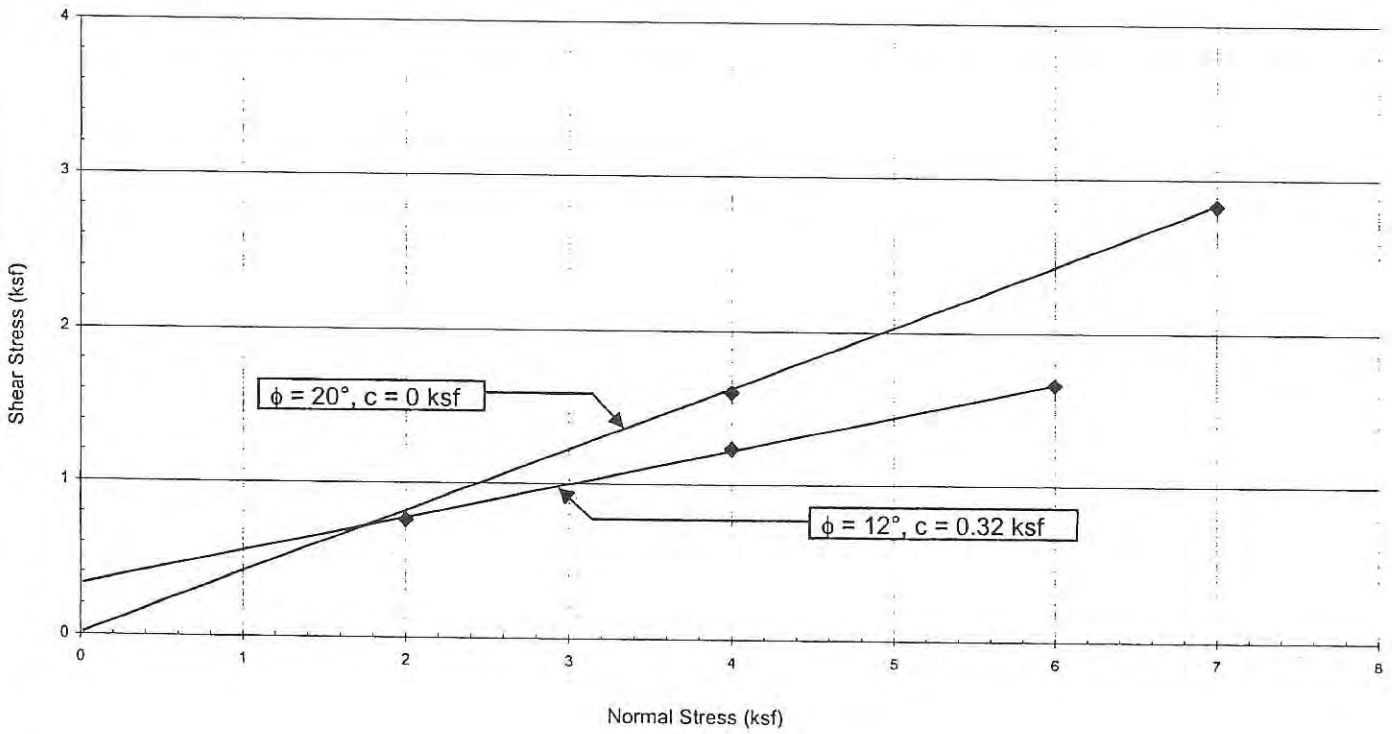
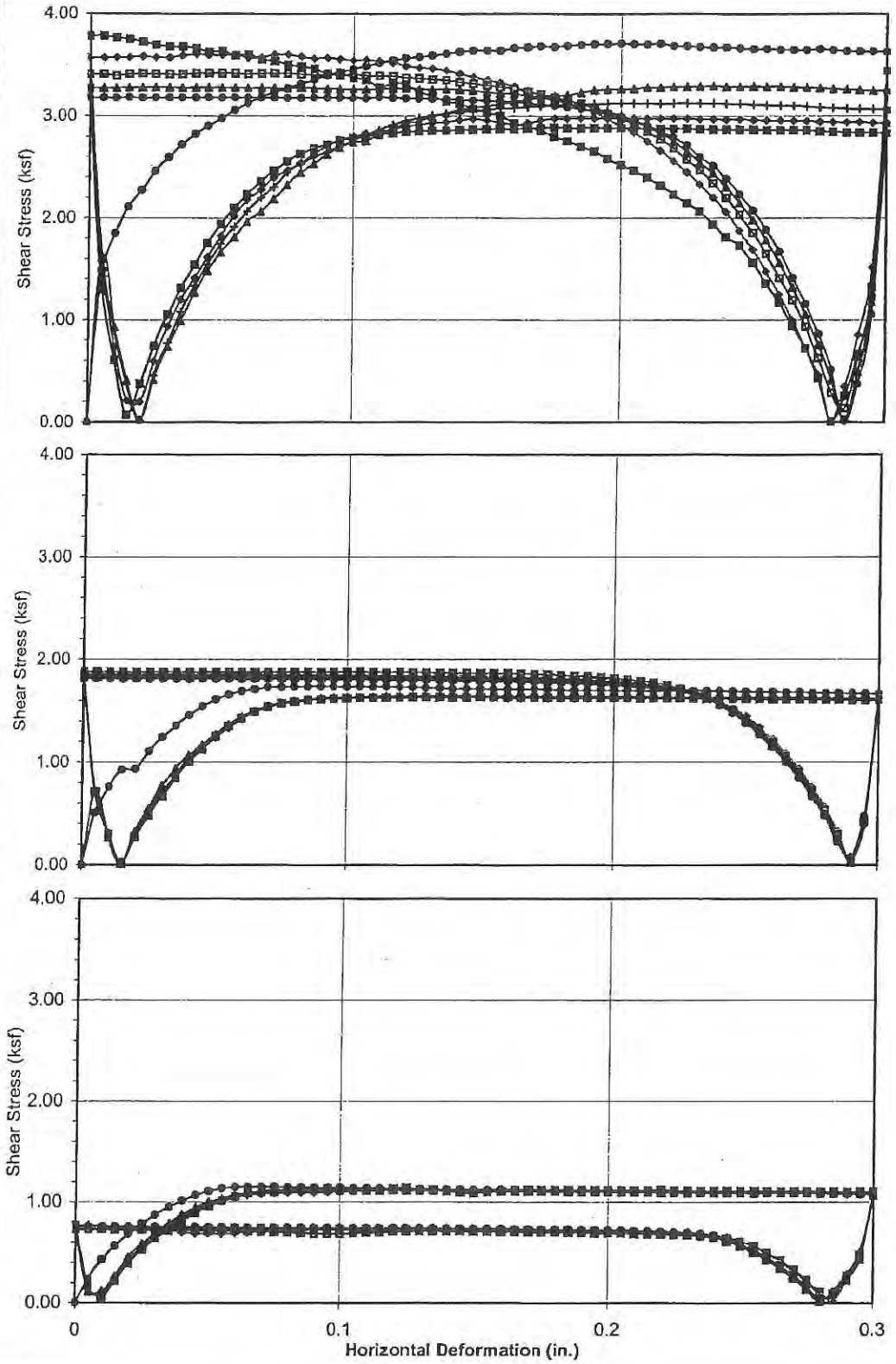


Figure

Summary of Direct Shear Test Results
Messenger Calabasas
Calabasas, California

Project No. 032483-002
Date: October 2010



Normal Stress (ksf) 7.00	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	3.628
■ 2	3.785
▲ 3	3.248
◆ 4	3.568
+ 5	3.065
□ 6	3.408
◇ 7	2.933
▲ 8	3.273
■ 9	2.833
● 10	3.178

Pass 1-2 0.05"/min

Normal Stress (ksf) 4.00	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	1.663
■ 2	1.880
▲ 3	1.622
◆ 4	1.864
+ 5	1.610
□ 6	1.849
◇ 7	1.610
▲ 8	1.827
■ 9	1.603
● 10	1.811

Pass 1-10 0.0017"/min

Normal Stress (ksf) 2.00	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	1.094
■ 2	0.732
▲ 3	1.088
◆ 4	0.723
+ 5	1.088
□ 6	0.729
◇ 7	1.072
▲ 8	0.767
■ 9	1.100
● 10	0.758

Pass 1-10 0.0017"/min

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Leighton

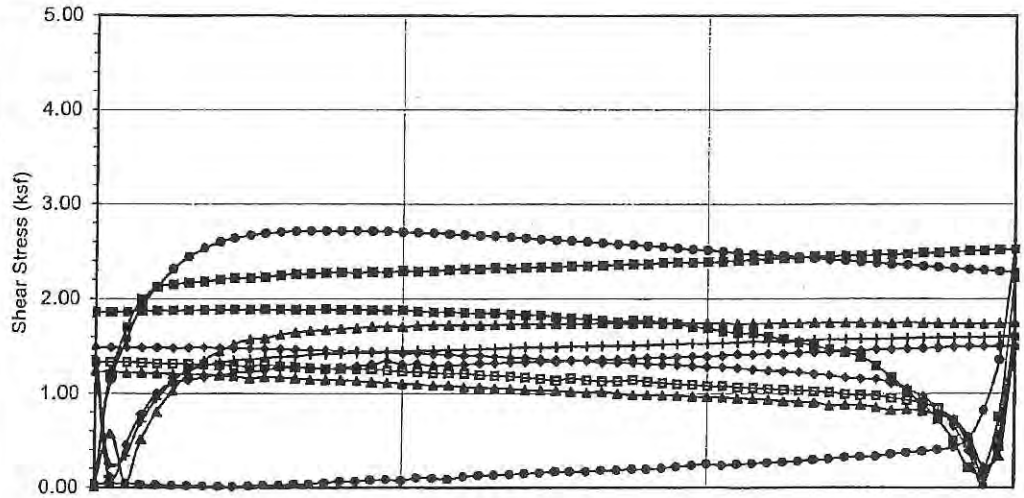
Boring No.:	B-2
Sample No.:	N/A
Depth (ft)	75
Soil Type:	Remold
Soil Description:	Gray lean clay (CL)

Project No.: 032483-002

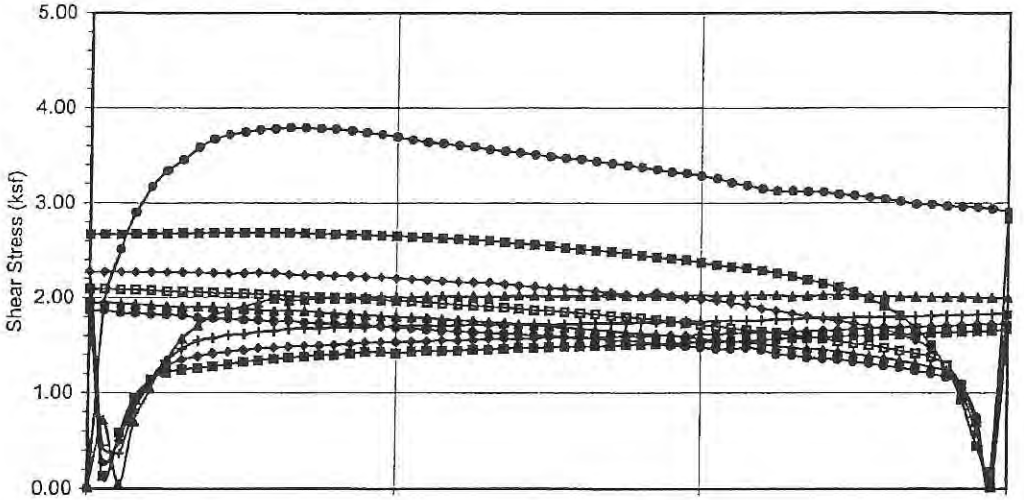
Messenger Calabasas

10-10

DS w Residual (10 passes) B-2 @ 75 7 ksf 4 ksf 2 ksf (incomplete)



Normal Stress (ksf) 4.00	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	2.282
■ 2	1.861
▲ 3	1.742
◆ 4	1.487
+ 5	1.606
□ 6	1.333
◇ 7	1.509
▲ 8	1.232
■ 9	2.524
● 10	0.041



Normal Stress (ksf) 6.00	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	2.908
■ 2	2.669
▲ 3	1.993
◆ 4	2.273
+ 5	1.830
□ 6	2.094
◇ 7	1.729
▲ 8	1.949
■ 9	1.663
● 10	1.864

Normal Stress (ksf)	
Shear Stress @ End of Pass (ksf)	
Pass No.	Shear Stress (ksf)
● 1	
■ 2	
▲ 3	
◆ 4	
+ 5	
□ 6	
◇ 7	
▲ 8	
■ 9	
● 10	

Pass 1-2 0.05"/min
Pass 3-10 0.0017"/min

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Leighton

Boring No.:	B-1
Sample No.:	N/A
Depth (ft)	54
Soil Type:	Remold
Soil Description:	Dark grayish brown lean clay with sand (CL)s

Project No.: 032483-002

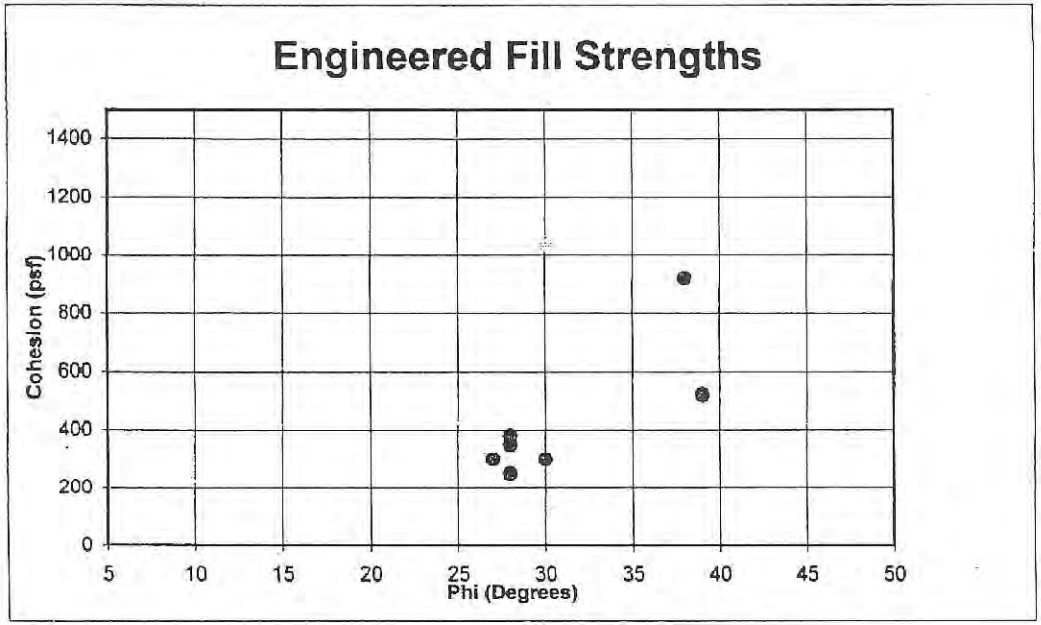
Messenger Calabasas

10-10

DS w Residual (10 passes) B-1 @ 54

ENGINEERED FILL SHEAR STRENGTH DATA PLOT

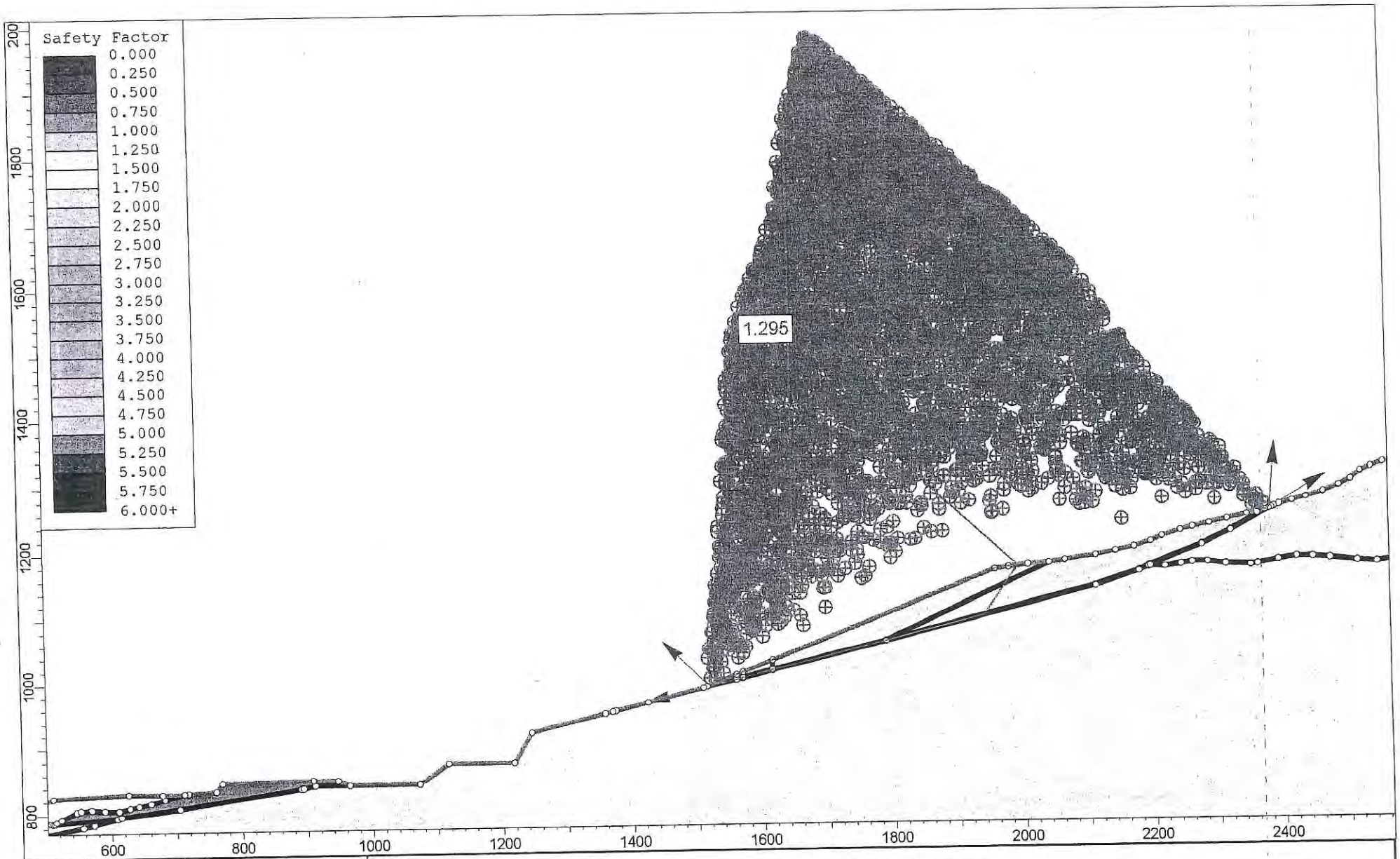
SOURCE:	SOIL TYPE	PHI VALUE	COHESION VALUE	STRENGTH CONDITION	BORING LOCATION AND DEPTH	NOTES
Pacific Soils Engineering, Inc. (1993), Tract 62443	Fill	30	300		PSE-6 @ 81'	Remolded to 93%
Pacific Soils Engineering, Inc. (1993), Tract 62444	Fill	27	300		PSE-2, PSE-12	Remolded to 90%
GeoSoils, Inc. (1990), Tract 62443	Fill	30	300	pk		Remolded
GeoSoils, Inc. (1990), Tract 62443	Fill	28	250	ult.		Remolded
West Coast Soils (2003), Tract 62443	Fill	28	350		B-4 @ 40'	Remolded
Subsurface Design, Inc. (2002), APN: 2069-011-005	Fill	28	380		DH-02 @ 2'	Remolded
RJR Engineering (2007), Tract 62443	Fill	38	920	pk	DH-1 @ 15'-20'	95% Remolded
RJR Engineering (2007), Tract 62443	Fill	39	520	res	DH-1 @ 15'-20'	95% Remolded



Appendix C

Slope Stability Output

Supplemental Landslide Evaluation,
Tentative Tract 62443,
City of Calabasas, California



SLIDEINTERPRET 6.011	Project	Messenger - Calabasas		
	Analysis Description	Section 1-1', Temporary Stability		
	Drawn By	LKS	Scale 1:2400	Company Geolabs-Westlake Village
	Date	5/10/2011, 11:48:35 AM		File Name Section 1-1' - Trial 25.slim

Slide Analysis Information

Messenger - Calabasas

Project Summary

File Name: Section 1-1' - Trial 25.slim
Slide Modeler Version: 6.01
Project Title: Messenger - Calabasas
Analysis: Section 1-1', Temporary Stability
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/10/2011, 11:48:35 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 194
Left Projection Angle (End Angle): 135
Right Projection Angle (Start Angle): 85
Right Projection Angle (End Angle): 30
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	af	Tc	Qls	Slide-2010.10.28	Trial af
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120
Cohesion [psf]	300	500	500		400
Friction Angle [deg]	27	30	30		35
Water Surface	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920
12000	3250

Global Minimums

Method: janbu corrected

FS: 1.295420
Axis Location: 1582.041, 1544.966
Left Slip Surface Endpoint: 1524.765, 988.925
Right Slip Surface Endpoint: 1992.508, 1165.521
Resisting Horizontal Force=696935 lb
Driving Horizontal Force=537998 lb

Method: spencer

FS: 1.273280
Axis Location: 1574.564, 1563.776
Left Slip Surface Endpoint: 1512.762, 984.147
Right Slip Surface Endpoint: 2001.186, 1166.557
Resisting Moment=4.23613e+008 lb-ft
Driving Moment=3.32694e+008 lb-ft
Resisting Horizontal Force=687918 lb
Driving Horizontal Force=540272 lb

Global Minimum Coordinates

Method: janbu corrected

X	Y
1524.77	988.925
1527.3	987.7
1789.99	1053.19
1940.7	1090.99
1992.51	1165.52

Method: spencer

X	Y
1512.76	984.147
1592.11	1003.85
1789.99	1053.19
1928.23	1087.86
2001.19	1166.56

Valid / Invalid Surfaces

Method: janbu corrected

Number of Valid Surfaces: 4926
Number of Invalid Surfaces: 74

Error Codes:

Error Code -108 reported for 66 surfaces
Error Code -112 reported for 8 surfaces

Method: spencer

Number of Valid Surfaces: 4837
Number of Invalid Surfaces: 163

Error Codes:

Error Code -108 reported for 101 surfaces
Error Code -111 reported for 44 surfaces
Error Code -112 reported for 18 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (janbu corrected) - Safety Factor: 1.29542

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.99309	209.832	Qls	500	30	450.518	583.611	332.017	187.2	144.817
2	0.546411	130.823	Slide-2010.10.28	250	21.8014	247.589	320.732	364.029	187.2	176.829
3	20.2065	9064.83	Slide-2010.10.28	250	21.8014	253.356	328.202	382.705	187.2	195.505
4	20.2065	16352.3	Slide-2010.10.28	250	21.8014	356.437	461.735	716.538	187.2	529.338
5	20.2065	23639.7	Slide-2010.10.28	250	21.8014	459.518	595.269	1050.37	187.2	863.172
6	20.2065	30927.1	Slide-2010.10.28	250	21.8014	562.599	728.802	1384.21	187.2	1197.01
7	20.2065	38214.6	Slide-2010.10.28	250	21.8014	665.681	862.336	1718.04	187.2	1530.84
8	20.2065	45502	Slide-2010.10.28	250	21.8014	768.761	995.869	2051.87	187.2	1864.67
9	20.2065	52789.5	Slide-2010.10.28	250	21.8014	871.843	1129.4	2385.71	187.2	2198.51
10	20.2065	60076.9	Slide-2010.10.28	640.909	13.6925	971.202	1258.12	2720.51	187.2	2533.31
11	20.2065	67364.3	Slide-2010.10.28	640.909	13.6925	1035.87	1341.88	3064.34	187.2	2877.14
12	20.2065	74651.8	Slide-2010.10.28	640.909	13.6925	1100.53	1425.65	3408.16	187.2	3220.96
13	20.2065	81939.2	Slide-2010.10.28	640.909	13.6925	1165.2	1509.42	3751.99	187.2	3564.79
14	20.2065	89226.6	Slide-2010.10.28	640.909	13.6925	1229.86	1593.19	4095.81	187.2	3908.61
15	20.2065	96514.1	Slide-2010.10.28	640.909	13.6925	1294.53	1676.96	4439.64	187.2	4252.44
16	21.5306	110816	Slide-2010.10.28	640.909	13.6925	1360.58	1762.52	4790.81	187.2	4603.61
17	21.5306	119006	Slide-2010.10.28	640.909	13.6925	1428.76	1850.85	5153.38	187.2	4966.18
18	21.5306	127196	Slide-2010.10.28	885.556	11.1466	1494.22	1935.65	5516.62	187.2	5329.42

19	21.5306	135386	Slide-2010.10.28	885.556	11.1466	1549.87	2007.74	5882.47	187.2	5695.27
20	21.5306	143575	Slide-2010.10.28	885.556	11.1466	1605.51	2079.82	6248.28	187.2	6061.08
21	21.5306	151765	Slide-2010.10.28	885.556	11.1466	1661.16	2151.9	6614.08	187.2	6426.88
22	21.5306	159955	Slide-2010.10.28	885.556	11.1466	1716.8	2223.98	6979.94	187.2	6792.74
23	0.378257	2873.15	Slide-2010.10.28	640.909	13.6925	1472.39	1907.37	5385.37	187.2	5198.17
24	25.7129	152095	Qls	500	30	1760.75	2280.91	3271.82	187.2	3084.62
25	25.7129	52305.8	Qls	500	30	724.452	938.469	946.65	187.2	759.45

Global Minimum Query (spencer) - Safety Factor: 1.27328

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	19.8357	3532.85	Slide-2010.10.28	250	21.8014	193.175	245.965	177.114	187.2	-10.0865
2	19.8357	10598.5	Slide-2010.10.28	250	21.8014	298.998	380.708	513.968	187.2	326.768
3	19.8357	17664.2	Slide-2010.10.28	250	21.8014	404.821	515.451	850.829	187.2	663.629
4	19.8357	24729.9	Slide-2010.10.28	250	21.8014	510.645	650.194	1187.68	187.2	1000.48
5	21.9872	35642.5	Slide-2010.10.28	250	21.8014	621.547	791.403	1540.71	187.2	1353.51
6	21.9872	44270.9	Slide-2010.10.28	250	21.8014	738.066	939.765	1911.61	187.2	1724.41
7	21.9872	52899.3	Slide-2010.10.28	250	21.8014	854.586	1088.13	2282.52	187.2	2095.32
8	21.9872	61527.7	Slide-2010.10.28	250	21.8014	971.105	1236.49	2653.42	187.2	2466.22
9	21.9872	70156.2	Slide-2010.10.28	640.909	13.6925	1045.69	1331.45	3021.52	187.2	2834.32
10	21.9872	78784.6	Slide-2010.10.28	640.909	13.6925	1116.12	1421.13	3389.6	187.2	3202.4
11	21.9872	87413	Slide-2010.10.28	640.909	13.6925	1186.55	1510.8	3757.67	187.2	3570.47
12	21.9872	96041.4	Slide-2010.10.28	640.909	13.6925	1256.97	1600.48	4125.74	187.2	3938.54
13	21.9872	104670	Slide-2010.10.28	640.909	13.6925	1327.41	1690.16	4493.83	187.2	4306.63
14	19.7479	101329	Slide-2010.10.28	640.909	13.6925	1393.13	1773.85	4837.34	187.2	4650.14
15	19.7479	108219	Slide-2010.10.28	640.909	13.6925	1455.7	1853.52	5164.32	187.2	4977.12
16	19.7479	115109	Slide-2010.10.28	885.556	11.1466	1516.25	1930.62	5491.09	187.2	5303.89
17	19.7479	121999	Slide-2010.10.28	885.556	11.1466	1566.75	1994.91	5817.38	187.2	5630.18
18	19.7479	128888	Slide-2010.10.28	885.556	11.1466	1617.24	2059.2	6143.66	187.2	5956.46
19	19.7479	135778	Slide-2010.10.28	885.556	11.1466	1667.73	2123.49	6469.95	187.2	6282.75
20	19.7479	142668	Slide-2010.10.28	885.556	11.1466	1718.22	2187.78	6796.19	187.2	6608.99
21	0.540183	3984.86	Slide-2010.10.28	640.909	13.6925	1380.78	1758.12	4772.75	187.2	4585.55
22	18.1052	119773	Qls	500	30	2026.21	2579.93	3789.74	187.2	3602.54
23	18.1052	92161.2	Qls	500	30	1615.34	2056.78	2883.63	187.2	2696.43
24	18.1052	56556.7	Qls	500	30	1085.54	1382.2	1715.21	187.2	1528.01
25	18.1052	18866.6	Qls	500	30	530.049	674.901	490.139	187.2	302.939

Interslice Data

Global Minimum Query (janbu corrected) - Safety Factor: 1.29542

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	1524.77	988.925	0	0	0

2	1526.76	987.963	1256.1	0	0
3	1527.3	987.7	1493.2	0	0
4	1547.51	992.737	4907.05	0	0
5	1567.72	997.775	8812.58	0	0
6	1587.92	1002.81	13209.8	0	0
7	1608.13	1007.85	18098.7	0	0
8	1628.34	1012.89	23479.2	0	0
9	1648.54	1017.92	29351.4	0	0
10	1668.75	1022.96	35715.3	0	0
11	1688.96	1028	42487.6	0	0
12	1709.16	1033.04	48891.2	0	0
13	1729.37	1038.07	54926.2	0	0
14	1749.58	1043.11	60592.5	0	0
15	1769.78	1048.15	65890.3	0	0
16	1789.99	1053.19	70819.4	0	0
17	1811.52	1058.59	75514.8	0	0
18	1833.05	1063.99	79784.2	0	0
19	1854.58	1069.39	83562.7	0	0
20	1876.11	1074.79	86615.8	0	0
21	1897.64	1080.19	88943.5	0	0
22	1919.17	1085.59	90545.7	0	0
23	1940.7	1090.99	91422.6	0	0
24	1941.08	1091.53	89072.9	0	0
25	1966.8	1128.53	15272.2	0	0
26	1992.51	1165.52	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.27328

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	1512.76	984.147	0	0	0
2	1532.6	989.074	2951.56	932.368	17.5308
3	1552.43	994.001	6338.4	2002.24	17.5308
4	1572.27	998.928	10160.5	3209.61	17.5309
5	1592.11	1003.85	14417.9	4554.48	17.5308
6	1614.09	1009.34	19611.7	6195.15	17.5308
7	1636.08	1014.82	25329.3	8001.27	17.5308
8	1658.07	1020.3	31570.7	9972.86	17.5308
9	1680.05	1025.78	38335.8	12109.9	17.5308
10	1702.04	1031.26	44719.9	14126.6	17.5308
11	1724.03	1036.74	50631.9	15994.1	17.5308
12	1746.02	1042.22	56071.8	17712.5	17.5308
13	1768	1047.71	61039.6	19281.8	17.5308
14	1789.99	1053.19	65535.3	20702	17.5308
15	1809.74	1058.14	69033.4	21807	17.5308
16	1829.49	1063.09	72145.1	22789.9	17.5308
17	1849.23	1068.05	74831.8	23638.6	17.5308

18	1868.98	1073	76897.6	24291.2	17.5308
19	1888.73	1077.95	78342.5	24747.6	17.5308
20	1908.48	1082.9	79166.4	25007.9	17.5308
21	1928.23	1087.86	79369.4	25072	17.5308
22	1928.77	1088.44	77332.9	24428.7	17.5308
23	1946.87	1107.97	39934	12614.7	17.5307
24	1964.98	1127.5	12807	4045.59	17.5308
25	1983.08	1147.03	-1074.89	-339.547	17.5308
26	2001.19	1166.56	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
1518.07	985.398
1789.99	1053.19
2113	1134.2
2179.52	1156.16
2195.74	1163.06
2276.57	1194.75
2321.29	1215.81
2381.57	1247.77

External Boundary

X	Y
2624.2	1350.53
2614.87	1343.11
2604.76	1334.78
2592.12	1328.93
2574.9	1320.82
2555.64	1315.58
2537.3	1308.56
2521.37	1301.66
2506.79	1289.88
2488.58	1280.95
2464.26	1272.05
2437.53	1263.83
2416.77	1258.68
2396.5	1253.73
2388.5	1250.79
2384.14	1249.18
2380.77	1247.88
2374.78	1245.57
2362.92	1240.82

2346.92	1239.13
2315.97	1232.55
2288.61	1226.72
2262.74	1221.81
2244.08	1216.79
2215.46	1208.04
2198.03	1200.32
2172.19	1192.71
2143.54	1186.16
2113.18	1180
2065.71	1173.13
2041.14	1169.61
2008.62	1167.44
1978.83	1163.89
1957.84	1161.3
1615.3	1024.96
1570.08	1006.96
1559.99	1002.95
1514.95	985.019
1509.04	982.667
1423.87	961.405
1374.99	949.205
1369.83	947.916
1358.12	944.994
1245.22	916.811
1217.72	870
1117	870
1072	840
965	840
947	847
909	848
770	845
760	833
718	830
711.351	829.834
678	829
626	830
511	825
499	821
450	821
437	818
382	817
307	818
164	816
131.749	793.934
126	790

111	789
0	784
0	742
0	600
2630	600
2630	1170.31
2630	1353.39

Material Boundary

X	Y
0	742
65	749
120	751
155	750
225	745
262	740
324	728
355	740
374.49	746.344
410.735	755.027
556.016	781.376
572.491	784.969
608.935	794.307

Material Boundary

X	Y
2321.31	1216.29
2380.77	1247.88

Material Boundary

X	Y
131.749	793.934
195.046	791.949
232.394	792.804
256.909	793.696
288.352	792.868
314.972	793.484
350.691	795.109
377.211	795.723
413.443	796.253
441.769	796.589
472.101	796.549
506.342	787.645

509.55	787.283

Material Boundary

X	Y
2194.58	1163.11
2196.74	1163.01
2219.93	1161.96
2244.46	1165.43
2261.68	1168.23
2285.18	1167.91
2312.98	1164.56
2351.38	1162.65
2361.99	1163.89
2393.33	1169.63
2421.86	1174.18
2446.77	1173.64
2473.17	1171.6
2514.76	1166.88
2544.96	1165.31
2567.98	1168.09
2587.1	1171.29
2605.82	1172.79
2618.42	1172.32
2630	1170.31

Material Boundary

X	Y
1790	1053.61
2041.14	1169.61

Material Boundary

X	Y
509.55	787.283
512.411	787.506
608.935	794.307
614.402	795.707
704.115	806.648
890.742	835.392
894.013	835.896
911.474	840
965	840

Material Boundary

X	Y
1514.95	985.019
1560	996.253
1570.08	998.768
1615.3	1010.04
1790	1053.61
2112.94	1134.67
2179.49	1156.57
2194.58	1163.11
2276.64	1195.18
2321.31	1216.29
2388.5	1250.79

Material Boundary

X	Y
512.411	787.506
514.925	789.849
522.585	793.944
546.187	804.335
552.673	806.013
569.073	807.509
589.015	805.744
610.845	805.102
627.916	809.108
641.496	811.972
660.267	816.099
681.526	821.456
711.351	829.834

Material Boundary

X	Y
1509.04	982.667
1560	995.387
1570.08	997.904
1615.3	1009.19
1790	1052.8
2113.02	1133.79
2179.55	1155.75
2194.63	1162.18
2196.74	1163.01
2276.66	1194.42
2321.3	1215.37
2388.5	1250.79

Material Boundary

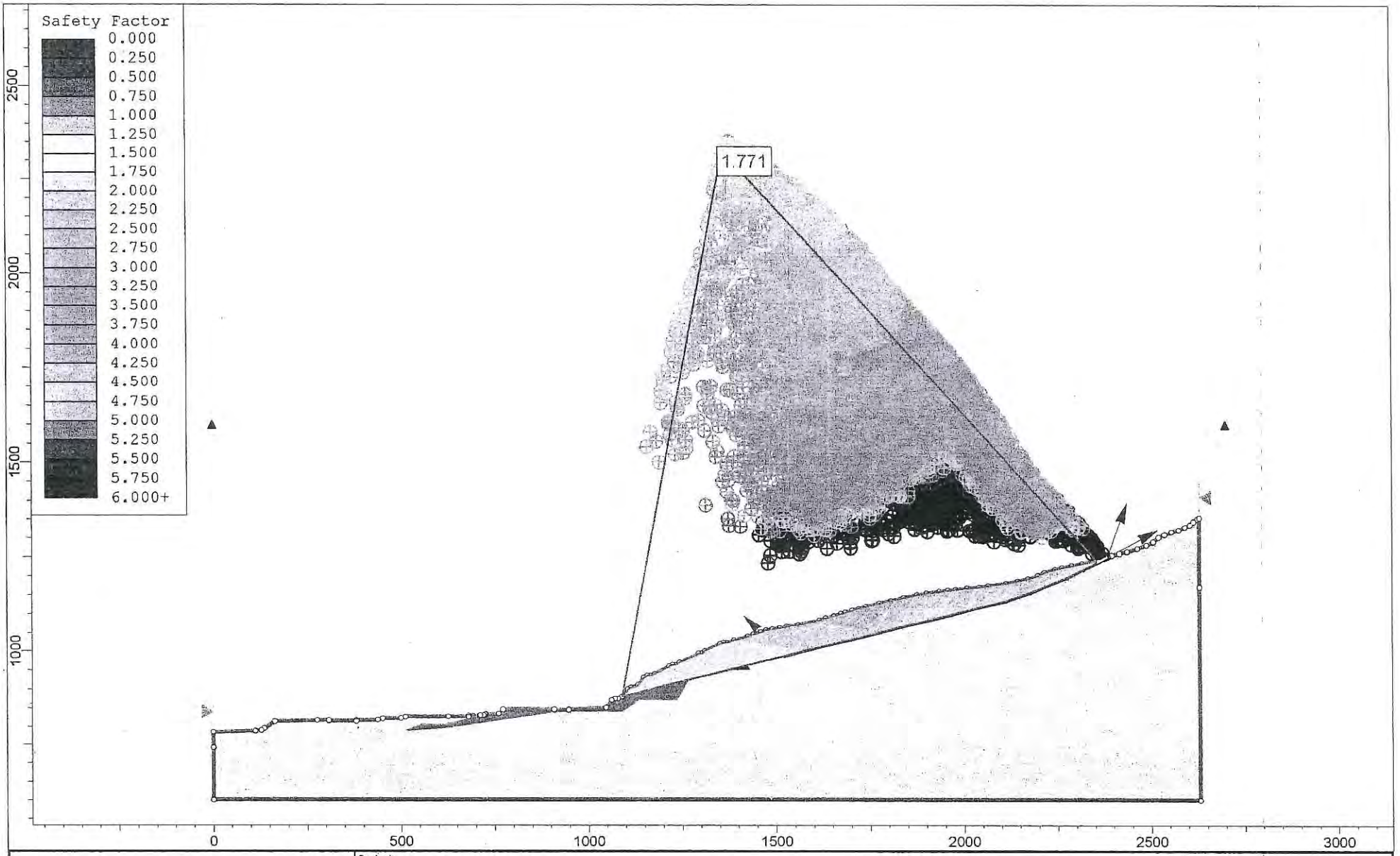
X	Y
1559.99	1002.95
1560	996.253
1560	995.387

Material Boundary

X	Y
1570.08	997.904
1570.08	998.768
1570.08	1006.96

Material Boundary

X	Y
1615.3	1009.19
1615.3	1010.04
1615.3	1024.96



	Project	Messenger Calabasas		
	Analysis Description	Section 1-1', Long Term Stability		
	Drawn By	LKS	Scale 1:4220	Company Geolabs-Westlake Village
SLIDEINTERPRET 6.011	Date	5/27/2011, 10:42:16 AM		File Name Section 1-1' - Trial 27.slim

Slide Analysis Information

Messenger Calabasas

Project Summary

File Name: Section 1-1' - Trial 27.slim
Slide Modeler Version: 6.011
Project Title: Messenger Calabasas
Analysis: Section 1-1', Long Term Stability
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/27/2011, 10:42:16 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 135
Left Projection Angle (End Angle): 194
Right Projection Angle (Start Angle): 70
Right Projection Angle (End Angle): 28
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	af	Tc	Qls	Qal	Slide-2010.10.28	Trial af
Color						
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120	120
Cohesion [psf]	300	500	500	100		400
Friction Angle [deg]	27	30	30	30		35
Water Surface	None	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920
12000	3250

Global Minimums

Method: spencer

FS: 1.771010
Axis Location: 1362.052, 2325.909
Left Slip Surface Endpoint: 1089.310, 879.746
Right Slip Surface Endpoint: 2355.338, 1240.018
Resisting Moment=5.34287e+009 lb-ft
Driving Moment=3.01686e+009 lb-ft
Resisting Horizontal Force=3.84689e+006 lb
Driving Horizontal Force=2.17215e+006 lb

Global Minimum Coordinates

Method: spencer

X	Y
1089.31	879.746
1590.45	1004.4
2112.82	1134.66
2179.28	1156.6
2192.3	1161.81
2276.39	1195.08
2321.02	1216.29
2352.04	1232.46
2355.34	1240.02

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4919
Number of Invalid Surfaces: 81

Error Codes:

Error Code -106 reported for 1 surface
Error Code -108 reported for 64 surfaces
Error Code -111 reported for 16 surfaces

Error Codes

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.77101

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	53.85	102454	Trial af	400	35	861.023	1524.88	1793.69	187.2	1606.49
2	53.85	248597	Trial af	400	35	1872.21	3315.7	4351.25	187.2	4164.05
3	53.85	315818	Trial af	400	35	2337.32	4139.41	5527.63	187.2	5340.43
4	53.85	383811	Trial af	400	35	2807.78	4972.6	6717.54	187.2	6530.34
5	53.85	453193	Trial af	400	35	3287.84	5822.79	7931.75	187.2	7744.55
6	53.85	487372	Trial af	400	35	3524.33	6241.62	8529.89	187.2	8342.69
7	53.85	503623	Trial af	400	35	3636.78	6440.77	8814.31	187.2	8627.11
8	53.85	511747	Trial af	400	35	3692.98	6540.31	8956.46	187.2	8769.26
9	70.3418	631355	Slide-2010.10.28	885.556	11.1466	1419.24	2513.49	8449.23	187.2	8262.03
10	58.0414	512024	Slide-2010.10.28	885.556	11.1466	1402.91	2484.57	8302.49	187.2	8115.29
11	58.0414	522291	Slide-2010.10.28	885.556	11.1466	1421.43	2517.37	8468.92	187.2	8281.72
12	58.0414	538564	Slide-2010.10.28	885.556	11.1466	1450.78	2569.35	8732.74	187.2	8545.54
13	58.0414	535841	Slide-2010.10.28	885.556	11.1466	1445.87	2560.65	8688.59	187.2	8501.39
14	58.0414	523946	Slide-2010.10.28	885.556	11.1466	1424.41	2522.65	8495.75	187.2	8308.55
15	58.0414	492979	Slide-2010.10.28	885.556	11.1466	1368.56	2423.73	7993.72	187.2	7806.52
16	58.0414	445989	Slide-2010.10.28	885.556	11.1466	1283.81	2273.64	7231.97	187.2	7044.77
17	58.0414	387860	Slide-2010.10.28	885.556	11.1466	1178.96	2087.96	6289.62	187.2	6102.42
18	58.0414	336573	Slide-2010.10.28	885.556	11.1466	1086.46	1924.14	5458.17	187.2	5270.97
19	66.455	329450	Slide-2010.10.28	640.909	13.6925	956.126	1693.31	4506.77	187.2	4319.57
20	13.024	58625.2	Slide-2010.10.28	640.909	13.6925	882.254	1562.48	3969.77	187.2	3782.57
21	42.0445	183871	Slide-2010.10.28	640.909	13.6925	867.522	1536.39	3862.68	187.2	3675.48
22	42.0445	165735	Slide-2010.10.28	640.909	13.6925	814.527	1442.53	3477.46	187.2	3290.26
23	44.63	124410	Slide-2010.10.28	250	21.8014	632.494	1120.15	2362.59	187.2	2175.39
24	31.0219	46544.8	Slide-2010.10.28	250	21.8014	378.05	669.53	1236.02	187.2	1048.82
25	3.29262	1425.3	Qls	500	30	198.626	351.768	-69.5459	187.2	-256.746

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.77101

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	1089.31	879.746	0	0	0
2	1143.16	893.141	22373.9	5680.32	14.2454
3	1197.01	906.537	64982.2	16497.7	14.2453
4	1250.86	919.932	116897	29678.1	14.2454
5	1304.71	933.327	178227	45248.4	14.2453
6	1358.56	946.722	249162	63257.6	14.2454
7	1412.41	960.117	324830	82468.2	14.2453

8	1466.26	973.512	402748	102250	14.2453
9	1520.11	986.907	481791	122318	14.2454
10	1590.45	1004.4	433857	110148	14.2453
11	1648.49	1018.88	395187	100330	14.2453
12	1706.53	1033.35	355183	90174.3	14.2453
13	1764.58	1047.82	313066	79481.6	14.2454
14	1822.62	1062.3	271303	68878.7	14.2453
15	1880.66	1076.77	231084	58668	14.2454
16	1938.7	1091.24	194887	49478.2	14.2454
17	1996.74	1105.71	164792	41837.5	14.2453
18	2054.78	1120.19	142245	36113.3	14.2453
19	2112.82	1134.66	126358	32079.9	14.2453
20	2179.28	1156.6	91048.8	23115.6	14.2454
21	2192.3	1161.81	81869.3	20785.1	14.2454
22	2234.35	1178.44	54121.2	13740.3	14.2453
23	2276.39	1195.08	30550.9	7756.3	14.2453
24	2321.02	1216.29	8680.37	2203.78	14.2453
25	2352.04	1232.46	438.746	111.389	14.2453
26	2355.34	1240.02	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
1521.91	987.315
2112.82	1134.66
2179.28	1156.6
2192.3	1161.81
2276.39	1195.08
2321.02	1216.29
2384.14	1249.18

External Boundary

X	Y
2624.2	1350.53
2614.87	1343.11
2604.76	1334.78
2592.12	1328.93
2574.9	1320.82
2555.64	1315.58
2537.3	1308.56
2521.37	1301.66
2506.79	1289.88

2488.58	1280.95
2464.26	1272.05
2437.53	1263.83
2416.77	1258.68
2396.5	1253.73
2386.7	1250.12
2384.14	1249.18
2380.77	1247.88
2374.78	1245.57
2362.92	1240.82
2346.92	1239.13
2315.97	1232.55
2288.61	1226.72
2262.74	1221.81
2244.08	1216.79
2215.46	1208.04
2198.03	1200.32
2172.19	1192.71
2143.54	1186.16
2113.18	1180
2065.71	1173.13
2041.63	1169.64
2008.62	1167.44
1978.83	1163.89
1958	1161.32
1934.75	1158.46
1900.17	1153.34
1875.39	1149.95
1840.24	1142.32
1806.29	1134.71
1775.14	1128.04
1739.6	1119.61
1720.55	1113.67
1703.1	1107.86
1684.75	1102.92
1672	1100
1654.71	1094.77
1632.35	1089.1
1615.3	1083.4
1559.9	1070.53
1528.72	1066.15
1509.04	1062.01
1490.26	1058.99
1473.18	1056.18
1459.32	1050.91
1438.78	1044.56

1424.56	1040
1388.46	1030
1368.26	1022.86
1360.26	1022.86
1350.75	1019.77
1310.83	1000
1301.5	994.004
1293.5	994.004
1243.1	970
1232.47	963.789
1224.47	963.789
1215.48	959.406
1176.77	940
1164.75	934.959
1156.75	934.959
1147.76	930.575
1133.03	910
1121.71	903.51
1113.71	903.51
1104.72	899.127
1089.81	880
1079.3	874.655
1071.3	874.655
1062.31	870.271
1046.88	850
947.231	846.219
947.204	844.119
909.384	844.004
908.816	846.512
772.035	845.467
760.483	834.01
726.165	831.927
726.165	833.95
724.354	833.173
720.515	830.22
711.212	829.853
680.375	828.635
679.731	825.241
626.012	825.831
511.852	825.496
500.094	821.444
451.461	820.668
438.006	816.939
381.23	815.304
381.23	813.166
307.999	813.505

307.822	815.308
277.112	815.703
164.016	812.552
135.635	794.361
127.901	789.404
112.187	788.906
111.962	786.908
1.4e-014	783.904
1.42109e-014	742
0	600
2630	600
2630	1170.31
2630	1353.39

Material Boundary

X	Y
1.42109e-014	742
65	749
120	751
155	750
225	745
262	740
324	728
355	740
374.49	746.344
410.735	755.027
556.016	781.376
572.491	784.969
614.437	795.712

Material Boundary

X	Y
1072	840
1090	840
1135	870
1235.72	870
1266.49	923.295
1267.03	924.22
1521.9	987.781
2112.8	1135.15
2179.32	1157.04
2192.3	1162.2
2276.44	1195.64
2321.09	1216.74

2380.77	1247.88

Material Boundary

X	Y
2192.3	1162.2
2194.24	1162.19
2219.93	1161.96
2244.46	1165.43
2261.68	1168.23
2285.18	1167.91
2312.98	1164.56
2351.38	1162.65
2361.99	1163.89
2393.33	1169.63
2421.86	1174.18
2446.77	1173.64
2473.17	1171.6
2514.76	1166.88
2544.96	1165.31
2567.98	1168.09
2587.1	1171.29
2605.82	1172.79
2618.42	1172.32
2630	1170.31

Material Boundary

X	Y
135.635	794.361
151.396	793.846
173.727	793.21
191.657	792.321
202.048	792.499
210.673	792.647
232.394	792.804
256.909	793.696
288.352	792.868
314.972	793.484
350.691	795.109
377.211	795.723
413.443	796.253
441.769	796.589
472.101	796.549
506.342	787.645
509.55	787.283

Material Boundary

X	Y
1521.9	987.781
1559.99	1002.94
1570.08	1006.96
1615.3	1024.95
1958	1161.32

Material Boundary

X	Y
911.474	840
929.474	840
1072	840

Material Boundary

X	Y
512.411	787.506
608.752	795.018
614.437	795.712
704.115	806.648
890.742	835.392
894.013	835.896
911.474	840

Material Boundary

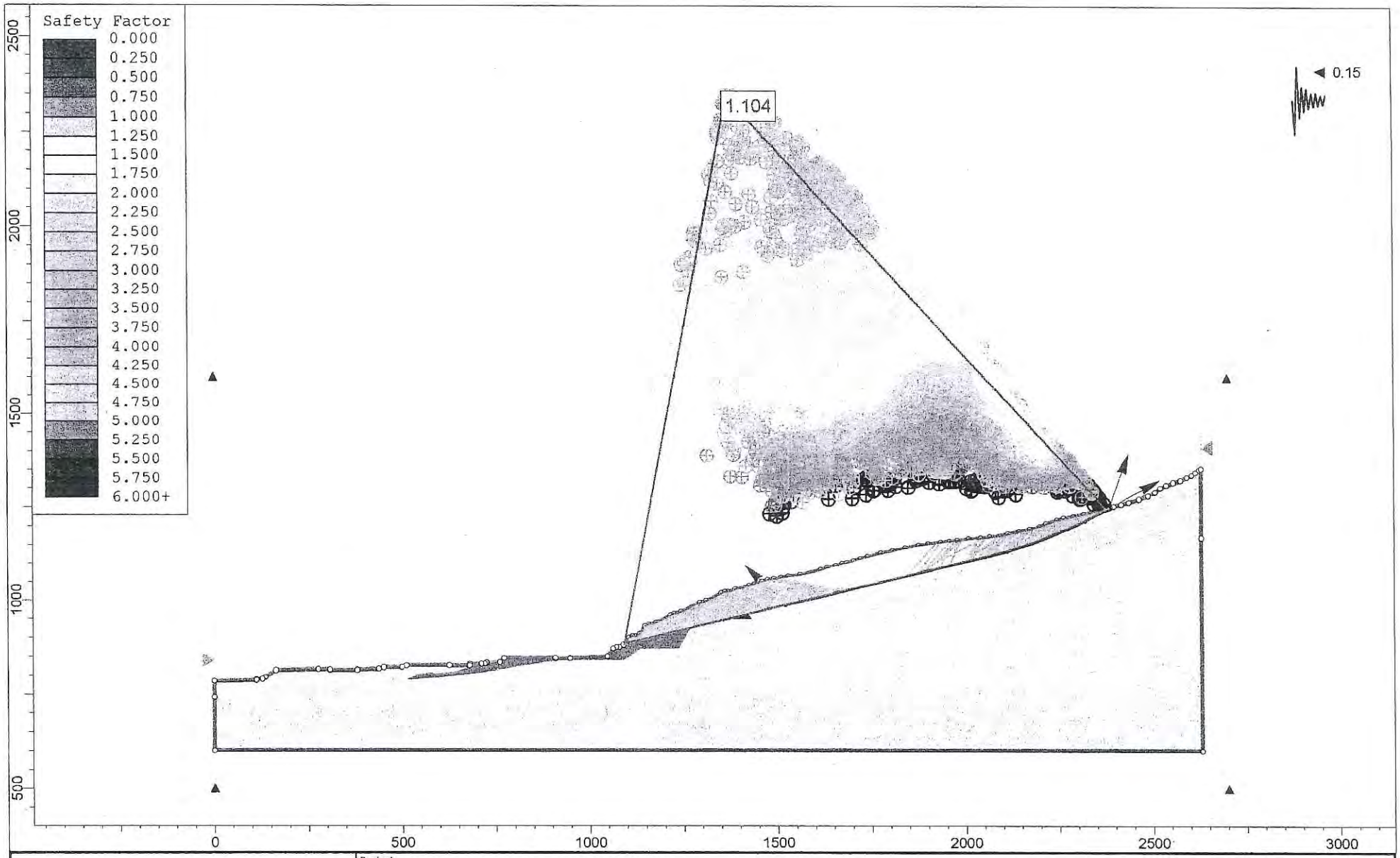
X	Y
509.55	787.283
512.411	787.506
514.925	789.849
522.585	793.944
546.187	804.335
552.673	806.013
569.073	807.509
589.015	805.744
610.845	805.102
627.916	809.108
641.496	811.972
660.267	816.099
681.526	821.456
701.581	827
711.212	829.853

Material Boundary

X	Y
1266.49	923.295
1518.35	986.048
1521.95	986.944
2112.8	1134.13
2179.36	1156.14
2192.31	1161.42
2194.24	1162.19
2276.4	1194.62
2321.11	1215.79
2386.7	1250.12

Material Boundary

X	Y
1518.35	986.048
1521.9	987.781



SLIDEINTERPRET 6.011

Project	Messenger Calabasas			
Analysis Description	Section 1-1', Long Term Stability			
Drawn By	LKS	Scale	1:4220	Company: Geolabs-Westlake Village
Date	5/27/2011, 10:42:16 AM			File Name: Section 1-1' - Trial 27.slim

Slide Analysis Information

Messenger Calabasas

Project Summary

File Name: Section 1-1' - Trial 27.slim
Slide Modeler Version: 6.011
Project Title: Messenger Calabasas
Analysis: Section 1-1', Long Term Stability
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/27/2011, 10:42:16 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 135
Left Projection Angle (End Angle): 194
Right Projection Angle (Start Angle): 70
Right Projection Angle (End Angle): 28
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.15

Material Properties

Property	af	Tc	Qls	Qal	Slide-2010.10.28	Trial af
Color						
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120	120
Cohesion [psf]	300	500	500	100		400
Friction Angle [deg]	27	30	30	30		35
Water Surface	None	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920

12000	3250

Global Minimums

Method: spencer

FS: 1.104110
Axis Location: 1369.672, 2347.336
Left Slip Surface Endpoint: 1091.451, 882.106
Right Slip Surface Endpoint: 2374.923, 1245.621
Resisting Moment=5.24675e+009 lb-ft
Driving Moment=4.75203e+009 lb-ft
Resisting Horizontal Force=3.73543e+006 lb
Driving Horizontal Force=3.38321e+006 lb

Global Minimum Coordinates

Method: spencer

X	Y
1091.45	882.106
1634.81	1015.47
2112.82	1134.66
2179.28	1156.6
2192.3	1161.81
2276.39	1195.08
2321.02	1216.29
2374.35	1244.08
2374.92	1245.62

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4933
Number of Invalid Surfaces: 67

Error Codes:

Error Code -106 reported for 1 surface
Error Code -108 reported for 58 surfaces
Error Code -111 reported for 8 surfaces

Error Codes

The following errors were encountered during the computation:

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to

avoid numerical errors which may result from too many slices, or too small a slip region.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.10411

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	53.7909	99081.6	Trial af	400	35	1340.64	1480.21	1729.9	187.2	1542.7
2	53.7909	241129	Trial af	400	35	2893.52	3194.76	4178.52	187.2	3991.32
3	53.7909	308972	Trial af	400	35	3635.17	4013.63	5347.99	187.2	5160.79
4	53.7909	377746	Trial af	400	35	4387.01	4843.74	6533.52	187.2	6346.32
5	53.7909	448904	Trial af	400	35	5164.92	5702.64	7760.15	187.2	7572.95
6	53.7909	481558	Trial af	400	35	5521.9	6096.78	8323.04	187.2	8135.84
7	53.7909	499513	Trial af	400	35	5718.18	6313.5	8632.55	187.2	8445.35
8	53.7909	507462	Trial af	400	35	5805.08	6409.45	8769.59	187.2	8582.39
9	56.517	506817	Slide-2010.10.28	885.556	11.1466	2204.69	2434.22	8046.92	187.2	7859.72
10	56.517	496270	Slide-2010.10.28	885.556	11.1466	2175.05	2401.5	7880.87	187.2	7693.67
11	59.7516	536020	Slide-2010.10.28	885.556	11.1466	2201.97	2431.22	8031.71	187.2	7844.51
12	59.7516	551045	Slide-2010.10.28	885.556	11.1466	2241.82	2475.22	8255.03	187.2	8067.83
13	59.7516	553428	Slide-2010.10.28	885.556	11.1466	2248.14	2482.2	8290.44	187.2	8103.24
14	59.7516	541151	Slide-2010.10.28	885.556	11.1466	2215.58	2446.25	8107.98	187.2	7920.78
15	59.7516	512066	Slide-2010.10.28	885.556	11.1466	2138.44	2361.08	7675.73	187.2	7488.53
16	59.7516	463025	Slide-2010.10.28	885.556	11.1466	2008.37	2217.47	6946.87	187.2	6759.67
17	59.7516	402149	Slide-2010.10.28	885.556	11.1466	1846.91	2039.2	6042.14	187.2	5854.94
18	59.7516	347131	Slide-2010.10.28	640.909	13.6925	1691.89	1868.03	5223.9	187.2	5036.7
19	66.455	329450	Slide-2010.10.28	640.909	13.6925	1475.37	1628.97	4242.66	187.2	4055.46
20	13.024	58625.2	Slide-2010.10.28	640.909	13.6925	1353.21	1494.09	3689.08	187.2	3501.88
21	42.0445	183871	Slide-2010.10.28	640.909	13.6925	1331.99	1470.67	3592.91	187.2	3405.71
22	42.0445	165735	Slide-2010.10.28	640.909	13.6925	1253.21	1383.69	3235.93	187.2	3048.73
23	44.63	124410	Slide-2010.10.28	250	21.8014	943.833	1042.1	2167.45	187.2	1980.25
24	53.3263	55766.5	Slide-2010.10.28	250	21.8014	439.552	485.314	775.485	187.2	588.285
25	0.573608	45.3941	Qls	500	30	523.867	578.407	323.004	187.2	135.804

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.10411

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	1091.45	882.106	0	0	0
2	1145.24	895.308	34356.4	11696.8	18.8014

3	1199.03	908.511	98542.8	33549.5	18.8015
4	1252.82	921.713	176976	60252.6	18.8015
5	1306.61	934.915	269852	91872.8	18.8015
6	1360.41	948.117	377671	128581	18.8015
7	1414.2	961.319	492348	167623	18.8015
8	1467.99	974.521	610795	207949	18.8015
9	1521.78	987.723	730911	248843	18.8014
10	1578.29	1001.59	667771	227347	18.8015
11	1634.81	1015.47	606843	206604	18.8015
12	1694.56	1030.36	538243	183248	18.8014
13	1754.32	1045.26	466441	158803	18.8015
14	1814.07	1060.16	394131	134184	18.8014
15	1873.82	1075.06	324437	110457	18.8015
16	1933.57	1089.96	260941	88839	18.8015
17	1993.32	1104.86	207894	70778.9	18.8015
18	2053.07	1119.76	167819	57134.9	18.8014
19	2112.82	1134.66	138931	47300	18.8015
20	2179.28	1156.6	94380.7	32132.5	18.8015
21	2192.3	1161.81	83980.8	28591.8	18.8015
22	2234.35	1178.44	52596	17906.6	18.8014
23	2276.39	1195.08	26560.2	9042.57	18.8014
24	2321.02	1216.29	4008.47	1364.71	18.8015
25	2374.35	1244.08	-2481.83	-844.956	18.8015
26	2374.92	1245.62	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
1521.91	987.315
2112.82	1134.66
2179.28	1156.6
2192.3	1161.81
2276.39	1195.08
2321.02	1216.29
2384.14	1249.18

External Boundary

X	Y
2624.2	1350.53
2614.87	1343.11
2604.76	1334.78
2592.12	1328.93
2574.9	1320.82

2555.64	1315.58
2537.3	1308.56
2521.37	1301.66
2506.79	1289.88
2488.58	1280.95
2464.26	1272.05
2437.53	1263.83
2416.77	1258.68
2396.5	1253.73
2386.7	1250.12
2384.14	1249.18
2380.77	1247.88
2374.78	1245.57
2362.92	1240.82
2346.92	1239.13
2315.97	1232.55
2288.61	1226.72
2262.74	1221.81
2244.08	1216.79
2215.46	1208.04
2198.03	1200.32
2172.19	1192.71
2143.54	1186.16
2113.18	1180
2065.71	1173.13
2041.63	1169.64
2008.62	1167.44
1978.83	1163.89
1958	1161.32
1934.75	1158.46
1900.17	1153.34
1875.39	1149.95
1840.24	1142.32
1806.29	1134.71
1775.14	1128.04
1739.6	1119.61
1720.55	1113.67
1703.1	1107.86
1684.75	1102.92
1672	1100
1654.71	1094.77
1632.35	1089.1
1615.3	1083.4
1559.9	1070.53
1528.72	1066.15
1509.04	1062.01

1490.26	1058.99
1473.18	1056.18
1459.32	1050.91
1438.78	1044.56
1424.56	1040
1388.46	1030
1368.26	1022.86
1360.26	1022.86
1350.75	1019.77
1310.83	1000
1301.5	994.004
1293.5	994.004
1243.1	970
1232.47	963.789
1224.47	963.789
1215.48	959.406
1176.77	940
1164.75	934.959
1156.75	934.959
1147.76	930.575
1133.03	910
1121.71	903.51
1113.71	903.51
1104.72	899.127
1089.81	880
1079.3	874.655
1071.3	874.655
1062.31	870.271
1046.88	850
947.231	846.219
947.204	844.119
909.384	844.004
908.816	846.512
772.035	845.467
760.483	834.01
726.165	831.927
726.165	833.95
724.354	833.173
720.515	830.22
711.212	829.853
680.375	828.635
679.731	825.241
626.012	825.831
511.852	825.496
500.094	821.444
451.461	820.668

438.006	816.939
381.23	815.304
381.23	813.166
307.999	813.505
307.822	815.308
277.112	815.703
164.016	812.552
135.635	794.361
127.901	789.404
112.187	788.906
111.962	786.908
1.4e-014	783.904
1.42109e-014	742
0	600
2630	600
2630	1170.31
2630	1353.39

Material Boundary

X	Y
1.42109e-014	742
65	749
120	751
155	750
225	745
262	740
324	728
355	740
374.49	746.344
410.735	755.027
556.016	781.376
572.491	784.969
614.437	795.712

Material Boundary

X	Y
1072	840
1090	840
1135	870
1235.72	870
1266.49	923.295
1267.03	924.22
1521.9	987.781
2112.8	1135.15

2179.32	1157.04
2192.3	1162.2
2276.44	1195.64
2321.09	1216.74
2380.77	1247.88

Material Boundary

X	Y
2192.3	1162.2
2194.24	1162.19
2219.93	1161.96
2244.46	1165.43
2261.68	1168.23
2285.18	1167.91
2312.98	1164.56
2351.38	1162.65
2361.99	1163.89
2393.33	1169.63
2421.86	1174.18
2446.77	1173.64
2473.17	1171.6
2514.76	1166.88
2544.96	1165.31
2567.98	1168.09
2587.1	1171.29
2605.82	1172.79
2618.42	1172.32
2630	1170.31

Material Boundary

X	Y
135.635	794.361
151.396	793.846
173.727	793.21
191.657	792.321
202.048	792.499
210.673	792.647
232.394	792.804
256.909	793.696
288.352	792.868
314.972	793.484
350.691	795.109
377.211	795.723
413.443	796.253

441.769	796.589
472.101	796.549
506.342	787.645
509.55	787.283

Material Boundary

X	Y
1521.9	987.781
1559.99	1002.94
1570.08	1006.96
1615.3	1024.95
1958	1161.32

Material Boundary

X	Y
911.474	840
929.474	840
1072	840

Material Boundary

X	Y
512.411	787.506
608.752	795.018
614.437	795.712
704.115	806.648
890.742	835.392
894.013	835.896
911.474	840

Material Boundary

X	Y
509.55	787.283
512.411	787.506
514.925	789.849
522.585	793.944
546.187	804.335
552.673	806.013
569.073	807.509
589.015	805.744
610.845	805.102
627.916	809.108
641.496	811.972

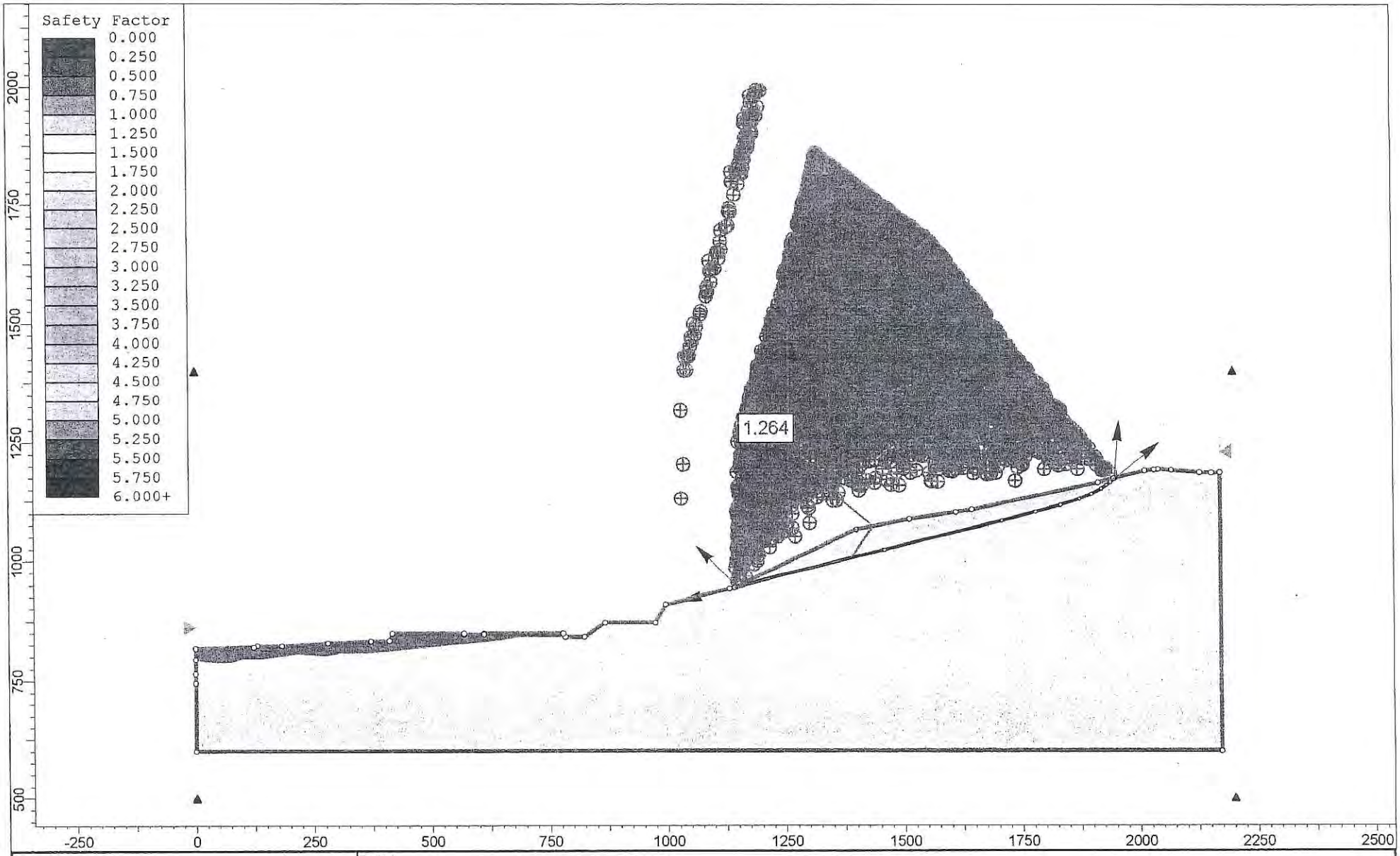
660.267	816.099
681.526	821.456
701.581	827
711.212	829.853

Material Boundary

X	Y
1266.49	923.295
1518.35	986.048
1521.95	986.944
2112.8	1134.13
2179.36	1156.14
2192.31	1161.42
2194.24	1162.19
2276.4	1194.62
2321.11	1215.79
2386.7	1250.12

Material Boundary

X	Y
1518.35	986.048
1521.9	987.781



	Project	Messenger - Calabasas; RJR Design, April 2011		
	Analysis Description	Section 2-2', Temporary Backcut		
	Drawn By	LKS	Scale 1:3353	Company Geolabs-Westlake Village
SLIDEINTERPRET 6.011	Date	5/5/2011, 5:18:54 AM		File Name Section 2-2' - Trial 22.slim

Slide Analysis Information

Messenger - Calabasas; RJR Design, April 2011

Project Summary

File Name: Section 2-2' - Trial 22.slim
Slide Modeler Version: 6.01
Project Title: Messenger - Calabasas; RJR Design, April 2011
Analysis: Section 2-2', Temporary Backcut
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/5/2011, 5:18:54 AM
Comments:

Mat Prop from Trial 12 (most recent date)

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 195
Left Projection Angle (End Angle): 135
Right Projection Angle (Start Angle): 85
Right Projection Angle (End Angle): 38
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	af	Tc	Qls	Slide-2010.10.28	Trial af
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120
Cohesion [psf]	300	500	500		400
Friction Angle [deg]	27	30	30		35
Water Surface	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920
12000	3250

Global Minimums

Method: spencer

FS: 1.263890
Axis Location: 1162.761, 1300.408
Left Slip Surface Endpoint: 1144.043, 944.825
Right Slip Surface Endpoint: 1435.997, 1072.083
Resisting Moment=1.46681e+008 lb-ft
Driving Moment=1.16055e+008 lb-ft
Resisting Horizontal Force=371712 lb
Driving Horizontal Force=294102 lb

Global Minimum Coordinates

Method: spencer

X	Y
1144.04	944.825
1355.72	996.564
1388.53	1004.58
1436	1072.08

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4815
Number of Invalid Surfaces: 185

Error Codes:

Error Code -108 reported for 118 surfaces
Error Code -111 reported for 34 surfaces
Error Code -112 reported for 33 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.26389

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	12.4514	2095.7	Slide-2010.10.28	250	21.8014	192.998	243.928	172.02	187.2	-15.1799
2	12.4514	6287.09	Slide-2010.10.28	250	21.8014	294.171	371.8	491.699	187.2	304.499
3	12.4514	10478.5	Slide-2010.10.28	250	21.8014	395.344	499.671	811.376	187.2	624.176
4	12.4514	14669.9	Slide-2010.10.28	250	21.8014	496.517	627.543	1131.06	187.2	943.86
5	12.4514	18861.3	Slide-2010.10.28	250	21.8014	597.69	755.414	1450.74	187.2	1263.54
6	12.4514	23052.7	Slide-2010.10.28	250	21.8014	698.863	883.286	1770.41	187.2	1583.21
7	12.4514	27244	Slide-2010.10.28	250	21.8014	800.036	1011.16	2090.1	187.2	1902.9
8	12.4514	31435.4	Slide-2010.10.28	250	21.8014	901.209	1139.03	2409.77	187.2	2222.57
9	12.4514	35626.8	Slide-2010.10.28	640.909	13.6925	997.083	1260.2	2729.08	187.2	2541.88
10	12.4514	39818.2	Slide-2010.10.28	640.909	13.6925	1058.04	1337.25	3045.32	187.2	2858.12
11	12.4514	44009.6	Slide-2010.10.28	640.909	13.6925	1119.01	1414.3	3361.57	187.2	3174.37
12	12.4514	48201	Slide-2010.10.28	640.909	13.6925	1179.97	1491.35	3677.81	187.2	3490.61
13	12.4514	52392.4	Slide-2010.10.28	640.909	13.6925	1240.93	1568.4	3994.05	187.2	3806.85
14	12.4514	56583.8	Slide-2010.10.28	640.909	13.6925	1301.89	1645.45	4310.3	187.2	4123.1
15	12.4514	60775.2	Slide-2010.10.28	640.909	13.6925	1362.86	1722.5	4626.54	187.2	4439.34
16	12.4514	64966.6	Slide-2010.10.28	640.909	13.6925	1423.81	1799.54	4942.79	187.2	4755.59
17	12.4514	69158	Slide-2010.10.28	640.909	13.6925	1484.77	1876.59	5259.04	187.2	5071.84
18	10.9378	64209.8	Slide-2010.10.28	885.556	11.1466	1537.67	1943.45	5556.18	187.2	5368.98
19	10.9378	67445.8	Slide-2010.10.28	885.556	11.1466	1580.86	1998.04	5833.25	187.2	5646.05
20	10.9378	70681.8	Slide-2010.10.28	885.556	11.1466	1624.05	2052.63	6110.33	187.2	5923.13
21	0.334549	2205	Slide-2010.10.28	640.909	13.6925	1159.18	1465.08	3569.98	187.2	3382.78
22	11.7831	69499.7	Qls	500	30	1595.53	2016.58	2814	187.2	2626.8
23	11.7831	51164.7	Qls	500	30	1235.98	1562.14	2026.88	187.2	1839.68
24	11.7831	30698.8	Qls	500	30	834.637	1054.89	1148.3	187.2	961.096
25	11.7831	10232.9	Qls	500	30	431.329	545.153	265.407	187.2	78.2067

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.26389

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	1144.04	944.825	0	0	0
2	1156.49	947.868	1881.87	633.557	18.6065
3	1168.95	950.912	4051.76	1364.08	18.6065
4	1181.4	953.955	6509.67	2191.57	18.6065
5	1193.85	956.999	9255.6	3116.02	18.6065
6	1206.3	960.042	12289.5	4137.44	18.6066
7	1218.75	963.086	15611.5	5255.83	18.6065
8	1231.2	966.129	19221.5	6471.18	18.6065
9	1243.65	969.173	23119.5	7783.49	18.6065

10	1256.11	972.216	27240.6	9170.92	18.6065
11	1268.56	975.26	31159	10490.1	18.6065
12	1281.01	978.303	34874.8	11741.1	18.6065
13	1293.46	981.347	38387.8	12923.8	18.6065
14	1305.91	984.39	41698.1	14038.2	18.6065
15	1318.36	987.434	44805.7	15084.4	18.6065
16	1330.81	990.477	47710.6	16062.4	18.6065
17	1343.27	993.521	50412.8	16972.2	18.6066
18	1355.72	996.564	52912.4	17813.7	18.6065
19	1366.65	999.236	54899.9	18482.8	18.6065
20	1377.59	1001.91	56619.9	19061.8	18.6065
21	1388.53	1004.58	58072.4	19550.8	18.6065
22	1388.86	1005.06	56762.1	19109.7	18.6065
23	1400.65	1021.81	28427.3	9570.44	18.6065
24	1412.43	1038.57	9041.13	3043.82	18.6065
25	1424.21	1055.33	-356.444	-120.002	18.6065
26	1436	1072.08	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
1146.42	945.431
1460.03	1022.05
1708.51	1083.18
1780.75	1101.91
1833.19	1116.03
1873.62	1129.16
1899.2	1139.76
1920.29	1150.84
1931.16	1158.72
1939.43	1164.67
1947.35	1172.65

External Boundary

X	Y
0	817
0	794
0	765
0	745
0	600
2172	600
2172	1186
2154	1185

2129	1186
2069	1191
2041	1193
2032	1192
2012	1190
1948.82	1173.41
1946.81	1172.88
1913	1164
1645	1107
1610.87	1101.83
1513	1087
1400.21	1065.15
1146	945.743
1142.47	944.085
1131.87	941.496
996.313	908.385
974.262	871
868	871
824	841
784	841
779.116	848
611.116	848
611.116	846
569.116	846
569.116	848
417.116	848
411.116	833
371.116	832
280.116	828
183.116	822
131.116	823
123.116	820

Material Boundary

X	Y
0	794
20	790
58	787
76	789
99	795
137	795
165.885	799.074
210	805.295
215	806
252.178	803.479

274	802
300	806
304.063	807.125
341.586	807.341
365.953	808.226
419.331	811.892
461.206	816.198
519.32	821.982
604.67	830.369
642.315	834.738
684.604	841
784	841

Material Boundary

X	Y
0	765
60	765
60	770
105	770
121.376	770
121.376	775
150	775
150	780
162.85	780
170	780
170	785
185	785
185	790
195	790
195	795
205	795
205	800
210	800
210	805.295

Material Boundary

X	Y
0	745
105	770

Material Boundary

X	Y
1939.28	1165.08

1946.81	1172.88

Material Boundary

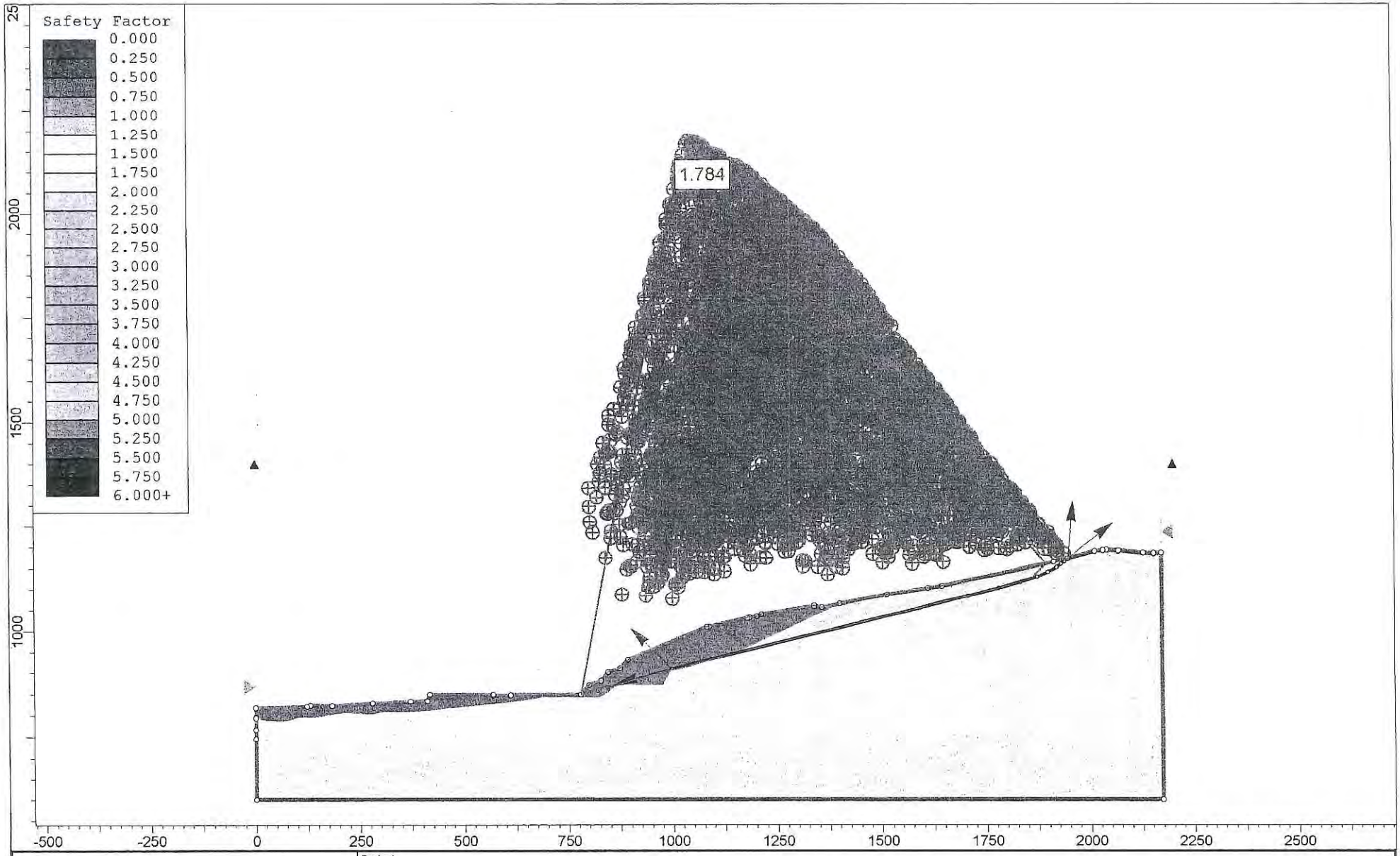
X	Y
1460.01	1022.43
1610.87	1101.83

Material Boundary

X	Y
1146	945.743
1460.01	1022.43
1708.46	1083.62
1780.59	1102.41
1833.18	1116.43
1873.58	1129.7
1899.19	1140.34
1920.2	1151.56
1931.11	1159.29
1939.28	1165.08
1948.82	1173.41

Material Boundary

X	Y
1142.47	944.085
1460	1021.65
1708.47	1082.83
1780.83	1101.31
1833.11	1115.52
1873.68	1128.55
1899.23	1139.22
1920.49	1150.26
1931.3	1158.3
1939.57	1164.21
1948.82	1173.41



	Project	Messenger - Calabasas; RJR Design, April 2011		
	Analysis Description	Section 2-2', Permanent Stability		
	Drawn By	LKS	Scale 1:3794	Company Geolabs-Westlake Village
SLIDEINTERPRET 6.011	Date	5/5/2011, 5:18:54 AM		File Name Section 2-2' - Trial 23.slim

Slide Analysis Information

Messenger - Calabasas; RJR Design, April 2011

Project Summary

File Name: Section 2-2' - Trial 23.slim
Slide Modeler Version: 6.01
Project Title: Messenger - Calabasas; RJR Design, April 2011
Analysis: Section 2-2', Permanent Stability
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/5/2011, 5:18:54 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 195
Left Projection Angle (End Angle): 135
Right Projection Angle (Start Angle): 85
Right Projection Angle (End Angle): 38
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Property	af	Tc	Qls	Slide-2010.10.28	Trial af
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120
Cohesion [psf]	300	500	500		400
Friction Angle [deg]	27	30	30		35
Water Surface	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920
12000	3250

Global Minimums

Method: spencer

FS: 1.783500
Axis Location: 1025.158, 2119.892
Left Slip Surface Endpoint: 779.281, 848.191
Right Slip Surface Endpoint: 1894.993, 1160.170
Resisting Moment=3.71399e+009 lb-ft
Driving Moment=2.08241e+009 lb-ft
Resisting Horizontal Force=3.06541e+006 lb
Driving Horizontal Force=1.71876e+006 lb

Global Minimum Coordinates

Method: spencer

X	Y
779.281	848.191
1153.13	947.135
1459.99	1022.04
1708.47	1083.25
1780.74	1101.86
1833.14	1115.95
1860.16	1124.76
1894.99	1160.17

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4814
Number of Invalid Surfaces: 186

Error Codes:

Error Code -108 reported for 105 surfaces
Error Code -111 reported for 30 surfaces
Error Code -112 reported for 51 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.7835

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	53.777	99670.7	Trial af	400	35	824.755	1470.95	1716.68	187.2	1529.48
2	53.777	240129	Trial af	400	35	1777.99	3171.04	4144.66	187.2	3957.46
3	53.777	362035	Trial af	400	35	2605.32	4646.58	6251.94	187.2	6064.74
4	53.777	415500	Trial af	400	35	2968.16	5293.71	7176.14	187.2	6988.94
5	45.614	393538	Tc	500	30	2820.49	5030.34	8033.98	187.2	7846.78
6	45.614	430944	Tc	500	30	3067.97	5471.72	8798.47	187.2	8611.27
7	45.614	435965	Tc	500	30	3101.19	5530.97	8901.09	187.2	8713.89
8	12.3534	116389	Trial af	400	35	3586.87	6397.19	8752.11	187.2	8564.91
9	9.54304	89421.4	Slide-2010.10.28	885.556	11.1466	1447.34	2581.33	8793.55	187.2	8606.35
10	51.1446	473008	Slide-2010.10.28	885.556	11.1466	1441.86	2571.56	8743.98	187.2	8556.78
11	51.1446	469861	Slide-2010.10.28	885.556	11.1466	1435.43	2560.09	8685.74	187.2	8498.54
12	51.1446	444624	Slide-2010.10.28	885.556	11.1466	1383.82	2468.05	8218.63	187.2	8031.43
13	51.1446	410995	Slide-2010.10.28	885.556	11.1466	1315.05	2345.4	7596.19	187.2	7408.99
14	51.1446	359375	Slide-2010.10.28	885.556	11.1466	1209.5	2157.15	6640.76	187.2	6453.56
15	51.1446	343559	Slide-2010.10.28	885.556	11.1466	1177.16	2099.47	6348.03	187.2	6160.83
16	49.6956	318348	Slide-2010.10.28	885.556	11.1466	1144.01	2040.35	6048.01	187.2	5860.81
17	49.6956	297310	Slide-2010.10.28	885.556	11.1466	1099.77	1961.45	5647.55	187.2	5460.35
18	49.6956	269242	Slide-2010.10.28	640.909	13.6925	1032.31	1841.13	5113.46	187.2	4926.26
19	49.6956	241843	Slide-2010.10.28	640.909	13.6925	961.11	1714.14	4592.25	187.2	4405.05
20	49.6956	227140	Slide-2010.10.28	640.909	13.6925	922.904	1646	4312.56	187.2	4125.36
21	72.271	309005	Slide-2010.10.28	640.909	13.6925	882.24	1573.47	4014.89	187.2	3827.69
22	52.396	204557	Slide-2010.10.28	640.909	13.6925	832.045	1483.95	3647.45	187.2	3460.25
23	27.0225	95765.8	Slide-2010.10.28	640.909	13.6925	775.084	1382.36	3230.47	187.2	3043.27
24	0.779605	2590.68	Slide-2010.10.28	250	21.8014	618.42	1102.95	2319.58	187.2	2132.38
25	34.0505	55935.7	Qls	500	30	540.882	964.663	992.021	187.2	804.821

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.7835

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	779.281	848.191	0	0	0
2	833.058	862.424	19912.9	4385.54	12.4203
3	886.835	876.657	56522.8	12448.4	12.4204
4	940.612	890.89	107624	23702.8	12.4204
5	994.389	905.123	165082	36356.9	12.4203
6	1040	917.195	196726	43326.2	12.4203
7	1085.62	929.267	230428	50748.6	12.4203
8	1131.23	941.34	264407	58231.8	12.4203

9	1143.58	944.609	280095	61687	12.4203
10	1153.13	947.135	271695	59837	12.4203
11	1204.27	959.62	236263	52033.6	12.4203
12	1255.42	972.104	201230	44318	12.4203
13	1306.56	984.589	169389	37305.5	12.4203
14	1357.71	997.073	141802	31230	12.4204
15	1408.85	1009.56	120746	26592.7	12.4204
16	1459.99	1022.04	101691	22396	12.4203
17	1509.69	1034.28	84501.4	18610.2	12.4203
18	1559.39	1046.52	70015.6	15419.9	12.4203
19	1609.08	1058.77	58715.3	12931.2	12.4203
20	1658.78	1071.01	50257.3	11068.5	12.4204
21	1708.47	1083.25	43324.6	9541.63	12.4203
22	1780.74	1101.86	32334.1	7121.14	12.4203
23	1833.14	1115.95	24523.6	5400.97	12.4203
24	1860.16	1124.76	17032	3751.06	12.4203
25	1860.94	1125.55	15675.4	3452.28	12.4203
26	1894.99	1160.17	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
996.638	908.936
1459.99	1022.04
1708.47	1083.25
1780.74	1101.86
1833.14	1115.95
1873.64	1129.15
1899.2	1139.79
1920.34	1150.88
1931.31	1158.77
1939.41	1164.64
1947.88	1173.16

External Boundary

X	Y
0	817
0	794
0	765
0	745
0	600
2172	600
2172	1186

2154	1185
2129	1186
2069	1191
2041	1193
2032	1192
2012	1190
1948.82	1173.41
1946.81	1172.88
1913	1164
1645	1107
1610.87	1101.83
1513	1087
1400	1065.11
1357.61	1056.9
1339	1060
1213	1040
1201.59	1034.29
1184	1032
1179.12	1030.9
1086.49	1010
1082	1010
892	931
873	911
844	901
828	881
799	871
779.116	848
611.116	848
611.116	846
569.116	846
569.116	848
417.116	848
411.116	833
371.116	832
280.116	828
183.116	822
131.116	823
123.116	820

Material Boundary

X	Y
0	794
20	790
58	787
76	789

99	795
137	795
165.885	799.074
210	805.295
215	806
252.178	803.479
274	802
300	806
304.063	807.125
341.586	807.341
365.953	808.226
419.331	811.892
461.206	816.198
519.32	821.982
604.67	830.369
642.315	834.738
684.604	841
784	841
824	841
868	871
974.262	871
996.313	908.385
996.866	909.321
1008.55	930.383
1131.87	1003.06
1142.47	1009.3
1179.12	1030.9

Material Boundary

X	Y
0	765
60	765
60	770
105	770
121.376	770
121.376	775
150	775
150	780
162.85	780
170	780
170	785
185	785
185	790
195	790
195	795

205	795
205	800
210	800
210	805.295

Material Boundary

X	Y
0	745
105	770

Material Boundary

X	Y
1939.28	1165.08
1946.81	1172.88

Material Boundary

X	Y
1460.01	1022.43
1610.87	1101.83

Material Boundary

X	Y
996.866	909.321
1131.87	942.293
1142.47	944.881
1145.99	945.742
1460.01	1022.43
1708.46	1083.62
1780.59	1102.41
1833.18	1116.43
1873.58	1129.7
1899.19	1140.34
1920.2	1151.56
1931.11	1159.29
1939.28	1165.08
1948.82	1173.41

Material Boundary

X	Y
996.313	908.385
1131.87	941.496

1142.47	944.085
1460	1021.65
1708.47	1082.83
1780.83	1101.31
1833.11	1115.52
1873.68	1128.55
1899.23	1139.22
1920.49	1150.26
1931.3	1158.3
1939.57	1164.21
1948.82	1173.41

Material Boundary

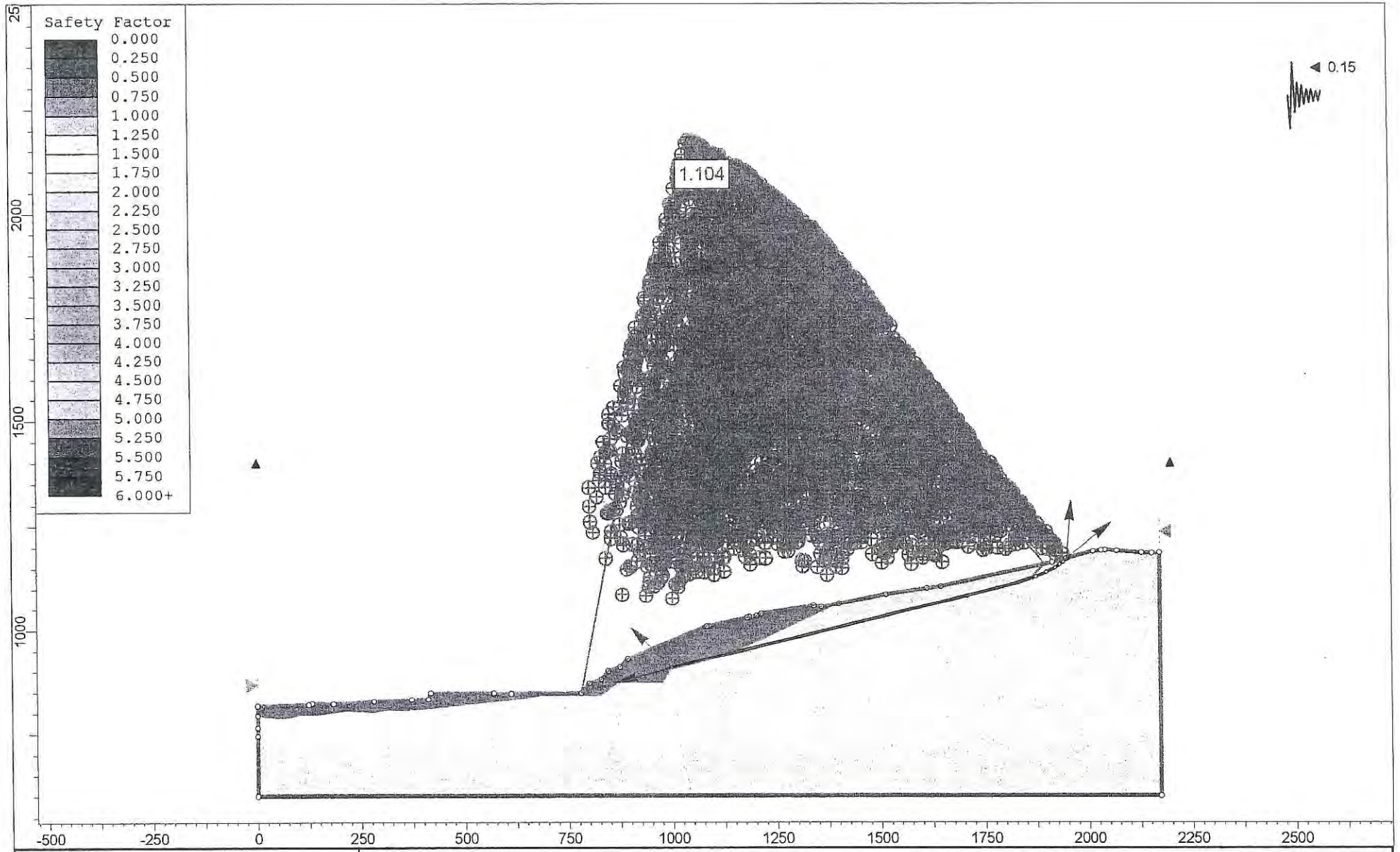
X	Y
1131.87	941.496
1131.87	942.293
1131.87	1003.06

Material Boundary

X	Y
1142.47	944.085
1142.47	944.881
1142.47	1009.3

Material Boundary

X	Y
1142.47	944.085
1145.99	945.742
1400	1065.11



	Project	Messenger - Calabasas; RJR Design, April 2011		
	Analysis Description	Section 2-2', Permanent Stability		
	Drawn By	LKS	Scale 1:3794	Company Geolabs-Westlake Village
	Date	5/5/2011, 5:18:54 AM		File Name Section 2-2' - Trial 23.slim

SLIDEINTERPRET 6.011

Slide Analysis Information

Messenger - Calabasas; RJR Design, April 2011

Project Summary

File Name: Section 2-2' - Trial 23.slim
Slide Modeler Version: 6.011
Project Title: Messenger - Calabasas; RJR Design, April 2011
Analysis: Section 2-2', Permanent Stability
Author: LKS
Company: Geolabs-Westlake Village
Date Created: 5/5/2011, 5:18:54 AM

General Settings

Units of Measurement: Imperial Units
Time Units: days
Permeability Units: feet/second
Failure Direction: Right to Left
Data Output: Standard
Maximum Material Properties: 20
Maximum Support Properties: 20

Analysis Options

Analysis Methods Used

Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50
Check malpha < 0.2: Yes
Initial trial value of FS: 1
Steffensen Iteration: Yes

Groundwater Analysis

Groundwater Method: Grid (Pressure Head)
Pore Fluid Unit Weight: 62.4 lbs/ft3
Grid Interpolation: Modified Chugh
Advanced Groundwater Method: None

Random Numbers

Pseudo-random Seed: 10116
Random Number Generation Method: Park and Miller v.3

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 195
Left Projection Angle (End Angle): 135
Right Projection Angle (Start Angle): 85
Right Projection Angle (End Angle): 38
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.15

Material Properties

Property	af	Tc	Qls	Slide-2010.10.28	Trial af
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Shear Normal function	Mohr-Coulomb
Unit Weight [lbs/ft3]	120	120	120	120	120
Cohesion [psf]	300	500	500		400
Friction Angle [deg]	27	30	30		35
Water Surface	None	None	None	None	None
Grid (Pore Pressure)	On	On	On	On	On

Shear Normal Functions

Name: Slide Plane

Normal (psf)	Shear (psf)
3373	1390
6661	2356
9610	3085
12000	3441
15000	3746

Name: 2010.10,28_Nonlinear

Normal (psf)	Shear (psf)
0	250
2500	1250
5250	1920

12000	3250

Global Minimums

Method: spencer

FS: 1.104300
Axis Location: 1025.158, 2119.892
Left Slip Surface Endpoint: 779.281, 848.191
Right Slip Surface Endpoint: 1894.993, 1160.170
Resisting Moment=3.62769e+009 lb-ft
Driving Moment=3.28507e+009 lb-ft
Resisting Horizontal Force=2.99559e+006 lb
Driving Horizontal Force=2.71266e+006 lb

Global Minimum Coordinates

Method: spencer

X	Y
779.281	848.191
1153.13	947.135
1459.99	1022.04
1708.47	1083.25
1780.74	1101.86
1833.14	1115.95
1860.16	1124.76
1894.99	1160.17

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 4760
Number of Invalid Surfaces: 240

Error Codes:

Error Code -108 reported for 138 surfaces
Error Code -111 reported for 94 surfaces
Error Code -112 reported for 8 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge

-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (spencer) - Safety Factor: 1.1043

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	53.777	99670.7	Trial af	400	35	1341.22	1481.11	1731.19	187.2	1543.99
2	53.777	240129	Trial af	400	35	2862.99	3161.6	4131.16	187.2	3943.96
3	53.777	362035	Trial af	400	35	4183.75	4620.12	6214.16	187.2	6026.96
4	53.777	415500	Trial af	400	35	4763.01	5259.79	7127.7	187.2	6940.5
5	45.614	393538	Tc	500	30	4469.09	4935.22	7869.22	187.2	7682.02
6	45.614	430944	Tc	500	30	4858.1	5364.8	8613.28	187.2	8426.08
7	45.614	435965	Tc	500	30	4910.31	5422.46	8713.14	187.2	8525.94
8	12.3534	116389	Trial af	400	35	5750.75	6350.55	8685.43	187.2	8498.23
9	9.54304	89421.4	Slide-2010.10.28	885.556	11.1466	2241.47	2475.26	8255.23	187.2	8068.03
10	51.1446	473008	Slide-2010.10.28	885.556	11.1466	2240.97	2474.71	8252.42	187.2	8065.22
11	51.1446	469861	Slide-2010.10.28	885.556	11.1466	2231.29	2464.02	8198.19	187.2	8010.99
12	51.1446	444624	Slide-2010.10.28	885.556	11.1466	2153.71	2378.35	7763.36	187.2	7576.16
13	51.1446	410995	Slide-2010.10.28	885.556	11.1466	2050.33	2264.18	7183.97	187.2	6996.77
14	51.1446	359375	Slide-2010.10.28	885.556	11.1466	1891.64	2088.94	6294.6	187.2	6107.4
15	51.1446	343559	Slide-2010.10.28	885.556	11.1466	1843.02	2035.25	6022.12	187.2	5834.92
16	49.6956	318348	Slide-2010.10.28	885.556	11.1466	1792.56	1979.53	5739.32	187.2	5552.12
17	49.6956	297310	Slide-2010.10.28	640.909	13.6925	1723.06	1902.78	5366.5	187.2	5179.3
18	49.6956	269242	Slide-2010.10.28	640.909	13.6925	1612.77	1780.98	4866.61	187.2	4679.41
19	49.6956	241843	Slide-2010.10.28	640.909	13.6925	1505.12	1662.1	4378.64	187.2	4191.44
20	49.6956	227140	Slide-2010.10.28	640.909	13.6925	1447.34	1598.3	4116.8	187.2	3929.6
21	72.271	309005	Slide-2010.10.28	640.909	13.6925	1383.04	1527.29	3825.35	187.2	3638.15
22	52.396	204557	Slide-2010.10.28	640.909	13.6925	1304.74	1440.82	3470.42	187.2	3283.22
23	27.0225	95765.8	Slide-2010.10.28	640.909	13.6925	1207.62	1333.58	3030.24	187.2	2843.04
24	0.779605	2590.68	Slide-2010.10.28	250	21.8014	840.157	927.785	1881.66	187.2	1694.46
25	34.0505	55935.7	Qls	500	30	752.818	831.337	761.093	187.2	573.893

Interslice Data

Global Minimum Query (spencer) - Safety Factor: 1.1043

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	779.281	848.191	0	0	0
2	833.058	862.424	32586.8	12620.3	21.1705
3	886.835	876.657	91839.1	35567.6	21.1705

4	940.612	890.89	174235	67478	21.1705
5	994.389	905.123	266781	103319	21.1704
6	1040	917.195	316745	122669	21.1704
7	1085.62	929.267	369872	143244	21.1704
8	1131.23	941.34	423423	163984	21.1705
9	1143.58	944.609	448658	173757	21.1705
10	1153.13	947.135	435800	168777	21.1704
11	1204.27	959.62	376515	145817	21.1704
12	1255.42	972.104	317884	123111	21.1705
13	1306.56	984.589	264497	102435	21.1705
14	1357.71	997.073	218096	84464.4	21.1704
15	1408.85	1009.56	182419	70647.7	21.1705
16	1459.99	1022.04	150029	58103.4	21.1704
17	1509.69	1034.28	121167	46925.5	21.1704
18	1559.39	1046.52	96566.8	37398.5	21.1704
19	1609.08	1058.77	76811.9	29747.8	21.1704
20	1658.78	1071.01	61786.2	23928.7	21.1705
21	1708.47	1083.25	49298.3	19092.3	21.1704
22	1780.74	1101.86	31758.5	12299.5	21.1705
23	1833.14	1115.95	20580.4	7970.4	21.1704
24	1860.16	1124.76	12200.5	4725.02	21.1704
25	1860.94	1125.55	10975.8	4250.73	21.1705
26	1894.99	1160.17	0	0	0

List Of Coordinates

Block Search Polyline

X	Y
996.638	908.936
1459.99	1022.04
1708.47	1083.25
1780.74	1101.86
1833.14	1115.95
1873.64	1129.15
1899.2	1139.79
1920.34	1150.88
1931.31	1158.77
1939.41	1164.64
1947.88	1173.16

External Boundary

X	Y
0	817
0	794

0	765
0	745
0	600
2172	600
2172	1186
2154	1185
2129	1186
2069	1191
2041	1193
2032	1192
2012	1190
1948.82	1173.41
1946.81	1172.88
1913	1164
1645	1107
1610.87	1101.83
1513	1087
1400	1065.11
1357.61	1056.9
1339	1060
1213	1040
1201.59	1034.29
1184	1032
1179.12	1030.9
1086.49	1010
1082	1010
892	931
873	911
844	901
828	881
799	871
779.116	848
611.116	848
611.116	846
569.116	846
569.116	848
417.116	848
411.116	833
371.116	832
280.116	828
183.116	822
131.116	823
123.116	820

Material Boundary

X	Y
0	794
20	790
58	787
76	789
99	795
137	795
165.885	799.074
210	805.295
215	806
252.178	803.479
274	802
300	806
304.063	807.125
341.586	807.341
365.953	808.226
419.331	811.892
461.206	816.198
519.32	821.982
604.67	830.369
642.315	834.738
684.604	841
784	841
824	841
868	871
974.262	871
996.313	908.385
996.866	909.321
1008.55	930.383
1131.87	1003.06
1142.47	1009.3
1179.12	1030.9

Material Boundary

X	Y
0	765
60	765
60	770
105	770
121.376	770
121.376	775
150	775
150	780
162.85	780
170	780

170	785
185	785
185	790
195	790
195	795
205	795
205	800
210	800
210	805.295

Material Boundary

X	Y
0	745
105	770

Material Boundary

X	Y
1939.28	1165.08
1946.81	1172.88

Material Boundary

X	Y
1460.01	1022.43
1610.87	1101.83

Material Boundary

X	Y
996.866	909.321
1131.87	942.293
1142.47	944.881
1145.99	945.742
1460.01	1022.43
1708.46	1083.62
1780.59	1102.41
1833.18	1116.43
1873.58	1129.7
1899.19	1140.34
1920.2	1151.56
1931.11	1159.29
1939.28	1165.08
1948.82	1173.41

Material Boundary

X	Y
996.313	908.385
1131.87	941.496
1142.47	944.085
1460	1021.65
1708.47	1082.83
1780.83	1101.31
1833.11	1115.52
1873.68	1128.55
1899.23	1139.22
1920.49	1150.26
1931.3	1158.3
1939.57	1164.21
1948.82	1173.41

Material Boundary

X	Y
1131.87	941.496
1131.87	942.293
1131.87	1003.06

Material Boundary

X	Y
1142.47	944.085
1142.47	944.881
1142.47	1009.3

Material Boundary

X	Y
1142.47	944.085
1145.99	945.742
1400	1065.11

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RJR Engineering, January 16, 2009; Geologic and Geotechnical Engineering Feasibility Study and Mitigation Measures, Vesting Tentative tract Map 63442, Agoura and Las Virgenes Road, City of Calabasas, California

..., July 17, 2009; Addendum 1, Geologic and Geotechnical Engineering Feasibility Study and Mitigation Measures, Vesting Tentative Tract Map 63442, City of Calabasas, California

APPENDIX I

Table 9: Slope Stability Analysis

Analysis No.	Section	Condition	Analysis	Limits (Uncorrected) Initiation			Termination		Factor of Safety	Comments
Appendix I										
20	SS-SS'	Circular	Pseudo	65	67		90	120	2.298	Front Commercial Slope Seg Facing - Adj to Las Virgenes Road
21	SS-SS'	Circular	Staic	383	420		445	545	1.748	Rear Commercial Seg Facing – Behind
22	SS-SS'	Circular	Pseudo	383	420		445	545	1.362	Rear Commercial Slope Seg Facing – Behind Building

Analysis 5

NATURAL SLOPES & DESILTING BASIN

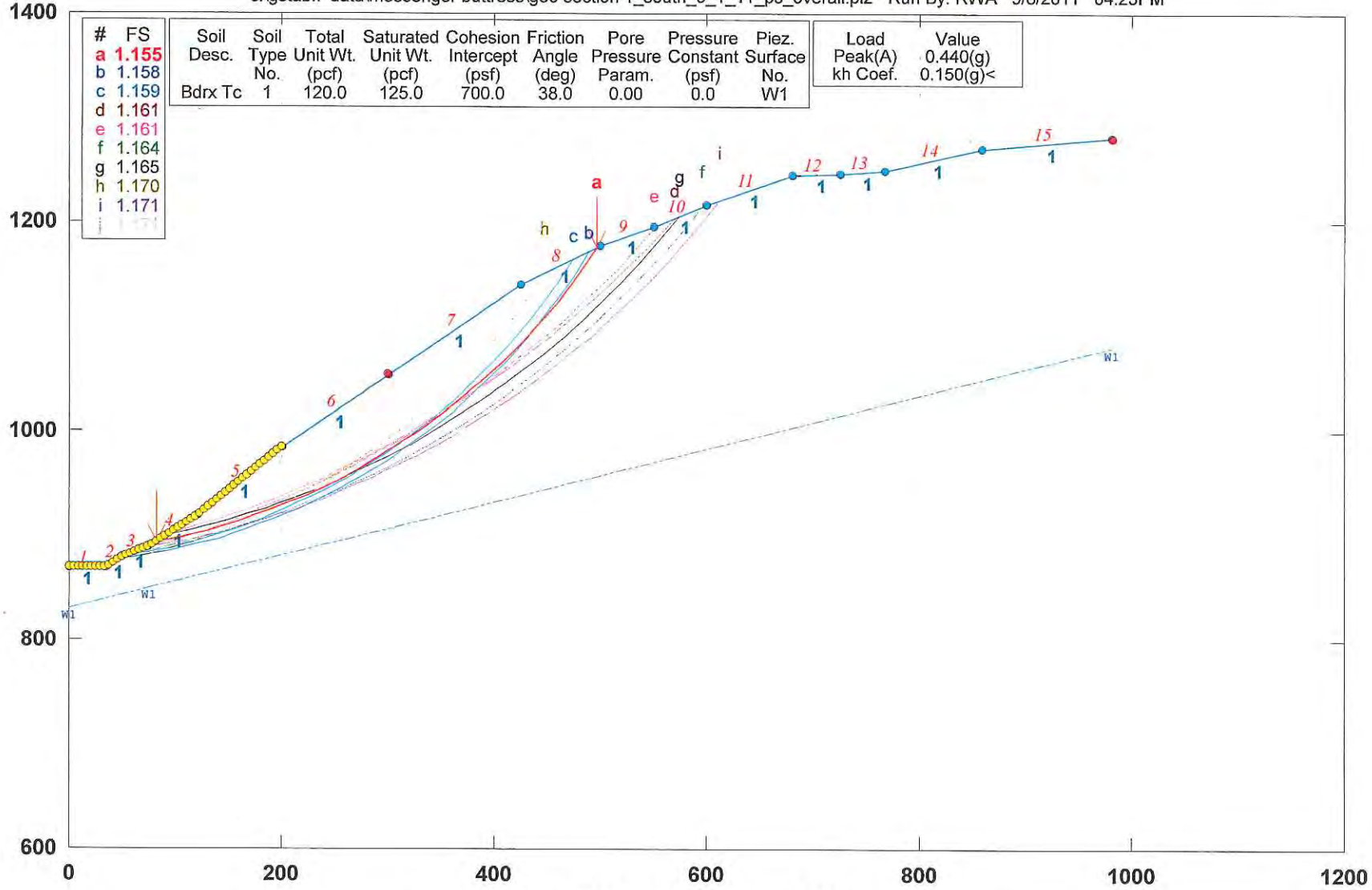
Tract 71546 / Calabasas Geo Section 1 (South)

c:\gstabl7 data\messenger buttress\geo section 1_south_9_1_11_ps_overall.pl2 Run By: RWA 9/8/2011 04:23PM

#	FS
a	1.155
b	1.158
c	1.159
d	1.161
e	1.161
f	1.164
g	1.165
h	1.170
i	1.171
j	1.171

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Bdrx Tc	1	120.0	125.0	700.0	38.0	0.00	0.0	W1

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.155

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/8/2011
Time of Run: 04:23PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_PS_overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_PS_overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_PS_overall.PLT

PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 1 (South)

BOUNDARY COORDINATES
15 Top Boundaries
15 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	870.00	35.00	870.00	1
2	35.00	870.00	50.00	880.00	1
3	50.00	880.00	75.00	890.00	1
4	75.00	890.00	121.00	920.00	1
5	121.00	920.00	200.00	985.00	1
6	200.00	985.00	300.00	1054.00	1
7	300.00	1054.00	425.00	1140.00	1
8	425.00	1140.00	500.00	1178.00	1
9	500.00	1178.00	550.00	1195.00	1
10	550.00	1195.00	600.00	1217.00	1
11	600.00	1217.00	680.00	1245.00	1
12	680.00	1245.00	725.00	1247.00	1
13	725.00	1247.00	768.00	1250.00	1
14	768.00	1250.00	858.00	1270.00	1
15	858.00	1270.00	982.00	1280.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	830.00
2	75.00	850.00
3	982.00	1080.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 982.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 5.678 FS Min = 1.155 FS Ave = 1.754
Standard Deviation = 0.373 Coefficient of Variation = 21.26 %
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.633	894.326
2	106.076	899.571
3	130.296	905.770
4	154.253	912.914
5	177.912	920.991
6	201.236	929.990
7	224.190	939.897
8	246.737	950.696
9	268.844	962.370
10	290.476	974.903
11	311.600	988.274
12	332.183	1002.462
13	352.195	1017.447
14	371.603	1033.205
15	390.379	1049.711
16	408.493	1066.941
17	425.918	1084.868
18	442.627	1103.465
19	458.593	1122.702
20	473.793	1142.550
21	488.204	1162.979
22	496.933	1176.446

Circle Center At X = -39.611 ; Y = 1519.541 ; and Radius = 636.862
Factor of Safety
*** 1.155 ***
Individual data on the 25 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	24.4	15687.7	0.0	0.0	0.	0.	2353.2	0.0	0.0
2	14.9	24450.6	0.0	0.0	0.	0.	3667.6	0.0	0.0
3	9.3	21466.0	0.0	0.0	0.	0.	3219.9	0.0	0.0
4	24.0	80964.5	0.0	0.0	0.	0.	12144.7	0.0	0.0
5	23.7	113963.2	0.0	0.0	0.	0.	17094.5	0.0	0.0
6	22.1	134278.9	0.0	0.0	0.	0.	20141.8	0.0	0.0
7	1.2	8259.4	0.0	0.0	0.	0.	1238.9	0.0	0.0
8	23.0	162037.1	0.0	0.0	0.	0.	24305.6	0.0	0.0
9	22.5	173632.4	0.0	0.0	0.	0.	26044.9	0.0	0.0
10	22.1	181297.9	0.0	0.0	0.	0.	27194.7	0.0	0.0
11	21.6	185157.3	0.0	0.0	0.	0.	27773.6	0.0	0.0
12	9.5	83201.4	0.0	0.0	0.	0.	12480.2	0.0	0.0
13	11.6	102152.6	0.0	0.0	0.	0.	15322.9	0.0	0.0
14	20.6	182024.3	0.0	0.0	0.	0.	27303.6	0.0	0.0

15	20.0	175471.5	0.0	0.0	0.	0.	26320.7	0.0	0.0
16	19.4	165967.7	0.0	0.0	0.	0.	24895.2	0.0	0.0
17	18.8	153805.0	0.0	0.0	0.	0.	23070.8	0.0	0.0
18	18.1	139303.5	0.0	0.0	0.	0.	20895.5	0.0	0.0
19	16.5	116648.6	0.0	0.0	0.	0.	17497.3	0.0	0.0
20	0.9	6150.7	0.0	0.0	0.	0.	922.6	0.0	0.0
21	16.7	101317.0	0.0	0.0	0.	0.	15197.6	0.0	0.0
22	16.0	76434.1	0.0	0.0	0.	0.	11465.1	0.0	0.0
23	15.2	51520.2	0.0	0.0	0.	0.	7728.0	0.0	0.0
24	14.4	26990.2	0.0	0.0	0.	0.	4048.5	0.0	0.0
25	8.7	4737.1	0.0	0.0	0.	0.	710.6	0.0	0.0

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.898	876.599
2	69.589	880.518
3	94.100	885.439
4	118.390	891.353
5	142.420	898.251
6	166.149	906.121
7	189.538	914.949
8	212.549	924.722
9	235.142	935.424
10	257.282	947.035
11	278.931	959.538
12	300.053	972.912
13	320.614	987.134
14	340.579	1002.180
15	359.915	1018.027
16	378.590	1034.647
17	396.574	1052.013
18	413.836	1070.097
19	430.348	1088.868
20	446.082	1108.296
21	461.013	1128.347
22	475.116	1148.990
23	488.367	1170.189
24	489.903	1172.884

Circle Center At X = -38.944 ; Y = 1484.854 ; and Radius = 614.007

Factor of Safety

*** 1.158 ***

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	48.980	879.320
2	73.562	883.870
3	97.940	889.412
4	122.074	895.936
5	145.923	903.432
6	169.450	911.888
7	192.615	921.289
8	215.380	931.621
9	237.708	942.866
10	259.563	955.006
11	280.908	968.021
12	301.708	981.890
13	321.930	996.589
14	341.540	1012.096
15	360.506	1028.384
16	378.797	1045.426
17	396.383	1063.195
18	413.235	1081.661
19	429.325	1100.795
20	444.628	1120.564
21	459.117	1140.937
22	472.770	1161.880
23	474.751	1165.207

Circle Center At X = -51.051 ; Y = 1488.433 ; and Radius = 617.272

Factor of Safety

*** 1.159 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.143	882.857
2	81.108	889.975
3	104.904	897.641
4	128.516	905.853
5	151.934	914.606
6	175.144	923.896
7	198.134	933.716
8	220.893	944.063
9	243.407	954.931
10	265.666	966.313
11	287.656	978.205
12	309.368	990.599
13	330.788	1003.490
14	351.907	1016.869
15	372.712	1030.731
16	393.192	1045.068
17	413.338	1059.872
18	433.138	1075.135
19	452.581	1090.850
20	471.658	1107.008
21	490.358	1123.600
22	508.672	1140.618
23	526.589	1158.053
24	544.100	1175.895
25	561.197	1194.135
26	569.747	1203.689

Circle Center At X = -239.912 ; Y = 1927.391 ; and Radius = 1085.952

Factor of Safety

*** 1.161 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	93.878	902.311
2	117.890	909.268
3	141.704	916.878
4	165.300	925.136
5	188.662	934.037
6	211.772	943.574
7	234.612	953.739
8	257.166	964.524
9	279.416	975.923
10	301.346	987.926
11	322.940	1000.524
12	344.181	1013.708
13	365.053	1027.468
14	385.541	1041.794
15	405.630	1056.675
16	425.305	1072.100
17	444.550	1088.057
18	463.351	1104.534
19	481.695	1121.519
20	499.568	1139.000
21	516.955	1156.963
22	533.845	1175.395
23	550.225	1194.281
24	551.274	1195.561

Circle Center At X = -148.310 ; Y = 1783.402 ; and Radius = 913.770

Factor of Safety

*** 1.161 ***

Failure Surface Specified By 27 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	57.143	882.857
2	81.666	887.718
3	106.039	893.280
4	130.243	899.540
5	154.257	906.492
6	178.061	914.131
7	201.636	922.450
8	224.963	931.443
9	248.022	941.101
10	270.794	951.417
11	293.261	962.383
12	315.403	973.990
13	337.204	986.227
14	358.643	999.085
15	379.705	1012.553
16	400.372	1026.621
17	420.626	1041.276
18	440.451	1056.506
19	459.831	1072.299
20	478.749	1088.642
21	497.191	1105.522
22	515.140	1122.924
23	532.582	1140.834
24	549.503	1159.237
25	565.888	1178.119
26	581.725	1197.463
27	595.160	1214.870

Circle Center At X = -99.864 ; Y = 1739.309 ; and Radius = 870.724

Factor of Safety

*** 1.164 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.796	899.650
2	114.147	905.307
3	138.319	911.691
4	162.288	918.793
5	186.035	926.609
6	209.538	935.131
7	232.776	944.351
8	255.727	954.262
9	278.372	964.854
10	300.691	976.118
11	322.663	988.045
12	344.269	1000.622
13	365.489	1013.840
14	386.305	1027.685
15	406.697	1042.147
16	426.649	1057.211
17	446.141	1072.865
18	465.157	1089.095
19	483.679	1105.886
20	501.691	1123.222
21	519.178	1141.090
22	536.122	1159.471
23	552.509	1178.351
24	568.325	1197.712
25	574.535	1205.795

Circle Center At X = -87.316 ; Y = 1717.159 ; and Radius = 836.474

Factor of Safety

*** 1.165 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.816	873.878
2	65.188	879.446

3	89.325	885.957
4	113.191	893.402
5	136.750	901.768
6	159.965	911.044
7	182.803	921.216
8	205.227	932.267
9	227.206	944.182
10	248.704	956.941
11	269.690	970.527
12	290.133	984.918
13	310.000	1000.093
14	329.263	1016.029
15	347.892	1032.701
16	365.859	1050.085
17	383.136	1068.154
18	399.698	1086.881
19	415.520	1106.238
20	430.577	1126.195
21	444.848	1146.722
22	447.999	1151.653

Circle Center At X = -89.979 ; Y = 1502.932 ; and Radius = 642.509

Factor of Safety

*** 1.170 ***

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.388	887.755
2	93.937	892.480
3	118.341	897.909
4	142.578	904.038
5	166.628	910.862
6	190.473	918.375
7	214.091	926.571
8	237.464	935.443
9	260.572	944.984
10	283.395	955.186
11	305.916	966.040
12	328.115	977.538
13	349.974	989.670
14	371.475	1002.426
15	392.600	1015.795
16	413.332	1029.766
17	433.653	1044.328
18	453.547	1059.469
19	472.996	1075.176
20	491.986	1091.436
21	510.500	1108.235
22	528.523	1125.561
23	546.041	1143.397
24	563.037	1161.731
25	579.500	1180.546
26	595.414	1199.826
27	610.766	1219.557
28	611.960	1221.186

Circle Center At X = -82.446 ; Y = 1742.989 ; and Radius = 868.607

Factor of Safety

*** 1.171 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.469	889.388
2	98.096	893.690
3	122.482	899.200
4	146.566	905.904
5	170.291	913.786
6	193.599	922.828
7	216.433	933.006

8	238.738	944.297
9	260.459	956.673
10	281.545	970.104
11	301.944	984.557
12	321.606	999.998
13	340.483	1016.388
14	358.531	1033.688
15	375.704	1051.856
16	391.962	1070.848
17	407.264	1090.618
18	421.574	1111.117
19	434.857	1132.297
20	444.796	1150.030

Circle Center At X = -1.344 ; Y = 1390.800 ; and Radius = 506.963

Factor of Safety

*** 1.171 ***

**** END OF GSTABL7 OUTPUT ****

```
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\Geo Section 1_South_9_1_11_PS_overall.in Version G7v2
Tract 71546 / Calabasas                    Geo Section 1 (South)
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35. 870. 50. 880. 1
50. 880. 75. 890. 1
75. 890. 121. 920. 1
121. 920. 200. 985. 1
200. 985. 300. 1054. 1
300. 1054. 425. 1140. 1
425. 1140. 500. 1178. 1
500. 1178. 550. 1195. 1
550. 1195. 600. 1217. 1
600. 1217. 680. 1245. 1
680. 1245. 725. 1247. 1
725. 1247. 768. 1250. 1
768. 1250. 858. 1270. 1
858. 1270. 982. 1280. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
3 0.5
0. 830.
75. 850.
982. 1080.
EQUAKE
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CIRCL2
50 50
0. 200. 300. 982.
0. 25. 0. 0.
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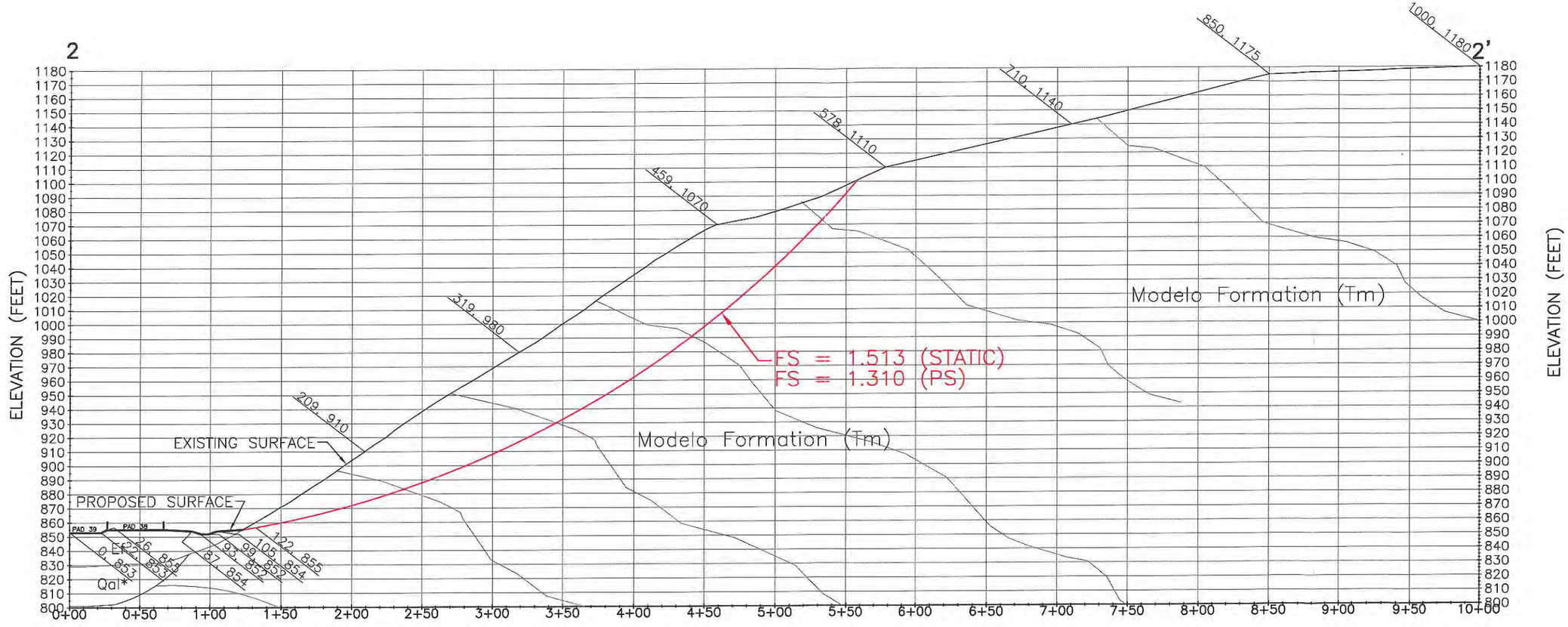
Analysis 6



*Qal to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 2–2'

GRAPHIC SCALE

0 1" 2"

0 40 80 160

1" = 80'

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-8408 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

NATURAL SLOPE - NORTH SIDE
GEOLOGIC X-SECTION 2-2'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

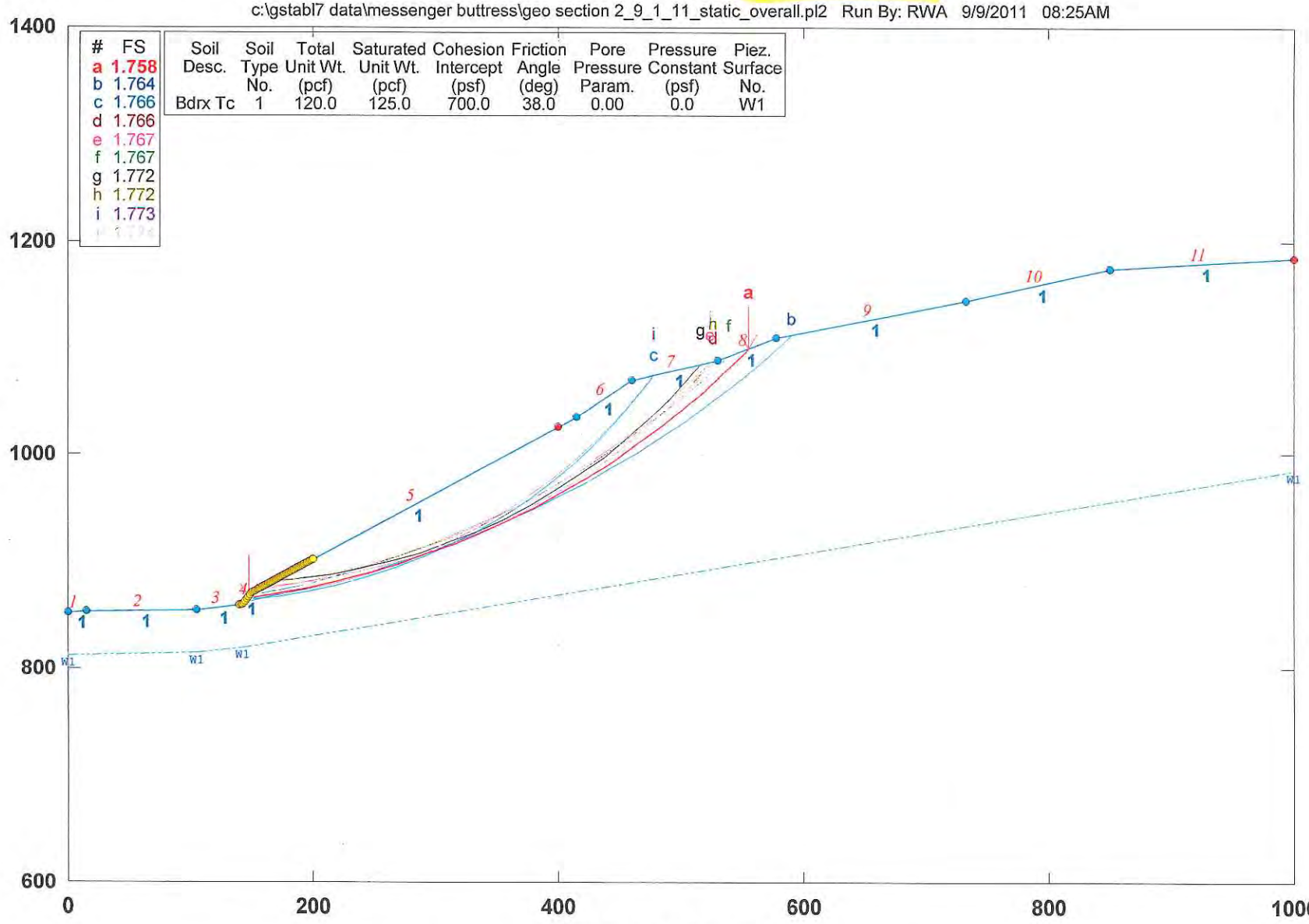
NATURAL SLOPE - NORTH SIDE

Tract 71546 / Calabasas Geo Section 2

c:\gstabl7 data\messenger buttress\geo section 2_9_1_11_static_overall.pl2 Run By: RWA 9/9/2011 08:25AM

#	FS
a	1.758
b	1.764
c	1.766
d	1.766
e	1.767
f	1.767
g	1.772
h	1.772
i	1.773

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Bdrx Tc	1	120.0	125.0	700.0	38.0	0.00	0.0	W1



GSTABL7 v.2 FSmin=1.758

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/9/2011
Time of Run: 08:25AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_Static_Overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_Static_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_Static_Overall.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 2

BOUNDARY COORDINATES
11 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	852.00	15.00	854.00	1
2	15.00	854.00	105.00	855.00	1
3	105.00	855.00	143.00	860.00	1
4	143.00	860.00	150.00	871.00	1
5	150.00	871.00	415.00	1035.00	1
6	415.00	1035.00	460.00	1070.00	1
7	460.00	1070.00	530.00	1089.00	1
8	530.00	1089.00	578.00	1110.00	1
9	578.00	1110.00	732.00	1145.00	1
10	732.00	1145.00	850.00	1175.00	1
11	850.00	1175.00	1000.00	1185.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	812.00
2	105.00	815.00
3	143.00	820.00
4	1000.00	985.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 140.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 400.00(ft)
and X =1000.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.886 FS Min = 1.758 FS Ave = 2.748
Standard Deviation = 0.569 Coefficient of Variation = 20.70 %
Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.347	866.831
2	171.952	871.259
3	196.373	876.607
4	220.576	882.867
5	244.528	890.030
6	268.194	898.087
7	291.542	907.025
8	314.538	916.833
9	337.150	927.496
10	359.346	939.000
11	381.095	951.328
12	402.366	964.463
13	423.130	978.386
14	443.357	993.078
15	463.019	1008.519
16	482.088	1024.686
17	500.537	1041.557
18	518.341	1059.108
19	535.474	1077.314
20	551.912	1096.150
21	554.962	1099.921

Circle Center At X = 41.610 ; Y = 1524.900 ; and Radius = 666.509
Factor of Safety
*** 1.758 ***
Individual data on the 24 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	2.7	587.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	22.0	22413.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.4	53361.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.2	79729.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.0	102437.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	23.7	121450.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	23.3	136765.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.0	148412.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	22.6	156455.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.2	160987.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.7	162135.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	21.3	160056.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	12.6	94589.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.1	60977.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.2	154027.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	16.6	127645.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	3.0	22852.6	0.0	0.0	0.	0.	0.0	0.0	0.0

18	19.1	129986.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	18.4	100462.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	17.8	70688.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	11.7	30941.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	5.5	10373.4	0.0	0.0	0.	0.	0.0	0.0	0.0
23	16.4	16291.5	0.0	0.0	0.	0.	0.0	0.0	0.0
24	3.0	445.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.898	862.982
2	169.311	868.370
3	193.552	874.480
4	217.602	881.309
5	241.437	888.849
6	265.038	897.095
7	288.384	906.039
8	311.453	915.672
9	334.226	925.988
10	356.682	936.976
11	378.801	948.626
12	400.564	960.929
13	421.952	973.874
14	442.945	987.448
15	463.526	1001.641
16	483.676	1016.440
17	503.377	1031.831
18	522.611	1047.800
19	541.362	1064.335
20	559.614	1081.420
21	577.349	1099.039
22	590.422	1112.823

Circle Center At X = -23.821 ; Y = 1686.005 ; and Radius = 840.138

Factor of Safety

*** 1.764 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	146.122	864.907
2	170.915	868.118
3	195.485	872.738
4	219.750	878.754
5	243.633	886.144
6	267.055	894.885
7	289.940	904.949
8	312.213	916.302
9	333.802	928.908
10	354.637	942.726
11	374.649	957.709
12	393.773	973.811
13	411.948	990.978
14	429.113	1009.154
15	445.212	1028.279
16	460.194	1048.293
17	474.010	1069.129
18	477.252	1074.683

Circle Center At X = 102.508 ; Y = 1299.982 ; and Radius = 437.256

Factor of Safety

*** 1.766 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.367	876.178
2	183.153	879.443
3	207.756	883.880
4	232.121	889.480
5	256.192	896.231

6	279.916	904.117
7	303.239	913.120
8	326.107	923.220
9	348.471	934.395
10	370.279	946.618
11	391.482	959.864
12	412.032	974.101
13	431.883	989.297
14	450.990	1005.419
15	469.311	1022.429
16	486.803	1040.291
17	503.428	1058.962
18	519.147	1078.402
19	526.148	1087.955

Circle Center At X = 102.041 ; Y = 1399.607 ; and Radius = 526.451

Factor of Safety

*** 1.766 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	154.694	873.905
2	179.249	878.598
3	203.593	884.291
4	227.683	890.975
5	251.479	898.638
6	274.943	907.267
7	298.034	916.849
8	320.714	927.366
9	342.945	938.802
10	364.689	951.138
11	385.912	964.352
12	406.576	978.422
13	426.648	993.326
14	446.094	1009.038
15	464.881	1025.532
16	482.978	1042.780
17	500.354	1060.754
18	516.982	1079.423
19	523.354	1087.196

Circle Center At X = 52.230 ; Y = 1476.609 ; and Radius = 611.352

Factor of Safety

*** 1.767 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	148.571	868.755
2	172.957	874.262
3	197.139	880.608
4	221.086	887.785
5	244.771	895.786
6	268.166	904.599
7	291.243	914.216
8	313.973	924.624
9	336.330	935.811
10	358.288	947.764
11	379.819	960.468
12	400.899	973.908
13	421.502	988.068
14	441.604	1002.932
15	461.180	1018.481
16	480.208	1034.697
17	498.663	1051.561
18	516.526	1069.052
19	533.773	1087.149
20	538.869	1092.880

Circle Center At X = 1.718 ; Y = 1576.389 ; and Radius = 722.711

Factor of Safety

*** 1.767 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	165.714	880.725
2	190.544	883.640
3	215.187	887.848
4	239.577	893.337
5	263.647	900.093
6	287.331	908.096
7	310.566	917.324
8	333.286	927.754
9	355.431	939.356
10	376.940	952.098
11	397.754	965.947
12	417.816	980.863
13	437.072	996.807
14	455.470	1013.734
15	472.958	1031.600
16	489.489	1050.354
17	505.019	1069.945
18	515.830	1085.154

Circle Center At X = 122.532 ; Y = 1356.710 ; and Radius = 477.940

Factor of Safety
*** 1.772 ***
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	163.265	879.209
2	187.918	883.362
3	212.365	888.590
4	236.560	894.886
5	260.455	902.236
6	284.005	910.626
7	307.164	920.040
8	329.889	930.461
9	352.135	941.868
10	373.860	954.239
11	395.021	967.550
12	415.579	981.776
13	435.493	996.890
14	454.725	1012.862
15	473.239	1029.662
16	490.999	1047.257
17	507.971	1065.614
18	524.121	1084.697
19	526.772	1088.124

Circle Center At X = 80.916 ; Y = 1443.415 ; and Radius = 570.184

Factor of Safety
*** 1.772 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.347	866.831
2	172.099	870.340
3	196.618	875.221
4	220.828	881.458
5	244.652	889.034
6	268.019	897.923
7	290.854	908.098
8	313.088	919.529
9	334.651	932.179
10	355.477	946.010
11	375.501	960.978
12	394.661	977.037
13	412.898	994.137
14	430.155	1012.226

15	446.378	1031.247
16	461.518	1051.141
17	475.528	1071.847
18	477.219	1074.674

Circle Center At X = 96.850 ; Y = 1312.672 ; and Radius = 448.692

Factor of Safety

*** 1.773 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	152.245	872.389
2	177.198	873.918
3	202.030	876.811
4	226.666	881.061
5	251.033	886.653
6	275.056	893.572
7	298.665	901.797
8	321.787	911.303
9	344.354	922.061
10	366.298	934.039
11	387.552	947.201
12	408.054	961.508
13	427.741	976.916
14	446.554	993.380
15	464.438	1010.849
16	481.337	1029.272
17	497.202	1048.594
18	511.985	1068.755
19	524.152	1087.413

Circle Center At X = 136.836 ; Y = 1328.321 ; and Radius = 456.192

Factor of Safety

*** 1.774 ***

**** END OF GSTABL7 OUTPUT ****

```
PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_Static_Overall.in Version G7v2.0
Tract 71546 / Calabasas                    Geo Section 2
11 11
0. 852. 15. 854. 1
15. 854. 105. 855. 1
105. 855. 143. 860. 1
143. 860. 150. 871. 1
150. 871. 415. 1035. 1
415. 1035. 460. 1070. 1
460. 1070. 530. 1089. 1
530. 1089. 578. 1110. 1
578. 1110. 732. 1145. 1
732. 1145. 850. 1175. 1
850. 1175. 1000. 1185. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
4 0.5
0. 812.
105. 815.
143. 820.
1000. 985.
EQUAKE
0.44 0.15 0.0 0. 1
EQUAKE
0.
CIRCL2
50 50
140. 200. 400. 1000.
0. 25. 0. 0.
```

Analysis 7

NATURAL SLOPE - NORTH SIDE

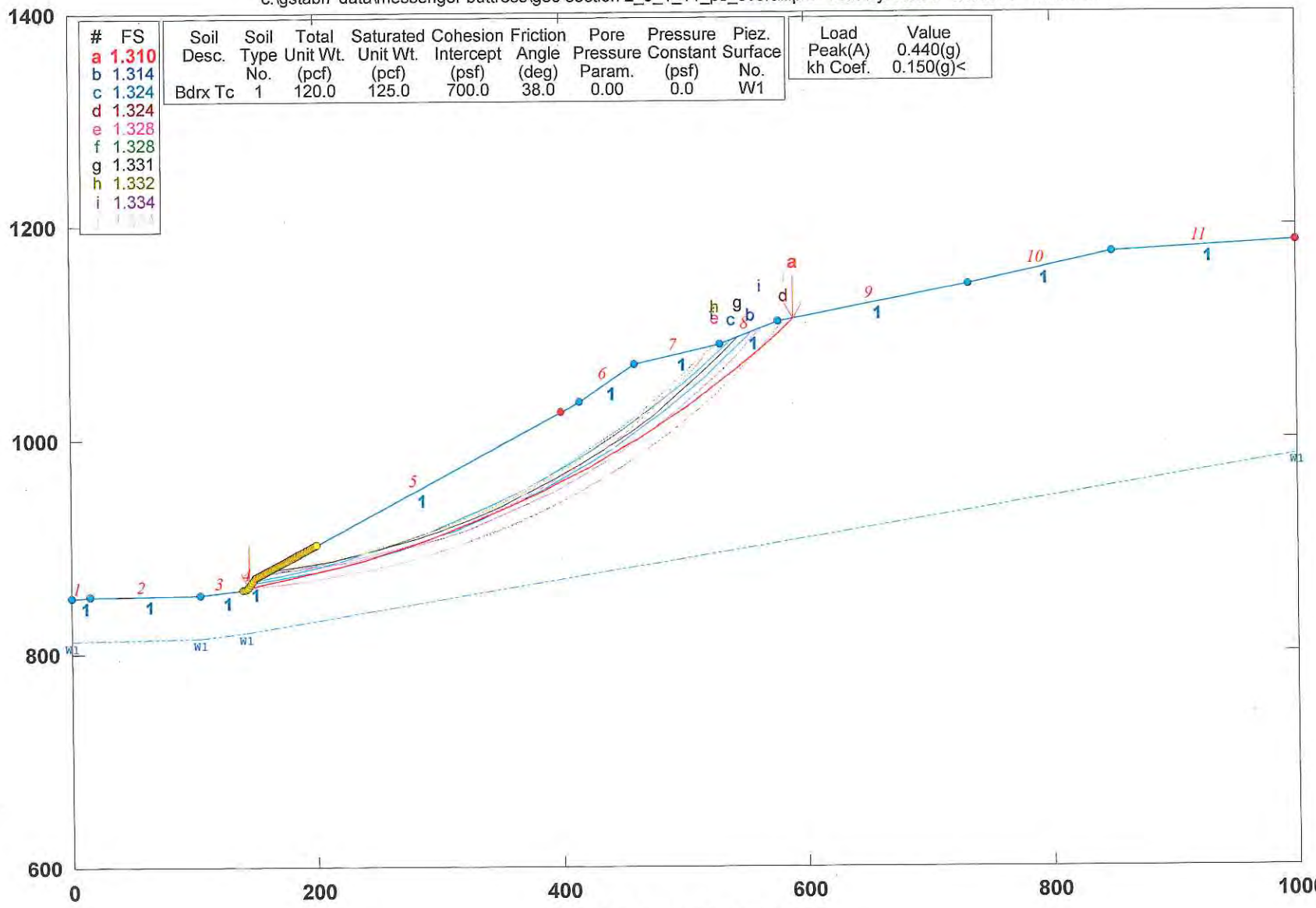
Tract 71546 / Calabasas Geo Section 2

c:\gstabl7 data\messenger buttress\geo section 2_9_1_11_ps_overall.pl2 Run By: RWA 9/9/2011 08:29AM

#	FS
a	1.310
b	1.314
c	1.324
d	1.324
e	1.328
f	1.328
g	1.331
h	1.332
i	1.334

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Bdrx Tc	1	120.0	125.0	700.0	38.0	0.00	0.0	W1

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.310

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 9/9/2011
Time of Run: 08:29AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_PS_Overall.in
Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_PS_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_PS_Overall.PLT
PROBLEM DESCRIPTION: Tract 71546 / Calabasas
Geo Section 2

BOUNDARY COORDINATES
11 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	852.00	15.00	854.00	1
2	15.00	854.00	105.00	855.00	1
3	105.00	855.00	143.00	860.00	1
4	143.00	860.00	150.00	871.00	1
5	150.00	871.00	415.00	1035.00	1
6	415.00	1035.00	460.00	1070.00	1
7	460.00	1070.00	530.00	1089.00	1
8	530.00	1089.00	578.00	1110.00	1
9	578.00	1110.00	732.00	1145.00	1
10	732.00	1145.00	850.00	1175.00	1
11	850.00	1175.00	1000.00	1185.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	812.00
2	105.00	815.00
3	143.00	820.00
4	1000.00	985.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.

50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 140.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 400.00(ft)
and X =1000.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.039 FS Min = 1.310 FS Ave = 1.968
Standard Deviation = 0.369 Coefficient of Variation = 18.77 %
Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.898	862.982
2	169.311	868.370
3	193.552	874.480
4	217.602	881.309
5	241.437	888.849
6	265.038	897.095
7	288.384	906.039
8	311.453	915.672
9	334.226	925.988
10	356.682	936.976
11	378.801	948.626
12	400.564	960.929
13	421.952	973.874
14	442.945	987.448
15	463.526	1001.641
16	483.676	1016.440
17	503.377	1031.831
18	522.611	1047.800
19	541.362	1064.335
20	559.614	1081.420
21	577.349	1099.039
22	590.422	1112.823

Circle Center At X = -23.821 ; Y = 1686.005 ; and Radius = 840.138
Factor of Safety
*** 1.310 ***
Individual data on the 26 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	5.1	2109.7	0.0	0.0	0.	0.	316.5	0.0	0.0
2	19.3	24879.0	0.0	0.0	0.	0.	3731.9	0.0	0.0
3	24.2	55349.8	0.0	0.0	0.	0.	8302.5	0.0	0.0
4	24.0	79364.1	0.0	0.0	0.	0.	11904.6	0.0	0.0
5	23.8	100491.1	0.0	0.0	0.	0.	15073.7	0.0	0.0
6	23.6	118718.7	0.0	0.0	0.	0.	17807.8	0.0	0.0
7	23.3	134051.6	0.0	0.0	0.	0.	20107.7	0.0	0.0
8	23.1	146510.9	0.0	0.0	0.	0.	21976.6	0.0	0.0
9	22.8	156133.0	0.0	0.0	0.	0.	23420.0	0.0	0.0
10	22.5	162971.5	0.0	0.0	0.	0.	24445.7	0.0	0.0
11	22.1	167095.2	0.0	0.0	0.	0.	25064.3	0.0	0.0
12	21.8	168588.4	0.0	0.0	0.	0.	25288.3	0.0	0.0
13	14.4	113007.1	0.0	0.0	0.	0.	16951.1	0.0	0.0
14	7.0	55004.1	0.0	0.0	0.	0.	8250.6	0.0	0.0
15	21.0	171080.6	0.0	0.0	0.	0.	25662.1	0.0	0.0
16	17.1	143337.2	0.0	0.0	0.	0.	21500.6	0.0	0.0
17	3.5	29641.9	0.0	0.0	0.	0.	4446.3	0.0	0.0

18	20.1	156323.5	0.0	0.0	0.	0.	23448.5	0.0	0.0
19	19.7	129942.0	0.0	0.0	0.	0.	19491.3	0.0	0.0
20	19.2	102870.6	0.0	0.0	0.	0.	15430.6	0.0	0.0
21	7.4	32753.0	0.0	0.0	0.	0.	4913.0	0.0	0.0
22	11.4	43849.4	0.0	0.0	0.	0.	6577.4	0.0	0.0
23	18.3	54943.2	0.0	0.0	0.	0.	8241.5	0.0	0.0
24	17.7	33213.9	0.0	0.0	0.	0.	4982.1	0.0	0.0
25	0.7	818.2	0.0	0.0	0.	0.	122.7	0.0	0.0
26	12.4	7657.8	0.0	0.0	0.	0.	1148.7	0.0	0.0

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	147.347	866.831
2	171.952	871.259
3	196.373	876.607
4	220.576	882.867
5	244.528	890.030
6	268.194	898.087
7	291.542	907.025
8	314.538	916.833
9	337.150	927.496
10	359.346	939.000
11	381.095	951.328
12	402.366	964.463
13	423.130	978.386
14	443.357	993.078
15	463.019	1008.519
16	482.088	1024.686
17	500.537	1041.557
18	518.341	1059.108
19	535.474	1077.314
20	551.912	1096.150
21	554.962	1099.921

Circle Center At X = 41.610 ; Y = 1524.900 ; and Radius = 666.509

Factor of Safety

*** 1.314 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	148.571	868.755
2	172.957	874.262
3	197.139	880.608
4	221.086	887.785
5	244.771	895.786
6	268.166	904.599
7	291.243	914.216
8	313.973	924.624
9	336.330	935.811
10	358.288	947.764
11	379.819	960.468
12	400.899	973.908
13	421.502	988.068
14	441.604	1002.932
15	461.180	1018.481
16	480.208	1034.697
17	498.663	1051.561
18	516.526	1069.052
19	533.773	1087.149
20	538.869	1092.880

Circle Center At X = 1.718 ; Y = 1576.389 ; and Radius = 722.711

Factor of Safety

*** 1.324 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.898	862.982
2	169.787	865.330

3	194.555	868.735
4	219.154	873.190
5	243.543	878.687
6	267.675	885.216
7	291.508	892.766
8	314.998	901.323
9	338.102	910.871
10	360.780	921.394
11	382.990	932.871
12	404.691	945.283
13	425.845	958.606
14	446.413	972.817
15	466.358	987.890
16	485.644	1003.798
17	504.236	1020.512
18	522.100	1038.001
19	539.203	1056.235
20	555.516	1075.179
21	571.009	1094.800
22	582.779	1111.086

Circle Center At X = 102.286 ; Y = 1448.651 ; and Radius = 587.216

Factor of Safety

*** 1.324 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.367	876.178
2	183.153	879.443
3	207.756	883.880
4	232.121	889.480
5	256.192	896.231
6	279.916	904.117
7	303.239	913.120
8	326.107	923.220
9	348.471	934.395
10	370.279	946.618
11	391.482	959.864
12	412.032	974.101
13	431.883	989.297
14	450.990	1005.419
15	469.311	1022.429
16	486.803	1040.291
17	503.428	1058.962
18	519.147	1078.402
19	526.148	1087.955

Circle Center At X = 102.041 ; Y = 1399.607 ; and Radius = 526.451

Factor of Safety

*** 1.328 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	154.694	873.905
2	179.249	878.598
3	203.593	884.291
4	227.683	890.975
5	251.479	898.638
6	274.943	907.267
7	298.034	916.849
8	320.714	927.366
9	342.945	938.802
10	364.689	951.138
11	385.912	964.352
12	406.576	978.422
13	426.648	993.326
14	446.094	1009.038
15	464.881	1025.532
16	482.978	1042.780

17	500.354	1060.754
18	516.982	1079.423
19	523.354	1087.196

Circle Center At X = 52.230 ; Y = 1476.609 ; and Radius = 611.352

Factor of Safety

*** 1.328 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	160.816	877.694
2	185.499	881.662
3	209.995	886.656
4	234.262	892.667
5	258.257	899.685
6	281.938	907.697
7	305.265	916.690
8	328.196	926.647
9	350.693	937.552
10	372.715	949.385
11	394.224	962.126
12	415.184	975.753
13	435.557	990.242
14	455.309	1005.568
15	474.404	1021.704
16	492.810	1038.623
17	510.494	1056.294
18	527.426	1074.687
19	543.577	1093.770
20	544.954	1095.542

Circle Center At X = 78.123 ; Y = 1471.113 ; and Radius = 599.153

Factor of Safety

*** 1.331 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	163.265	879.209
2	187.918	883.362
3	212.365	888.590
4	236.560	894.886
5	260.455	902.236
6	284.005	910.626
7	307.164	920.040
8	329.889	930.461
9	352.135	941.868
10	373.860	954.239
11	395.021	967.550
12	415.579	981.776
13	435.493	996.890
14	454.725	1012.862
15	473.239	1029.662
16	490.999	1047.257
17	507.971	1065.614
18	524.121	1084.697
19	526.772	1088.124

Circle Center At X = 80.916 ; Y = 1443.415 ; and Radius = 570.184

Factor of Safety

*** 1.332 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	157.143	875.420
2	181.974	878.323
3	206.655	882.303
4	231.139	887.354
5	255.381	893.466
6	279.333	900.628
7	302.951	908.825

8	326.190	918.042
9	349.005	928.262
10	371.354	939.466
11	393.194	951.632
12	414.484	964.737
13	435.184	978.756
14	455.253	993.663
15	474.655	1009.429
16	493.352	1026.025
17	511.308	1043.419
18	528.491	1061.578
19	544.867	1080.468
20	560.405	1100.053
21	562.792	1103.347

Circle Center At X = 102.911 ; Y = 1447.064 ; and Radius = 574.210

Factor of Safety

*** 1.334 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.469	873.147
2	177.956	878.185
3	202.269	884.006
4	226.383	890.604
5	250.273	897.971
6	273.914	906.101
7	297.283	914.984
8	320.354	924.612
9	343.105	934.975
10	365.512	946.063
11	387.552	957.863
12	409.202	970.364
13	430.440	983.552
14	451.245	997.415
15	471.594	1011.938
16	491.467	1027.106
17	510.843	1042.903
18	529.703	1059.313
19	548.027	1076.320
20	565.797	1093.906
21	581.885	1110.883

Circle Center At X = 8.633 ; Y = 1639.115 ; and Radius = 779.541

Factor of Safety

*** 1.334 ***

**** END OF GSTABL7 OUTPUT ****

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PROFIL  C:\GSTABL7 DATA\Messenger Buttress\geo section 2_9_1_11_PS_Overall.in Version G7v2.005.1
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150. 871. 415. 1035. 1
415. 1035. 460. 1070. 1
460. 1070. 530. 1089. 1
530. 1089. 578. 1110. 1
578. 1110. 732. 1145. 1
732. 1145. 850. 1175. 1
850. 1175. 1000. 1185. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 0.
4 0.5
0. 812.
105. 815.
143. 820.
1000. 985.
EQUAKE
0.44 0.15 0.0 0. 1
CIRCL2
50 50
140. 200. 400. 1000.
0. 25. 0. 0.
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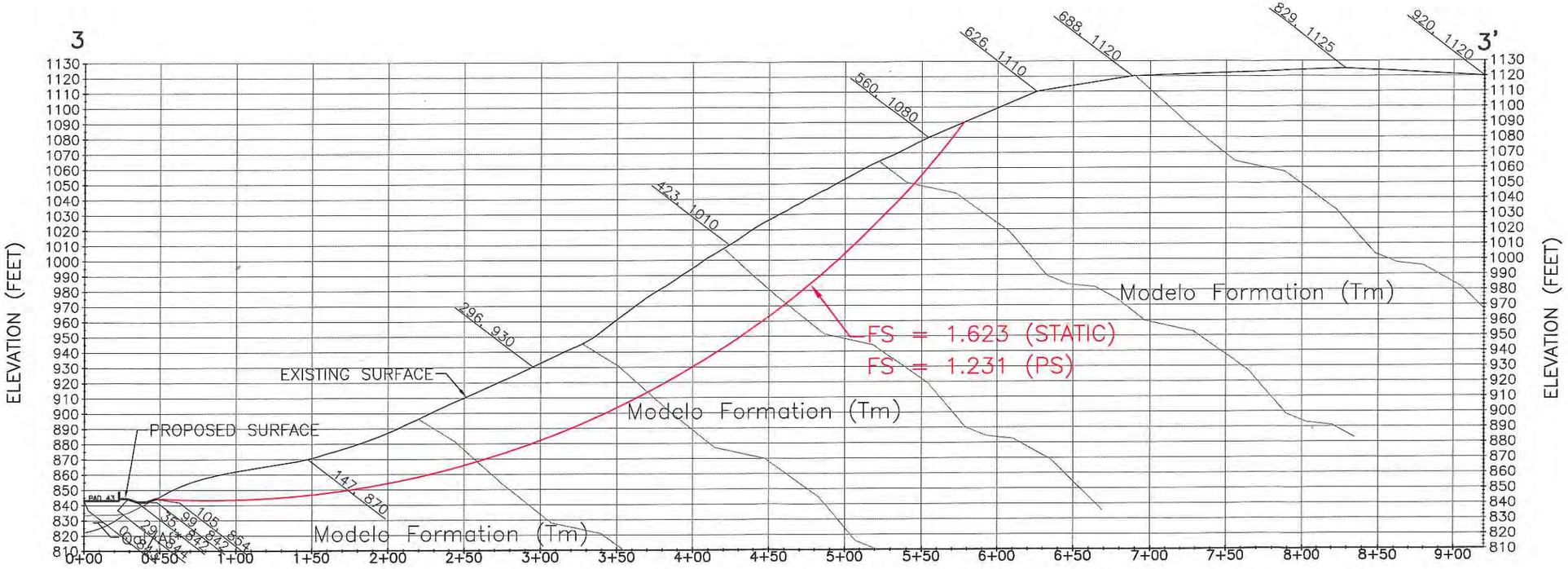
Analysis 8



*Qal/Af to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 3–3'

GRAPHIC SCALE

0 1" 2"

0 40 80 160

1" = 80'

PREPARED BY:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality

3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-8496 FAX
890 Oono Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

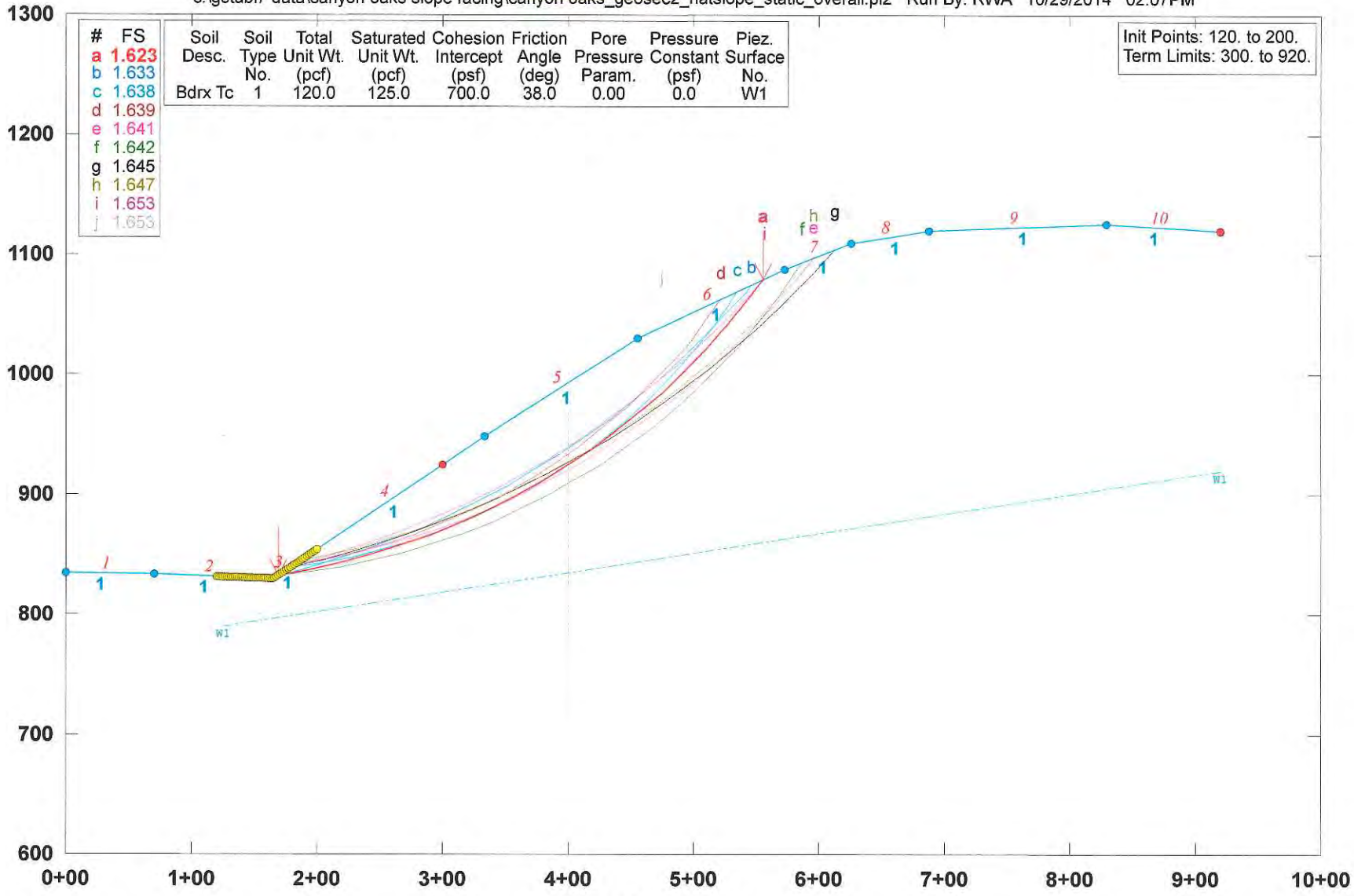
NATURAL SLOPE - NORTHWEST SIDE
GEOLOGIC X-SECTION 3-3'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

NATURAL SLOPE - NORTH SIDE

Canyon Oaks Section 3 - 3' - Northern Existing Slope

c:\gstabl7 data\canyon oaks slope facing\canyon oaks_geosec2_natslope_static_overall.pl2 Run By: RWA 10/29/2014 02:07PM



GSTABL7 v.2 FSmin=1.623

Safety Factors Are Calculated By The Modified Bishop Method

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70. 833. 165. 830. 1
165. 830. 180. 840. 1
180. 840. 333. 948. 1
333. 948. 455. 1030. 1
455. 1030. 573. 1088. 1
573. 1088. 626. 1110. 1
626. 1110. 688. 1120. 1
688. 1120. 829. 1125. 1
829. 1125. 920. 1120. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 62.4
2 0.5
125. 790.
920. 920.
EQUAKE
0.44 0.15 0.0 0. 1
EQUAKE
0.
CIRCL2
50 50
120. 200. 300. 920.
0. 25. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: **10/29/2014**
Time of Run: 02:07PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_Static_Overall.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_Static_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_Static_Overall.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 3 - 3' - Northern Existing Slope

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	835.00	70.00	833.00	1
2	70.00	833.00	165.00	830.00	1
3	165.00	830.00	180.00	840.00	1
4	180.00	840.00	333.00	948.00	1
5	333.00	948.00	455.00	1030.00	1
6	455.00	1030.00	573.00	1088.00	1
7	573.00	1088.00	626.00	1110.00	1
8	626.00	1110.00	688.00	1120.00	1
9	688.00	1120.00	829.00	1125.00	1
10	829.00	1125.00	920.00	1120.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	125.00	790.00
2	920.00	920.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 120.00(ft)

and X = 200.00(ft)
Each Surface Terminates Between X = 300.00(ft)
and X = 920.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.990 FS Min = 1.623 FS Ave = 2.682
Standard Deviation = 0.515 Coefficient of Variation = 19.20 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.980	832.653
2	193.561	837.210
3	217.923	842.823
4	242.019	849.482
5	265.806	857.175
6	289.239	865.888
7	312.274	875.603
8	334.868	886.304
9	356.980	897.969
10	378.567	910.578
11	399.590	924.107
12	420.010	938.530
13	439.788	953.821
14	458.888	969.952
15	477.274	986.891
16	494.912	1004.609
17	511.769	1023.071
18	527.814	1042.243
19	543.016	1062.090
20	554.930	1079.118

Circle Center At X = 75.888 ; Y = 1403.849 ; and Radius = 578.732
Factor of Safety
*** 1.623 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.0	3507.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.6	14374.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.4	53072.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.1	84206.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	23.8	110880.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	23.4	133027.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	23.0	150633.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	20.7	149659.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.9	14072.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	22.1	171275.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.6	173818.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	21.0	172431.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	20.4	167363.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	19.8	158906.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	15.2	117999.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.9	29230.5	0.0	0.0	0.	0.	0.0	0.0	0.0
17	18.4	127985.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	17.6	104839.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	16.9	80753.8	0.0	0.0	0.	0.	0.0	0.0	0.0
20	16.0	56200.8	0.0	0.0	0.	0.	0.0	0.0	0.0
21	15.2	31668.8	0.0	0.0	0.	0.	0.0	0.0	0.0
22	11.9	7986.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.347	831.565
2	191.460	838.167
3	215.326	845.610
4	238.917	853.883
5	262.204	862.978
6	285.159	872.882
7	307.752	883.584
8	329.958	895.070
9	351.747	907.326
10	373.094	920.338
11	393.972	934.090
12	414.356	948.563
13	434.221	963.742
14	453.542	979.607
15	472.296	996.138
16	490.460	1013.316
17	508.011	1031.120
18	524.928	1049.526
19	541.190	1068.514
20	546.240	1074.847

Circle Center At X = -8.754 ; Y = 1522.517 ; and Radius = 713.041

Factor of Safety

*** 1.633 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.776	839.184
2	203.508	842.835
3	228.018	847.757
4	252.243	853.936
5	276.117	861.355
6	299.576	869.995
7	322.559	879.833
8	345.004	890.843
9	366.852	902.996
10	388.044	916.258
11	408.524	930.595
12	428.238	945.970
13	447.133	962.340
14	465.159	979.662
15	482.268	997.891
16	498.414	1016.977
17	513.556	1036.870
18	527.651	1057.518
19	534.781	1069.214

Circle Center At X = 120.359 ; Y = 1320.429 ; and Radius = 484.778

Factor of Safety

*** 1.638 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	182.041	841.441
2	206.599	846.123
3	230.895	852.014
4	254.870	859.099
5	278.465	867.361
6	301.623	876.779
7	324.287	887.331
8	346.401	898.991
9	367.912	911.730
10	388.767	925.517
11	408.915	940.318
12	428.306	956.098
13	446.893	972.817
14	464.630	990.434

15	481.475	1008.907
16	497.386	1028.191
17	512.324	1048.237
18	522.272	1063.066

Circle Center At X = 99.940 ; Y = 1339.447 ; and Radius = 504.728

Factor of Safety

*** 1.639 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	180.408	840.288
2	204.969	844.957
3	229.331	850.567
4	253.459	857.111
5	277.318	864.578
6	300.872	872.957
7	324.086	882.236
8	346.926	892.402
9	369.358	903.438
10	391.349	915.330
11	412.866	928.059
12	433.877	941.606
13	454.352	955.952
14	474.259	971.074
15	493.570	986.952
16	512.255	1003.560
17	530.288	1020.876
18	547.642	1038.872
19	564.290	1057.522
20	580.208	1076.799
21	595.373	1096.675
22	595.982	1097.540

Circle Center At X = 71.429 ; Y = 1480.630 ; and Radius = 649.549

Factor of Safety

*** 1.641 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.980	832.653
2	193.808	835.582
3	218.477	839.636
4	242.936	844.806
5	267.136	851.082
6	291.025	858.452
7	314.554	866.899
8	337.676	876.407
9	360.341	886.955
10	382.504	898.523
11	404.119	911.085
12	425.140	924.617
13	445.525	939.090
14	465.231	954.474
15	484.218	970.737
16	502.446	987.847
17	519.878	1005.767
18	536.478	1024.460
19	552.211	1043.889
20	567.045	1064.012
21	580.949	1084.789
22	586.213	1093.485

Circle Center At X = 117.179 ; Y = 1379.641 ; and Radius = 549.435

Factor of Safety

*** 1.642 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.776	839.184
2	203.041	845.200

3	227.108	851.966
4	250.954	859.475
5	274.555	867.720
6	297.889	876.693
7	320.934	886.385
8	343.667	896.787
9	366.067	907.889
10	388.112	919.680
11	409.780	932.149
12	431.052	945.283
13	451.906	959.072
14	472.322	973.500
15	492.281	988.554
16	511.764	1004.220
17	530.752	1020.482
18	549.226	1037.326
19	567.169	1054.734
20	584.564	1072.690
21	601.393	1091.177
22	612.807	1104.524

Circle Center At X = -2.786 ; Y = 1623.830 ; and Radius = 805.378

Factor of Safety

*** 1.645 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.306	843.746
2	209.672	849.342
3	233.827	855.788
4	257.740	863.077
5	281.384	871.199
6	304.729	880.146
7	327.745	889.904
8	350.406	900.464
9	372.682	911.811
10	394.547	923.932
11	415.974	936.812
12	436.937	950.435
13	457.409	964.784
14	477.365	979.841
15	496.782	995.589
16	515.635	1012.008
17	533.901	1029.077
18	551.557	1046.776
19	568.582	1065.083
20	584.955	1083.975
21	595.863	1097.490

Circle Center At X = 37.865 ; Y = 1541.576 ; and Radius = 713.237

Factor of Safety

*** 1.647 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	180.408	840.288
2	204.431	847.209
3	228.209	854.931
4	251.714	863.446
5	274.920	872.745
6	297.802	882.817
7	320.332	893.651
8	342.487	905.234
9	364.241	917.554
10	385.569	930.596
11	406.448	944.347
12	426.853	958.790
13	446.763	973.909
14	466.155	989.688
15	485.007	1006.108

16	503.297	1023.151
17	521.005	1040.798
18	538.112	1059.029
19	554.597	1077.823
20	556.150	1079.718

Circle Center At X = -13.693 ; Y = 1559.439 ; and Radius = 744.885

Factor of Safety

*** 1.653 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	170.612	833.742
2	195.393	837.050
3	219.907	841.953
4	244.054	848.428
5	267.732	856.450
6	290.843	865.984
7	313.289	876.990
8	334.978	889.424
9	355.819	903.232
10	375.724	918.358
11	394.611	934.737
12	412.400	952.303
13	429.018	970.980
14	444.395	990.692
15	458.466	1011.356
16	471.174	1032.885
17	474.587	1039.627

Circle Center At X = 131.826 ; Y = 1218.667 ; and Radius = 386.875

Factor of Safety

*** 1.653 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 9

NATURAL SLOPE - NORTH SIDE

Canyon Oaks Section 3 - 3' - Northern Existing Slope

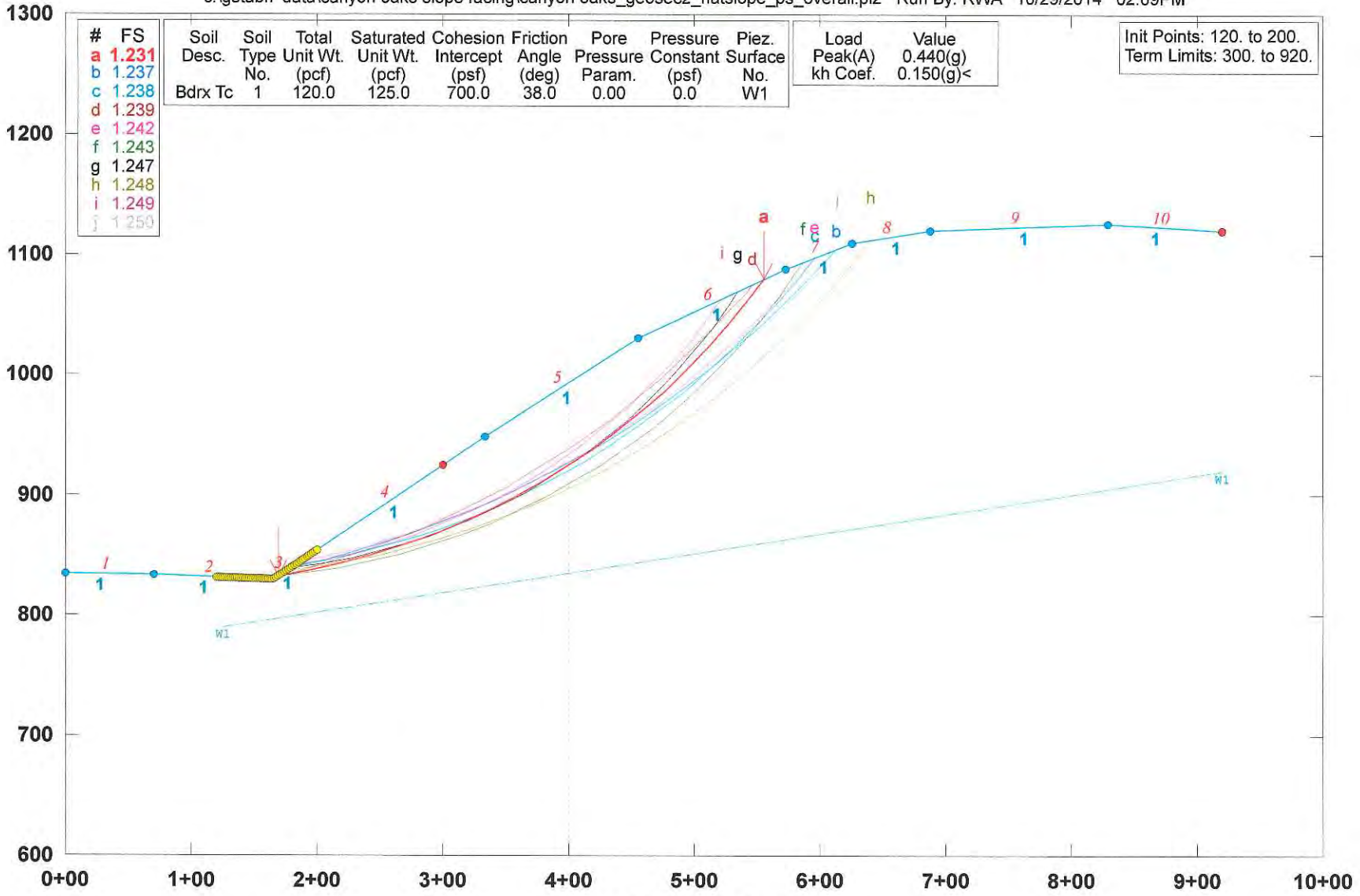
c:\gstabl7 data\canyon oaks slope facing\canyon oaks_geosec2_natslope_ps_overall.pl2 Run By: RWA 10/29/2014 02:09PM

#	FS
a	1.231
b	1.237
c	1.238
d	1.239
e	1.242
f	1.243
g	1.247
h	1.248
i	1.249
j	1.250

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Bdrx Tc	1	120.0	125.0	700.0	38.0	0.00	0.0	W1

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

Init Points: 120. to 200.
Term Limits: 300. to 920.



GSTABL7 v.2 FSmin=1.231

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_PS_Overall.in Versi
Canyon Oaks                                Section 3 - 3' - Northern Existing Slope
10 10
0. 835. 70. 833. 1
70. 833. 165. 830. 1
165. 830. 180. 840. 1
180. 840. 333. 948. 1
333. 948. 455. 1030. 1
455. 1030. 573. 1088. 1
573. 1088. 626. 1110. 1
626. 1110. 688. 1120. 1
688. 1120. 829. 1125. 1
829. 1125. 920. 1120. 1
600. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 1
WATER
1 62.4
2 0.5
125. 790.
920. 920.
EQUAKE
0.44 0.15 0.0 0. 1
CIRCL2
50 50
120. 200. 300. 920.
0. 25. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 02:09PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_PS_Overall.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_PS_Overall.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\Canyon Oaks_Geosec2_NatSlope_PS_Overall.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 3 - 3' - Northern Existing Slope

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	835.00	70.00	833.00	1
2	70.00	833.00	165.00	830.00	1
3	165.00	830.00	180.00	840.00	1
4	180.00	840.00	333.00	948.00	1
5	333.00	948.00	455.00	1030.00	1
6	455.00	1030.00	573.00	1088.00	1
7	573.00	1088.00	626.00	1110.00	1
8	626.00	1110.00	688.00	1120.00	1
9	688.00	1120.00	829.00	1125.00	1
10	829.00	1125.00	920.00	1120.00	1

User Specified Y-Origin = 600.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	125.00	790.00
2	920.00	920.00

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 120.00(ft)
and X = 200.00(ft)

Each Surface Terminates Between X = 300.00(ft)
and X = 920.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.194 FS Min = 1.231 FS Ave = 1.967
Standard Deviation = 0.342 Coefficient of Variation = 17.40 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.980	832.653
2	193.561	837.210
3	217.923	842.823
4	242.019	849.482
5	265.806	857.175
6	289.239	865.888
7	312.274	875.603
8	334.868	886.304
9	356.980	897.969
10	378.567	910.578
11	399.590	924.107
12	420.010	938.530
13	439.788	953.821
14	458.888	969.952
15	477.274	986.891
16	494.912	1004.609
17	511.769	1023.071
18	527.814	1042.243
19	543.016	1062.090
20	554.930	1079.118

Circle Center At X = 75.888 ; Y = 1403.849 ; and Radius = 578.732
Factor of Safety
*** 1.231 ***
Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	11.0	3507.0	0.0	0.0	0.	0.	526.1	0.0	0.0
2	13.6	14374.6	0.0	0.0	0.	0.	2156.2	0.0	0.0
3	24.4	53072.2	0.0	0.0	0.	0.	7960.8	0.0	0.0
4	24.1	84206.5	0.0	0.0	0.	0.	12631.0	0.0	0.0
5	23.8	110880.3	0.0	0.0	0.	0.	16632.0	0.0	0.0
6	23.4	133027.0	0.0	0.0	0.	0.	19954.1	0.0	0.0
7	23.0	150633.7	0.0	0.0	0.	0.	22595.1	0.0	0.0
8	20.7	149659.4	0.0	0.0	0.	0.	22448.9	0.0	0.0
9	1.9	14072.4	0.0	0.0	0.	0.	2110.9	0.0	0.0
10	22.1	171275.8	0.0	0.0	0.	0.	25691.4	0.0	0.0
11	21.6	173818.5	0.0	0.0	0.	0.	26072.8	0.0	0.0
12	21.0	172431.8	0.0	0.0	0.	0.	25864.8	0.0	0.0
13	20.4	167363.4	0.0	0.0	0.	0.	25104.5	0.0	0.0
14	19.8	158906.5	0.0	0.0	0.	0.	23836.0	0.0	0.0
15	15.2	117999.8	0.0	0.0	0.	0.	17700.0	0.0	0.0
16	3.9	29230.5	0.0	0.0	0.	0.	4384.6	0.0	0.0
17	18.4	127985.4	0.0	0.0	0.	0.	19197.8	0.0	0.0
18	17.6	104839.6	0.0	0.0	0.	0.	15725.9	0.0	0.0
19	16.9	80753.8	0.0	0.0	0.	0.	12113.1	0.0	0.0
20	16.0	56200.8	0.0	0.0	0.	0.	8430.1	0.0	0.0
21	15.2	31668.8	0.0	0.0	0.	0.	4750.3	0.0	0.0
22	11.9	7986.4	0.0	0.0	0.	0.	1198.0	0.0	0.0

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.776	839.184
2	203.041	845.200
3	227.108	851.966
4	250.954	859.475
5	274.555	867.720
6	297.889	876.693
7	320.934	886.385
8	343.667	896.787
9	366.067	907.889
10	388.112	919.680
11	409.780	932.149
12	431.052	945.283
13	451.906	959.072
14	472.322	973.500
15	492.281	988.554
16	511.764	1004.220
17	530.752	1020.482
18	549.226	1037.326
19	567.169	1054.734
20	584.564	1072.690
21	601.393	1091.177
22	612.807	1104.524

Circle Center At X = -2.786 ; Y = 1623.830 ; and Radius = 805.378

Factor of Safety

*** 1.237 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	180.408	840.288
2	204.969	844.957
3	229.331	850.567
4	253.459	857.111
5	277.318	864.578
6	300.872	872.957
7	324.086	882.236
8	346.926	892.402
9	369.358	903.438
10	391.349	915.330
11	412.866	928.059
12	433.877	941.606
13	454.352	955.952
14	474.259	971.074
15	493.570	986.952
16	512.255	1003.560
17	530.288	1020.876
18	547.642	1038.872
19	564.290	1057.522
20	580.208	1076.799
21	595.373	1096.675
22	595.982	1097.540

Circle Center At X = 71.429 ; Y = 1480.630 ; and Radius = 649.549

Factor of Safety

*** 1.238 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	167.347	831.565
2	191.460	838.167
3	215.326	845.610
4	238.917	853.883
5	262.204	862.978
6	285.159	872.882
7	307.752	883.584
8	329.958	895.070
9	351.747	907.326
10	373.094	920.338

11	393.972	934.090
12	414.356	948.563
13	434.221	963.742
14	453.542	979.607
15	472.296	996.138
16	490.460	1013.316
17	508.011	1031.120
18	524.928	1049.526
19	541.190	1068.514
20	546.240	1074.847

Circle Center At X = -8.754 ; Y = 1522.517 ; and Radius = 713.041

Factor of Safety
*** 1.239 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.306	843.746
2	209.672	849.342
3	233.827	855.788
4	257.740	863.077
5	281.384	871.199
6	304.729	880.146
7	327.745	889.904
8	350.406	900.464
9	372.682	911.811
10	394.547	923.932
11	415.974	936.812
12	436.937	950.435
13	457.409	964.784
14	477.365	979.841
15	496.782	995.589
16	515.635	1012.008
17	533.901	1029.077
18	551.557	1046.776
19	568.582	1065.083
20	584.955	1083.975
21	595.863	1097.490

Circle Center At X = 37.865 ; Y = 1541.576 ; and Radius = 713.237

Factor of Safety
*** 1.242 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	168.980	832.653
2	193.808	835.582
3	218.477	839.636
4	242.936	844.806
5	267.136	851.082
6	291.025	858.452
7	314.554	866.899
8	337.676	876.407
9	360.341	886.955
10	382.504	898.523
11	404.119	911.085
12	425.140	924.617
13	445.525	939.090
14	465.231	954.474
15	484.218	970.737
16	502.446	987.847
17	519.878	1005.767
18	536.478	1024.460
19	552.211	1043.889
20	567.045	1064.012
21	580.949	1084.789
22	586.213	1093.485

Circle Center At X = 117.179 ; Y = 1379.641 ; and Radius = 549.435

Factor of Safety
*** 1.243 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.776	839.184
2	203.508	842.835
3	228.018	847.757
4	252.243	853.936
5	276.117	861.355
6	299.576	869.995
7	322.559	879.833
8	345.004	890.843
9	366.852	902.996
10	388.044	916.258
11	408.524	930.595
12	428.238	945.970
13	447.133	962.340
14	465.159	979.662
15	482.268	997.891
16	498.414	1016.977
17	513.556	1036.870
18	527.651	1057.518
19	534.781	1069.214

Circle Center At X = 120.359 ; Y = 1320.429 ; and Radius = 484.778

Factor of Safety

*** 1.247 ***

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	175.510	837.007
2	200.271	840.460
3	224.885	844.833
4	249.320	850.117
5	273.542	856.308
6	297.516	863.394
7	321.211	871.368
8	344.592	880.218
9	367.628	889.931
10	390.286	900.495
11	412.536	911.894
12	434.347	924.113
13	455.688	937.135
14	476.529	950.941
15	496.843	965.514
16	516.601	980.832
17	535.775	996.874
18	554.339	1013.619
19	572.267	1031.042
20	589.534	1049.121
21	606.118	1067.829
22	621.993	1087.141
23	637.140	1107.030
24	640.927	1112.408

Circle Center At X = 95.257 ; Y = 1503.600 ; and Radius = 671.407

Factor of Safety

*** 1.248 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	182.041	841.441
2	206.599	846.123
3	230.895	852.014
4	254.870	859.099
5	278.465	867.361
6	301.623	876.779
7	324.287	887.331
8	346.401	898.991
9	367.912	911.730
10	388.767	925.517

11	408.915	940.318
12	428.306	956.098
13	446.893	972.817
14	464.630	990.434
15	481.475	1008.907
16	497.386	1028.191
17	512.324	1048.237
18	522.272	1063.066

Circle Center At X = 99.940 ; Y = 1339.447 ; and Radius = 504.728

Factor of Safety

*** 1.249 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	183.674	842.593
2	208.418	846.159
3	232.996	850.735
4	257.366	856.312
5	281.487	862.882
6	305.319	870.434
7	328.822	878.954
8	351.957	888.429
9	374.685	898.843
10	396.967	910.179
11	418.767	922.416
12	440.048	935.536
13	460.775	949.515
14	480.911	964.331
15	500.425	979.958
16	519.283	996.371
17	537.453	1013.542
18	554.906	1031.442
19	571.611	1050.041
20	587.542	1069.309
21	602.670	1089.212
22	613.570	1104.840

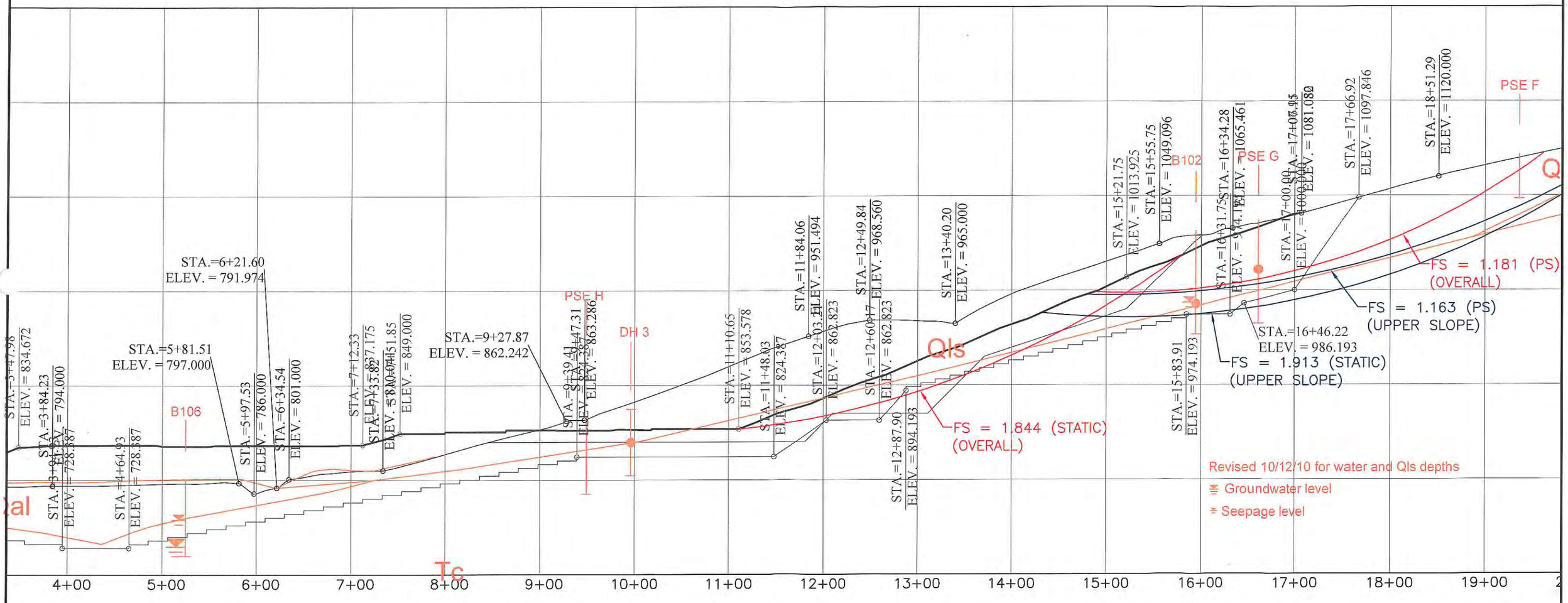
Circle Center At X = 109.108 ; Y = 1448.311 ; and Radius = 610.290

Factor of Safety

*** 1.250 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 10



GRAPHIC SCALE

0 1" 2"

0 50 100 200

1" = 100'

PREPARED BY:

RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6498 FAX
890 Oaco Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0258 FAX
E-mail: rjr@rjreng.com

SOUTHERN SLOPE
GEOLOGIC X-SECTION 1-1'
TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

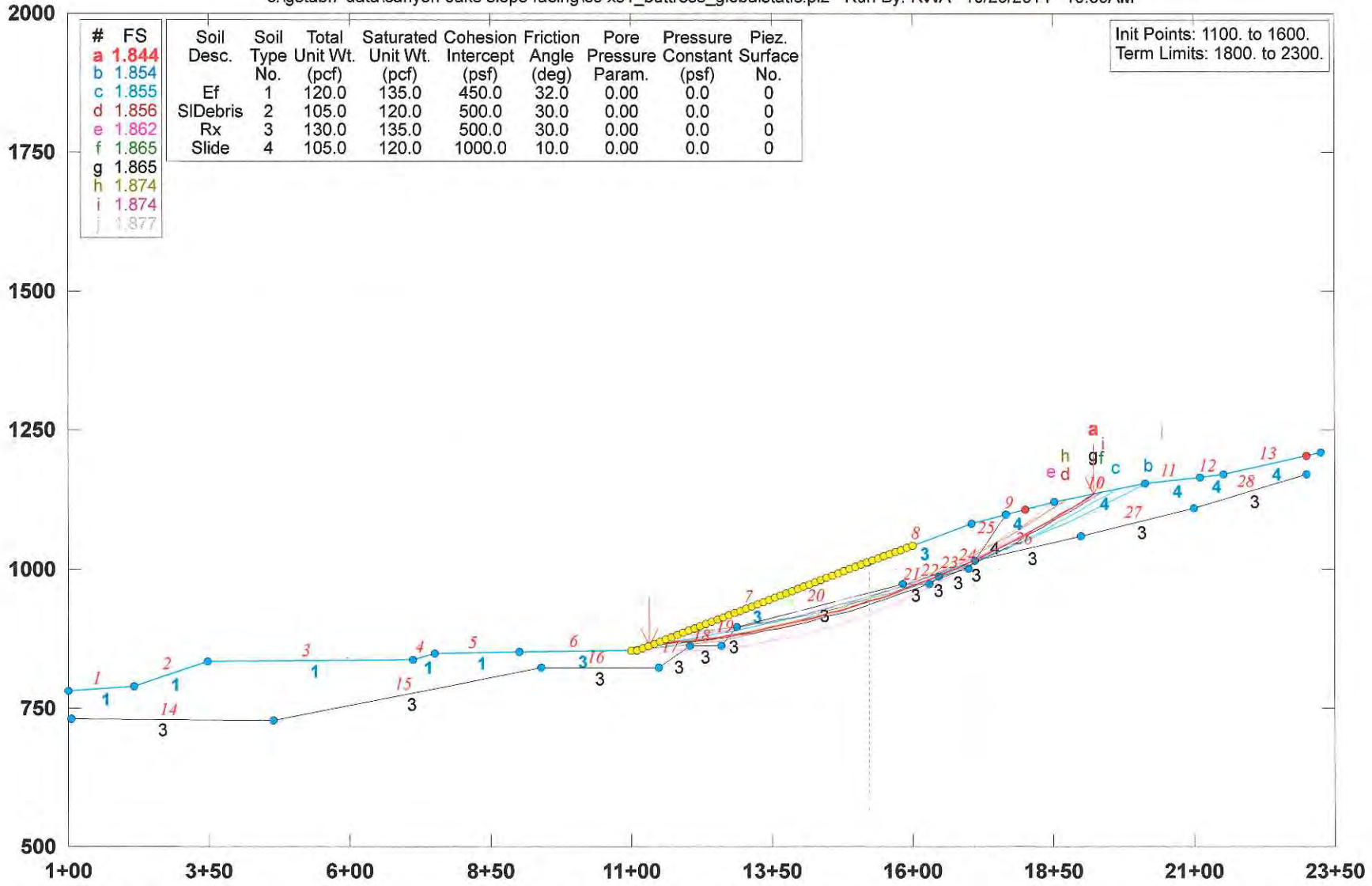
Canyon Oaks Section 1 - 1' - Southern Slope Buttress (GLOBAL)

c:\gstabl7 data\canyon oaks slope facing\co xs1_buttress_globalstatic.pl2 Run By: RWA 10/29/2014 10:39AM

#	FS
a	1.844
b	1.854
c	1.855
d	1.856
e	1.862
f	1.865
g	1.865
h	1.874
i	1.874
j	1.877

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Init Points: 1100. to 1600.
Term Limits: 1800. to 2300.



GSTABL7 v.2 FSmin=1.844

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_GlobalStatic.in Version G7v2.005
Canyon Oaks                                Section 1 - 1' - Southern Slope Buttress
28 13
100. 782. 218. 790. 1
218. 790. 347. 834. 1
347. 834. 712. 837. 1
712. 837. 751. 849. 1
751. 849. 900. 850. 1
900. 850. 1110. 853. 3
1110. 853. 1521. 1013. 3
1521. 1013. 1706. 1081. 3
1706. 1081. 1851. 1120. 4
1851. 1120. 2013. 1154. 4
2013. 1154. 2112. 1165. 4
2112. 1165. 2152. 1169. 4
2152. 1169. 2325. 1209. 4
106. 732. 464. 728. 3
464. 728. 939. 824. 3
939. 824. 1148. 824. 3
1148. 824. 1203. 862. 3
1203. 862. 1260. 862. 3
1260. 862. 1287. 894. 3
1287. 894. 1583. 974. 3
1583. 974. 1631. 974. 3
1631. 974. 1646. 986. 3
1646. 986. 1700. 1000. 3
1700. 1000. 1710. 1015. 3
1710. 1015. 1766. 1097. 4
1710. 1015. 1900. 1060. 3
1900. 1060. 2100. 1110. 3
2100. 1110. 2300. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
EQUAKE
0.
CIRCL2
50 50
1100. 1600. 1800. 2300.
0. 25. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 10:39AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_GlobalStatic.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_GlobalStatic.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_GlobalStatic.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 1 - 1' - Southern Slope Buttress

BOUNDARY COORDINATES
13 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	782.00	218.00	790.00	1
2	218.00	790.00	347.00	834.00	1
3	347.00	834.00	712.00	837.00	1
4	712.00	837.00	751.00	849.00	1
5	751.00	849.00	900.00	850.00	1
6	900.00	850.00	1110.00	853.00	3
7	1110.00	853.00	1521.00	1013.00	3
8	1521.00	1013.00	1706.00	1081.00	3
9	1706.00	1081.00	1851.00	1120.00	4
10	1851.00	1120.00	2013.00	1154.00	4
11	2013.00	1154.00	2112.00	1165.00	4
12	2112.00	1165.00	2152.00	1169.00	4
13	2152.00	1169.00	2325.00	1209.00	4
14	106.00	732.00	464.00	728.00	3
15	464.00	728.00	939.00	824.00	3
16	939.00	824.00	1148.00	824.00	3
17	1148.00	824.00	1203.00	862.00	3
18	1203.00	862.00	1260.00	862.00	3
19	1260.00	862.00	1287.00	894.00	3
20	1287.00	894.00	1583.00	974.00	3
21	1583.00	974.00	1631.00	974.00	3
22	1631.00	974.00	1646.00	986.00	3
23	1646.00	986.00	1700.00	1000.00	3
24	1700.00	1000.00	1710.00	1015.00	3
25	1710.00	1015.00	1766.00	1097.00	4
26	1710.00	1015.00	1900.00	1060.00	3
27	1900.00	1060.00	2100.00	1110.00	3
28	2100.00	1110.00	2300.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0

2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X =1100.00(ft)
and X =1600.00(ft)
Each Surface Terminates Between X =1800.00(ft)
and X =2300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 4.881 FS Min = 1.844 FS Ave = 3.016
Standard Deviation = 0.664 Coefficient of Variation = 22.01 %
Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1130.612	861.024
2	1155.508	863.304
3	1180.368	865.950
4	1205.186	868.962
5	1229.957	872.338
6	1254.675	876.077
7	1279.336	880.180
8	1303.934	884.646
9	1328.464	889.472
10	1352.920	894.659
11	1377.297	900.205
12	1401.590	906.109
13	1425.794	912.369
14	1449.902	918.985
15	1473.911	925.954
16	1497.815	933.276
17	1521.609	940.949
18	1545.287	948.970
19	1568.844	957.339
20	1592.276	966.054
21	1615.577	975.112
22	1638.743	984.512
23	1661.768	994.252
24	1684.647	1004.329
25	1707.375	1014.741
26	1729.948	1025.487
27	1752.360	1036.564
28	1774.607	1047.969
29	1796.684	1059.699
30	1818.586	1071.754
31	1840.308	1084.129
32	1861.846	1096.822
33	1883.195	1109.831
34	1904.350	1123.152
35	1922.613	1135.030

Circle Center At X = 988.030 ; Y = 2554.903 ; and Radius = 1699.869
Factor of Safety

*** 1.844 ***
Individual data on the 43 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	24.9	11993.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.9	35315.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.8	57327.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	24.8	78017.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.7	97374.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	20.0	92287.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.6	23101.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.7	39390.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	16.9	92665.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	24.5	147367.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	24.5	161321.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	24.4	173917.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	24.3	185155.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	24.2	195038.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	24.1	203570.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	24.0	210759.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	23.9	216612.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	23.2	215422.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	0.6	5716.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	23.7	223522.9	0.0	0.0	0.	0.	0.0	0.0	0.0
21	23.6	223873.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	14.2	134735.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	9.3	88229.5	0.0	0.0	0.	0.	0.0	0.0	0.0
24	20.4	193789.8	0.0	0.0	0.	0.	0.0	0.0	0.0
25	2.9	27031.0	0.0	0.0	0.	0.	0.0	0.0	0.0
26	23.2	217458.3	0.0	0.0	0.	0.	0.0	0.0	0.0
27	23.0	212902.6	0.0	0.0	0.	0.	0.0	0.0	0.0
28	22.9	207176.2	0.0	0.0	0.	0.	0.0	0.0	0.0
29	21.4	188361.4	0.0	0.0	0.	0.	0.0	0.0	0.0
30	1.4	9639.1	0.0	0.0	0.	0.	0.0	0.0	0.0
31	3.6	25236.1	0.0	0.0	0.	0.	0.0	0.0	0.0
32	18.9	127142.8	0.0	0.0	0.	0.	0.0	0.0	0.0
33	22.4	139856.0	0.0	0.0	0.	0.	0.0	0.0	0.0
34	13.6	79118.6	0.0	0.0	0.	0.	0.0	0.0	0.0
35	8.6	47476.9	0.0	0.0	0.	0.	0.0	0.0	0.0
36	22.1	112629.8	0.0	0.0	0.	0.	0.0	0.0	0.0
37	21.9	97989.7	0.0	0.0	0.	0.	0.0	0.0	0.0
38	21.7	82707.2	0.0	0.0	0.	0.	0.0	0.0	0.0
39	10.7	35119.1	0.0	0.0	0.	0.	0.0	0.0	0.0
40	10.8	31332.1	0.0	0.0	0.	0.	0.0	0.0	0.0
41	21.3	47501.1	0.0	0.0	0.	0.	0.0	0.0	0.0
42	21.2	27734.8	0.0	0.0	0.	0.	0.0	0.0	0.0
43	18.3	7713.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1130.612	861.024
2	1155.309	864.904
3	1179.971	869.005
4	1204.594	873.326
5	1229.178	877.868
6	1253.721	882.629
7	1278.219	887.610
8	1302.673	892.810
9	1327.078	898.228
10	1351.435	903.865
11	1375.740	909.719
12	1399.991	915.791
13	1424.187	922.079
14	1448.326	928.584
15	1472.406	935.304
16	1496.425	942.240

17	1520.380	949.390
18	1544.271	956.754
19	1568.095	964.332
20	1591.850	972.123
21	1615.535	980.126
22	1639.146	988.341
23	1662.684	996.766
24	1686.145	1005.402
25	1709.528	1014.247
26	1732.830	1023.302
27	1756.051	1032.564
28	1779.188	1042.034
29	1802.240	1051.711
30	1825.203	1061.593
31	1848.078	1071.681
32	1870.861	1081.973
33	1893.551	1092.468
34	1916.147	1103.166
35	1938.645	1114.066
36	1961.046	1125.167
37	1983.346	1136.467
38	2005.544	1147.967
39	2017.984	1154.554

Circle Center At X = 709.387 ; Y = 3622.773 ; and Radius = 2793.688

Factor of Safety

*** 1.854 ***

Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1120.408	857.052
2	1145.256	859.805
3	1170.068	862.868
4	1194.839	866.242
5	1219.566	869.924
6	1244.246	873.916
7	1268.873	878.215
8	1293.445	882.823
9	1317.957	887.737
10	1342.406	892.957
11	1366.788	898.482
12	1391.099	904.311
13	1415.335	910.444
14	1439.492	916.880
15	1463.568	923.617
16	1487.557	930.654
17	1511.456	937.991
18	1535.262	945.626
19	1558.970	953.557
20	1582.577	961.785
21	1606.080	970.307
22	1629.474	979.122
23	1652.756	988.229
24	1675.923	997.626
25	1698.970	1007.312
26	1721.895	1017.286
27	1744.693	1027.545
28	1767.361	1038.088
29	1789.895	1048.914
30	1812.293	1060.021
31	1834.549	1071.407
32	1856.662	1083.070
33	1878.627	1095.008
34	1900.441	1107.221
35	1922.101	1119.705
36	1943.603	1132.458
37	1961.033	1143.093

Circle Center At X = 912.604 ; Y = 2846.159 ; and Radius = 1999.933

Factor of Safety

*** 1.855 ***
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1110.204	853.079
2	1135.126	855.054
3	1160.012	857.443
4	1184.854	860.245
5	1209.647	863.459
6	1234.382	867.085
7	1259.054	871.121
8	1283.656	875.566
9	1308.180	880.420
10	1332.620	885.680
11	1356.970	891.346
12	1381.222	897.415
13	1405.370	903.887
14	1429.407	910.759
15	1453.327	918.029
16	1477.122	925.695
17	1500.787	933.756
18	1524.314	942.209
19	1547.698	951.052
20	1570.932	960.282
21	1594.009	969.896
22	1616.924	979.893
23	1639.669	990.269
24	1662.238	1001.021
25	1684.626	1012.147
26	1706.826	1023.643
27	1728.832	1035.507
28	1750.637	1047.734
29	1772.237	1060.323
30	1793.624	1073.268
31	1814.794	1086.567
32	1835.739	1100.215
33	1856.455	1114.210
34	1870.604	1124.115

Circle Center At X = 1003.917 ; Y = 2353.456 ; and Radius = 1504.137

Factor of Safety
*** 1.856 ***
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1110.204	853.079
2	1135.186	852.135
3	1160.184	851.806
4	1185.182	852.094
5	1210.166	852.997
6	1235.120	854.517
7	1260.029	856.651
8	1284.877	859.398
9	1309.651	862.757
10	1334.333	866.725
11	1358.911	871.301
12	1383.369	876.481
13	1407.691	882.263
14	1431.863	888.642
15	1455.871	895.615
16	1479.700	903.178
17	1503.334	911.326
18	1526.761	920.054
19	1549.966	929.357
20	1572.934	939.229
21	1595.652	949.665
22	1618.106	960.657
23	1640.282	972.199
24	1662.167	984.284

25	1683.747	996.905
26	1705.010	1010.055
27	1725.942	1023.724
28	1746.531	1037.905
29	1766.763	1052.589
30	1786.628	1067.768
31	1806.113	1083.432
32	1825.205	1099.571
33	1843.894	1116.176
34	1846.772	1118.863

Circle Center At X = 1161.057 ; Y = 1865.672 ; and Radius = 1013.869

Factor of Safety

*** 1.862 ***

Failure Surface Specified By 33 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1191.837	884.859
2	1216.747	886.974
3	1241.621	889.483
4	1266.452	892.385
5	1291.234	895.680
6	1315.961	899.365
7	1340.626	903.441
8	1365.224	907.906
9	1389.749	912.760
10	1414.193	918.001
11	1438.552	923.628
12	1462.818	929.638
13	1486.987	936.032
14	1511.051	942.807
15	1535.006	949.962
16	1558.844	957.495
17	1582.560	965.403
18	1606.148	973.685
19	1629.603	982.339
20	1652.917	991.363
21	1676.086	1000.755
22	1699.104	1010.511
23	1721.965	1020.630
24	1744.662	1031.109
25	1767.192	1041.946
26	1789.547	1053.137
27	1811.722	1064.681
28	1833.712	1076.574
29	1855.512	1088.812
30	1877.115	1101.394
31	1898.516	1114.316
32	1919.711	1127.575
33	1935.345	1137.702

Circle Center At X = 1070.477 ; Y = 2461.559 ; and Radius = 1581.364

Factor of Safety

*** 1.865 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1140.816	864.997
2	1165.772	866.483
3	1190.699	868.389
4	1215.591	870.716
5	1240.440	873.461
6	1265.239	876.625
7	1289.981	880.207
8	1314.659	884.205
9	1339.266	888.619
10	1363.796	893.447
11	1388.240	898.688
12	1412.593	904.340
13	1436.847	910.402

14	1460.995	916.871
15	1485.031	923.747
16	1508.948	931.027
17	1532.738	938.710
18	1556.396	946.792
19	1579.914	955.271
20	1603.285	964.146
21	1626.504	973.414
22	1649.563	983.072
23	1672.456	993.117
24	1695.177	1003.547
25	1717.718	1014.358
26	1740.074	1025.548
27	1762.239	1037.112
28	1784.205	1049.049
29	1805.967	1061.355
30	1827.518	1074.025
31	1848.853	1087.057
32	1869.965	1100.447
33	1890.848	1114.191
34	1911.496	1128.285
35	1920.362	1134.557

Circle Center At X = 1065.146 ; Y = 2346.082 ; and Radius = 1483.017

Factor of Safety

*** 1.865 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1110.204	853.079
2	1135.049	855.856
3	1159.852	858.995
4	1184.605	862.495
5	1209.306	866.355
6	1233.947	870.574
7	1258.524	875.153
8	1283.032	880.089
9	1307.465	885.382
10	1331.819	891.030
11	1356.088	897.033
12	1380.266	903.388
13	1404.349	910.096
14	1428.333	917.154
15	1452.210	924.560
16	1475.977	932.314
17	1499.629	940.413
18	1523.160	948.856
19	1546.566	957.642
20	1569.841	966.767
21	1592.980	976.231
22	1615.979	986.031
23	1638.833	996.165
24	1661.537	1006.631
25	1684.086	1017.427
26	1706.475	1028.550
27	1728.699	1039.999
28	1750.755	1051.770
29	1772.636	1063.861
30	1794.339	1076.270
31	1815.859	1088.994
32	1837.191	1102.031
33	1858.331	1115.376
34	1872.272	1124.464

Circle Center At X = 932.270 ; Y = 2558.393 ; and Radius = 1714.571

Factor of Safety

*** 1.874 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	1171.429	876.914
2	1196.258	879.833
3	1221.045	883.084
4	1245.788	886.665
5	1270.480	890.577
6	1295.117	894.818
7	1319.696	899.387
8	1344.212	904.284
9	1368.660	909.508
10	1393.036	915.058
11	1417.336	920.932
12	1441.556	927.131
13	1465.690	933.653
14	1489.735	940.496
15	1513.687	947.659
16	1537.541	955.142
17	1561.293	962.943
18	1584.938	971.060
19	1608.473	979.491
20	1631.894	988.237
21	1655.196	997.294
22	1678.374	1006.662
23	1701.426	1016.338
24	1724.346	1026.321
25	1747.131	1036.609
26	1769.776	1047.201
27	1792.278	1058.094
28	1814.633	1069.286
29	1836.836	1080.776
30	1858.884	1092.561
31	1880.773	1104.640
32	1902.498	1117.009
33	1924.056	1129.668
34	1938.383	1138.340

Circle Center At X = 965.347 ; Y = 2737.236 ; and Radius = 1871.702

Factor of Safety

*** 1.874 ***

Failure Surface Specified By 38 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1171.429	876.914
2	1196.045	881.280
3	1220.627	885.831
4	1245.174	890.569
5	1269.684	895.492
6	1294.156	900.601
7	1318.590	905.895
8	1342.982	911.374
9	1367.332	917.037
10	1391.639	922.884
11	1415.900	928.915
12	1440.116	935.129
13	1464.283	941.527
14	1488.402	948.107
15	1512.470	954.870
16	1536.486	961.814
17	1560.449	968.940
18	1584.357	976.247
19	1608.209	983.735
20	1632.004	991.404
21	1655.740	999.252
22	1679.417	1007.279
23	1703.031	1015.486
24	1726.583	1023.871
25	1750.071	1032.434
26	1773.493	1041.175
27	1796.849	1050.092
28	1820.136	1059.186

29	1843.354	1068.456
30	1866.500	1077.902
31	1889.575	1087.522
32	1912.577	1097.317
33	1935.503	1107.286
34	1958.354	1117.428
35	1981.127	1127.742
36	2003.821	1138.229
37	2026.435	1148.887
38	2044.316	1157.479

Circle Center At X = 607.103 ; Y = 4130.757 ; and Radius = 3302.417

Factor of Safety

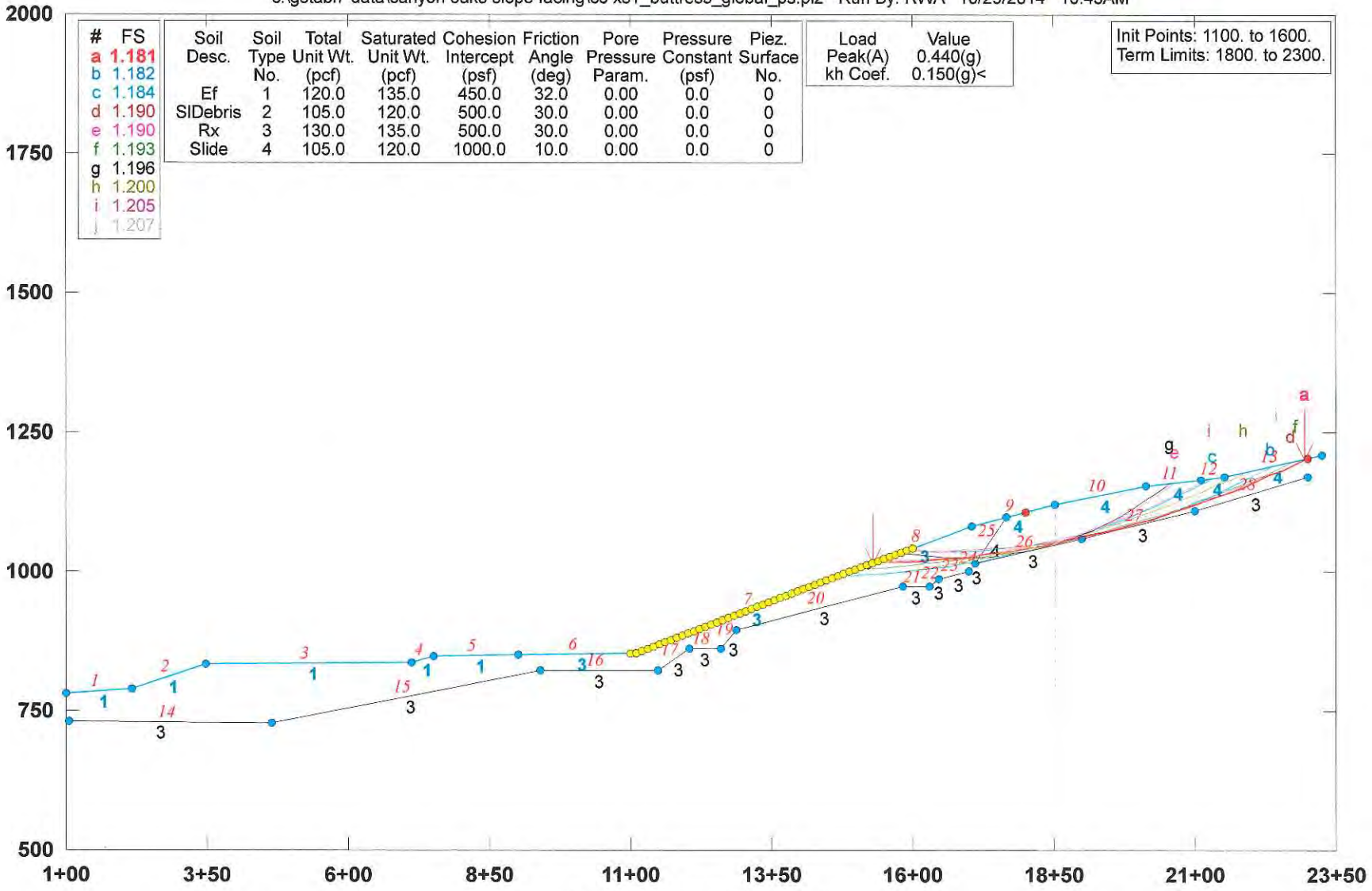
*** 1.877 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 11

Canyon Oaks Section 1 - 1' - Southern Slope Buttress - (Global)

c:\gstabl7 data\canyon oaks slope facing\co xs1_buttress_global_ps.pl2 Run By: RWA 10/29/2014 10:43AM



#	FS
a	1.181
b	1.182
c	1.184
d	1.190
e	1.190
f	1.193
g	1.196
h	1.200
i	1.205
j	1.207

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

Init Points: 1100. to 1600.
Term Limits: 1800. to 2300.

GSTABL7 v.2 FSmin=1.181

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Global_PS.in Version G7v2.005.1
Canyon Oaks                                Section 1 - 1' - Southern Slope Buttress
28 13
100. 782. 218. 790. 1
218. 790. 347. 834. 1
347. 834. 712. 837. 1
712. 837. 751. 849. 1
751. 849. 900. 850. 1
900. 850. 1110. 853. 3
1110. 853. 1521. 1013. 3
1521. 1013. 1706. 1081. 3
1706. 1081. 1851. 1120. 4
1851. 1120. 2013. 1154. 4
2013. 1154. 2112. 1165. 4
2112. 1165. 2152. 1169. 4
2152. 1169. 2325. 1209. 4
106. 732. 464. 728. 3
464. 728. 939. 824. 3
939. 824. 1148. 824. 3
1148. 824. 1203. 862. 3
1203. 862. 1260. 862. 3
1260. 862. 1287. 894. 3
1287. 894. 1583. 974. 3
1583. 974. 1631. 974. 3
1631. 974. 1646. 986. 3
1646. 986. 1700. 1000. 3
1700. 1000. 1710. 1015. 3
1710. 1015. 1766. 1097. 4
1710. 1015. 1900. 1060. 3
1900. 1060. 2100. 1110. 3
2100. 1110. 2300. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
CIRCL2
50 50
1100. 1600. 1800. 2300.
0. 25. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 10:43AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Global_PS.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Global_PS.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Global_PS.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 1 - 1' - Southern Slope Buttress

BOUNDARY COORDINATES
13 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	782.00	218.00	790.00	1
2	218.00	790.00	347.00	834.00	1
3	347.00	834.00	712.00	837.00	1
4	712.00	837.00	751.00	849.00	1
5	751.00	849.00	900.00	850.00	1
6	900.00	850.00	1110.00	853.00	3
7	1110.00	853.00	1521.00	1013.00	3
8	1521.00	1013.00	1706.00	1081.00	3
9	1706.00	1081.00	1851.00	1120.00	4
10	1851.00	1120.00	2013.00	1154.00	4
11	2013.00	1154.00	2112.00	1165.00	4
12	2112.00	1165.00	2152.00	1169.00	4
13	2152.00	1169.00	2325.00	1209.00	4
14	106.00	732.00	464.00	728.00	3
15	464.00	728.00	939.00	824.00	3
16	939.00	824.00	1148.00	824.00	3
17	1148.00	824.00	1203.00	862.00	3
18	1203.00	862.00	1260.00	862.00	3
19	1260.00	862.00	1287.00	894.00	3
20	1287.00	894.00	1583.00	974.00	3
21	1583.00	974.00	1631.00	974.00	3
22	1631.00	974.00	1646.00	986.00	3
23	1646.00	986.00	1700.00	1000.00	3
24	1700.00	1000.00	1710.00	1015.00	3
25	1710.00	1015.00	1766.00	1097.00	4
26	1710.00	1015.00	1900.00	1060.00	3
27	1900.00	1060.00	2100.00	1110.00	3
28	2100.00	1110.00	2300.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0

2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X =1100.00(ft)
and X =1600.00(ft)
Each Surface Terminates Between X =1800.00(ft)
and X =2300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
25.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.302 FS Min = 1.181 FS Ave = 1.915
Standard Deviation = 0.387 Coefficient of Variation = 20.23 %
Failure Surface Specified By 33 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1528.572	1015.783
2	1553.567	1016.318
3	1578.551	1017.204
4	1603.520	1018.442
5	1628.470	1020.032
6	1653.394	1021.973
7	1678.289	1024.264
8	1703.149	1026.906
9	1727.969	1029.898
10	1752.745	1033.240
11	1777.471	1036.930
12	1802.143	1040.968
13	1826.755	1045.352
14	1851.304	1050.083
15	1875.783	1055.160
16	1900.188	1060.581
17	1924.515	1066.344
18	1948.757	1072.450
19	1972.912	1078.897
20	1996.973	1085.683
21	2020.937	1092.808
22	2044.797	1100.269
23	2068.550	1108.066
24	2092.191	1116.196
25	2115.715	1124.659
26	2139.118	1133.452
27	2162.394	1142.574
28	2185.540	1152.022
29	2208.550	1161.796
30	2231.421	1171.893
31	2254.146	1182.311
32	2276.723	1193.048
33	2295.022	1202.069

Circle Center At X = 1503.134 ; Y = 2790.575 ; and Radius = 1774.974
Factor of Safety
*** 1.181 ***
Individual data on the 39 slices

	Water	Water	Tie	Tie	Earthquake

Slice No.	Width (ft)	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	Surcharge Load (lbs)
1	25.0	14057.4	0.0	0.0	0.	0.	2108.6	0.0	0.0
2	25.0	41578.3	0.0	0.0	0.	0.	6236.7	0.0	0.0
3	25.0	67906.2	0.0	0.0	0.	0.	10185.9	0.0	0.0
4	24.9	93022.1	0.0	0.0	0.	0.	13953.3	0.0	0.0
5	24.9	116909.6	0.0	0.0	0.	0.	17536.4	0.0	0.0
6	24.9	139552.1	0.0	0.0	0.	0.	20932.8	0.0	0.0
7	24.9	160936.6	0.0	0.0	0.	0.	24140.5	0.0	0.0
8	2.9	19791.4	0.0	0.0	0.	0.	2968.7	0.0	0.0
9	13.5	77465.5	0.0	0.0	0.	0.	11619.8	0.0	0.0
10	8.5	50283.9	0.0	0.0	0.	0.	7542.6	0.0	0.0
11	24.8	152631.9	0.0	0.0	0.	0.	22894.8	0.0	0.0
12	13.3	85074.5	0.0	0.0	0.	0.	12761.2	0.0	0.0
13	11.5	75408.5	0.0	0.0	0.	0.	11311.3	0.0	0.0
14	24.7	167329.5	0.0	0.0	0.	0.	25099.4	0.0	0.0
15	24.6	173171.8	0.0	0.0	0.	0.	25975.8	0.0	0.0
16	24.2	175781.6	0.0	0.0	0.	0.	26367.2	0.0	0.0
17	0.3	2230.7	0.0	0.0	0.	0.	334.6	0.0	0.0
18	24.5	179949.5	0.0	0.0	0.	0.	26992.4	0.0	0.0
19	24.4	179102.2	0.0	0.0	0.	0.	26865.3	0.0	0.0
20	24.3	177302.5	0.0	0.0	0.	0.	26595.4	0.0	0.0
21	24.2	174559.9	0.0	0.0	0.	0.	26184.0	0.0	0.0
22	24.2	170886.0	0.0	0.0	0.	0.	25632.9	0.0	0.0
23	24.1	166292.9	0.0	0.0	0.	0.	24943.9	0.0	0.0
24	16.0	108124.2	0.0	0.0	0.	0.	16218.6	0.0	0.0
25	7.9	52345.0	0.0	0.0	0.	0.	7851.7	0.0	0.0
26	23.9	149492.0	0.0	0.0	0.	0.	22423.8	0.0	0.0
27	23.8	136388.7	0.0	0.0	0.	0.	20458.3	0.0	0.0
28	23.6	122512.5	0.0	0.0	0.	0.	18376.9	0.0	0.0
29	19.8	91808.8	0.0	0.0	0.	0.	13771.3	0.0	0.0
30	3.7	16070.7	0.0	0.0	0.	0.	2410.6	0.0	0.0
31	23.4	92114.4	0.0	0.0	0.	0.	13817.2	0.0	0.0
32	12.9	43797.6	0.0	0.0	0.	0.	6569.6	0.0	0.0
33	10.4	32376.0	0.0	0.0	0.	0.	4856.4	0.0	0.0
34	23.1	65086.3	0.0	0.0	0.	0.	9762.9	0.0	0.0
35	23.0	54375.9	0.0	0.0	0.	0.	8156.4	0.0	0.0
36	22.9	42923.6	0.0	0.0	0.	0.	6438.5	0.0	0.0
37	22.7	30754.5	0.0	0.0	0.	0.	4613.2	0.0	0.0
38	22.6	17893.6	0.0	0.0	0.	0.	2684.0	0.0	0.0
39	18.3	4601.4	0.0	0.0	0.	0.	690.2	0.0	0.0

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1589.797	1038.287
2	1614.773	1037.193
3	1639.766	1036.626
4	1664.766	1036.586
5	1689.762	1037.073
6	1714.741	1038.088
7	1739.694	1039.628
8	1764.608	1041.695
9	1789.473	1044.286
10	1814.279	1047.402
11	1839.012	1051.040
12	1863.664	1055.198
13	1888.223	1059.875
14	1912.677	1065.070
15	1937.017	1070.779
16	1961.230	1077.000
17	1985.307	1083.730
18	2009.237	1090.966
19	2033.009	1098.705
20	2056.613	1106.944
21	2080.037	1115.679
22	2103.272	1124.906
23	2126.307	1134.621

24	2149.132	1144.819
25	2171.738	1155.496
26	2194.113	1166.648
27	2216.247	1178.269
28	2233.647	1187.878

Circle Center At X = 1654.206 ; Y = 2221.452 ; and Radius = 1184.917

Factor of Safety

*** 1.182 ***

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1467.348	992.113
2	1492.340	992.750
3	1517.317	993.822
4	1542.271	995.328
5	1567.196	997.268
6	1592.083	999.641
7	1616.925	1002.447
8	1641.714	1005.684
9	1666.444	1009.353
10	1691.106	1013.451
11	1715.693	1017.977
12	1740.197	1022.930
13	1764.611	1028.309
14	1788.928	1034.112
15	1813.141	1040.338
16	1837.242	1046.983
17	1861.223	1054.047
18	1885.078	1061.526
19	1908.799	1069.420
20	1932.379	1077.725
21	1955.811	1086.439
22	1979.088	1095.560
23	2002.203	1105.083
24	2025.148	1115.008
25	2047.918	1125.331
26	2070.504	1136.047
27	2092.901	1147.156
28	2115.101	1158.652
29	2130.229	1166.823

Circle Center At X = 1443.236 ; Y = 2428.888 ; and Radius = 1436.977

Factor of Safety

*** 1.184 ***

Failure Surface Specified By 30 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1589.797	1038.287
2	1614.788	1037.627
3	1639.787	1037.433
4	1664.786	1037.706
5	1689.775	1038.446
6	1714.746	1039.653
7	1739.690	1041.327
8	1764.598	1043.466
9	1789.462	1046.070
10	1814.273	1049.138
11	1839.022	1052.669
12	1863.702	1056.662
13	1888.302	1061.115
14	1912.814	1066.027
15	1937.231	1071.397
16	1961.543	1077.221
17	1985.742	1083.499
18	2009.819	1090.228
19	2033.767	1097.405
20	2057.576	1105.029
21	2081.239	1113.096
22	2104.747	1121.604

23	2128.091	1130.549
24	2151.265	1139.930
25	2174.259	1149.741
26	2197.066	1159.980
27	2219.677	1170.644
28	2242.086	1181.729
29	2264.283	1193.230
30	2269.855	1196.250

Circle Center At X = 1637.725 ; Y = 2374.820 ; and Radius = 1337.392

Factor of Safety

*** 1.190 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1600.001	1042.038
2	1624.658	1037.911
3	1649.473	1034.875
4	1674.398	1032.937
5	1699.384	1032.100
6	1724.382	1032.365
7	1749.345	1033.734
8	1774.223	1036.202
9	1798.967	1039.765
10	1823.531	1044.416
11	1847.865	1050.146
12	1871.924	1056.943
13	1895.658	1064.795
14	1919.024	1073.687
15	1941.974	1083.600
16	1964.465	1094.516
17	1986.453	1106.414
18	2007.894	1119.270
19	2028.747	1133.058
20	2048.972	1147.754
21	2063.921	1159.658

Circle Center At X = 1705.858 ; Y = 1598.708 ; and Radius = 566.645

Factor of Safety

*** 1.190 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1497.960	1004.031
2	1522.930	1005.251
3	1547.883	1006.782
4	1572.815	1008.623
5	1597.723	1010.774
6	1622.601	1013.235
7	1647.448	1016.004
8	1672.257	1019.083
9	1697.027	1022.470
10	1721.752	1026.165
11	1746.430	1030.167
12	1771.056	1034.476
13	1795.626	1039.090
14	1820.137	1044.010
15	1844.585	1049.234
16	1868.966	1054.762
17	1893.277	1060.593
18	1917.513	1066.726
19	1941.671	1073.159
20	1965.747	1079.893
21	1989.738	1086.925
22	2013.639	1094.256
23	2037.447	1101.883
24	2061.158	1109.805
25	2084.769	1118.022
26	2108.276	1126.532
27	2131.676	1135.333

28	2154.964	1144.425
29	2178.137	1153.806
30	2201.192	1163.474
31	2224.125	1173.429
32	2246.932	1183.668
33	2269.610	1194.189
34	2277.692	1198.062

Circle Center At X = 1412.450 ; Y = 3011.387 ; and Radius = 2009.177

Factor of Safety

*** 1.193 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1579.593	1034.537
2	1604.272	1030.546
3	1629.101	1027.622
4	1654.032	1025.772
5	1679.020	1024.998
6	1704.018	1025.303
7	1728.980	1026.684
8	1753.859	1029.141
9	1778.609	1032.668
10	1803.184	1037.259
11	1827.538	1042.905
12	1851.626	1049.595
13	1875.403	1057.318
14	1898.826	1066.059
15	1921.849	1075.802
16	1944.431	1086.527
17	1966.530	1098.217
18	1988.104	1110.849
19	2009.114	1124.398
20	2029.520	1138.841
21	2049.284	1154.151
22	2054.565	1158.618

Circle Center At X = 1684.483 ; Y = 1604.141 ; and Radius = 579.181

Factor of Safety

*** 1.196 ***

Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1457.144	988.141
2	1482.084	989.859
3	1507.002	991.892
4	1531.891	994.238
5	1556.750	996.898
6	1581.572	999.870
7	1606.355	1003.156
8	1631.095	1006.753
9	1655.788	1010.662
10	1680.429	1014.881
11	1705.015	1019.411
12	1729.542	1024.251
13	1754.007	1029.399
14	1778.404	1034.854
15	1802.731	1040.617
16	1826.983	1046.686
17	1851.157	1053.061
18	1875.248	1059.739
19	1899.254	1066.720
20	1923.169	1074.003
21	1946.991	1081.587
22	1970.716	1089.471
23	1994.339	1097.653
24	2017.857	1106.132
25	2041.266	1114.907
26	2064.563	1123.976
27	2087.744	1133.337

28	2110.805	1142.991
29	2133.743	1152.934
30	2156.554	1163.165
31	2179.233	1173.683
32	2185.742	1176.802

Circle Center At X = 1333.406 ; Y = 2967.248 ; and Radius = 1982.971

Factor of Safety

*** 1.200 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1538.776	1019.534
2	1563.776	1019.356
3	1588.773	1019.717
4	1613.757	1020.619
5	1638.715	1022.061
6	1663.637	1024.042
7	1688.510	1026.561
8	1713.322	1029.616
9	1738.063	1033.208
10	1762.720	1037.333
11	1787.282	1041.990
12	1811.739	1047.177
13	1836.077	1052.891
14	1860.286	1059.129
15	1884.354	1065.890
16	1908.271	1073.169
17	1932.025	1080.963
18	1955.605	1089.268
19	1979.000	1098.081
20	2002.199	1107.398
21	2025.192	1117.214
22	2047.967	1127.525
23	2070.513	1138.325
24	2092.821	1149.610
25	2114.880	1161.375
26	2123.362	1166.136

Circle Center At X = 1559.634 ; Y = 2175.198 ; and Radius = 1155.853

Factor of Safety

*** 1.205 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1457.144	988.141
2	1482.062	990.163
3	1506.957	992.453
4	1531.825	995.011
5	1556.665	997.836
6	1581.473	1000.929
7	1606.246	1004.289
8	1630.982	1007.916
9	1655.677	1011.808
10	1680.329	1015.966
11	1704.934	1020.390
12	1729.491	1025.078
13	1753.995	1030.031
14	1778.445	1035.246
15	1802.837	1040.725
16	1827.169	1046.467
17	1851.438	1052.470
18	1875.640	1058.734
19	1899.774	1065.258
20	1923.836	1072.041
21	1947.823	1079.084
22	1971.734	1086.384
23	1995.564	1093.942
24	2019.312	1101.755
25	2042.974	1109.824

```
 26        2066.548      1118.147
 27        2090.031      1126.724
 28        2113.420      1135.552
 29        2136.712      1144.633
 30        2159.906      1153.963
 31        2182.998      1163.543
 32        2205.985      1173.371
 33        2228.865      1183.446
 34        2243.848      1190.236
Circle Center At X =  1282.010 ; Y =  3302.153 ; and Radius =  2320.630
      Factor of Safety
     ***    1.207   ***
         **** END OF GSTABL7 OUTPUT ****
```

Analysis 12

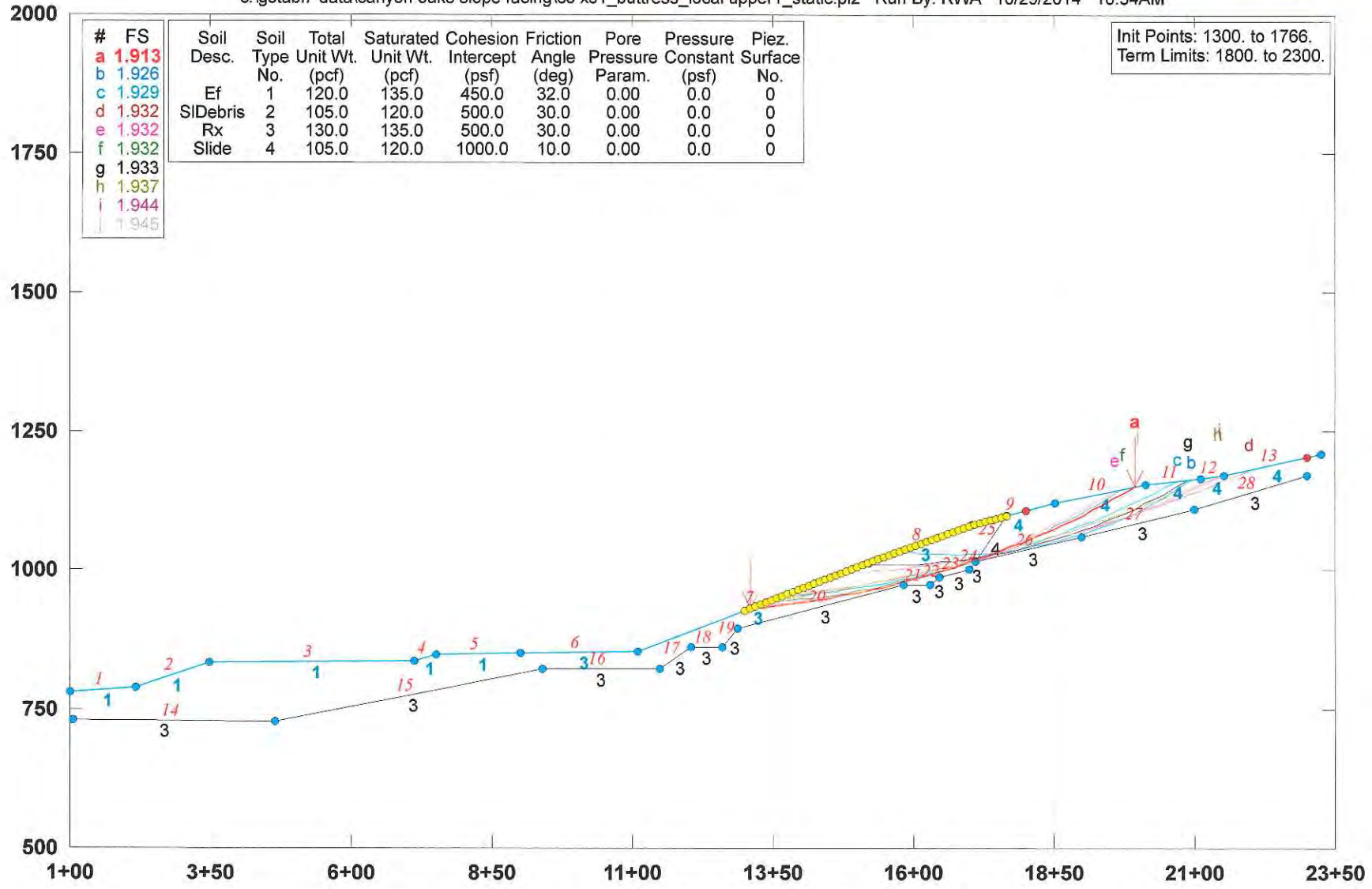
Canyon Oaks Section 1 - 1' - Southern Slope Buttress (Upper Slope)

c:\gstabl7 data\canyon oaks slope facing\co xs1_buttress_local upper1_static.pl2 Run By: RWA 10/29/2014 10:54AM

#	FS
a	1.913
b	1.926
c	1.929
d	1.932
e	1.932
f	1.932
g	1.933
h	1.937
i	1.944
j	1.945

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Init Points: 1300. to 1766.
Term Limits: 1800. to 2300.



GSTABL7 v.2 FSmin=1.913
Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_Static.in Version G
Canyon Oaks                                Section 1 - 1' - Southern Slope Buttress
28 13
100. 782. 218. 790. 1
218. 790. 347. 834. 1
347. 834. 712. 837. 1
712. 837. 751. 849. 1
751. 849. 900. 850. 1
900. 850. 1110. 853. 3
1110. 853. 1521. 1013. 3
1521. 1013. 1706. 1081. 3
1706. 1081. 1851. 1120. 4
1851. 1120. 2013. 1154. 4
2013. 1154. 2112. 1165. 4
2112. 1165. 2152. 1169. 4
2152. 1169. 2325. 1209. 4
106. 732. 464. 728. 3
464. 728. 939. 824. 3
939. 824. 1148. 824. 3
1148. 824. 1203. 862. 3
1203. 862. 1260. 862. 3
1260. 862. 1287. 894. 3
1287. 894. 1583. 974. 3
1583. 974. 1631. 974. 3
1631. 974. 1646. 986. 3
1646. 986. 1700. 1000. 3
1700. 1000. 1710. 1015. 3
1710. 1015. 1766. 1097. 4
1710. 1015. 1900. 1060. 3
1900. 1060. 2100. 1110. 3
2100. 1110. 2300. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
EQUAKE
0.
CIRCL2
50 50
1300. 1766. 1800. 2300.
0. 20. 0. 0.
```

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

**** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 ****

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****

SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 10:54AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_Static.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_Static.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_Static.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 1 - 1' - Southern Slope Buttress

BOUNDARY COORDINATES
13 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	782.00	218.00	790.00	1
2	218.00	790.00	347.00	834.00	1
3	347.00	834.00	712.00	837.00	1
4	712.00	837.00	751.00	849.00	1
5	751.00	849.00	900.00	850.00	1
6	900.00	850.00	1110.00	853.00	3
7	1110.00	853.00	1521.00	1013.00	3
8	1521.00	1013.00	1706.00	1081.00	3
9	1706.00	1081.00	1851.00	1120.00	4
10	1851.00	1120.00	2013.00	1154.00	4
11	2013.00	1154.00	2112.00	1165.00	4
12	2112.00	1165.00	2152.00	1169.00	4
13	2152.00	1169.00	2325.00	1209.00	4
14	106.00	732.00	464.00	728.00	3
15	464.00	728.00	939.00	824.00	3
16	939.00	824.00	1148.00	824.00	3
17	1148.00	824.00	1203.00	862.00	3
18	1203.00	862.00	1260.00	862.00	3
19	1260.00	862.00	1287.00	894.00	3
20	1287.00	894.00	1583.00	974.00	3
21	1583.00	974.00	1631.00	974.00	3
22	1631.00	974.00	1646.00	986.00	3
23	1646.00	986.00	1700.00	1000.00	3
24	1700.00	1000.00	1710.00	1015.00	3
25	1710.00	1015.00	1766.00	1097.00	4
26	1710.00	1015.00	1900.00	1060.00	3
27	1900.00	1060.00	2100.00	1110.00	3
28	2100.00	1110.00	2300.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0

2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X =1300.00(ft)
and X =1766.00(ft)
Each Surface Terminates Between X =1800.00(ft)
and X =2300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 31.218 FS Min = 1.913 FS Ave = 3.491
Standard Deviation = 1.400 Coefficient of Variation = 40.10 %
Failure Surface Specified By 38 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1309.510	930.668
2	1329.429	932.473
3	1349.323	934.526
4	1369.190	936.826
5	1389.027	939.373
6	1408.831	942.166
7	1428.599	945.205
8	1448.328	948.490
9	1468.014	952.020
10	1487.654	955.794
11	1507.246	959.812
12	1526.787	964.073
13	1546.273	968.577
14	1565.702	973.323
15	1585.070	978.310
16	1604.375	983.538
17	1623.613	989.005
18	1642.782	994.711
19	1661.879	1000.654
20	1680.900	1006.835
21	1699.842	1013.252
22	1718.704	1019.903
23	1737.481	1026.789
24	1756.172	1033.907
25	1774.772	1041.258
26	1793.279	1048.839
27	1811.691	1056.649
28	1830.004	1064.688
29	1848.216	1072.954
30	1866.324	1081.446
31	1884.325	1090.162
32	1902.216	1099.102
33	1919.994	1108.263
34	1937.657	1117.644
35	1955.203	1127.244
36	1972.627	1137.062
37	1989.928	1147.095

38 1995.261 1150.277

Circle Center At X = 1174.372 ; Y = 2533.117 ; and Radius = 1608.137

Factor of Safety

*** 1.913 ***

Individual data on the 42 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.9	7701.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.9	22745.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	19.9	37083.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	19.8	50707.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	19.8	63614.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	19.8	75797.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	19.7	87254.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	19.7	97981.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	19.6	107975.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	19.6	117235.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	13.8	87631.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	5.8	38083.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	19.5	132697.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	19.4	138688.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	19.4	143957.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	19.3	148504.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	19.2	152335.5	0.0	0.0	0.	0.	0.0	0.0	0.0
18	19.2	155454.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	19.1	157865.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	19.0	159574.1	0.0	0.0	0.	0.	0.0	0.0	0.0
21	18.9	160588.4	0.0	0.0	0.	0.	0.0	0.0	0.0
22	6.2	52456.6	0.0	0.0	0.	0.	0.0	0.0	0.0
23	5.6	38760.8	0.0	0.0	0.	0.	0.0	0.0	0.0
24	7.1	48003.3	0.0	0.0	0.	0.	0.0	0.0	0.0
25	18.8	125387.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	18.7	120953.1	0.0	0.0	0.	0.	0.0	0.0	0.0
27	9.8	61885.2	0.0	0.0	0.	0.	0.0	0.0	0.0
28	8.8	54150.9	0.0	0.0	0.	0.	0.0	0.0	0.0
29	18.5	110646.3	0.0	0.0	0.	0.	0.0	0.0	0.0
30	18.4	104795.5	0.0	0.0	0.	0.	0.0	0.0	0.0
31	18.3	98492.7	0.0	0.0	0.	0.	0.0	0.0	0.0
32	18.2	91751.4	0.0	0.0	0.	0.	0.0	0.0	0.0
33	2.8	13450.7	0.0	0.0	0.	0.	0.0	0.0	0.0
34	15.3	70403.5	0.0	0.0	0.	0.	0.0	0.0	0.0
35	18.0	74281.7	0.0	0.0	0.	0.	0.0	0.0	0.0
36	17.9	64321.2	0.0	0.0	0.	0.	0.0	0.0	0.0
37	17.8	54009.6	0.0	0.0	0.	0.	0.0	0.0	0.0
38	17.7	43362.6	0.0	0.0	0.	0.	0.0	0.0	0.0
39	17.5	32395.1	0.0	0.0	0.	0.	0.0	0.0	0.0
40	17.4	21123.0	0.0	0.0	0.	0.	0.0	0.0	0.0
41	17.3	9562.3	0.0	0.0	0.	0.	0.0	0.0	0.0
42	5.3	577.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1575.797	1033.142
2	1595.661	1030.810
3	1615.581	1029.023
4	1635.542	1027.782
5	1655.531	1027.089
6	1675.530	1026.944
7	1695.526	1027.348
8	1715.503	1028.298
9	1735.447	1029.796
10	1755.343	1031.840
11	1775.174	1034.428
12	1794.928	1037.559
13	1814.588	1041.229
14	1834.140	1045.437

15	1853.570	1050.180
16	1872.862	1055.452
17	1892.003	1061.252
18	1910.978	1067.574
19	1929.772	1074.413
20	1948.372	1081.765
21	1966.763	1089.623
22	1984.932	1097.983
23	2002.865	1106.837
24	2020.549	1116.180
25	2037.971	1126.003
26	2055.116	1136.300
27	2071.973	1147.063
28	2088.529	1158.284
29	2095.292	1163.144

Circle Center At X = 1670.821 ; Y = 1756.759 ; and Radius = 729.829

Factor of Safety

*** 1.926 ***

Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1357.062	949.180
2	1376.982	950.966
3	1396.881	952.970
4	1416.757	955.191
5	1436.608	957.629
6	1456.431	960.283
7	1476.224	963.153
8	1495.985	966.240
9	1515.710	969.542
10	1535.399	973.059
11	1555.047	976.791
12	1574.654	980.737
13	1594.217	984.897
14	1613.733	989.270
15	1633.200	993.856
16	1652.616	998.655
17	1671.978	1003.665
18	1691.284	1008.886
19	1710.533	1014.317
20	1729.721	1019.959
21	1748.846	1025.809
22	1767.906	1031.868
23	1786.899	1038.135
24	1805.822	1044.608
25	1824.674	1051.288
26	1843.451	1058.173
27	1862.152	1065.263
28	1880.775	1072.557
29	1899.317	1080.053
30	1917.776	1087.751
31	1936.150	1095.651
32	1954.436	1103.750
33	1972.633	1112.049
34	1990.739	1120.546
35	2008.750	1129.240
36	2026.666	1138.130
37	2044.483	1147.215
38	2062.200	1156.494
39	2069.168	1160.241

Circle Center At X = 1203.388 ; Y = 2774.722 ; and Radius = 1831.999

Factor of Safety

*** 1.929 ***

Failure Surface Specified By 45 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1357.062	949.180
2	1376.884	951.840

3	1396.689	954.625
4	1416.476	957.535
5	1436.245	960.568
6	1455.994	963.725
7	1475.723	967.006
8	1495.431	970.411
9	1515.117	973.940
10	1534.781	977.591
11	1554.422	981.367
12	1574.038	985.265
13	1593.630	989.286
14	1613.196	993.430
15	1632.735	997.697
16	1652.248	1002.087
17	1671.732	1006.598
18	1691.188	1011.232
19	1710.614	1015.988
20	1730.010	1020.866
21	1749.375	1025.865
22	1768.709	1030.986
23	1788.010	1036.227
24	1807.277	1041.590
25	1826.511	1047.074
26	1845.710	1052.678
27	1864.873	1058.402
28	1884.000	1064.247
29	1903.090	1070.212
30	1922.142	1076.296
31	1941.155	1082.500
32	1960.130	1088.822
33	1979.064	1095.264
34	1997.957	1101.824
35	2016.809	1108.503
36	2035.619	1115.300
37	2054.385	1122.215
38	2073.108	1129.248
39	2091.787	1136.397
40	2110.420	1143.664
41	2129.007	1151.048
42	2147.547	1158.548
43	2166.041	1166.164
44	2184.485	1173.896
45	2197.868	1179.605

Circle Center At X = 942.912 ; Y = 4109.790 ; and Radius = 3187.629

Factor of Safety

*** 1.932 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1319.021	934.371
2	1338.969	935.801
3	1358.895	937.527
4	1378.792	939.547
5	1398.658	941.861
6	1418.487	944.470
7	1438.276	947.371
8	1458.019	950.565
9	1477.713	954.051
10	1497.353	957.828
11	1516.935	961.895
12	1536.455	966.251
13	1555.908	970.896
14	1575.290	975.828
15	1594.597	981.047
16	1613.825	986.551
17	1632.969	992.338
18	1652.026	998.409
19	1670.991	1004.760

20	1689.859	1011.392
21	1708.627	1018.302
22	1727.291	1025.490
23	1745.847	1032.952
24	1764.290	1040.689
25	1782.617	1048.697
26	1800.823	1056.976
27	1818.904	1065.523
28	1836.857	1074.337
29	1854.678	1083.416
30	1872.362	1092.758
31	1889.906	1102.360
32	1907.307	1112.221
33	1924.559	1122.338
34	1941.660	1132.709
35	1956.809	1142.207

Circle Center At X = 1232.340 ; Y = 2282.972 ; and Radius = 1351.384

Factor of Safety

*** 1.932 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1338.041	941.775
2	1357.999	943.075
3	1377.935	944.676
4	1397.844	946.576
5	1417.723	948.776
6	1437.566	951.276
7	1457.369	954.073
8	1477.128	957.169
9	1496.839	960.562
10	1516.495	964.251
11	1536.094	968.236
12	1555.631	972.515
13	1575.101	977.088
14	1594.500	981.954
15	1613.824	987.111
16	1633.068	992.559
17	1652.227	998.296
18	1671.298	1004.320
19	1690.276	1010.632
20	1709.157	1017.228
21	1727.937	1024.108
22	1746.610	1031.269
23	1765.174	1038.712
24	1783.624	1046.432
25	1801.955	1054.430
26	1820.164	1062.703
27	1838.246	1071.249
28	1856.198	1080.067
29	1874.014	1089.154
30	1891.692	1098.508
31	1909.227	1108.127
32	1926.615	1118.009
33	1943.852	1128.152
34	1960.935	1138.553
35	1971.701	1145.332

Circle Center At X = 1261.679 ; Y = 2267.762 ; and Radius = 1328.184

Factor of Safety

*** 1.932 ***

Failure Surface Specified By 32 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1509.226	1008.416
2	1529.220	1007.959
3	1549.220	1007.885
4	1569.218	1008.195
5	1589.206	1008.889

6	1609.177	1009.966
7	1629.123	1011.427
8	1649.038	1013.270
9	1668.914	1015.495
10	1688.744	1018.101
11	1708.519	1021.088
12	1728.234	1024.453
13	1747.881	1028.196
14	1767.452	1032.316
15	1786.940	1036.810
16	1806.339	1041.678
17	1825.641	1046.917
18	1844.838	1052.526
19	1863.924	1058.502
20	1882.892	1064.843
21	1901.735	1071.547
22	1920.446	1078.612
23	1939.018	1086.034
24	1957.443	1093.812
25	1975.716	1101.942
26	1993.830	1110.421
27	2011.778	1119.246
28	2029.553	1128.414
29	2047.148	1137.922
30	2064.558	1147.765
31	2081.776	1157.941
32	2089.088	1162.454

Circle Center At X = 1543.124 ; Y = 2049.249 ; and Radius = 1041.385

Factor of Safety

*** 1.933 ***

Failure Surface Specified By 43 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1338.041	941.775
2	1357.805	944.840
3	1377.550	948.022
4	1397.276	951.321
5	1416.982	954.736
6	1436.668	958.268
7	1456.333	961.916
8	1475.975	965.680
9	1495.595	969.560
10	1515.192	973.557
11	1534.765	977.668
12	1554.313	981.896
13	1573.835	986.239
14	1593.332	990.697
15	1612.802	995.271
16	1632.245	999.959
17	1651.660	1004.763
18	1671.046	1009.681
19	1690.402	1014.713
20	1709.728	1019.860
21	1729.024	1025.121
22	1748.288	1030.496
23	1767.520	1035.985
24	1786.720	1041.587
25	1805.885	1047.303
26	1825.017	1053.131
27	1844.114	1059.073
28	1863.176	1065.128
29	1882.201	1071.295
30	1901.190	1077.575
31	1920.141	1083.967
32	1939.054	1090.470
33	1957.928	1097.086
34	1976.763	1103.812
35	1995.558	1110.650

36	2014.312	1117.599
37	2033.024	1124.659
38	2051.695	1131.829
39	2070.323	1139.110
40	2088.907	1146.500
41	2107.448	1154.000
42	2125.944	1161.610
43	2140.973	1167.897

Circle Center At X = 829.360 ; Y = 4286.788 ; and Radius = 3383.469

Factor of Safety

*** 1.937 ***

Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1471.185	993.607
2	1491.159	994.611
3	1511.121	995.854
4	1531.066	997.336
5	1550.992	999.056
6	1570.895	1001.015
7	1590.774	1003.211
8	1610.626	1005.646
9	1630.446	1008.318
10	1650.234	1011.227
11	1669.985	1014.372
12	1689.697	1017.754
13	1709.367	1021.371
14	1728.993	1025.223
15	1748.571	1029.310
16	1768.098	1033.631
17	1787.573	1038.186
18	1806.991	1042.973
19	1826.351	1047.992
20	1845.650	1053.242
21	1864.884	1058.724
22	1884.051	1064.434
23	1903.149	1070.374
24	1922.174	1076.542
25	1941.124	1082.937
26	1959.996	1089.559
27	1978.788	1096.406
28	1997.496	1103.477
29	2016.118	1110.772
30	2034.652	1118.289
31	2053.094	1126.027
32	2071.442	1133.985
33	2089.694	1142.163
34	2107.847	1150.558
35	2125.898	1159.170
36	2143.844	1167.997
37	2144.304	1168.230

Circle Center At X = 1397.283 ; Y = 2663.152 ; and Radius = 1671.180

Factor of Safety

*** 1.944 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1385.592	960.287
2	1405.565	961.327
3	1425.519	962.684
4	1445.449	964.356
5	1465.350	966.343
6	1485.218	968.644
7	1505.046	971.259
8	1524.830	974.188
9	1544.566	977.429
10	1564.248	980.981
11	1583.871	984.845

12	1603.431	989.018
13	1622.922	993.500
14	1642.340	998.290
15	1661.680	1003.386
16	1680.937	1008.787
17	1700.106	1014.492
18	1719.182	1020.500
19	1738.161	1026.809
20	1757.038	1033.417
21	1775.808	1040.322
22	1794.467	1047.524
23	1813.009	1055.019
24	1831.430	1062.807
25	1849.726	1070.885
26	1867.892	1079.252
27	1885.923	1087.905
28	1903.816	1096.842
29	1921.564	1106.060
30	1939.165	1115.558
31	1956.613	1125.334
32	1973.905	1135.384
33	1991.035	1145.706
34	1999.925	1151.256

Circle Center At X = 1329.864 ; Y = 2223.173 ; and Radius = 1264.115

Factor of Safety

*** 1.945 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 13

Canyon Oaks Section 1 - 1' - Southern Slope Buttress (Upper Slope)

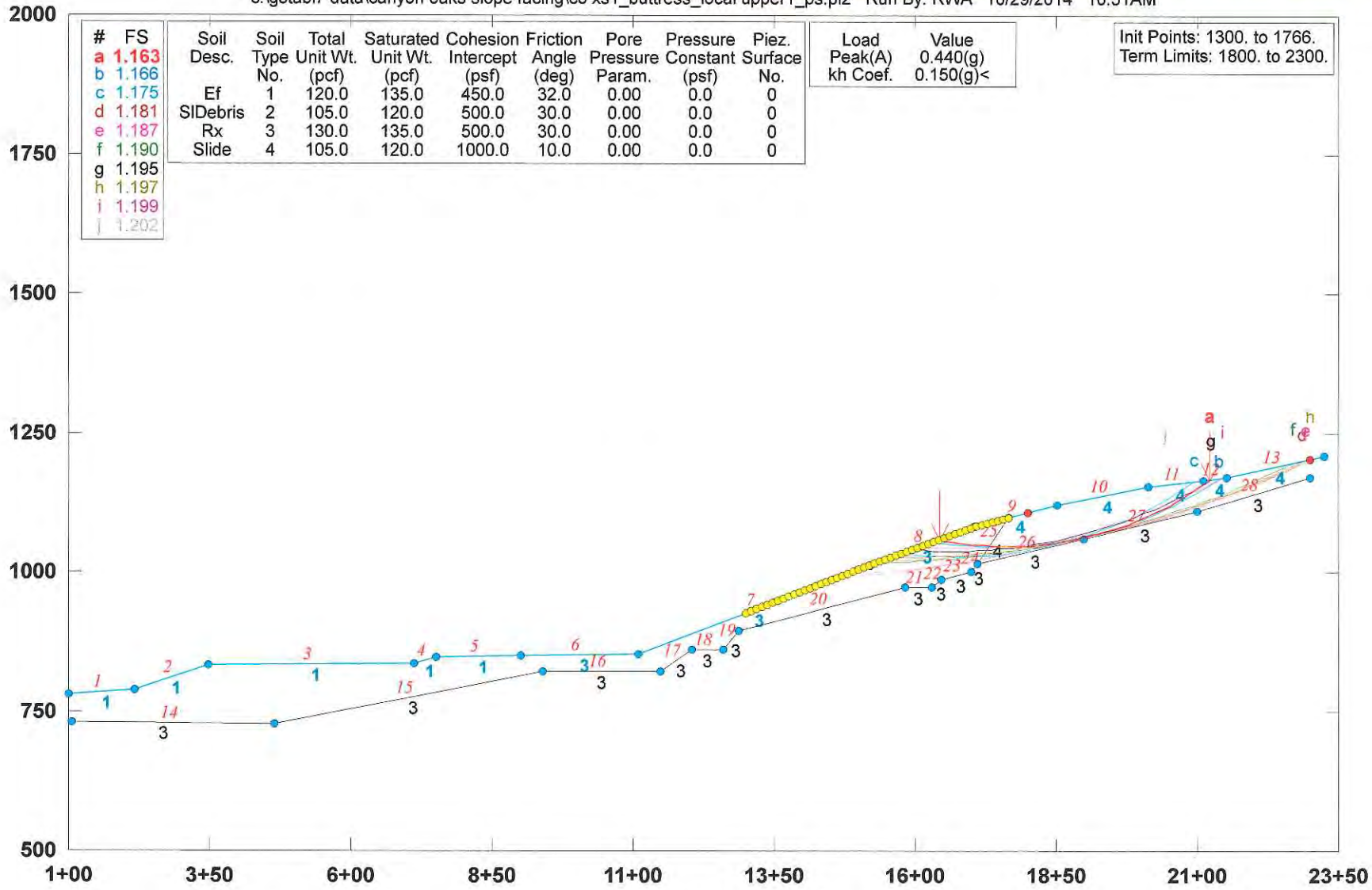
c:\gstabl7 data\canyon oaks slope facing\co xs1_buttress_local upper1_ps.pl2 Run By: RWA 10/29/2014 10:51AM

#	FS
a	1.163
b	1.166
c	1.175
d	1.181
e	1.187
f	1.190
g	1.195
h	1.197
i	1.199
j	1.202

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Ef	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Load	Value
Peak(A)	0.440(g)
kh Coef.	0.150(g)<

Init Points: 1300. to 1766.
Term Limits: 1800. to 2300.



GSTABL7 v.2 FSmin=1.163

Safety Factors Are Calculated By The Modified Bishop Method

```
PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_PS.in Version G7v2.
Canyon Oaks                                Section 1 - 1' - Southern Slope Buttress
28 13
100. 782. 218. 790. 1
218. 790. 347. 834. 1
347. 834. 712. 837. 1
712. 837. 751. 849. 1
751. 849. 900. 850. 1
900. 850. 1110. 853. 3
1110. 853. 1521. 1013. 3
1521. 1013. 1706. 1081. 3
1706. 1081. 1851. 1120. 4
1851. 1120. 2013. 1154. 4
2013. 1154. 2112. 1165. 4
2112. 1165. 2152. 1169. 4
2152. 1169. 2325. 1209. 4
106. 732. 464. 728. 3
464. 728. 939. 824. 3
939. 824. 1148. 824. 3
1148. 824. 1203. 862. 3
1203. 862. 1260. 862. 3
1260. 862. 1287. 894. 3
1287. 894. 1583. 974. 3
1583. 974. 1631. 974. 3
1631. 974. 1646. 986. 3
1646. 986. 1700. 1000. 3
1700. 1000. 1710. 1015. 3
1710. 1015. 1766. 1097. 4
1710. 1015. 1900. 1060. 3
1900. 1060. 2100. 1110. 3
2100. 1110. 2300. 1170. 3
500. 0. 0.
SOIL  Ef      SlDebrisRx      Slide
4
120. 135. 450. 32. 0. 0. 0
105. 120. 500. 30. 0. 0. 0
130. 135. 500. 30. 0. 0. 0
105. 120. 1000. 10. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
CIRCL2
50 50
1300. 1766. 1800. 2300.
0. 20. 0. 0.
```

*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
(All Rights Reserved-Unauthorized Use Prohibited)

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 10/29/2014
Time of Run: 10:51AM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_PS.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_PS.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\CO XS1_Buttress_Local Upper1_PS.PLT
PROBLEM DESCRIPTION: Canyon Oaks
Section 1 - 1' - Southern Slope Buttress

BOUNDARY COORDINATES
13 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	100.00	782.00	218.00	790.00	1
2	218.00	790.00	347.00	834.00	1
3	347.00	834.00	712.00	837.00	1
4	712.00	837.00	751.00	849.00	1
5	751.00	849.00	900.00	850.00	1
6	900.00	850.00	1110.00	853.00	3
7	1110.00	853.00	1521.00	1013.00	3
8	1521.00	1013.00	1706.00	1081.00	3
9	1706.00	1081.00	1851.00	1120.00	4
10	1851.00	1120.00	2013.00	1154.00	4
11	2013.00	1154.00	2112.00	1165.00	4
12	2112.00	1165.00	2152.00	1169.00	4
13	2152.00	1169.00	2325.00	1209.00	4
14	106.00	732.00	464.00	728.00	3
15	464.00	728.00	939.00	824.00	3
16	939.00	824.00	1148.00	824.00	3
17	1148.00	824.00	1203.00	862.00	3
18	1203.00	862.00	1260.00	862.00	3
19	1260.00	862.00	1287.00	894.00	3
20	1287.00	894.00	1583.00	974.00	3
21	1583.00	974.00	1631.00	974.00	3
22	1631.00	974.00	1646.00	986.00	3
23	1646.00	986.00	1700.00	1000.00	3
24	1700.00	1000.00	1710.00	1015.00	3
25	1710.00	1015.00	1766.00	1097.00	4
26	1710.00	1015.00	1900.00	1060.00	3
27	1900.00	1060.00	2100.00	1110.00	3
28	2100.00	1110.00	2300.00	1170.00	3

User Specified Y-Origin = 500.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0

2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X =1300.00(ft)
and X =1766.00(ft)
Each Surface Terminates Between X =1800.00(ft)
and X =2300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
20.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 20.066 FS Min = 1.163 FS Ave = 2.159
Standard Deviation = 0.876 Coefficient of Variation = 40.58 %
Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1642.369	1057.611
2	1662.018	1053.879
3	1681.781	1050.809
4	1701.636	1048.406
5	1721.560	1046.671
6	1741.532	1045.606
7	1761.528	1045.214
8	1781.526	1045.494
9	1801.504	1046.446
10	1821.438	1048.069
11	1841.306	1050.361
12	1861.086	1053.320
13	1880.755	1056.942
14	1900.292	1061.223
15	1919.673	1066.158
16	1938.878	1071.742
17	1957.884	1077.968
18	1976.670	1084.829
19	1995.215	1092.319
20	2013.497	1100.427
21	2031.497	1109.145
22	2049.194	1118.464
23	2066.567	1128.372
24	2083.597	1138.858
25	2100.266	1149.911
26	2116.553	1161.518
27	2122.478	1166.048

Circle Center At X = 1763.200 ; Y = 1640.131 ; and Radius = 594.920
Factor of Safety
*** 1.163 ***
Individual data on the 32 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.6	13990.8	0.0	0.0	0.	0.	2098.6	0.0	0.0
2	19.8	41419.5	0.0	0.0	0.	0.	6212.9	0.0	0.0
3	19.9	67469.7	0.0	0.0	0.	0.	10120.4	0.0	0.0

4	4.4	18144.8	0.0	0.0	0.	0.	2721.7	0.0	0.0
5	15.6	58401.2	0.0	0.0	0.	0.	8760.2	0.0	0.0
6	9.7	40883.5	0.0	0.0	0.	0.	6132.5	0.0	0.0
7	10.3	46631.1	0.0	0.0	0.	0.	6994.7	0.0	0.0
8	20.0	100436.1	0.0	0.0	0.	0.	15065.4	0.0	0.0
9	4.5	24083.4	0.0	0.0	0.	0.	3612.5	0.0	0.0
10	15.5	87774.3	0.0	0.0	0.	0.	13166.1	0.0	0.0
11	20.0	121726.0	0.0	0.0	0.	0.	18258.9	0.0	0.0
12	19.9	130002.1	0.0	0.0	0.	0.	19500.3	0.0	0.0
13	19.9	136655.0	0.0	0.0	0.	0.	20498.3	0.0	0.0
14	9.7	68819.9	0.0	0.0	0.	0.	10323.0	0.0	0.0
15	10.1	72533.9	0.0	0.0	0.	0.	10880.1	0.0	0.0
16	19.7	142607.8	0.0	0.0	0.	0.	21391.2	0.0	0.0
17	19.5	141978.9	0.0	0.0	0.	0.	21296.8	0.0	0.0
18	19.4	139785.8	0.0	0.0	0.	0.	20967.9	0.0	0.0
19	19.2	136070.1	0.0	0.0	0.	0.	20410.5	0.0	0.0
20	19.0	130880.6	0.0	0.0	0.	0.	19632.1	0.0	0.0
21	18.8	124280.4	0.0	0.0	0.	0.	18642.1	0.0	0.0
22	18.5	116340.0	0.0	0.0	0.	0.	17451.0	0.0	0.0
23	17.8	104336.7	0.0	0.0	0.	0.	15650.5	0.0	0.0
24	0.5	2804.7	0.0	0.0	0.	0.	420.7	0.0	0.0
25	18.0	95007.4	0.0	0.0	0.	0.	14251.1	0.0	0.0
26	17.7	80334.4	0.0	0.0	0.	0.	12050.2	0.0	0.0
27	17.4	64884.8	0.0	0.0	0.	0.	9732.7	0.0	0.0
28	17.0	48788.2	0.0	0.0	0.	0.	7318.2	0.0	0.0
29	16.7	32178.7	0.0	0.0	0.	0.	4826.8	0.0	0.0
30	11.7	12636.7	0.0	0.0	0.	0.	1895.5	0.0	0.0
31	4.6	2549.4	0.0	0.0	0.	0.	382.4	0.0	0.0
32	5.9	1224.9	0.0	0.0	0.	0.	183.7	0.0	0.0

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1632.859	1054.116
2	1652.633	1051.119
3	1672.486	1048.698
4	1692.401	1046.856
5	1712.361	1045.593
6	1732.349	1044.911
7	1752.349	1044.810
8	1772.344	1045.290
9	1792.315	1046.351
10	1812.248	1047.993
11	1832.124	1050.213
12	1851.928	1053.009
13	1871.642	1056.381
14	1891.249	1060.323
15	1910.734	1064.834
16	1930.079	1069.910
17	1949.269	1075.545
18	1968.286	1081.736
19	1987.116	1088.477
20	2005.742	1095.763
21	2024.148	1103.587
22	2042.319	1111.942
23	2060.240	1120.822
24	2077.895	1130.219
25	2095.269	1140.126
26	2112.348	1150.533
27	2129.117	1161.432
28	2138.033	1167.603

Circle Center At X = 1745.835 ; Y = 1732.318 ; and Radius = 687.548

Factor of Safety

*** 1.166 ***

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1575.797	1033.142
2	1595.661	1030.810

3	1615.581	1029.023
4	1635.542	1027.782
5	1655.531	1027.089
6	1675.530	1026.944
7	1695.526	1027.348
8	1715.503	1028.298
9	1735.447	1029.796
10	1755.343	1031.840
11	1775.174	1034.428
12	1794.928	1037.559
13	1814.588	1041.229
14	1834.140	1045.437
15	1853.570	1050.180
16	1872.862	1055.452
17	1892.003	1061.252
18	1910.978	1067.574
19	1929.772	1074.413
20	1948.372	1081.765
21	1966.763	1089.623
22	1984.932	1097.983
23	2002.865	1106.837
24	2020.549	1116.180
25	2037.971	1126.003
26	2055.116	1136.300
27	2071.973	1147.063
28	2088.529	1158.284
29	2095.292	1163.144

Circle Center At X = 1670.821 ; Y = 1756.759 ; and Radius = 729.829

Factor of Safety

*** 1.175 ***

Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1556.777	1026.150
2	1576.777	1026.096
3	1596.776	1026.299
4	1616.771	1026.758
5	1636.758	1027.475
6	1656.734	1028.448
7	1676.696	1029.677
8	1696.641	1031.163
9	1716.565	1032.906
10	1736.465	1034.903
11	1756.337	1037.157
12	1776.179	1039.665
13	1795.988	1042.429
14	1815.759	1045.446
15	1835.489	1048.717
16	1855.176	1052.242
17	1874.817	1056.019
18	1894.406	1060.048
19	1913.943	1064.328
20	1933.423	1068.859
21	1952.843	1073.641
22	1972.200	1078.671
23	1991.491	1083.949
24	2010.713	1089.475
25	2029.862	1095.247
26	2048.935	1101.265
27	2067.929	1107.527
28	2086.842	1114.033
29	2105.669	1120.781
30	2124.408	1127.770
31	2143.055	1135.000
32	2161.609	1142.469
33	2180.064	1150.175
34	2198.419	1158.118
35	2216.671	1166.296

36	2234.816	1174.708
37	2252.851	1183.352
38	2270.774	1192.227
39	2285.895	1199.958

Circle Center At X = 1571.005 ; Y = 2582.825 ; and Radius = 1556.739

Factor of Safety

*** 1.181 ***

Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1604.328	1043.629
2	1624.313	1042.857
3	1644.308	1042.389
4	1664.307	1042.225
5	1684.307	1042.365
6	1704.302	1042.809
7	1724.288	1043.557
8	1744.260	1044.609
9	1764.214	1045.964
10	1784.145	1047.623
11	1804.049	1049.584
12	1823.920	1051.848
13	1843.755	1054.413
14	1863.548	1057.279
15	1883.296	1060.447
16	1902.993	1063.913
17	1922.635	1067.679
18	1942.218	1071.743
19	1961.737	1076.105
20	1981.187	1080.762
21	2000.564	1085.715
22	2019.864	1090.961
23	2039.081	1096.501
24	2058.212	1102.332
25	2077.253	1108.453
26	2096.198	1114.862
27	2115.043	1121.559
28	2133.785	1128.542
29	2152.418	1135.808
30	2170.938	1143.358
31	2189.342	1151.188
32	2207.624	1159.296
33	2225.781	1167.682
34	2243.809	1176.342
35	2261.703	1185.276
36	2279.459	1194.481
37	2292.469	1201.479

Circle Center At X = 1665.088 ; Y = 2357.882 ; and Radius = 1315.657

Factor of Safety

*** 1.187 ***

Failure Surface Specified By 40 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1528.246	1015.663
2	1548.241	1016.100
3	1568.230	1016.768
4	1588.210	1017.667
5	1608.178	1018.798
6	1628.132	1020.160
7	1648.068	1021.753
8	1667.985	1023.576
9	1687.879	1025.630
10	1707.748	1027.915
11	1727.589	1030.429
12	1747.400	1033.173
13	1767.178	1036.146
14	1786.920	1039.348
15	1806.624	1042.779

16	1826.286	1046.437
17	1845.905	1050.323
18	1865.478	1054.436
19	1885.002	1058.775
20	1904.474	1063.340
21	1923.891	1068.130
22	1943.253	1073.145
23	1962.554	1078.383
24	1981.794	1083.845
25	2000.969	1089.529
26	2020.078	1095.435
27	2039.116	1101.561
28	2058.082	1107.908
29	2076.974	1114.474
30	2095.788	1121.258
31	2114.522	1128.260
32	2133.174	1135.478
33	2151.741	1142.912
34	2170.221	1150.560
35	2188.611	1158.422
36	2206.909	1166.496
37	2225.112	1174.782
38	2243.218	1183.277
39	2261.225	1191.982
40	2269.747	1196.225

Circle Center At X = 1500.629 ; Y = 2741.898 ; and Radius = 1726.455

Factor of Safety

*** 1.190 ***

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1594.818	1040.133
2	1614.766	1038.695
3	1634.742	1037.714
4	1654.735	1037.189
5	1674.735	1037.122
6	1694.731	1037.511
7	1714.713	1038.357
8	1734.671	1039.660
9	1754.593	1041.419
10	1774.471	1043.632
11	1794.292	1046.299
12	1814.047	1049.418
13	1833.726	1052.988
14	1853.318	1057.007
15	1872.813	1061.472
16	1892.201	1066.382
17	1911.472	1071.734
18	1930.615	1077.524
19	1949.621	1083.751
20	1968.480	1090.410
21	1987.182	1097.499
22	2005.717	1105.013
23	2024.075	1112.949
24	2042.247	1121.302
25	2060.223	1130.068
26	2077.995	1139.243
27	2095.552	1148.822
28	2112.885	1158.799
29	2125.305	1166.330

Circle Center At X = 1667.695 ; Y = 1912.185 ; and Radius = 875.092

Factor of Safety

*** 1.195 ***

Failure Surface Specified By 41 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1537.756	1019.159
2	1557.749	1019.704

3	1577.734	1020.466
4	1597.710	1021.446
5	1617.674	1022.643
6	1637.624	1024.058
7	1657.558	1025.689
8	1677.472	1027.538
9	1697.365	1029.604
10	1717.234	1031.886
11	1737.078	1034.384
12	1756.893	1037.099
13	1776.677	1040.029
14	1796.428	1043.174
15	1816.144	1046.534
16	1835.822	1050.109
17	1855.460	1053.898
18	1875.055	1057.900
19	1894.606	1062.116
20	1914.109	1066.544
21	1933.563	1071.185
22	1952.966	1076.037
23	1972.314	1081.100
24	1991.607	1086.373
25	2010.840	1091.856
26	2030.013	1097.549
27	2049.123	1103.450
28	2068.167	1109.558
29	2087.144	1115.874
30	2106.050	1122.396
31	2124.885	1129.124
32	2143.645	1136.056
33	2162.329	1143.192
34	2180.933	1150.531
35	2199.457	1158.073
36	2217.897	1165.815
37	2236.252	1173.758
38	2254.520	1181.901
39	2272.698	1190.242
40	2290.783	1198.780
41	2299.863	1203.188

Circle Center At X = 1497.759 ; Y = 2855.115 ; and Radius = 1836.392

Factor of Safety

*** 1.197 ***

Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1471.185	993.607
2	1491.159	994.611
3	1511.121	995.854
4	1531.066	997.336
5	1550.992	999.056
6	1570.895	1001.015
7	1590.774	1003.211
8	1610.626	1005.646
9	1630.446	1008.318
10	1650.234	1011.227
11	1669.985	1014.372
12	1689.697	1017.754
13	1709.367	1021.371
14	1728.993	1025.223
15	1748.571	1029.310
16	1768.098	1033.631
17	1787.573	1038.186
18	1806.991	1042.973
19	1826.351	1047.992
20	1845.650	1053.242
21	1864.884	1058.724
22	1884.051	1064.434
23	1903.149	1070.374

24	1922.174	1076.542
25	1941.124	1082.937
26	1959.996	1089.559
27	1978.788	1096.406
28	1997.496	1103.477
29	2016.118	1110.772
30	2034.652	1118.289
31	2053.094	1126.027
32	2071.442	1133.985
33	2089.694	1142.163
34	2107.847	1150.558
35	2125.898	1159.170
36	2143.844	1167.997
37	2144.304	1168.230

Circle Center At X = 1397.283 ; Y = 2663.152 ; and Radius = 1671.180

Factor of Safety

*** 1.199 ***

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	1604.328	1043.629
2	1623.876	1039.401
3	1643.582	1035.984
4	1663.412	1033.382
5	1683.333	1031.601
6	1703.310	1030.643
7	1723.309	1030.510
8	1743.297	1031.202
9	1763.240	1032.718
10	1783.103	1035.055
11	1802.852	1038.210
12	1822.455	1042.177
13	1841.877	1046.949
14	1861.086	1052.519
15	1880.049	1058.876
16	1898.733	1066.010
17	1917.108	1073.909
18	1935.140	1082.558
19	1952.801	1091.945
20	1970.059	1102.052
21	1986.886	1112.862
22	2003.252	1124.358
23	2019.130	1136.519
24	2034.493	1149.324
25	2043.380	1157.376

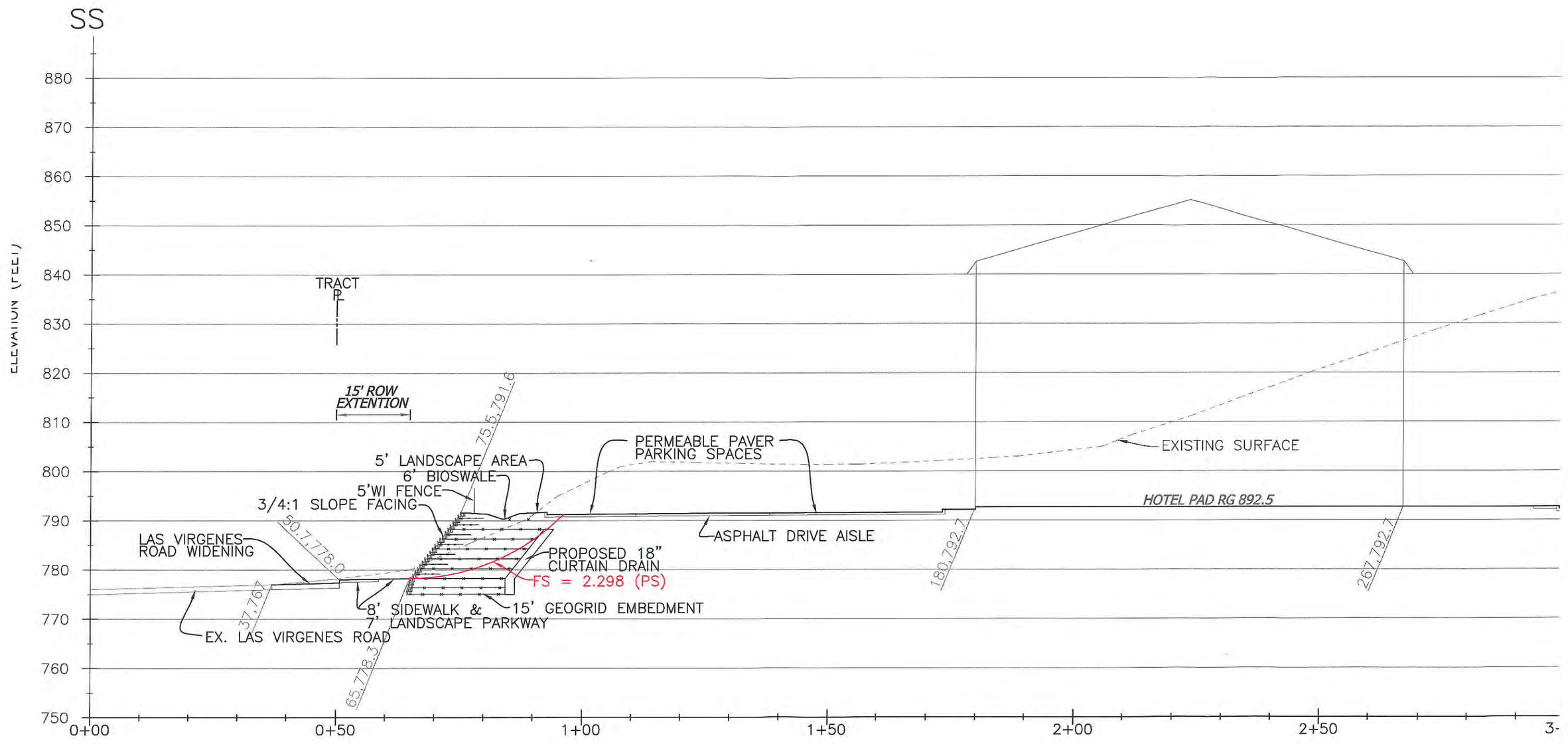
Circle Center At X = 1716.534 ; Y = 1515.170 ; and Radius = 484.708

Factor of Safety

*** 1.202 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 20



PREPARED BY:

RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6486 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjreng.com

GRAPHIC SCALE

0 1" 2"

0 10 20 40

1" = 20'

COMMERCIAL - FRONT SLOPE GEOLOGIC X-SECTION SS-SS'

TENTATIVE TRACT NO. 71546

CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Canyon Oaks / Calabasas Cross Section C1 - Lower Com Facing

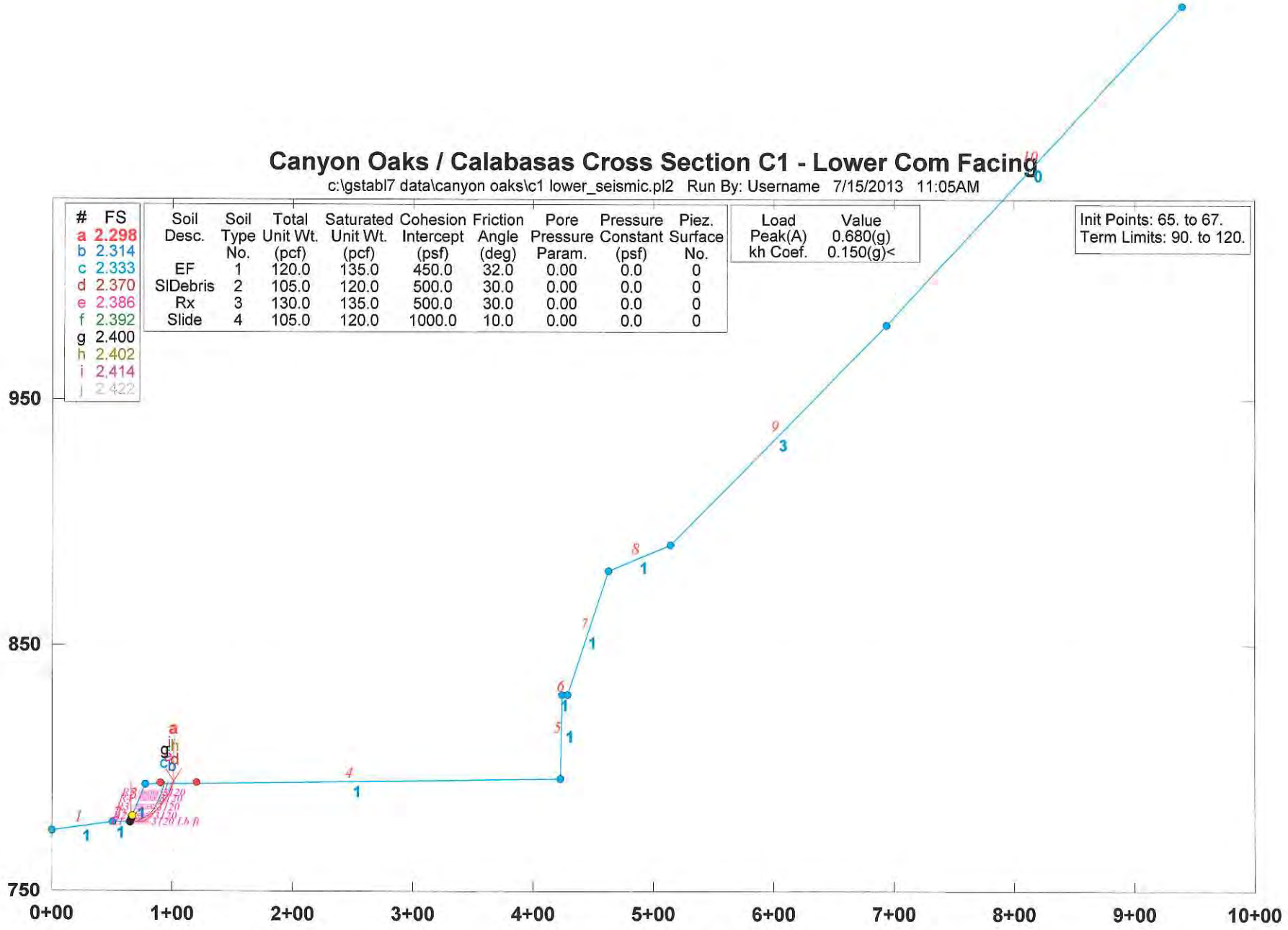
c:\gstabl7 data\canyon oaks\c1 lower_seismic.pl2 Run By: Username 7/15/2013 11:05AM

#	FS
a	2.298
b	2.314
c	2.333
d	2.370
e	2.386
f	2.392
g	2.400
h	2.402
i	2.414
j	2.422

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
EF	1	120.0	135.0	450.0	32.0	0.00	0.0	0
SlDebris	2	105.0	120.0	500.0	30.0	0.00	0.0	0
Rx	3	130.0	135.0	500.0	30.0	0.00	0.0	0
Slide	4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Load	Value
Peak(A)	0.680(g)
kh Coef.	0.150(g)<

Init Points: 65. to 67.
Term Limits: 90. to 120.



GSTABL7 v.2 FSmin=2.298

Safety Factors Are Calculated By The Modified Bishop Method

Input File

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77. 794. 423. 796. 1
423. 796. 424. 830. 1
424. 830. 429. 830. 1
429. 830. 463. 880. 1
463. 880. 514. 891. 1
514. 891. 694. 980. 3
694. 980. 939. 1110. 0
750. 0. 0.
SOIL  EF      SlDebrisRx      Slide
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73.33 778. 3120. 0.                       81.17 784. 3120. 0.
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76.67 778. 3120. 0.                       84.5 784. 3120. 0.
78.33 778. 3120. 0.                       10  R4
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68.92 781. 3120. 0.                       76.75 787. 3120. 0.
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73.92 781. 3120. 0.                       81.75 787. 3120. 0.
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77.25 781. 3120. 0.                       85.08 787. 3120. 0.
78.92 781. 3120. 0.                       86.75 787. 3120. 0.
80.58 781. 3120. 0.                       10  R5
82.25 781. 3120. 0.                       74. 790. 3120. 0.
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***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 7/15/2013
Time of Run: 11:05AM
Run By: Username
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks\C1 Lower_seismic.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks\C1 Lower_seismic.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks\C1 Lower_seismic.PLT
PROBLEM DESCRIPTION: Canyon Oaks / Calabasas
Cross Section C1 - Lower Com Facing

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	775.00	51.00	778.00	1
2	51.00	778.00	65.00	778.00	1
3	65.00	778.00	77.00	794.00	1
4	77.00	794.00	423.00	796.00	1
5	423.00	796.00	424.00	830.00	1
6	424.00	830.00	429.00	830.00	1
7	429.00	830.00	463.00	880.00	1
8	463.00	880.00	514.00	891.00	1
9	514.00	891.00	694.00	980.00	3
10	694.00	980.00	939.00	1110.00	0

User Specified Y-Origin = 750.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	135.0	450.0	32.0	0.00	0.0	0
2	105.0	120.0	500.0	30.0	0.00	0.0	0
3	130.0	135.0	500.0	30.0	0.00	0.0	0
4	105.0	120.0	1000.0	10.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.680(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000

REINFORCING LAYER(S)
5 REINFORCING LAYER(S) SPECIFIED
REINFORCING LAYER NO. 1
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	778.00	3120.00	0.000
2	66.67	778.00	3120.00	0.000
3	68.33	778.00	3120.00	0.000
4	70.00	778.00	3120.00	0.000
5	71.67	778.00	3120.00	0.000
6	73.33	778.00	3120.00	0.000
7	75.00	778.00	3120.00	0.000
8	76.67	778.00	3120.00	0.000
9	78.33	778.00	3120.00	0.000

10	80.00	778.00	3120.00	0.000

REINFORCING LAYER NO. 2
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	67.25	781.00	3120.00	0.000
2	68.92	781.00	3120.00	0.000
3	70.58	781.00	3120.00	0.000
4	72.25	781.00	3120.00	0.000
5	73.92	781.00	3120.00	0.000
6	75.58	781.00	3120.00	0.000
7	77.25	781.00	3120.00	0.000
8	78.92	781.00	3120.00	0.000
9	80.58	781.00	3120.00	0.000
10	82.25	781.00	3120.00	0.000

REINFORCING LAYER NO. 3
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	69.50	784.00	3120.00	0.000
2	71.17	784.00	3120.00	0.000
3	72.83	784.00	3120.00	0.000
4	74.50	784.00	3120.00	0.000
5	76.17	784.00	3120.00	0.000
6	77.83	784.00	3120.00	0.000
7	79.50	784.00	3120.00	0.000
8	81.17	784.00	3120.00	0.000
9	82.83	784.00	3120.00	0.000
10	84.50	784.00	3120.00	0.000

REINFORCING LAYER NO. 4
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	71.75	787.00	3120.00	0.000
2	73.42	787.00	3120.00	0.000
3	75.08	787.00	3120.00	0.000
4	76.75	787.00	3120.00	0.000
5	78.42	787.00	3120.00	0.000
6	80.08	787.00	3120.00	0.000
7	81.75	787.00	3120.00	0.000
8	83.42	787.00	3120.00	0.000
9	85.08	787.00	3120.00	0.000
10	86.75	787.00	3120.00	0.000

REINFORCING LAYER NO. 5
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	74.00	790.00	3120.00	0.000
2	75.67	790.00	3120.00	0.000
3	77.33	790.00	3120.00	0.000
4	79.00	790.00	3120.00	0.000
5	80.67	790.00	3120.00	0.000
6	82.33	790.00	3120.00	0.000
7	84.00	790.00	3120.00	0.000
8	85.67	790.00	3120.00	0.000
9	87.33	790.00	3120.00	0.000
10	89.00	790.00	3120.00	0.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 65.00(ft)
and X = 67.00(ft)
Each Surface Terminates Between X = 90.00(ft)
and X = 120.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
5.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 5.460 FS Min = 2.298 FS Ave = 3.842
Standard Deviation = 0.844 Coefficient of Variation = 21.98 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.163	778.218
2	70.163	778.142
3	75.133	778.683
4	80.000	779.830
5	84.688	781.568
6	89.127	783.869
7	93.250	786.698
8	96.992	790.014
9	100.299	793.764
10	100.553	794.136

Circle Center At X = 68.291 ; Y = 818.562 ; and Radius = 40.466
Factor of Safety
*** 2.298 ***
Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Surcharge Force Ver (lbs)	Surcharge Load (lbs)
1	5.0	2022.1	0.0	0.0	0.	0.	303.3	0.0	0.0
2	5.0	5836.6	0.0	0.0	0.	0.	875.5	0.0	0.0
3	1.9	3102.9	0.0	0.0	0.	0.	465.4	0.0	0.0
4	3.0	5231.5	0.0	0.0	0.	0.	784.7	0.0	0.0
5	4.7	7500.6	0.0	0.0	0.	0.	1125.1	0.0	0.0
6	4.4	6040.1	0.0	0.0	0.	0.	906.0	0.0	0.0
7	4.1	4352.3	0.0	0.0	0.	0.	652.9	0.0	0.0
8	3.7	2582.0	0.0	0.0	0.	0.	387.3	0.0	0.0
9	3.3	887.3	0.0	0.0	0.	0.	133.1	0.0	0.0
10	0.3	5.6	0.0	0.0	0.	0.	0.8	0.0	0.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.286	778.381
2	70.283	778.203
3	75.259	778.692
4	80.125	779.840
5	84.795	781.626
6	89.185	784.019
7	93.218	786.975
8	96.820	790.443
9	99.747	794.131

Circle Center At X = 69.117 ; Y = 815.616 ; and Radius = 37.432
Factor of Safety
*** 2.314 ***
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.041	778.054
2	70.041	778.032
3	74.963	778.912
4	79.645	780.665
5	83.934	783.235
6	87.690	786.536
7	90.788	790.460
8	92.710	794.091

Circle Center At X = 67.694 ; Y = 805.365 ; and Radius = 27.440
Factor of Safety

*** 2.333 ***
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.408	778.544
2	70.408	778.553
3	75.378	779.099
4	80.260	780.178
5	84.998	781.776
6	89.536	783.875
7	93.822	786.450
8	97.805	789.472
9	101.440	792.906
10	102.499	794.147

Circle Center At X = 67.878 ; Y = 824.559 ; and Radius = 46.081

Factor of Safety
*** 2.370 ***
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.122	778.163
2	70.122	778.137
3	75.068	778.872
4	79.844	780.352
5	84.339	782.541
6	88.449	785.389
7	92.077	788.829
8	95.140	792.782
9	95.876	794.109

Circle Center At X = 67.793 ; Y = 810.808 ; and Radius = 32.754

Factor of Safety
*** 2.386 ***
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.163	778.218
2	70.163	778.287
3	75.102	779.063
4	79.882	780.530
5	84.406	782.659
6	88.583	785.407
7	92.330	788.718
8	95.570	792.527
9	96.571	794.113

Circle Center At X = 67.177 ; Y = 813.400 ; and Radius = 35.240

Factor of Safety
*** 2.392 ***
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.204	778.272
2	70.200	778.064
3	75.150	778.769
4	79.889	780.363
5	84.259	782.793
6	88.113	785.978
7	91.324	789.811
8	93.745	794.097

Circle Center At X = 68.838 ; Y = 805.368 ; and Radius = 27.338

Factor of Safety
*** 2.400 ***
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.245	778.327
2	70.234	778.004
3	75.226	778.299
4	80.143	779.206

5	84.911	780.711
6	89.457	782.793
7	93.712	785.418
8	97.612	788.548
9	101.096	792.134
10	102.619	794.148

Circle Center At X = 70.382 ; Y = 818.247 ; and Radius = 40.249

Factor of Safety

*** 2.402 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.408	778.544
2	70.393	778.938
3	75.295	779.923
4	80.044	781.486
5	84.574	783.604
6	88.818	786.246
7	92.718	789.375
8	96.217	792.947
9	97.116	794.116

Circle Center At X = 64.608 ; Y = 820.408 ; and Radius = 41.872

Factor of Safety

*** 2.414 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.367	778.490
2	70.352	778.092
3	75.345	778.346
4	80.264	779.245
5	85.024	780.775
6	89.545	782.910
7	93.750	785.615
8	97.569	788.842
9	100.937	792.538
10	102.058	794.145

Circle Center At X = 70.937 ; Y = 816.258 ; and Radius = 38.177

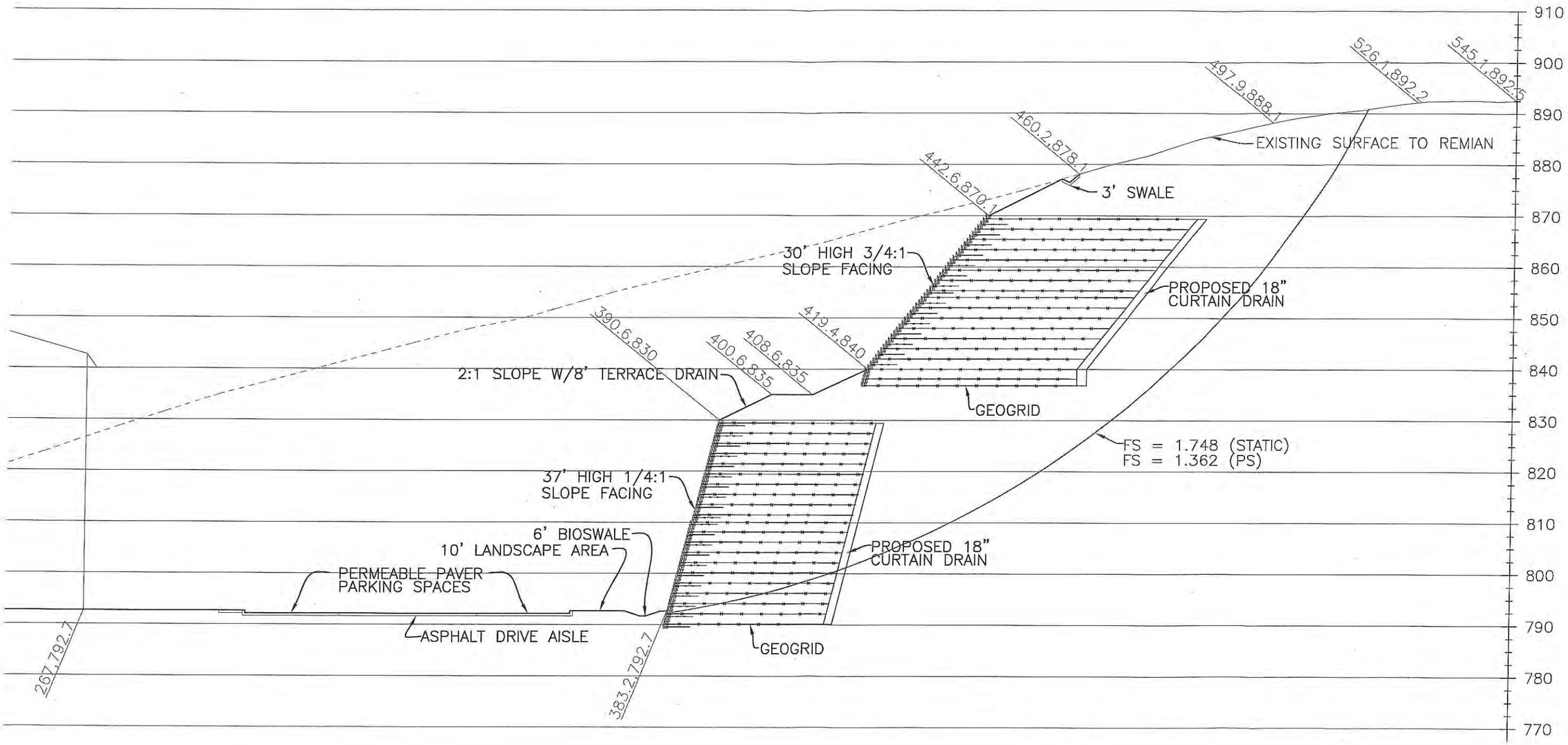
Factor of Safety

*** 2.422 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 21

SS'



PREPARED BY:

RJR ENGINEERING GROUP
Planning-Civil Engineering-Flood Control/Hydrology
Geotechnical Engineering-Geology-Water Resources-Water Quality
3500 Camino Ave., Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-8496 FAX
890 Osos Street, Suite A, San Luis Obispo, CA 93401
(805) 596-0216 (805) 596-0256 FAX
E-mail: rjr@rjrseng.com

GRAPHIC SCALE

0 1" 2"

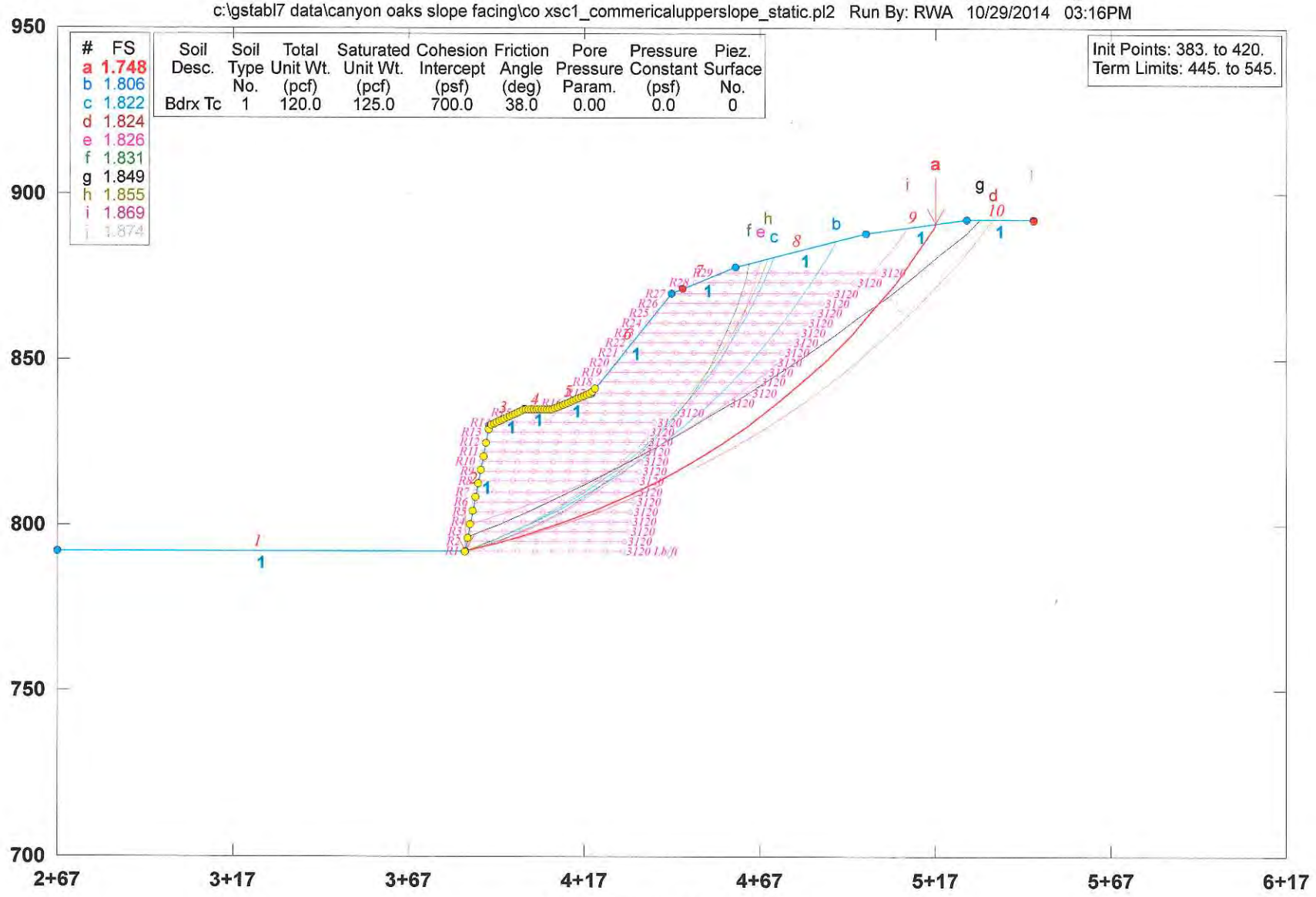
0 10 20 40

1" = 20'

COMMERCIAL - REAR SLOPE
GEOLOGIC X-SECTION SS-SS'
TENTATIVE TRACT NO. 71546
CANYON OAKS
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Canyon Oaks - Commerical Rear Slope X/S C1-C1' - Slope Facing

c:\gstabl7 data\canyon oaks slope facing\co xsc1_commericaluppersloope_static.pl2 Run By: RWA 10/29/2014 03:16PM



GSTABL7 v.2 FSmin=1.748

Safety Factors Are Calculated By The Modified Bishop Method

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PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericalupperslope_Static.in Version G
Canyon Oaks - Commerical Rear Slope     X/S C1-C1' - Slope Facing
10 10
267. 792. 383. 792. 1
383. 792. 390. 830. 1
390. 830. 400. 835. 1
400. 835. 408. 835. 1
408. 835. 419. 840. 1
419. 840. 442. 870. 1
442. 870. 460. 878. 1
460. 878. 497. 888. 1
497. 888. 526. 892. 1
526. 892. 545. 892. 1
700. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
EQUAKE
0.
REINF 3120            792. 878. 3. 383. 45. 3120. 0. 10. 40. 0. 0. 0. 0. 0. 0. 0. 0. 0.
29
10  R1
383. 792. 3120. 0.
388. 792. 3120. 0.
393. 792. 3120. 0.
398. 792. 3120. 0.
403. 792. 3120. 0.
408. 792. 3120. 0.
413. 792. 3120. 0.
418. 792. 3120. 0.
423. 792. 3120. 0.
428. 792. 3120. 0.
10  R2
383.55 795. 3120. 0.
388.55 795. 3120. 0.
393.55 795. 3120. 0.
398.55 795. 3120. 0.
403.55 795. 3120. 0.
408.55 795. 3120. 0.
413.55 795. 3120. 0.
418.55 795. 3120. 0.
423.55 795. 3120. 0.
428.55 795. 3120. 0.
10  R3
384.11 798. 3120. 0.
389.11 798. 3120. 0.
394.11 798. 3120. 0.
399.11 798. 3120. 0.
404.11 798. 3120. 0.
409.11 798. 3120. 0.
414.11 798. 3120. 0.
419.11 798. 3120. 0.
424.11 798. 3120. 0.
429.11 798. 3120. 0.
10  R4
384.66 801. 3120. 0.
389.66 801. 3120. 0.
394.66 801. 3120. 0.
399.66 801. 3120. 0.
404.66 801. 3120. 0.
409.66 801. 3120. 0.
414.66 801. 3120. 0.
419.66 801. 3120. 0.
424.66 801. 3120. 0.
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429.66 801. 3120. 0.
10  R5
385.21 804. 3120. 0.
390.21 804. 3120. 0.
395.21 804. 3120. 0.
400.21 804. 3120. 0.
405.21 804. 3120. 0.
410.21 804. 3120. 0.
415.21 804. 3120. 0.
420.21 804. 3120. 0.
425.21 804. 3120. 0.
430.21 804. 3120. 0.
10  R6
385.76 807. 3120. 0.
390.76 807. 3120. 0.
395.76 807. 3120. 0.
400.76 807. 3120. 0.
405.76 807. 3120. 0.
410.76 807. 3120. 0.
415.76 807. 3120. 0.
420.76 807. 3120. 0.
425.76 807. 3120. 0.
430.76 807. 3120. 0.
10  R7
386.32 810. 3120. 0.
391.32 810. 3120. 0.
396.32 810. 3120. 0.
401.32 810. 3120. 0.
406.32 810. 3120. 0.
411.32 810. 3120. 0.
416.32 810. 3120. 0.
421.32 810. 3120. 0.
426.32 810. 3120. 0.
431.32 810. 3120. 0.
10  R8
386.87 813. 3120. 0.
391.87 813. 3120. 0.
396.87 813. 3120. 0.
401.87 813. 3120. 0.
406.87 813. 3120. 0.
411.87 813. 3120. 0.
416.87 813. 3120. 0.
421.87 813. 3120. 0.
426.87 813. 3120. 0.
431.87 813. 3120. 0.
10  R9
387.42 816. 3120. 0.
392.42 816. 3120. 0.
397.42 816. 3120. 0.
402.42 816. 3120. 0.
407.42 816. 3120. 0.
412.42 816. 3120. 0.
417.42 816. 3120. 0.
422.42 816. 3120. 0.
427.42 816. 3120. 0.
432.42 816. 3120. 0.
10  R10
387.97 819. 3120. 0.
392.97 819. 3120. 0.
397.97 819. 3120. 0.
402.97 819. 3120. 0.
407.97 819. 3120. 0.
412.97 819. 3120. 0.
417.97 819. 3120. 0.
422.97 819. 3120. 0.
427.97 819. 3120. 0.
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432.97 819. 3120. 0.
10  R11
388.53 822. 3120. 0.
393.53 822. 3120. 0.
398.53 822. 3120. 0.
403.53 822. 3120. 0.
408.53 822. 3120. 0.
413.53 822. 3120. 0.
418.53 822. 3120. 0.
423.53 822. 3120. 0.
428.53 822. 3120. 0.
433.53 822. 3120. 0.
10  R12
389.08 825. 3120. 0.
394.08 825. 3120. 0.
399.08 825. 3120. 0.
404.08 825. 3120. 0.
409.08 825. 3120. 0.
414.08 825. 3120. 0.
419.08 825. 3120. 0.
424.08 825. 3120. 0.
429.08 825. 3120. 0.
434.08 825. 3120. 0.
10  R13
389.63 828. 3120. 0.
394.63 828. 3120. 0.
399.63 828. 3120. 0.
404.63 828. 3120. 0.
409.63 828. 3120. 0.
414.63 828. 3120. 0.
419.63 828. 3120. 0.
424.63 828. 3120. 0.
429.63 828. 3120. 0.
434.63 828. 3120. 0.
10  R14
392. 831. 3120. 0.
397. 831. 3120. 0.
402. 831. 3120. 0.
407. 831. 3120. 0.
412. 831. 3120. 0.
417. 831. 3120. 0.
422. 831. 3120. 0.
427. 831. 3120. 0.
432. 831. 3120. 0.
437. 831. 3120. 0.
10  R15
398. 834. 3120. 0.
403. 834. 3120. 0.
408. 834. 3120. 0.
413. 834. 3120. 0.
418. 834. 3120. 0.
423. 834. 3120. 0.
428. 834. 3120. 0.
433. 834. 3120. 0.
438. 834. 3120. 0.
443. 834. 3120. 0.
10  R16
412.4 837. 3120. 0.
417.4 837. 3120. 0.
422.4 837. 3120. 0.
427.4 837. 3120. 0.
432.4 837. 3120. 0.
437.4 837. 3120. 0.
442.4 837. 3120. 0.
447.4 837. 3120. 0.
452.4 837. 3120. 0.
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457.4 837. 3120. 0.
10  R17
419. 840. 3120. 0.
424. 840. 3120. 0.
429. 840. 3120. 0.
434. 840. 3120. 0.
439. 840. 3120. 0.
444. 840. 3120. 0.
449. 840. 3120. 0.
454. 840. 3120. 0.
459. 840. 3120. 0.
464. 840. 3120. 0.
10  R18
421.3 843. 3120. 0.
426.3 843. 3120. 0.
431.3 843. 3120. 0.
436.3 843. 3120. 0.
441.3 843. 3120. 0.
446.3 843. 3120. 0.
451.3 843. 3120. 0.
456.3 843. 3120. 0.
461.3 843. 3120. 0.
466.3 843. 3120. 0.
10  R19
423.6 846. 3120. 0.
428.6 846. 3120. 0.
433.6 846. 3120. 0.
438.6 846. 3120. 0.
443.6 846. 3120. 0.
448.6 846. 3120. 0.
453.6 846. 3120. 0.
458.6 846. 3120. 0.
463.6 846. 3120. 0.
468.6 846. 3120. 0.
10  R20
425.9 849. 3120. 0.
430.9 849. 3120. 0.
435.9 849. 3120. 0.
440.9 849. 3120. 0.
445.9 849. 3120. 0.
450.9 849. 3120. 0.
455.9 849. 3120. 0.
460.9 849. 3120. 0.
465.9 849. 3120. 0.
470.9 849. 3120. 0.
10  R21
428.2 852. 3120. 0.
433.2 852. 3120. 0.
438.2 852. 3120. 0.
443.2 852. 3120. 0.
448.2 852. 3120. 0.
453.2 852. 3120. 0.
458.2 852. 3120. 0.
463.2 852. 3120. 0.
468.2 852. 3120. 0.
473.2 852. 3120. 0.
10  R22
430.5 855. 3120. 0.
435.5 855. 3120. 0.
440.5 855. 3120. 0.
445.5 855. 3120. 0.
450.5 855. 3120. 0.
455.5 855. 3120. 0.
460.5 855. 3120. 0.
465.5 855. 3120. 0.
470.5 855. 3120. 0.
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475.5 855. 3120. 0.
10  R23
432.8 858. 3120. 0.
437.8 858. 3120. 0.
442.8 858. 3120. 0.
447.8 858. 3120. 0.
452.8 858. 3120. 0.
457.8 858. 3120. 0.
462.8 858. 3120. 0.
467.8 858. 3120. 0.
472.8 858. 3120. 0.
477.8 858. 3120. 0.
10  R24
435.1 861. 3120. 0.
440.1 861. 3120. 0.
445.1 861. 3120. 0.
450.1 861. 3120. 0.
455.1 861. 3120. 0.
460.1 861. 3120. 0.
465.1 861. 3120. 0.
470.1 861. 3120. 0.
475.1 861. 3120. 0.
480.1 861. 3120. 0.
10  R25
437.4 864. 3120. 0.
442.4 864. 3120. 0.
447.4 864. 3120. 0.
452.4 864. 3120. 0.
457.4 864. 3120. 0.
462.4 864. 3120. 0.
467.4 864. 3120. 0.
472.4 864. 3120. 0.
477.4 864. 3120. 0.
482.4 864. 3120. 0.
10  R26
439.7 867. 3120. 0.
444.7 867. 3120. 0.
449.7 867. 3120. 0.
454.7 867. 3120. 0.
459.7 867. 3120. 0.
464.7 867. 3120. 0.
469.7 867. 3120. 0.
474.7 867. 3120. 0.
479.7 867. 3120. 0.
484.7 867. 3120. 0.
10  R27
442. 870. 3120. 0.
447. 870. 3120. 0.
452. 870. 3120. 0.
457. 870. 3120. 0.
462. 870. 3120. 0.
467. 870. 3120. 0.
472. 870. 3120. 0.
477. 870. 3120. 0.
482. 870. 3120. 0.
487. 870. 3120. 0.
10  R28
448.75 873. 3120. 0.
453.75 873. 3120. 0.
458.75 873. 3120. 0.
463.75 873. 3120. 0.
468.75 873. 3120. 0.
473.75 873. 3120. 0.
478.75 873. 3120. 0.
483.75 873. 3120. 0.
488.75 873. 3120. 0.
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493.75 873. 3120. 0.
10  R29
455.5 876. 3120. 0.
460.5 876. 3120. 0.
465.5 876. 3120. 0.
470.5 876. 3120. 0.
475.5 876. 3120. 0.
480.5 876. 3120. 0.
485.5 876. 3120. 0.
490.5 876. 3120. 0.
495.5 876. 3120. 0.
500.5 876. 3120. 0.
CIRCL2
50 50
383. 420. 445. 545.
0. 10. 0. 0.
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***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 10/29/2014
Time of Run: 03:16PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericaluppersloped_Static.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericaluppersloped_Static.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericaluppersloped_Static.PLT
PROBLEM DESCRIPTION: Canyon Oaks - Commerical Rear Slope
X/S C1-C1' - Slope Facing

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	267.00	792.00	383.00	792.00	1
2	383.00	792.00	390.00	830.00	1
3	390.00	830.00	400.00	835.00	1
4	400.00	835.00	408.00	835.00	1
5	408.00	835.00	419.00	840.00	1
6	419.00	840.00	442.00	870.00	1
7	442.00	870.00	460.00	878.00	1
8	460.00	878.00	497.00	888.00	1
9	497.00	888.00	526.00	892.00	1
10	526.00	892.00	545.00	892.00	1

User Specified Y-Origin = 700.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED

REINFORCING LAYER(S)
29 REINFORCING LAYER(S) SPECIFIED
REINFORCING LAYER NO. 1
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	383.00	792.00	3120.00	0.000
2	388.00	792.00	3120.00	0.000
3	393.00	792.00	3120.00	0.000
4	398.00	792.00	3120.00	0.000
5	403.00	792.00	3120.00	0.000
6	408.00	792.00	3120.00	0.000
7	413.00	792.00	3120.00	0.000

8	418.00	792.00	3120.00	0.000
9	423.00	792.00	3120.00	0.000
10	428.00	792.00	3120.00	0.000

REINFORCING LAYER NO. 2
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	383.55	795.00	3120.00	0.000
2	388.55	795.00	3120.00	0.000
3	393.55	795.00	3120.00	0.000
4	398.55	795.00	3120.00	0.000
5	403.55	795.00	3120.00	0.000
6	408.55	795.00	3120.00	0.000
7	413.55	795.00	3120.00	0.000
8	418.55	795.00	3120.00	0.000
9	423.55	795.00	3120.00	0.000
10	428.55	795.00	3120.00	0.000

REINFORCING LAYER NO. 3
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	384.11	798.00	3120.00	0.000
2	389.11	798.00	3120.00	0.000
3	394.11	798.00	3120.00	0.000
4	399.11	798.00	3120.00	0.000
5	404.11	798.00	3120.00	0.000
6	409.11	798.00	3120.00	0.000
7	414.11	798.00	3120.00	0.000
8	419.11	798.00	3120.00	0.000
9	424.11	798.00	3120.00	0.000
10	429.11	798.00	3120.00	0.000

REINFORCING LAYER NO. 4
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	384.66	801.00	3120.00	0.000
2	389.66	801.00	3120.00	0.000
3	394.66	801.00	3120.00	0.000
4	399.66	801.00	3120.00	0.000
5	404.66	801.00	3120.00	0.000
6	409.66	801.00	3120.00	0.000
7	414.66	801.00	3120.00	0.000
8	419.66	801.00	3120.00	0.000
9	424.66	801.00	3120.00	0.000
10	429.66	801.00	3120.00	0.000

REINFORCING LAYER NO. 5
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	385.21	804.00	3120.00	0.000
2	390.21	804.00	3120.00	0.000
3	395.21	804.00	3120.00	0.000
4	400.21	804.00	3120.00	0.000
5	405.21	804.00	3120.00	0.000
6	410.21	804.00	3120.00	0.000
7	415.21	804.00	3120.00	0.000
8	420.21	804.00	3120.00	0.000
9	425.21	804.00	3120.00	0.000
10	430.21	804.00	3120.00	0.000

REINFORCING LAYER NO. 6
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	385.76	807.00	3120.00	0.000
2	390.76	807.00	3120.00	0.000
3	395.76	807.00	3120.00	0.000
4	400.76	807.00	3120.00	0.000
5	405.76	807.00	3120.00	0.000

6	410.76	807.00	3120.00	0.000
7	415.76	807.00	3120.00	0.000
8	420.76	807.00	3120.00	0.000
9	425.76	807.00	3120.00	0.000
10	430.76	807.00	3120.00	0.000

REINFORCING LAYER NO. 7
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	386.32	810.00	3120.00	0.000
2	391.32	810.00	3120.00	0.000
3	396.32	810.00	3120.00	0.000
4	401.32	810.00	3120.00	0.000
5	406.32	810.00	3120.00	0.000
6	411.32	810.00	3120.00	0.000
7	416.32	810.00	3120.00	0.000
8	421.32	810.00	3120.00	0.000
9	426.32	810.00	3120.00	0.000
10	431.32	810.00	3120.00	0.000

REINFORCING LAYER NO. 8
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	386.87	813.00	3120.00	0.000
2	391.87	813.00	3120.00	0.000
3	396.87	813.00	3120.00	0.000
4	401.87	813.00	3120.00	0.000
5	406.87	813.00	3120.00	0.000
6	411.87	813.00	3120.00	0.000
7	416.87	813.00	3120.00	0.000
8	421.87	813.00	3120.00	0.000
9	426.87	813.00	3120.00	0.000
10	431.87	813.00	3120.00	0.000

REINFORCING LAYER NO. 9
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	387.42	816.00	3120.00	0.000
2	392.42	816.00	3120.00	0.000
3	397.42	816.00	3120.00	0.000
4	402.42	816.00	3120.00	0.000
5	407.42	816.00	3120.00	0.000
6	412.42	816.00	3120.00	0.000
7	417.42	816.00	3120.00	0.000
8	422.42	816.00	3120.00	0.000
9	427.42	816.00	3120.00	0.000
10	432.42	816.00	3120.00	0.000

REINFORCING LAYER NO. 10
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	387.97	819.00	3120.00	0.000
2	392.97	819.00	3120.00	0.000
3	397.97	819.00	3120.00	0.000
4	402.97	819.00	3120.00	0.000
5	407.97	819.00	3120.00	0.000
6	412.97	819.00	3120.00	0.000
7	417.97	819.00	3120.00	0.000
8	422.97	819.00	3120.00	0.000
9	427.97	819.00	3120.00	0.000
10	432.97	819.00	3120.00	0.000

REINFORCING LAYER NO. 11
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	388.53	822.00	3120.00	0.000
2	393.53	822.00	3120.00	0.000
3	398.53	822.00	3120.00	0.000

4	403.53	822.00	3120.00	0.000
5	408.53	822.00	3120.00	0.000
6	413.53	822.00	3120.00	0.000
7	418.53	822.00	3120.00	0.000
8	423.53	822.00	3120.00	0.000
9	428.53	822.00	3120.00	0.000
10	433.53	822.00	3120.00	0.000

REINFORCING LAYER NO. 12
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	389.08	825.00	3120.00	0.000
2	394.08	825.00	3120.00	0.000
3	399.08	825.00	3120.00	0.000
4	404.08	825.00	3120.00	0.000
5	409.08	825.00	3120.00	0.000
6	414.08	825.00	3120.00	0.000
7	419.08	825.00	3120.00	0.000
8	424.08	825.00	3120.00	0.000
9	429.08	825.00	3120.00	0.000
10	434.08	825.00	3120.00	0.000

REINFORCING LAYER NO. 13
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	389.63	828.00	3120.00	0.000
2	394.63	828.00	3120.00	0.000
3	399.63	828.00	3120.00	0.000
4	404.63	828.00	3120.00	0.000
5	409.63	828.00	3120.00	0.000
6	414.63	828.00	3120.00	0.000
7	419.63	828.00	3120.00	0.000
8	424.63	828.00	3120.00	0.000
9	429.63	828.00	3120.00	0.000
10	434.63	828.00	3120.00	0.000

REINFORCING LAYER NO. 14
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	392.00	831.00	3120.00	0.000
2	397.00	831.00	3120.00	0.000
3	402.00	831.00	3120.00	0.000
4	407.00	831.00	3120.00	0.000
5	412.00	831.00	3120.00	0.000
6	417.00	831.00	3120.00	0.000
7	422.00	831.00	3120.00	0.000
8	427.00	831.00	3120.00	0.000
9	432.00	831.00	3120.00	0.000
10	437.00	831.00	3120.00	0.000

REINFORCING LAYER NO. 15
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	398.00	834.00	3120.00	0.000
2	403.00	834.00	3120.00	0.000
3	408.00	834.00	3120.00	0.000
4	413.00	834.00	3120.00	0.000
5	418.00	834.00	3120.00	0.000
6	423.00	834.00	3120.00	0.000
7	428.00	834.00	3120.00	0.000
8	433.00	834.00	3120.00	0.000
9	438.00	834.00	3120.00	0.000
10	443.00	834.00	3120.00	0.000

REINFORCING LAYER NO. 16
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	412.40	837.00	3120.00	0.000

2	417.40	837.00	3120.00	0.000
3	422.40	837.00	3120.00	0.000
4	427.40	837.00	3120.00	0.000
5	432.40	837.00	3120.00	0.000
6	437.40	837.00	3120.00	0.000
7	442.40	837.00	3120.00	0.000
8	447.40	837.00	3120.00	0.000
9	452.40	837.00	3120.00	0.000
10	457.40	837.00	3120.00	0.000

REINFORCING LAYER NO. 17
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	419.00	840.00	3120.00	0.000
2	424.00	840.00	3120.00	0.000
3	429.00	840.00	3120.00	0.000
4	434.00	840.00	3120.00	0.000
5	439.00	840.00	3120.00	0.000
6	444.00	840.00	3120.00	0.000
7	449.00	840.00	3120.00	0.000
8	454.00	840.00	3120.00	0.000
9	459.00	840.00	3120.00	0.000
10	464.00	840.00	3120.00	0.000

REINFORCING LAYER NO. 18
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	421.30	843.00	3120.00	0.000
2	426.30	843.00	3120.00	0.000
3	431.30	843.00	3120.00	0.000
4	436.30	843.00	3120.00	0.000
5	441.30	843.00	3120.00	0.000
6	446.30	843.00	3120.00	0.000
7	451.30	843.00	3120.00	0.000
8	456.30	843.00	3120.00	0.000
9	461.30	843.00	3120.00	0.000
10	466.30	843.00	3120.00	0.000

REINFORCING LAYER NO. 19
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	423.60	846.00	3120.00	0.000
2	428.60	846.00	3120.00	0.000
3	433.60	846.00	3120.00	0.000
4	438.60	846.00	3120.00	0.000
5	443.60	846.00	3120.00	0.000
6	448.60	846.00	3120.00	0.000
7	453.60	846.00	3120.00	0.000
8	458.60	846.00	3120.00	0.000
9	463.60	846.00	3120.00	0.000
10	468.60	846.00	3120.00	0.000

REINFORCING LAYER NO. 20
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	425.90	849.00	3120.00	0.000
2	430.90	849.00	3120.00	0.000
3	435.90	849.00	3120.00	0.000
4	440.90	849.00	3120.00	0.000
5	445.90	849.00	3120.00	0.000
6	450.90	849.00	3120.00	0.000
7	455.90	849.00	3120.00	0.000
8	460.90	849.00	3120.00	0.000
9	465.90	849.00	3120.00	0.000
10	470.90	849.00	3120.00	0.000

REINFORCING LAYER NO. 21
10 POINTS DEFINE THIS LAYER

POINT	X-COORD	Y-COORD	FORCE	INCLINATION

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	428.20	852.00	3120.00	0.000
2	433.20	852.00	3120.00	0.000
3	438.20	852.00	3120.00	0.000
4	443.20	852.00	3120.00	0.000
5	448.20	852.00	3120.00	0.000
6	453.20	852.00	3120.00	0.000
7	458.20	852.00	3120.00	0.000
8	463.20	852.00	3120.00	0.000
9	468.20	852.00	3120.00	0.000
10	473.20	852.00	3120.00	0.000

REINFORCING LAYER NO. 22
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	430.50	855.00	3120.00	0.000
2	435.50	855.00	3120.00	0.000
3	440.50	855.00	3120.00	0.000
4	445.50	855.00	3120.00	0.000
5	450.50	855.00	3120.00	0.000
6	455.50	855.00	3120.00	0.000
7	460.50	855.00	3120.00	0.000
8	465.50	855.00	3120.00	0.000
9	470.50	855.00	3120.00	0.000
10	475.50	855.00	3120.00	0.000

REINFORCING LAYER NO. 23
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	432.80	858.00	3120.00	0.000
2	437.80	858.00	3120.00	0.000
3	442.80	858.00	3120.00	0.000
4	447.80	858.00	3120.00	0.000
5	452.80	858.00	3120.00	0.000
6	457.80	858.00	3120.00	0.000
7	462.80	858.00	3120.00	0.000
8	467.80	858.00	3120.00	0.000
9	472.80	858.00	3120.00	0.000
10	477.80	858.00	3120.00	0.000

REINFORCING LAYER NO. 24
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	435.10	861.00	3120.00	0.000
2	440.10	861.00	3120.00	0.000
3	445.10	861.00	3120.00	0.000
4	450.10	861.00	3120.00	0.000
5	455.10	861.00	3120.00	0.000
6	460.10	861.00	3120.00	0.000
7	465.10	861.00	3120.00	0.000
8	470.10	861.00	3120.00	0.000
9	475.10	861.00	3120.00	0.000
10	480.10	861.00	3120.00	0.000

REINFORCING LAYER NO. 25
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	437.40	864.00	3120.00	0.000
2	442.40	864.00	3120.00	0.000
3	447.40	864.00	3120.00	0.000
4	452.40	864.00	3120.00	0.000
5	457.40	864.00	3120.00	0.000
6	462.40	864.00	3120.00	0.000
7	467.40	864.00	3120.00	0.000
8	472.40	864.00	3120.00	0.000
9	477.40	864.00	3120.00	0.000
10	482.40	864.00	3120.00	0.000

REINFORCING LAYER NO. 26

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	439.70	867.00	3120.00	0.000
2	444.70	867.00	3120.00	0.000
3	449.70	867.00	3120.00	0.000
4	454.70	867.00	3120.00	0.000
5	459.70	867.00	3120.00	0.000
6	464.70	867.00	3120.00	0.000
7	469.70	867.00	3120.00	0.000
8	474.70	867.00	3120.00	0.000
9	479.70	867.00	3120.00	0.000
10	484.70	867.00	3120.00	0.000

REINFORCING LAYER NO. 27

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	442.00	870.00	3120.00	0.000
2	447.00	870.00	3120.00	0.000
3	452.00	870.00	3120.00	0.000
4	457.00	870.00	3120.00	0.000
5	462.00	870.00	3120.00	0.000
6	467.00	870.00	3120.00	0.000
7	472.00	870.00	3120.00	0.000
8	477.00	870.00	3120.00	0.000
9	482.00	870.00	3120.00	0.000
10	487.00	870.00	3120.00	0.000

REINFORCING LAYER NO. 28

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	448.75	873.00	3120.00	0.000
2	453.75	873.00	3120.00	0.000
3	458.75	873.00	3120.00	0.000
4	463.75	873.00	3120.00	0.000
5	468.75	873.00	3120.00	0.000
6	473.75	873.00	3120.00	0.000
7	478.75	873.00	3120.00	0.000
8	483.75	873.00	3120.00	0.000
9	488.75	873.00	3120.00	0.000
10	493.75	873.00	3120.00	0.000

REINFORCING LAYER NO. 29

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	455.50	876.00	3120.00	0.000
2	460.50	876.00	3120.00	0.000
3	465.50	876.00	3120.00	0.000
4	470.50	876.00	3120.00	0.000
5	475.50	876.00	3120.00	0.000
6	480.50	876.00	3120.00	0.000
7	485.50	876.00	3120.00	0.000
8	490.50	876.00	3120.00	0.000
9	495.50	876.00	3120.00	0.000
10	500.50	876.00	3120.00	0.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 383.00(ft)
and X = 420.00(ft)
Each Surface Terminates Between X = 445.00(ft)
and X = 545.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are

Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 8.698 FS Min = 1.748 FS Ave = 3.416
Standard Deviation = 0.709 Coefficient of Variation = 20.77 %
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.688	794.478
3	402.247	797.415
4	411.656	800.803
5	420.892	804.635
6	429.936	808.901
7	438.767	813.594
8	447.365	818.701
9	455.710	824.211
10	463.783	830.112
11	471.567	836.390
12	479.043	843.032
13	486.194	850.021
14	493.005	857.343
15	499.460	864.981
16	505.544	872.917
17	511.244	881.134
18	516.547	889.612
19	517.206	890.787

Circle Center At X = 335.774 ; Y = 996.772 ; and Radius = 210.148
Factor of Safety
*** 1.748 ***
Individual data on the 25 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.0	15207.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.7	11785.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.3	32965.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.2	10228.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	5.8	25231.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.7	15654.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.3	31731.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	1.9	8400.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.0	45146.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.8	51688.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	3.2	20691.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	5.4	34819.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.3	52856.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	4.3	26393.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.8	22599.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.8	43733.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.5	38060.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	7.2	32256.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	6.8	26413.6	0.0	0.0	0.	0.	0.0	0.0	0.0
20	4.0	13304.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.5	7275.0	0.0	0.0	0.	0.	0.0	0.0	0.0
22	6.1	14463.5	0.0	0.0	0.	0.	0.0	0.0	0.0
23	5.7	8581.4	0.0	0.0	0.	0.	0.0	0.0	0.0
24	5.3	3154.5	0.0	0.0	0.	0.	0.0	0.0	0.0
25	0.7	42.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.275	795.737
3	401.349	799.941

4	410.197	804.600
5	418.797	809.703
6	427.127	815.236
7	435.165	821.185
8	442.891	827.534
9	450.284	834.268
10	457.326	841.368
11	463.997	848.817
12	470.282	856.595
13	476.164	864.683
14	481.627	873.059
15	486.658	881.701
16	488.758	885.773

Circle Center At X = 314.343 ; Y = 975.957 ; and Radius = 196.352

Factor of Safety

*** 1.806 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.271	795.748
3	401.265	800.120
4	409.938	805.097
5	418.252	810.654
6	426.166	816.767
7	433.644	823.406
8	440.651	830.541
9	447.153	838.138
10	453.122	846.162
11	458.528	854.574
12	463.347	863.336
13	467.556	872.408
14	470.821	880.925

Circle Center At X = 332.927 ; Y = 929.280 ; and Radius = 146.127

Factor of Safety

*** 1.822 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.693	794.461
3	402.282	797.295
4	411.755	800.499
5	421.097	804.067
6	430.293	807.995
7	439.331	812.276
8	448.195	816.904
9	456.874	821.872
10	465.354	827.172
11	473.622	832.797
12	481.665	838.739
13	489.473	844.987
14	497.033	851.533
15	504.333	858.367
16	511.363	865.479
17	518.112	872.858
18	524.570	880.493
19	530.728	888.372
20	533.343	892.000

Circle Center At X = 324.508 ; Y = 1042.955 ; and Radius = 257.681

Factor of Safety

*** 1.824 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.516	795.073
3	401.741	798.933

4	410.611	803.552
5	419.062	808.897
6	427.036	814.932
7	434.476	821.614
8	441.330	828.895
9	447.550	836.725
10	453.093	845.049
11	457.919	853.807
12	461.994	862.939
13	465.290	872.380
14	467.240	879.957

Circle Center At X = 351.260 ; Y = 906.718 ; and Radius = 119.028

Factor of Safety

*** 1.826 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.493	795.144
3	401.676	799.102
4	410.481	803.844
5	418.839	809.333
6	426.689	815.529
7	433.970	822.383
8	440.627	829.846
9	446.609	837.859
10	451.872	846.362
11	456.376	855.290
12	460.086	864.576
13	462.974	874.150
14	464.004	879.082

Circle Center At X = 351.859 ; Y = 902.184 ; and Radius = 114.500

Factor of Safety

*** 1.831 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.755	796.099
2	392.873	800.205
3	401.911	804.484
4	410.867	808.934
5	419.736	813.553
6	428.516	818.340
7	437.203	823.293
8	445.795	828.411
9	454.287	833.690
10	462.678	839.130
11	470.964	844.729
12	479.142	850.484
13	487.209	856.393
14	495.163	862.455
15	502.999	868.666
16	510.717	875.026
17	518.312	881.531
18	525.782	888.179
19	529.914	892.000

Circle Center At X = 172.275 ; Y = 1277.864 ; and Radius = 526.138

Factor of Safety

*** 1.849 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.205	795.908
3	401.125	800.429
4	409.720	805.540
5	417.950	811.220
6	425.779	817.442

7	433.170	824.177
8	440.090	831.396
9	446.508	839.065
10	452.394	847.149
11	457.721	855.612
12	462.466	864.415
13	466.605	873.518
14	469.226	880.493

Circle Center At X = 329.900 ; Y = 929.994 ; and Radius = 147.858

Factor of Safety

*** 1.855 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	384.510	800.198
2	394.022	803.285
3	403.395	806.770
4	412.612	810.648
5	421.658	814.911
6	430.516	819.553
7	439.169	824.564
8	447.604	829.937
9	455.804	835.660
10	463.755	841.725
11	471.443	848.120
12	478.854	854.833
13	485.975	861.854
14	492.794	869.169
15	499.297	876.765
16	505.474	884.629
17	509.100	889.669

Circle Center At X = 316.186 ; Y = 1026.954 ; and Radius = 236.826

Factor of Safety

*** 1.869 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.633	794.683
3	402.179	797.662
4	411.628	800.935
5	420.972	804.499
6	430.200	808.351
7	439.306	812.486
8	448.278	816.900
9	457.110	821.590
10	465.793	826.551
11	474.318	831.778
12	482.677	837.267
13	490.863	843.011
14	498.866	849.006
15	506.681	855.246
16	514.299	861.724
17	521.713	868.435
18	528.915	875.372
19	535.900	882.528
20	542.660	889.898
21	544.472	892.000

Circle Center At X = 301.115 ; Y = 1104.688 ; and Radius = 323.232

Factor of Safety

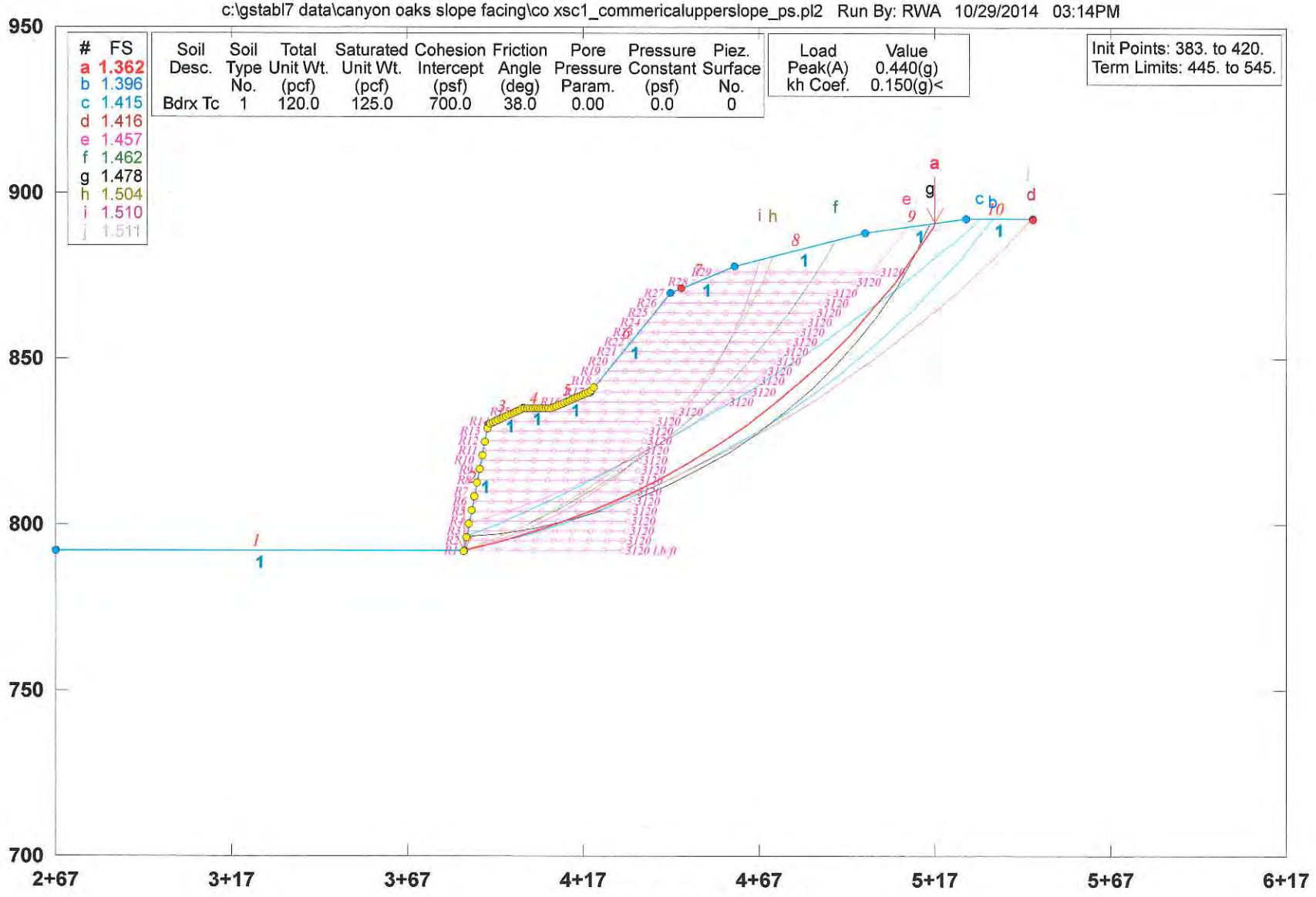
*** 1.874 ***

**** END OF GSTABL7 OUTPUT ****

Analysis 22

Canyon Oaks - Commerical Rear Slope X/S C1-C1' - Slope Facing

c:\gstabl7 data\canyon oaks slope facing\co xsc1_commericalupperslope_ps.pl2 Run By: RWA 10/29/2014 03:14PM



GSTABL7 v.2 FSmin=1.362

Safety Factors Are Calculated By The Modified Bishop Method

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PROFIL  C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericaluppersloped_ps.in Version G7v2.
Canyon Oaks - Commerical Rear Slope     X/S C1-C1' - Slope Facing
10 10
267. 792. 383. 792. 1
383. 792. 390. 830. 1
390. 830. 400. 835. 1
400. 835. 408. 835. 1
408. 835. 419. 840. 1
419. 840. 442. 870. 1
442. 870. 460. 878. 1
460. 878. 497. 888. 1
497. 888. 526. 892. 1
526. 892. 545. 892. 1
700. 0. 0.
SOIL  Bdrx Tc
1
120. 125. 700. 38. 0. 0. 0
EQUAKE
0.44 0.15 0.0 1. 1
REINF 3120            792. 878. 3. 383. 45. 3120. 0. 10. 40. 0. 0. 0. 0. 0. 0. 0. 0. 0.
29
10  R1
383. 792. 3120. 0.
388. 792. 3120. 0.
393. 792. 3120. 0.
398. 792. 3120. 0.
403. 792. 3120. 0.
408. 792. 3120. 0.
413. 792. 3120. 0.
418. 792. 3120. 0.
423. 792. 3120. 0.
428. 792. 3120. 0.
10  R2
383.55 795. 3120. 0.
388.55 795. 3120. 0.
393.55 795. 3120. 0.
398.55 795. 3120. 0.
403.55 795. 3120. 0.
408.55 795. 3120. 0.
413.55 795. 3120. 0.
418.55 795. 3120. 0.
423.55 795. 3120. 0.
428.55 795. 3120. 0.
10  R3
384.11 798. 3120. 0.
389.11 798. 3120. 0.
394.11 798. 3120. 0.
399.11 798. 3120. 0.
404.11 798. 3120. 0.
409.11 798. 3120. 0.
414.11 798. 3120. 0.
419.11 798. 3120. 0.
424.11 798. 3120. 0.
429.11 798. 3120. 0.
10  R4
384.66 801. 3120. 0.
389.66 801. 3120. 0.
394.66 801. 3120. 0.
399.66 801. 3120. 0.
404.66 801. 3120. 0.
409.66 801. 3120. 0.
414.66 801. 3120. 0.
419.66 801. 3120. 0.
424.66 801. 3120. 0.
429.66 801. 3120. 0.
10  R5
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385.21 804. 3120. 0.
390.21 804. 3120. 0.
395.21 804. 3120. 0.
400.21 804. 3120. 0.
405.21 804. 3120. 0.
410.21 804. 3120. 0.
415.21 804. 3120. 0.
420.21 804. 3120. 0.
425.21 804. 3120. 0.
430.21 804. 3120. 0.
10  R6
385.76 807. 3120. 0.
390.76 807. 3120. 0.
395.76 807. 3120. 0.
400.76 807. 3120. 0.
405.76 807. 3120. 0.
410.76 807. 3120. 0.
415.76 807. 3120. 0.
420.76 807. 3120. 0.
425.76 807. 3120. 0.
430.76 807. 3120. 0.
10  R7
386.32 810. 3120. 0.
391.32 810. 3120. 0.
396.32 810. 3120. 0.
401.32 810. 3120. 0.
406.32 810. 3120. 0.
411.32 810. 3120. 0.
416.32 810. 3120. 0.
421.32 810. 3120. 0.
426.32 810. 3120. 0.
431.32 810. 3120. 0.
10  R8
386.87 813. 3120. 0.
391.87 813. 3120. 0.
396.87 813. 3120. 0.
401.87 813. 3120. 0.
406.87 813. 3120. 0.
411.87 813. 3120. 0.
416.87 813. 3120. 0.
421.87 813. 3120. 0.
426.87 813. 3120. 0.
431.87 813. 3120. 0.
10  R9
387.42 816. 3120. 0.
392.42 816. 3120. 0.
397.42 816. 3120. 0.
402.42 816. 3120. 0.
407.42 816. 3120. 0.
412.42 816. 3120. 0.
417.42 816. 3120. 0.
422.42 816. 3120. 0.
427.42 816. 3120. 0.
432.42 816. 3120. 0.
10  R10
387.97 819. 3120. 0.
392.97 819. 3120. 0.
397.97 819. 3120. 0.
402.97 819. 3120. 0.
407.97 819. 3120. 0.
412.97 819. 3120. 0.
417.97 819. 3120. 0.
422.97 819. 3120. 0.
427.97 819. 3120. 0.
432.97 819. 3120. 0.
10  R11
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```
388.53 822. 3120. 0.
393.53 822. 3120. 0.
398.53 822. 3120. 0.
403.53 822. 3120. 0.
408.53 822. 3120. 0.
413.53 822. 3120. 0.
418.53 822. 3120. 0.
423.53 822. 3120. 0.
428.53 822. 3120. 0.
433.53 822. 3120. 0.
10  R12
389.08 825. 3120. 0.
394.08 825. 3120. 0.
399.08 825. 3120. 0.
404.08 825. 3120. 0.
409.08 825. 3120. 0.
414.08 825. 3120. 0.
419.08 825. 3120. 0.
424.08 825. 3120. 0.
429.08 825. 3120. 0.
434.08 825. 3120. 0.
10  R13
389.63 828. 3120. 0.
394.63 828. 3120. 0.
399.63 828. 3120. 0.
404.63 828. 3120. 0.
409.63 828. 3120. 0.
414.63 828. 3120. 0.
419.63 828. 3120. 0.
424.63 828. 3120. 0.
429.63 828. 3120. 0.
434.63 828. 3120. 0.
10  R14
392. 831. 3120. 0.
397. 831. 3120. 0.
402. 831. 3120. 0.
407. 831. 3120. 0.
412. 831. 3120. 0.
417. 831. 3120. 0.
422. 831. 3120. 0.
427. 831. 3120. 0.
432. 831. 3120. 0.
437. 831. 3120. 0.
10  R15
398. 834. 3120. 0.
403. 834. 3120. 0.
408. 834. 3120. 0.
413. 834. 3120. 0.
418. 834. 3120. 0.
423. 834. 3120. 0.
428. 834. 3120. 0.
433. 834. 3120. 0.
438. 834. 3120. 0.
443. 834. 3120. 0.
10  R16
412.4 837. 3120. 0.
417.4 837. 3120. 0.
422.4 837. 3120. 0.
427.4 837. 3120. 0.
432.4 837. 3120. 0.
437.4 837. 3120. 0.
442.4 837. 3120. 0.
447.4 837. 3120. 0.
452.4 837. 3120. 0.
457.4 837. 3120. 0.
10  R17
```

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419. 840. 3120. 0.
424. 840. 3120. 0.
429. 840. 3120. 0.
434. 840. 3120. 0.
439. 840. 3120. 0.
444. 840. 3120. 0.
449. 840. 3120. 0.
454. 840. 3120. 0.
459. 840. 3120. 0.
464. 840. 3120. 0.
10  R18
421.3 843. 3120. 0.
426.3 843. 3120. 0.
431.3 843. 3120. 0.
436.3 843. 3120. 0.
441.3 843. 3120. 0.
446.3 843. 3120. 0.
451.3 843. 3120. 0.
456.3 843. 3120. 0.
461.3 843. 3120. 0.
466.3 843. 3120. 0.
10  R19
423.6 846. 3120. 0.
428.6 846. 3120. 0.
433.6 846. 3120. 0.
438.6 846. 3120. 0.
443.6 846. 3120. 0.
448.6 846. 3120. 0.
453.6 846. 3120. 0.
458.6 846. 3120. 0.
463.6 846. 3120. 0.
468.6 846. 3120. 0.
10  R20
425.9 849. 3120. 0.
430.9 849. 3120. 0.
435.9 849. 3120. 0.
440.9 849. 3120. 0.
445.9 849. 3120. 0.
450.9 849. 3120. 0.
455.9 849. 3120. 0.
460.9 849. 3120. 0.
465.9 849. 3120. 0.
470.9 849. 3120. 0.
10  R21
428.2 852. 3120. 0.
433.2 852. 3120. 0.
438.2 852. 3120. 0.
443.2 852. 3120. 0.
448.2 852. 3120. 0.
453.2 852. 3120. 0.
458.2 852. 3120. 0.
463.2 852. 3120. 0.
468.2 852. 3120. 0.
473.2 852. 3120. 0.
10  R22
430.5 855. 3120. 0.
435.5 855. 3120. 0.
440.5 855. 3120. 0.
445.5 855. 3120. 0.
450.5 855. 3120. 0.
455.5 855. 3120. 0.
460.5 855. 3120. 0.
465.5 855. 3120. 0.
470.5 855. 3120. 0.
475.5 855. 3120. 0.
10  R23
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432.8 858. 3120. 0.
437.8 858. 3120. 0.
442.8 858. 3120. 0.
447.8 858. 3120. 0.
452.8 858. 3120. 0.
457.8 858. 3120. 0.
462.8 858. 3120. 0.
467.8 858. 3120. 0.
472.8 858. 3120. 0.
477.8 858. 3120. 0.
10  R24
435.1 861. 3120. 0.
440.1 861. 3120. 0.
445.1 861. 3120. 0.
450.1 861. 3120. 0.
455.1 861. 3120. 0.
460.1 861. 3120. 0.
465.1 861. 3120. 0.
470.1 861. 3120. 0.
475.1 861. 3120. 0.
480.1 861. 3120. 0.
10  R25
437.4 864. 3120. 0.
442.4 864. 3120. 0.
447.4 864. 3120. 0.
452.4 864. 3120. 0.
457.4 864. 3120. 0.
462.4 864. 3120. 0.
467.4 864. 3120. 0.
472.4 864. 3120. 0.
477.4 864. 3120. 0.
482.4 864. 3120. 0.
10  R26
439.7 867. 3120. 0.
444.7 867. 3120. 0.
449.7 867. 3120. 0.
454.7 867. 3120. 0.
459.7 867. 3120. 0.
464.7 867. 3120. 0.
469.7 867. 3120. 0.
474.7 867. 3120. 0.
479.7 867. 3120. 0.
484.7 867. 3120. 0.
10  R27
442. 870. 3120. 0.
447. 870. 3120. 0.
452. 870. 3120. 0.
457. 870. 3120. 0.
462. 870. 3120. 0.
467. 870. 3120. 0.
472. 870. 3120. 0.
477. 870. 3120. 0.
482. 870. 3120. 0.
487. 870. 3120. 0.
10  R28
448.75 873. 3120. 0.
453.75 873. 3120. 0.
458.75 873. 3120. 0.
463.75 873. 3120. 0.
468.75 873. 3120. 0.
473.75 873. 3120. 0.
478.75 873. 3120. 0.
483.75 873. 3120. 0.
488.75 873. 3120. 0.
493.75 873. 3120. 0.
10  R29
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455.5 876. 3120. 0.
460.5 876. 3120. 0.
465.5 876. 3120. 0.
470.5 876. 3120. 0.
475.5 876. 3120. 0.
480.5 876. 3120. 0.
485.5 876. 3120. 0.
490.5 876. 3120. 0.
495.5 876. 3120. 0.
500.5 876. 3120. 0.
CIRCL2
50 50
383. 420. 445. 545.
0. 10. 0. 0.
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*** GSTABL7 ***
** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **
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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 10/29/2014
Time of Run: 03:14PM
Run By: RWA
Input Data Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericalupperslope_ps.in
Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericalupperslope_ps.OUT
Unit System: English
Plotted Output Filename: C:\GSTABL7 DATA\Canyon Oaks Slope Facing\co xsc1_commericalupperslope_ps.PLT
PROBLEM DESCRIPTION: Canyon Oaks - Commerical Rear Slope
X/S C1-C1' - Slope Facing

BOUNDARY COORDINATES
10 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	267.00	792.00	383.00	792.00	1
2	383.00	792.00	390.00	830.00	1
3	390.00	830.00	400.00	835.00	1
4	400.00	835.00	408.00	835.00	1
5	408.00	835.00	419.00	840.00	1
6	419.00	840.00	442.00	870.00	1
7	442.00	870.00	460.00	878.00	1
8	460.00	878.00	497.00	888.00	1
9	497.00	888.00	526.00	892.00	1
10	526.00	892.00	545.00	892.00	1

User Specified Y-Origin = 700.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	700.0	38.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.440(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 1.000

REINFORCING LAYER(S)
29 REINFORCING LAYER(S) SPECIFIED
REINFORCING LAYER NO. 1
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	383.00	792.00	3120.00	0.000
2	388.00	792.00	3120.00	0.000
3	393.00	792.00	3120.00	0.000
4	398.00	792.00	3120.00	0.000
5	403.00	792.00	3120.00	0.000
6	408.00	792.00	3120.00	0.000
7	413.00	792.00	3120.00	0.000
8	418.00	792.00	3120.00	0.000

9	423.00	792.00	3120.00	0.000
10	428.00	792.00	3120.00	0.000

REINFORCING LAYER NO. 2
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	383.55	795.00	3120.00	0.000
2	388.55	795.00	3120.00	0.000
3	393.55	795.00	3120.00	0.000
4	398.55	795.00	3120.00	0.000
5	403.55	795.00	3120.00	0.000
6	408.55	795.00	3120.00	0.000
7	413.55	795.00	3120.00	0.000
8	418.55	795.00	3120.00	0.000
9	423.55	795.00	3120.00	0.000
10	428.55	795.00	3120.00	0.000

REINFORCING LAYER NO. 3
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	384.11	798.00	3120.00	0.000
2	389.11	798.00	3120.00	0.000
3	394.11	798.00	3120.00	0.000
4	399.11	798.00	3120.00	0.000
5	404.11	798.00	3120.00	0.000
6	409.11	798.00	3120.00	0.000
7	414.11	798.00	3120.00	0.000
8	419.11	798.00	3120.00	0.000
9	424.11	798.00	3120.00	0.000
10	429.11	798.00	3120.00	0.000

REINFORCING LAYER NO. 4
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	384.66	801.00	3120.00	0.000
2	389.66	801.00	3120.00	0.000
3	394.66	801.00	3120.00	0.000
4	399.66	801.00	3120.00	0.000
5	404.66	801.00	3120.00	0.000
6	409.66	801.00	3120.00	0.000
7	414.66	801.00	3120.00	0.000
8	419.66	801.00	3120.00	0.000
9	424.66	801.00	3120.00	0.000
10	429.66	801.00	3120.00	0.000

REINFORCING LAYER NO. 5
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	385.21	804.00	3120.00	0.000
2	390.21	804.00	3120.00	0.000
3	395.21	804.00	3120.00	0.000
4	400.21	804.00	3120.00	0.000
5	405.21	804.00	3120.00	0.000
6	410.21	804.00	3120.00	0.000
7	415.21	804.00	3120.00	0.000
8	420.21	804.00	3120.00	0.000
9	425.21	804.00	3120.00	0.000
10	430.21	804.00	3120.00	0.000

REINFORCING LAYER NO. 6
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	385.76	807.00	3120.00	0.000
2	390.76	807.00	3120.00	0.000
3	395.76	807.00	3120.00	0.000
4	400.76	807.00	3120.00	0.000
5	405.76	807.00	3120.00	0.000
6	410.76	807.00	3120.00	0.000

7	415.76	807.00	3120.00	0.000
8	420.76	807.00	3120.00	0.000
9	425.76	807.00	3120.00	0.000
10	430.76	807.00	3120.00	0.000

REINFORCING LAYER NO. 7
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	386.32	810.00	3120.00	0.000
2	391.32	810.00	3120.00	0.000
3	396.32	810.00	3120.00	0.000
4	401.32	810.00	3120.00	0.000
5	406.32	810.00	3120.00	0.000
6	411.32	810.00	3120.00	0.000
7	416.32	810.00	3120.00	0.000
8	421.32	810.00	3120.00	0.000
9	426.32	810.00	3120.00	0.000
10	431.32	810.00	3120.00	0.000

REINFORCING LAYER NO. 8
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	386.87	813.00	3120.00	0.000
2	391.87	813.00	3120.00	0.000
3	396.87	813.00	3120.00	0.000
4	401.87	813.00	3120.00	0.000
5	406.87	813.00	3120.00	0.000
6	411.87	813.00	3120.00	0.000
7	416.87	813.00	3120.00	0.000
8	421.87	813.00	3120.00	0.000
9	426.87	813.00	3120.00	0.000
10	431.87	813.00	3120.00	0.000

REINFORCING LAYER NO. 9
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	387.42	816.00	3120.00	0.000
2	392.42	816.00	3120.00	0.000
3	397.42	816.00	3120.00	0.000
4	402.42	816.00	3120.00	0.000
5	407.42	816.00	3120.00	0.000
6	412.42	816.00	3120.00	0.000
7	417.42	816.00	3120.00	0.000
8	422.42	816.00	3120.00	0.000
9	427.42	816.00	3120.00	0.000
10	432.42	816.00	3120.00	0.000

REINFORCING LAYER NO. 10
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	387.97	819.00	3120.00	0.000
2	392.97	819.00	3120.00	0.000
3	397.97	819.00	3120.00	0.000
4	402.97	819.00	3120.00	0.000
5	407.97	819.00	3120.00	0.000
6	412.97	819.00	3120.00	0.000
7	417.97	819.00	3120.00	0.000
8	422.97	819.00	3120.00	0.000
9	427.97	819.00	3120.00	0.000
10	432.97	819.00	3120.00	0.000

REINFORCING LAYER NO. 11
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	388.53	822.00	3120.00	0.000
2	393.53	822.00	3120.00	0.000
3	398.53	822.00	3120.00	0.000
4	403.53	822.00	3120.00	0.000

5	408.53	822.00	3120.00	0.000
6	413.53	822.00	3120.00	0.000
7	418.53	822.00	3120.00	0.000
8	423.53	822.00	3120.00	0.000
9	428.53	822.00	3120.00	0.000
10	433.53	822.00	3120.00	0.000

REINFORCING LAYER NO. 12
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	389.08	825.00	3120.00	0.000
2	394.08	825.00	3120.00	0.000
3	399.08	825.00	3120.00	0.000
4	404.08	825.00	3120.00	0.000
5	409.08	825.00	3120.00	0.000
6	414.08	825.00	3120.00	0.000
7	419.08	825.00	3120.00	0.000
8	424.08	825.00	3120.00	0.000
9	429.08	825.00	3120.00	0.000
10	434.08	825.00	3120.00	0.000

REINFORCING LAYER NO. 13
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	389.63	828.00	3120.00	0.000
2	394.63	828.00	3120.00	0.000
3	399.63	828.00	3120.00	0.000
4	404.63	828.00	3120.00	0.000
5	409.63	828.00	3120.00	0.000
6	414.63	828.00	3120.00	0.000
7	419.63	828.00	3120.00	0.000
8	424.63	828.00	3120.00	0.000
9	429.63	828.00	3120.00	0.000
10	434.63	828.00	3120.00	0.000

REINFORCING LAYER NO. 14
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	392.00	831.00	3120.00	0.000
2	397.00	831.00	3120.00	0.000
3	402.00	831.00	3120.00	0.000
4	407.00	831.00	3120.00	0.000
5	412.00	831.00	3120.00	0.000
6	417.00	831.00	3120.00	0.000
7	422.00	831.00	3120.00	0.000
8	427.00	831.00	3120.00	0.000
9	432.00	831.00	3120.00	0.000
10	437.00	831.00	3120.00	0.000

REINFORCING LAYER NO. 15
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	398.00	834.00	3120.00	0.000
2	403.00	834.00	3120.00	0.000
3	408.00	834.00	3120.00	0.000
4	413.00	834.00	3120.00	0.000
5	418.00	834.00	3120.00	0.000
6	423.00	834.00	3120.00	0.000
7	428.00	834.00	3120.00	0.000
8	433.00	834.00	3120.00	0.000
9	438.00	834.00	3120.00	0.000
10	443.00	834.00	3120.00	0.000

REINFORCING LAYER NO. 16
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	412.40	837.00	3120.00	0.000
2	417.40	837.00	3120.00	0.000

3	422.40	837.00	3120.00	0.000
4	427.40	837.00	3120.00	0.000
5	432.40	837.00	3120.00	0.000
6	437.40	837.00	3120.00	0.000
7	442.40	837.00	3120.00	0.000
8	447.40	837.00	3120.00	0.000
9	452.40	837.00	3120.00	0.000
10	457.40	837.00	3120.00	0.000

REINFORCING LAYER NO. 17
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	419.00	840.00	3120.00	0.000
2	424.00	840.00	3120.00	0.000
3	429.00	840.00	3120.00	0.000
4	434.00	840.00	3120.00	0.000
5	439.00	840.00	3120.00	0.000
6	444.00	840.00	3120.00	0.000
7	449.00	840.00	3120.00	0.000
8	454.00	840.00	3120.00	0.000
9	459.00	840.00	3120.00	0.000
10	464.00	840.00	3120.00	0.000

REINFORCING LAYER NO. 18
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	421.30	843.00	3120.00	0.000
2	426.30	843.00	3120.00	0.000
3	431.30	843.00	3120.00	0.000
4	436.30	843.00	3120.00	0.000
5	441.30	843.00	3120.00	0.000
6	446.30	843.00	3120.00	0.000
7	451.30	843.00	3120.00	0.000
8	456.30	843.00	3120.00	0.000
9	461.30	843.00	3120.00	0.000
10	466.30	843.00	3120.00	0.000

REINFORCING LAYER NO. 19
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	423.60	846.00	3120.00	0.000
2	428.60	846.00	3120.00	0.000
3	433.60	846.00	3120.00	0.000
4	438.60	846.00	3120.00	0.000
5	443.60	846.00	3120.00	0.000
6	448.60	846.00	3120.00	0.000
7	453.60	846.00	3120.00	0.000
8	458.60	846.00	3120.00	0.000
9	463.60	846.00	3120.00	0.000
10	468.60	846.00	3120.00	0.000

REINFORCING LAYER NO. 20
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	425.90	849.00	3120.00	0.000
2	430.90	849.00	3120.00	0.000
3	435.90	849.00	3120.00	0.000
4	440.90	849.00	3120.00	0.000
5	445.90	849.00	3120.00	0.000
6	450.90	849.00	3120.00	0.000
7	455.90	849.00	3120.00	0.000
8	460.90	849.00	3120.00	0.000
9	465.90	849.00	3120.00	0.000
10	470.90	849.00	3120.00	0.000

REINFORCING LAYER NO. 21
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR

1	428.20	852.00	3120.00	0.000
2	433.20	852.00	3120.00	0.000
3	438.20	852.00	3120.00	0.000
4	443.20	852.00	3120.00	0.000
5	448.20	852.00	3120.00	0.000
6	453.20	852.00	3120.00	0.000
7	458.20	852.00	3120.00	0.000
8	463.20	852.00	3120.00	0.000
9	468.20	852.00	3120.00	0.000
10	473.20	852.00	3120.00	0.000

REINFORCING LAYER NO. 22
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	430.50	855.00	3120.00	0.000
2	435.50	855.00	3120.00	0.000
3	440.50	855.00	3120.00	0.000
4	445.50	855.00	3120.00	0.000
5	450.50	855.00	3120.00	0.000
6	455.50	855.00	3120.00	0.000
7	460.50	855.00	3120.00	0.000
8	465.50	855.00	3120.00	0.000
9	470.50	855.00	3120.00	0.000
10	475.50	855.00	3120.00	0.000

REINFORCING LAYER NO. 23
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	432.80	858.00	3120.00	0.000
2	437.80	858.00	3120.00	0.000
3	442.80	858.00	3120.00	0.000
4	447.80	858.00	3120.00	0.000
5	452.80	858.00	3120.00	0.000
6	457.80	858.00	3120.00	0.000
7	462.80	858.00	3120.00	0.000
8	467.80	858.00	3120.00	0.000
9	472.80	858.00	3120.00	0.000
10	477.80	858.00	3120.00	0.000

REINFORCING LAYER NO. 24
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	435.10	861.00	3120.00	0.000
2	440.10	861.00	3120.00	0.000
3	445.10	861.00	3120.00	0.000
4	450.10	861.00	3120.00	0.000
5	455.10	861.00	3120.00	0.000
6	460.10	861.00	3120.00	0.000
7	465.10	861.00	3120.00	0.000
8	470.10	861.00	3120.00	0.000
9	475.10	861.00	3120.00	0.000
10	480.10	861.00	3120.00	0.000

REINFORCING LAYER NO. 25
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	437.40	864.00	3120.00	0.000
2	442.40	864.00	3120.00	0.000
3	447.40	864.00	3120.00	0.000
4	452.40	864.00	3120.00	0.000
5	457.40	864.00	3120.00	0.000
6	462.40	864.00	3120.00	0.000
7	467.40	864.00	3120.00	0.000
8	472.40	864.00	3120.00	0.000
9	477.40	864.00	3120.00	0.000
10	482.40	864.00	3120.00	0.000

REINFORCING LAYER NO. 26
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	439.70	867.00	3120.00	0.000
2	444.70	867.00	3120.00	0.000
3	449.70	867.00	3120.00	0.000
4	454.70	867.00	3120.00	0.000
5	459.70	867.00	3120.00	0.000
6	464.70	867.00	3120.00	0.000
7	469.70	867.00	3120.00	0.000
8	474.70	867.00	3120.00	0.000
9	479.70	867.00	3120.00	0.000
10	484.70	867.00	3120.00	0.000

REINFORCING LAYER NO. 27
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	442.00	870.00	3120.00	0.000
2	447.00	870.00	3120.00	0.000
3	452.00	870.00	3120.00	0.000
4	457.00	870.00	3120.00	0.000
5	462.00	870.00	3120.00	0.000
6	467.00	870.00	3120.00	0.000
7	472.00	870.00	3120.00	0.000
8	477.00	870.00	3120.00	0.000
9	482.00	870.00	3120.00	0.000
10	487.00	870.00	3120.00	0.000

REINFORCING LAYER NO. 28
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	448.75	873.00	3120.00	0.000
2	453.75	873.00	3120.00	0.000
3	458.75	873.00	3120.00	0.000
4	463.75	873.00	3120.00	0.000
5	468.75	873.00	3120.00	0.000
6	473.75	873.00	3120.00	0.000
7	478.75	873.00	3120.00	0.000
8	483.75	873.00	3120.00	0.000
9	488.75	873.00	3120.00	0.000
10	493.75	873.00	3120.00	0.000

REINFORCING LAYER NO. 29
10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	455.50	876.00	3120.00	0.000
2	460.50	876.00	3120.00	0.000
3	465.50	876.00	3120.00	0.000
4	470.50	876.00	3120.00	0.000
5	475.50	876.00	3120.00	0.000
6	480.50	876.00	3120.00	0.000
7	485.50	876.00	3120.00	0.000
8	490.50	876.00	3120.00	0.000
9	495.50	876.00	3120.00	0.000
10	500.50	876.00	3120.00	0.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
50 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 383.00(ft)
and X = 420.00(ft)
Each Surface Terminates Between X = 445.00(ft)
and X = 545.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2500
Number of Trial Surfaces With Valid FS = 2500
Statistical Data On All Valid FS Values:
FS Max = 7.595 FS Min = 1.362 FS Ave = 2.570
Standard Deviation = 0.503 Coefficient of Variation = 19.58 %
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.688	794.478
3	402.247	797.415
4	411.656	800.803
5	420.892	804.635
6	429.936	808.901
7	438.767	813.594
8	447.365	818.701
9	455.710	824.211
10	463.783	830.112
11	471.567	836.390
12	479.043	843.032
13	486.194	850.021
14	493.005	857.343
15	499.460	864.981
16	505.544	872.917
17	511.244	881.134
18	516.547	889.612
19	517.206	890.787

Circle Center At X = 335.774 ; Y = 996.772 ; and Radius = 210.148
Factor of Safety
*** 1.362 ***
Individual data on the 25 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.0	15207.9	0.0	0.0	0.	0.	2281.2	0.0	0.0
2	2.7	11785.4	0.0	0.0	0.	0.	1767.8	0.0	0.0
3	7.3	32965.9	0.0	0.0	0.	0.	4944.9	0.0	0.0
4	2.2	10228.0	0.0	0.0	0.	0.	1534.2	0.0	0.0
5	5.8	25231.7	0.0	0.0	0.	0.	3784.8	0.0	0.0
6	3.7	15654.9	0.0	0.0	0.	0.	2348.2	0.0	0.0
7	7.3	31731.4	0.0	0.0	0.	0.	4759.7	0.0	0.0
8	1.9	8400.7	0.0	0.0	0.	0.	1260.1	0.0	0.0
9	9.0	45146.3	0.0	0.0	0.	0.	6771.9	0.0	0.0
10	8.8	51688.5	0.0	0.0	0.	0.	7753.3	0.0	0.0
11	3.2	20691.0	0.0	0.0	0.	0.	3103.7	0.0	0.0
12	5.4	34819.2	0.0	0.0	0.	0.	5222.9	0.0	0.0
13	8.3	52856.3	0.0	0.0	0.	0.	7928.5	0.0	0.0
14	4.3	26393.9	0.0	0.0	0.	0.	3959.1	0.0	0.0
15	3.8	22599.9	0.0	0.0	0.	0.	3390.0	0.0	0.0
16	7.8	43733.8	0.0	0.0	0.	0.	6560.1	0.0	0.0
17	7.5	38060.7	0.0	0.0	0.	0.	5709.1	0.0	0.0
18	7.2	32256.3	0.0	0.0	0.	0.	4838.4	0.0	0.0
19	6.8	26413.6	0.0	0.0	0.	0.	3962.0	0.0	0.0
20	4.0	13304.7	0.0	0.0	0.	0.	1995.7	0.0	0.0
21	2.5	7275.0	0.0	0.0	0.	0.	1091.3	0.0	0.0
22	6.1	14463.5	0.0	0.0	0.	0.	2169.5	0.0	0.0
23	5.7	8581.4	0.0	0.0	0.	0.	1287.2	0.0	0.0
24	5.3	3154.5	0.0	0.0	0.	0.	473.2	0.0	0.0
25	0.7	42.9	0.0	0.0	0.	0.	6.4	0.0	0.0

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.693	794.461
3	402.282	797.295
4	411.755	800.499

5	421.097	804.067
6	430.293	807.995
7	439.331	812.276
8	448.195	816.904
9	456.874	821.872
10	465.354	827.172
11	473.622	832.797
12	481.665	838.739
13	489.473	844.987
14	497.033	851.533
15	504.333	858.367
16	511.363	865.479
17	518.112	872.858
18	524.570	880.493
19	530.728	888.372
20	533.343	892.000

Circle Center At X = 324.508 ; Y = 1042.955 ; and Radius = 257.681

Factor of Safety

*** 1.396 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.755	796.099
2	392.873	800.205
3	401.911	804.484
4	410.867	808.934
5	419.736	813.553
6	428.516	818.340
7	437.203	823.293
8	445.795	828.411
9	454.287	833.690
10	462.678	839.130
11	470.964	844.729
12	479.142	850.484
13	487.209	856.393
14	495.163	862.455
15	502.999	868.666
16	510.717	875.026
17	518.312	881.531
18	525.782	888.179
19	529.914	892.000

Circle Center At X = 172.275 ; Y = 1277.864 ; and Radius = 526.138

Factor of Safety

*** 1.415 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.633	794.683
3	402.179	797.662
4	411.628	800.935
5	420.972	804.499
6	430.200	808.351
7	439.306	812.486
8	448.278	816.900
9	457.110	821.590
10	465.793	826.551
11	474.318	831.778
12	482.677	837.267
13	490.863	843.011
14	498.866	849.006
15	506.681	855.246
16	514.299	861.724
17	521.713	868.435
18	528.915	875.372
19	535.900	882.528
20	542.660	889.898
21	544.472	892.000

Circle Center At X = 301.115 ; Y = 1104.688 ; and Radius = 323.232

Factor of Safety

*** 1.416 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	384.510	800.198
2	394.022	803.285
3	403.395	806.770
4	412.612	810.648
5	421.658	814.911
6	430.516	819.553
7	439.169	824.564
8	447.604	829.937
9	455.804	835.660
10	463.755	841.725
11	471.443	848.120
12	478.854	854.833
13	485.975	861.854
14	492.794	869.169
15	499.297	876.765
16	505.474	884.629
17	509.100	889.669

Circle Center At X = 316.186 ; Y = 1026.954 ; and Radius = 236.826

Factor of Safety

*** 1.457 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.275	795.737
3	401.349	799.941
4	410.197	804.600
5	418.797	809.703
6	427.127	815.236
7	435.165	821.185
8	442.891	827.534
9	450.284	834.268
10	457.326	841.368
11	463.997	848.817
12	470.282	856.595
13	476.164	864.683
14	481.627	873.059
15	486.658	881.701
16	488.758	885.773

Circle Center At X = 314.343 ; Y = 975.957 ; and Radius = 196.352

Factor of Safety

*** 1.462 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.755	796.099
2	393.698	797.168
3	403.552	798.869
4	413.277	801.197
5	422.834	804.141
6	432.183	807.689
7	441.287	811.828
8	450.107	816.539
9	458.609	821.805
10	466.756	827.603
11	474.517	833.909
12	481.859	840.699
13	488.752	847.943
14	495.169	855.613
15	501.082	863.677
16	506.468	872.103
17	511.305	880.856

18	515.573	889.899
19	515.850	890.600

Circle Center At X = 372.018 ; Y = 952.116 ; and Radius = 156.457

Factor of Safety

*** 1.478 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.271	795.748
3	401.265	800.120
4	409.938	805.097
5	418.252	810.654
6	426.166	816.767
7	433.644	823.406
8	440.651	830.541
9	447.153	838.138
10	453.122	846.162
11	458.528	854.574
12	463.347	863.336
13	467.556	872.408
14	470.821	880.925

Circle Center At X = 332.927 ; Y = 929.280 ; and Radius = 146.127

Factor of Safety

*** 1.504 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.000	792.000
2	392.516	795.073
3	401.741	798.933
4	410.611	803.552
5	419.062	808.897
6	427.036	814.932
7	434.476	821.614
8	441.330	828.895
9	447.550	836.725
10	453.093	845.049
11	457.919	853.807
12	461.994	862.939
13	465.290	872.380
14	467.240	879.957

Circle Center At X = 351.260 ; Y = 906.718 ; and Radius = 119.028

Factor of Safety

*** 1.510 ***

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	383.755	796.099
2	393.649	797.553
3	403.470	799.434
4	413.201	801.740
5	422.822	804.466
6	432.316	807.607
7	441.665	811.157
8	450.850	815.109
9	459.856	819.457
10	468.664	824.191
11	477.259	829.303
12	485.624	834.783
13	493.743	840.621
14	501.601	846.805
15	509.183	853.325
16	516.475	860.168
17	523.464	867.321
18	530.135	874.770
19	536.477	882.502
20	542.477	890.502

```
      21        543.502      892.000
   Circle Center At X =   355.227 ; Y =  1024.696 ; and Radius =   230.370
         Factor of Safety
        ***    1.511   ***
            **** END OF GSTABL7 OUTPUT ****
```

Appendix E

Hydrology Study

Civil Engineering

Land Planning

Hydrology/Flood Control

Geotechnical Engineering

Geology/Seismic Hazards

Public Works Services

Storm Water Management

RJR ENGINEERING

3500 Camino Avenue, Suite 200
Oxnard, California 93030
p: 805.485.3935
f: 805.485.6496

Malibu p: 310.456.9085
San Luis Obispo p: 805.596.0216
Sacramento p: 530.888.7356

www.rjreng.com

PRELIMINARY HYDROLOGY STUDY
CANYON OAKS DEVELOPMENT
TENTATIVE TRACT 71546
INTERSECTION OF AGOURA & LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Prepared For:

The New Home Company
95 Enterprise, Suite 325
Aliso Viejo, CA. 92656

Attn: Mr. Rick Bianchi

Submittal: January 13, 2015

Project: 1344.60

PRELIMINARY HYDROLOGY AND HYDRAULIC ANALYSIS

TRACT 71546

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TRACT 71546

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LIST OF EXHIBITS

Appendix A – Site Hydrology Information

Satellite Image of Project Site

50 Year 24-hour Isohyet (1-H1.25)

Runoff Coefficient Curve (Soil Type 034)

Runoff Coefficient Curve (Soil Type 034)

Proportion Impervious Table

Appendix B – Existing Hydrology Calculations

Existing 100 Year

Existing 50 Year (Capital Storm)

Existing 10 Year

Existing 2 Year

Appendix C – Proposed Hydrology Calculations

Proposed 100 Year

Proposed 50 Year (Capital Storm)

Proposed 10 Year

Proposed 2 Year

Appendix D – Debris Basin Design Data

Debris Production Calculations

Peak Bulking Factor Charts

Excerpt from approved Tract 53534 Drainage Study regarding Debris Basins

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Appendix E – Low Impact Development (LID) Calculations

LID Calculations

HydroCalc Results - Undeveloped

HydroCalc Results - Developed

Dry Well System Capacity Design

Dry Well Typical Detail

Appendix F – Hydrology Maps

Existing Hydrology Map

Proposed Hydrology Map

Detention Basin Plan

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PRELIMINARY HYDROLOGY AND HYDRAULIC ANALYSIS
TRACT 71546
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

1.0. INTRODUCTION

1.1. General Information

This Consultant Report was prepared for the The New Home Company, based on the Professional Services Agreement between The New Home Company and RJR Engineering.

This report presents results of the preliminary hydrologic engineering analysis conducted by RJR Engineering Group (RJR), for the land planning and feasibility of Tract 71546 in Calabasas. The initial agreement and scope of work includes assessing existing hydrology and hydraulic conditions of the onsite and offsite tributary areas related to the subject site as well as the hydrologic and hydraulic conditions of the proposed site improvements.

Figure 1-1: The project site east of Las Virgenes Road in Calabasas at the Agoura Road and Las Virgenes Road intersection.

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1.2. Available Information

As part of the study RJR was provided certain plans and reports. Specific references are listed in Section 8.0., Bibliography. This report has been written specifically for these improvements and assumptions. Any changes in this data may result in new or additional recommendations and conclusions.

1.3. Purpose

RJR Engineering Group has conducted this preliminary hydrology and hydraulic engineering analysis for the Calabasas Holdings, LLC property for the purposes of providing design parameters for a feasibility analysis of the hydrology, hydraulics, the conveyance of storm flows, flood control, stormwater management and LID concepts for the proposed site development.

Currently, the Calabasas Holdings project is in the tentative tract map stage. Tentative site plans have been prepared including residential, commercial and recreational improvements. This study has incorporated the tentative design into the proposed hydrology and hydraulic calculations.

The following presents a brief synopsis of some important points in the approach of this study:

1. **Topography**: Topography for the study relied on site specific survey as well as U.S.G.S., large scale topography that has been used for a planning level. The intract and the immediate surrounding areas were included in a detailed site survey, however in order to complete the required hydrology study additional topography was needed in order to accurately calculate the tributary areas to the site. The additional topography was gathered from the U.S.G.S. and was used to determine the size and location of tributary areas surrounding the golf course.

The topography, although not extremely detailed does provide a general indication as to the surrounding terrain and is sufficient to provide an overall hydraulic picture for planning and feasibility. The actual size of the tributary areas however may differ from actual field conditions resulting in larger or smaller flow rates when detailed sub-tributary areas are established in design level studies.

2. **Existing Watershed Modeling**: The existing watershed model was developed by RJR using site specific topo, USGS topo, aerial photographs, topographic maps, and field reconnaissance.

3. **Proposed Watershed Modeling**: The proposed watershed model was developed by RJR using the site topography, tentative tract map and proposed preliminary improvement plans.

4. **Flow Rates**: The flow rates analyzed for this study were calculated according to the methods outlined by the Los Angeles County Department of Public Works. The study provides an overall representation of the flow rates that can be expected during a Los Angeles Capital

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Storm (50 year storm) as well as the 2 year, 10 year, and 25 year events for the project site and its surrounding tributary areas.

4. **Design Debris Event**: The debris production rate for the upstream tributary areas were calculated for a 50 year capital storm event in accordance with the Los Angeles County Public Works, Sedimentation Manual, March 2006.

5. **Detention Design**: Drainage impacts due to the proposed site improvements were then reviewed in order to properly assess storm water detention requirements.

6. **Low Impact Development**: Low Impact Development guidelines were followed to determine stormwater treatment and infiltration requirements and provide a preliminary set of LID facilities to fulfill the requirements.

Detailed studies will be performed subsequent to the Tentative Map approval to confirm and finalize these results.

2.0. SCOPE OF WORK

The following tasks were performed for this study:

1. Researched County records pertaining to existing storm drain facilities and information including topographic maps and previous flood hazard studies'.

2. Conducted a site visit to inspect the existing drainage scheme and facilities.

3. Existing Streams and drainage facilities were mapped.

4. Determined rainfall zones, historical intensities and bulking factors in order to begin hydrologic calculations.

5. Prepared Hydrology Calculations to determine the volume and rates of flow that traverses the site. This task involved:

   a. Delineating the tributary areas;
   b. Conducting field studies to verify drainage paths in the up-stream areas;
   c. Performed time of concentration analysis for each area based on the Modified Rational Method.
   d. Performed a routing analysis utilizing the County of Los Angeles F0601 program.

6. Finalized all plates, computer printouts, supporting documents including the preparation of a Hydrology Map illustrating the appropriate information for the hydrology study.

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7. An analysis of the proposed hydrology conditions were then analyzed based on the tentative tract map.

a. Delineating the tributary areas based on Tentative Tract Map proposed design;
c. Performed time of concentration analysis for each area based on the Modified Rational Method.
d. Performed a routing analysis utilizing the County of Los Angeles F0601 program.

8. Proposed hydrology maps were prepared illustrating the flow rates, flow velocities, and proposed improvements.

9. Drainage impacts due to the proposed development were assessed to determine required mitigation measures such as stormwater detention.

10. The Design Debris Event (DDE) was calculated for the 50 year capital storm event to properly size the debris basin located on the eastern portion of the property.

9. Preliminary Low Impact Development requirements were then assessed using the hydrologic data prepared above. Individual LID elements will be designed upon the final site design and drainage study.

10. This preliminary report was prepared analyzing the results of RJR's study and will be used in sizing the storm drain improvements, catch basins and in tract drainage upon the final site design.

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3.0. SITE DESCRIPTION

3.1. Existing Site Conditions

The project site is an undeveloped lot of about 41± acres in size located east of Las Virgenes Road and south of Agoura Road in the City of Calabasas. The property consists of a northern descending hillside, tributary canyon to Las Virgenes Creek, and a portion of the southern descending slope north of the tributary canyon. Most of the site consists of the northern descending slope. The western boundary of the property is Las Virgenes Road in the northern portion and in the southern portion is the adjacent Tract 53534. The northern, eastern, and southern properties are presently undeveloped.

Figure 2-1: Existing undeveloped project site located at the intersection of Agoura/Las Virgenes.

On site slopes range in gradient from about 1:1 (horizontal to vertical) in localized slope segments to nearly horizontal (30:1) in the tributary canyons. Natural slopes generally range

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between 3:1 and 2:1 in gradient. The total elevation change across the site is approximately 320 vertical feet with the elevations ranging from about 780 to 1100 feet above mean sea level. A small spring (water seepage) area is present in the main tributary canyon just east of the proposed development. Previous placed fill is present in the northern canyon area. Two generalized area of fill are present and consist of recently placed engineered fill for the debris basin constructed as part of Tract 53534 along the western boundary of the main canyon and fill placed along the northern canyon side slopes over several episodes. The remaining portions of the site are in a relatively natural condition. The southern ascending slopes contain access roads that were previously graded for exploration access.

Vegetation on the site consists of grasses and oak trees are present in the drainages and on the upper portions of the slopes.

Drainage of the site is primarily by sheet flow down the existing ground surface and is concentrated and directed to the tributary canyons and then offsite to the west.

3.2. Existing Site Drainage

Topographically, the site sits in a natural drainage valley and is the collection point for many smaller natural mountain drainage channels. Storm waters flow from the Eastern portions, west, through the natural mountain channels.

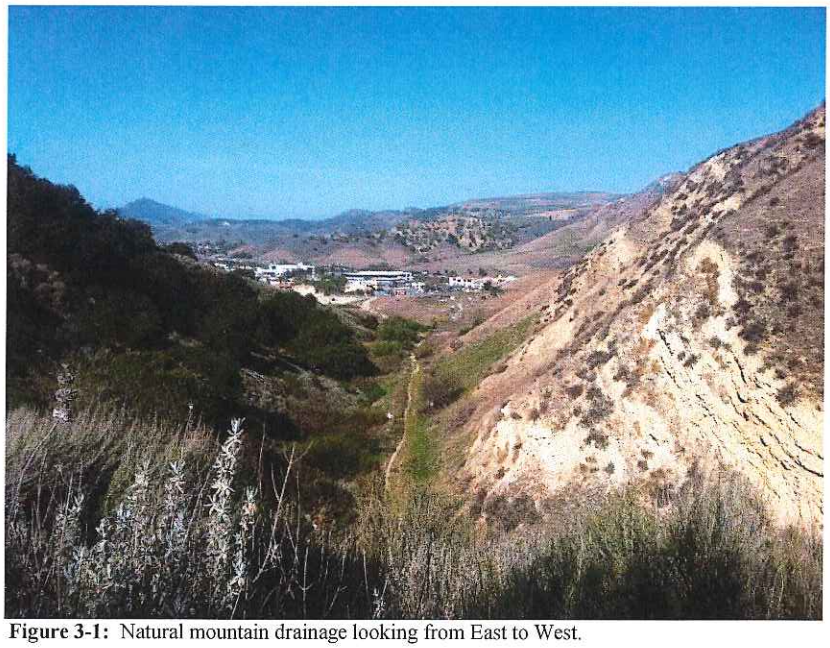

Figure 3-1: Natural mountain drainage looking from East to West.

There are two existing debris basins located onsite which were built as part of the Tract 53534 development. Both basins are located along the western property boundary adjacent to Tract 53534. The larger of the two basins is the northern most basin and collects the majority of the water which flows out of the natural mountain drainage. The debris basin is an earthen

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bottomed basin with 3:1 concrete lined side slopes and has a capacity of 10,776 cubic yards. Storm flows are outlet from the basin via a 96" RCP pipe which conveys water west where the pipe transitions into an existing box culvert under Las Virgenes Road and ultimately outlet into Las Virgenes Creek.

The smaller of the two debris basins is the southern most basin and has a capacity of approximately 1,527 cubic yards. This basin collects runoff from the existing Verdura Block faced slope located south of Tract 53534 as well as surface runoff from the existing undeveloped slope located directly east of the basin. The collected runoff is outlet via a 48" RCP and conveyed under Las Virgenes Road to Las Virgenes Creek.

Figure 4-1: Existing debris basin locations.

3.3. Proposed Development

The proposed development (Tentative Site Plan) consists of excavating all alluvium, artificial fill and soils in the central basin, and replacing the materials with engineered fill. The central canyon area will be elevated to accommodate the extension of Agoura Road (private) to the east within the tract boundaries. The private road will extend to the east into the commercial complex. Geogrid reinforced segmented slope facing will be used at the westerly portion of the development to help raise the pad grade along Las Virgenes Road. In conjunction with 2:1 fill slopes to accommodate the necessary grading to the south of the pad, 2:1 cut slopes will be constructed on the south facing slopes which are present on the north of the pad. The proposed development will occur at the toe of the landslide complex that comprises the southern slope of the property. One buttress will be constructed to stabilize the existing landslides on the

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southern ascending slope. The buttress is being constructed to support the entire slide mass and raise the factors of safety for the proposed building areas above the code requirements.

One large debris basin is proposed in the tributary canyons to intercept the design storm (50 year Burn and Bulk) runoff, catch the debris and convey the 50 year burn volume, to the existing downslope storm drain system located on the western property boundary. The existing large debris basin that was constructed as part of Tract 53534 development, (Debris Basin A – See Image 4) will essentially be relocated upstream to the eastern property boundary of the proposed site. The debris basin will be constructed with predominately 3:1 slopes consisting of compacted earth embankments and lined with a concrete slope facing, and soft bottom, and inlet tower system in accordance with the County of Los Angeles Flood Control District. Storm drain lines will be extended from the existing system installed for Tract 53534 into the proposed tract to accommodate drainage.

The smaller of the two existing debris basins on the project site (Debris Basin B – See Image 4) will remain functional and unchanged. The basin sill continue to collect storm runoff from the Verdura Block faced slope located on the south side of Tract 53534. Due to the proposed site grading within the proposed project the tributary flow to this basin will be slightly reduced by routing storm flows from the adjacent slopes to the proposed intact storm drain system. The changes in the basin tributary are outlined in more detail in section 4.4.

A roadway dedication will be offered to the City to widen the east side of Las Virgenes Road, consisting of two lanes, as necessary, sidewalk, curb, gutter and landscaping. In addition, the intersection of Agoura Road and Las Virgenes will be improved.

Other improvements will then consist of building the on-site streets; modification of striping of Las Virgenes Road, the signalization of the intersection, on- and off-site storm drains (public drains), sewer (City of Calabasas and County of Los Angeles), water and reclaimed water (LVMWD); and dry utilities. Low Impact Development guidelines will be implemented to fulfill infiltration and filtration requirements

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4.0. Preliminary Hydrologic Analysis

4.1 Hydrologic Methodology

In 1921 the Los Angeles County Flood Control District developed a comprehensive plan of flood control facilities to collect and convey flows from the mountain canyons, alluvial fans and urbanized coastal plains. The flood control plan established an approach to reduce damage due to high canyon flows, better convey large volumes of water in major storms and make the improvements necessary to meet future demands. After extensive study of the county's needs, financing and efficiency, the Flood Control District decided to use a rainfall recurrence interval of 50 years as the limit for designing facilities within the county.

Based on studies of historic storms, the 50 year design storm occurs over a period of four days, with the maximum rainfall falling on the fourth day. The first through third days have respectively 10, 40 and 35 percent of the last day's rainfall amount. It is also assumed that that the 50 year design storm falls on saturated soils.

A 50 year event is a probabilistic assessment that means a given event has a one-in-fifty chance (2 percent) of occurrence in any given year, or a "return period" of once every 50 years. The runoff discharge associated with a specific event are based upon statistical frequency of collected runoff data from a particular watershed. The statistical frequency of increasingly rare events occurring is shown below. This table illustrates that the 50 year return period storm has an 18% chance of occurrence in 10 years, 40% chance in 25 years, 61% chance in 50 years and an 86% chance in 100 years. Therefore, a homeowner has a 40(±) percent chance of experiencing a 50 year event during a typical 30 year mortgage period (Table 4-1).

Table 4-1: Probabilistic Occurrence of Runoff Events

	RETURN PERIOD YEARS	2	5	10	20	50	100	200	500	1000	2000	5000	10000
PERCENT CHANCE OF GETTING ONE OR MORE SUCH OR BIGGER FLOODS IN THESE MANY YEARS	ANY 1 YEAR	50	40 30 25 20	15 10	5	2	1	0.5	0.2	0.1	0.05	0.02	0.01
	TEN YEARS		80	65	40	18	9.5	5	2	1	0.5	0.2	0.1
	TWENTY FIVE YEARS		99	94	71	40	22	12	5	2.5	1.2	0.5	0.25
	FIFTY YEARS			99.9	90.5	61	39	22	9.5	4.8	2.3	1.0	0.5
	ONE HUNDRED YEARS					86	64	40	18	10	5	2	1

In general, the Los Angeles County Flood Control District uses the Modified Rational Method for converting the calculated rainfall to runoff rates. The Modified Rational Method is used to find flow rates for any size watershed with any combination of proposed drains. It is extremely versatile and can be used for any combination of developed and undeveloped watershed conditions for any combination of 50-year, 25-year, or 10-year frequency design storms. This method ultimately produces a hydrograph, the relationship of flow rates versus time, for every subarea which provides a peak Q.

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The classic Rational Formula, (Q=CIA) is a mathematical model for finding the maximum runoff rate from a given rainfall. The basic assumption of the classic Rational Formula is that rain falls at a constant rate uniformly over the entire watershed long enough for runoff from the farthest point to reach the collection point, after which time the rate runoff does not increase. The classic rational method however has some shortcomings. First, the classic method only calculates the peak Q and does not produce a hydrograph. In addition, the runoff coefficient is usually the same regardless of rainfall intensity, and usually do not account for different soil conditions. Lastly the results tend to be unreliable for areas greater than 100 acres.

As a method of urban hydrology, the rational method falls short in several ways. First, the method does not produce a hydrograph, only a single flow rate. Second, the rational method does not account for changing (time dependent) conditions such as soil condition or rainfall intensity. Finally, results are not very accurate for large areas. Due to the shortfalls of the rational method, F0601 contains the following modifications:

- Rainfall intensity, "I", is a variable dependent on rainfall frequency, storm time, and time of concentration. The variation of "I" is represented by a temporal distribution curve (rainfall mass curve).

- C, the runoff coefficient, varies with soil type, rainfall intensity, and imperviousness.

- The time variation of C and "I" allow the flow, Q, to vary with time, thus producing a hydrograph. The area under the hydrograph represents the total volume of flow from a watershed, a variable which the rational method does not provide.

- Hydrographs may be computed for a number of subareas, for each lateral to the main channel, and for each collection point on the main channel. These hydrographs are routed and combined as computation progresses downstream.

The above modifications to the rational method allowed for the computation of storm hydrographs for any size watershed. With such improvements, the modified rational method has been adopted by LACDPW as the preferred method of hydrologic analysis. Therefore, this program was used to model drainage areas and routing to establish flow rates and hydrographs.

4.2 Hydrologic Regime

In order to calculate flow rates, RJR gathered additional topography in order to accurately calculate the tributary areas which contribute to the flows with in the subject property. The watershed was divided into multiple tributary areas which are divided by natural ridgelines throughout the surrounding areas. Field observations were conducted in order to verify the general drainage courses outlined in the topographic maps. The outlined tributary areas can be found on the Hydrology Map.

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Using the Los Angeles County Hydrology and Sedimentation Manual, the soil numbers, runoff intensities and runoff coefficient curves were gathered. The corresponding plates have been provided in Appendix A for reference.

Table 4-2 presents the various parameters were utilized in the hydrology analysis, based on the Los Angeles County Hydrology Manual:

Table 4-2: Hydrology Parameters

Location:	Calabasas Quad 1-H1.25 (Appendix A)
Debris Potential Area:	6 (Appendix A)
Debris Factor:	1.6 (Appendix A)
Rainfall:	7.5" (centroid average of entire tributary watershed <40 acres – applied to all subareas) (Appendix A)
Soil Number(s):	034, 035, 066 (Appendix A)
Imperviousness:	0.42, 0.59, 0.96, 0.02 (Code(s) 1111, 1140, 1222, 1272 respectively)
Time of Concentration (Tc):	See data below for individual sub-area Tc (generated using LA County Tc Calculator)
Fire Factor (FF):	0.83 (subareas with less than 15 percent Imp)

Time of Concentration calculations were then performed for each tributary area based on the Modified Rational Method outlined by the Los Angeles County Hydrology Manual. Flow rates and routing analysis were then performed utilizing the County of Los Angeles F0601 program (LARAT02) which provides a more accurate depiction of the storm flows since it takes into account the travel time of the storm flows. The calculation printouts from the software program F0601 (LARAT02) have been provided in Appendices B and C for reference.

4.3 Existing Hydrology Calculations

Using the method described above, each tributary area was delineated based on major confluence points and then and assigned a name. Acreages, conveyance length and slopes were then calculated for each area. The tributary areas were then analyzed and overall flow rates for each respective zone were calculated using F0601. The areas are delineated on the Hydrology Map located in Appendix F.

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It is important to note that areas tributary to the development that are below (do not drain) to the debris basin, were calculated as undeveloped and the runoff values were burned and bulked to ensure a flowrate that was conservative for purposes of accessing pipe sizing. Since all catch basins and drainage devices on the terrace drains will be equipped with trashed racks and other sediment intercepting devices, additional incidental debris removal will occur that is not accounted for in the analysis.

The results of the analysis rendered an existing flow rate at the downstream end of the site of 387.06 cfs. The existing hydrology map (Appendix F) along with the existing F0601 calculations (Appendix B) has been provided for reference. Table 4-3 below summarizes the existing hydrologic condition for the various tributary areas to the site.

Table 4-3: Existing Conditions - Hydrology Results

Existing Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
1A	52.7	2020	0.23270	165.00
2A	29.4	2042	0.25470	253.38
3A	.0	760	0.09210	246.15
4A	22.7	1952	0.21880	293.73
5A	14.5	1505	0.34680	304.03
6A	.0	1306	0.00730	302.63
7A	22.6	2405	0.13100	326.02
8A	19.8	2327	0.27290	341.59
9A	.0	613	0.04410	340.69
10A	19.0	2144	0.18100	355.79
11A	18.2	2532	0.26000	381.50
12A	.0	500	0.03600	380.40
13A	6.3	1226	0.23270	383.94
14A	9.3	1613	0.19030	387.98
15B	.3	254	0.013780	1.03
16A				
16AB	.3	500	0.03600	387.73
17A	.0	500	0.03600	387.59
18A	.0	500	0.03600	387.31
19A	.0	500	0.03600	387.06
-	-	-	-	-
Total:				**387.06 cfs**

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The resulting hydrographs and routing calculations indicate that the watershed produces significant flows from the natural mountain channels surrounding the site. The flows reach the existing canyon bottom and increase in volume as they move down stream reaching a peak flow rate of 387.06 cubic feet per second at the downstream most point of the project site.. The 50 year routed storm flows are shown above. The 2 year, 10 year, 25 year and 100 year routed storm flow rates have been provided in Appendix B.

4.4. Proposed Hydrology Calculations

For the proposed hydrology analysis, the preliminary site design and storm drain layout was included in the hydrologic model to provide more accurate routing results. The existing upstream watershed as well as the proposed development was broken out into major tributary areas and confluence points. Tributary area acreages, conveyance length and slopes were then calculated for each area. The tributary areas were then analyzed and overall flow rates for each respective zone were calculated using the F0601. The areas have been delineated on the Hydrology Map (Appendix F).

Areas of the proposed development that will be developed with building and structures were assigned an imperviousness and a corresponding developed runoff was calculated.

The results of the analysis rendered a preliminary proposed flow rate at the downstream end of the site of 252.17 cfs. The proposed hydrology map (Appendix F), along with the proposed F0601 output calculations (Appendix C) have been provided for reference. Table 4-4 below summarizes the proposed hydrologic condition.

4.4.1 Proposed Model Description

The proposed hydrologic model was divided into two portions, existing upstream and proposed site design. The existing upstream portion of the model includes the existing undisturbed watershed east of the site. These tributary areas (1A through 9A) converge at Node 9A which represents the location of the proposed debris basin. The bulked portion of the 50 year burned and bulked storm flow is then removed by the basin. The proposed development portion of the model is then modeled with the Q50 flow rate with a burn factor to the site outlet.

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Table 4-4: Proposed Conditions - Hydrology Results

Path A

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
1A	10.0	2020	.23270	32.13	17AB	15.2	348	.03590	204.34
2A	29.4	2042	.25470	113.56	18A	2.3	536	.03080	205.55
3A	.0	760	.09470	108.46	19A	.0	116	.02000	205.35
4A	22.7	1952	.21880	148.14	20A	.4	232	.05820	205.50
5A	14.5	1505	.36010	158.14	21A	.0	140	.02000	205.35
6A	.0	948	.06650	157.23	22A	1.4	360	.00830	206.20
7A	12.9	2054	.13880	172.83	23A	.0	190	.02000	205.87
8A	16.7	1321	.43150	178.26	24A	.0	305	.02300	205.86
9A*	.0	360	.02500	177.69	25A	.0	48	.04000	205.71
10A	1.3	300	.03000	178.34	33AC	9.1	360	.14400	220.34
11A	.0	92	.02720	178.13	71AD	40.1	461	.02820	263.53
12A	.0	22	.04540	178.06	72A	.0	10	.02000	252.17

*Node 9A represents the confluence at the proposed debris basin. At this point the bulked portion of the flow rate is removed via the basin. All the nodes downstream of the basin represent a Q50 burned without the bulking factor.

Path B

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
13B	14.1	1899	.31070	45.30	16B	85	348	.02350	42.94
14B	.0	271	.02000	42.37	17AB	15.2	348	.3590	204.34
15B	1.1	335	.01190	43.22					

Path C

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
26C	4.8	1321	.17030	16.51	30C	.0	308	.02000	16.56
27C	1.4	380	.01840	15.81	31C	1.7	414	.02170	19.39
28C	.0	223	.03000	15.54	32C	.0	47	.02000	19.28
29C	1.2	326	.02760	16.61	33AC	9.1	360	.14400	220.34

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Path D

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
34D	6.3	1212	.21450	23.51	53D	.7	240	.05000	76.78
35D	.0	51	.17650	20.80	54D	.0	105	.04200	76.06
36D	.3	224	.17860	21.30	55D	.9	190	.01050	76.65
37D	.0	34	.03000	20.95	56D	.0	280	.06960	76.58
40DE	5.3	115	.03000	37.31	57D	2.2	529	.07720	77.52
41D	.6	372	.57260	38.13	58D	1.4	737	.44100	78.13
42D	.0	133	.04000	37.69	59D	.0	78	.06500	77.53
43D	1.1	433	.49650	38.51	64DG	2.3	113	.05000	81.29
44D	.0	73	.02740	38.33	65D	.0	24	.03000	81.18
49DF	12.9	246	.04880	77.51	66D	2.0	815	.07360	82.07
50D	.9	246	.04000	77.34	69DH	1.4	80	.02000	81.05
51D	1.8	675	.42960	77.64	70D	.0	270	.02000	80.99
52D	.0	240	.05830	76.93	71AD	40.1	461	.02820	263.53

Path E

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
38E	5.3	860	.39530	21.98	40DE	5.3	115	.03000	37.31
39E	.0	74	.20280	20.09					

Path F

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
45F	12.2	1323	.24940	12.2	48F	.0	100	.04880	12.9
46F	.0	86	.08140	12.2	49DF	12.9	246	.04000	26.5
47F	.7	340	.64710	12.9					

Path G

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
60G	1.2	753	.23770	3.48	63G	.0	247	.02020	5.77
61G	1.1	415	.01200	6.34	64DG	2.3	113	.05000	81.29
62G	.0	33	.04290	5.77					

Path H

Proposed Flow Data					Proposed Flow Data				
Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
67H	1.4	602	.08310	5.56	69DH	1.4	80	.02000	81.05
68H	.0	76	.10530	4.96					

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The resulting hydrographs and routing calculations indicate that the watershed produces significant flows from the natural mountain channels surrounding the site. The flows reach the existing canyon bottom and increase in volume as they move down stream reaching a peak flow rate of 389.15 cubic feet per second at the downstream most point of the project site. The 50 year routed storm flows are shown above. The 2 year, 10 year, and 100 year routed storm flow rates with the use of a debris basin have been provided in Appendix C.

4.5. Hydrologic Impacts of Proposed Development

When land is developed, the natural cycle of water is disrupted and altered. Clearing removes the vegetation that intercepts, and slows storm runoff. Grading flattens hilly terrain and fills natural depressions that slow and stores runoff. Rainfall that once seeped into the soil runs onto compacted surfaces, buildings, roadways, parking lots and other impervious surface areas, reducing infiltration and increasing runoff.

These changes in land surface can increase the total runoff volume dramatically as well as increase the rate at which runoff flows across the land. Impacts to immediate downstream facilities, property owners or natural drainages can be detrimentally impacted if the project results in:

- An increase in impervious areas that would cause an increase in storm flows and cause existing downstream storm drain system to have insufficient capacity;
- Any increase in overall post-development flows rates not adequately addressed by the project;
- Substantial potential for erosion or siltation of offsite (down drainage) natural features or man-made drainage control and diversion structures;
- Creating substantial offsite flooding issues;

These guidelines have been used to evaluate potential impacts of the project. A significant increased impact would require the project to implement mitigation measures to attenuate the impacts. Water quality impacts and surface water quality is discussed and evaluated in Section 6.0.

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4.5.1. Impact Analysis

Table 4-5 presents a summary of the flow rates for the site for the existing conditions for burned and bulked conditions.

Table 4-5: Existing Conditions – Summary of Flow Rates per Storm Frequency

$Q2_{BB}$ = 87.67 cfs

$Q10_{BB}$ = 324.47 cfs

$Q50_{BB}$ = 387.06 cfs

$Q100_{BB}$ = 447.80 cfs

Existing Condition Capital Storm (50 Year - Bulked & Burned) Flow Rate = 387.06 cfs

Table 4-6 provides the proposed flow rates for each frequency which demonstrates the proposed condition with the use of a debris basin above the proposed site.

Table 4-6: Proposed Conditions – Summary of Flow Rates per Storm Frequency

Q2 = 64.77 cfs

Q10 = 151.82 cfs

Q50 = 263.53 cfs

Q100 = 252.17 cfs

Proposed Condition Capital Storm (50 – With Debris Basin) Flow Rate = 263.53 cfs

Based on the proposed site layout, system design and debris basin, the design hydrograph generated for the proposed development mitigated any increased flow rate from the site.

These factors include but are not limited to the following:

1. *Short lengths and steep gradients at the lower portions of the development*: The residential tract has a series of steeper gradient, short flow lengths along the lower (western side of the development). These developed areas including the commercial area have gradients that increase the velocity of the flows relative to the existing condition, that reach the proposed storm drain system in a very short duration. Therefore, when this flow rate is out of the system when the peak flow drains

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overland to the natural channel, into the valley channel, attenuated thru the detention basin, and routed thru the storm drain system.

2. *High Bulking Factor Area*: The bulking factor for this area is relatively high (1.66) and the de-bulking with the use of a debris basin has a significant impact on the flow.
3. *Basin attenuation*: The proposed detention basin has a long length to width ratio, which is affective in sediment control and also serves to retard flow velocities increasing the time of concentration.
4. *Pipe and drainage device routing*: The longer pipe routing and other drainage device routing (e.g. terrace drains, v-ditches, etc.) serves to provide an effective lesser gradients than the natural channel further serves to attenuate the hydrograph.
5. *Decreased flow volumes*: decreased flow volumes as a result of the de-bulking decrease the flow velocities in the pipe due to the increased surface interaction within the pipe. As such, the effect of flow routing is enhanced.

Hence, these five factors provide the primary reasons for the affective flow rate attenuation that occurs in the developed flow rates. The results of the analysis quantitatively demonstrate that the proposed flowrates, because of the proposed development will effectively be mitigated and the delta Q (increased flow rate) will be decreased from the existing condition.

The existing 96" RCP located on the western property boundary, built as part of tract 53534, was designed to carry a $Q50_B$ volume of 660cfs and outlet that flow to Las Virgenes Creek. The proposed improvements will reduce the flow rate down to 252.17 cfs, and therefore, the system has the required capacity to convey the proposed storm flow. An excerpt from the approved Tract 53534 Drainage study has been provided in Appendix X for reference.

Water Surface Pressure Gradient (WSPG) calculations will be required in conjunction with the final site and storm drain design to ensure that onsite storm drains are sufficiently sized to convey the capital storm event to the proposed point of connections at the existing 96" storm drain on-site and the RCB arch structure in Las Virgenes Road.

Overall, no detrimental downstream impacts are anticipated and the addition of mitigation measures is not currently required. A final hydrology and routing analysis shall be performed along with the final grading and storm drain design to verify that no mitigation measures are required. It should be noted that any changes in the storm drain layout or site design could alter the proposed hydrologic model and render the results void. If significant changes to site design should occur, storm water impacts and the need for mitigation measures shall be re-assessed.

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5.0. SEDIMENT PRODUCTION AND BASIN DESIGN

Sediment production from a watershed is a function of several variables including vegetative cover, rainfall intensity, slopes of the watershed, geology, soil type and size of drainage area. Recently denuded watersheds, due to fire, will have an increased amount of runoff and erosion due to a lack of vegetation and lowered infiltration rates. The Los Angeles Department of public works requires that sediment retention facilities be designed to handle the design storm sediment volume.

The volume of the debris basin for the proposed project has been sized according to the Design Debris Event (DDE) which is defined as the quantity of sediment produced by a saturated watershed significantly recovered from a burn (after 4 years) as a result of a 50-year, 24 hour rainfall amount.

5.1 Debris Design Event (DDE) Calculations

The subject watershed is located in DPA zone 6 (Peak Bulking Factor of 1.6 – Appendix D – Table B-4) and has a tributary area of 0.25 square miles.

The debris production rate for the given watershed is 35,000 cubic yards per square mile (Appendix D – Table B-5).

Design Debris Event (DDE) is 35,000 x 0.25 = ***8,750 cubic yards***

5.2 Debris/Detention Basin Design

The debris basin for the proposed project shall have a volume capacity sufficient for the Design Debris Event (DDE) of 8,750 cubic yards while maintaining a freeboard of two (2) feet above the maximum water surface elevation. In addition, the following general criteria shall be implemented into the final debris basin design as required by the Los Angeles County Public Works Debris Dams and Basins Design Manual.

- The basin shall be designed with an elevated inlet to safely convey the water and sediment.
- The basin shall be designed with a horizontal alignment within the original watercourse where the dam is perpendicular to the flow path.
- A standard concrete outlet tower and conduit shall be designed within the basin for primary drainage.
- A secondary overflow inlet shall be constructed for emergency overflow. This coupled with the additional capacity, and freeboard should provide suitable factor of safety for

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the downstream facilities, and far exceed the requirements of the County of Los Angeles and City of Calabasas.

- The embankments of the basin shall be sloped at 3H : 1V and shall be lined with 6 inches of concrete (Type V) with reinforcing steel (no wire mesh) extending to the canyon walls. Air placed concrete is acceptable. Steeper side slopes shall require a complete geotechnical stability analysis and suitable factor of safety.

- The embankment crest top width of the berm over the inlet shall be 20-feet, paved with 3 inches of asphalt concrete. A berm width of 15 feet may be approved if geological analysis is provided to support the reduction.

- The outlet shall be equipped with a trash rack. Trash posts shall be spaced at 4 feet or 2/3 the diameter of the conduit, whichever is smaller.

- A vehicular access road into the basin must be provided at least 12-feet wide within a 15 foot easement, paved with 3 inches of asphalt concrete over 4 inches of crushed aggregate base. An access ramp into the basin is required and shall be paved if greater than 10 percent. Access ramp slope shall not exceed 12 percent.

- The basin area shall be secured with 5 foot high fencing per APWA 600-0.

- The maximum allowable ponding within the basin shall be 3 feet above the soffit of the conduit inlet.

- The minimum drain size of the outlet shall be 36 inch RCP and the maximum shall be 84 inch RCP or an equivalent RC Box.

- The inlet and storm drain shall be designed to convey the burned flow rate.

- To reduce the likelihood of "momentum overflow", the basin shall be designed with a level capacity large enough to accommodate at least 50 percent of the debris event.

- The basin shall be designed to hold the earth volume for any surficial failures from a single event that may be tributary to the basin in accordance with the County of Los Angeles requirements.

A preliminary debris basin design has been incorporated into the Tentative Tract Map with a more than sufficient design to contain the Debris Design Event (DDE). The basin will also have an excess volume sufficient to hold the debris volume and storm flows while having a minimum 2 feet of freeboard as required by the Los Angeles County Public Works Department (Table 5-1).

Minimum Required Volume for DDE = 8,750 cu.yds.
Total Volume (Level Capacity) = 23,500 cu.yds.

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Additional volume capacity has been maintained for additional factor of safety, as well as, for surficial failures that may occur tributary to the basin. These estimates will be further quantified in the final studies, but are expected to be on the order of less than 2,000 cubic yards.

Table 5-1: Summary of Debris Calculations

Elevation (ft)	Contour Interval (ft)	Area (s.f.)	Mean Area (s.f.)	Interval Volume (c.y.)	Total Volume (c.y.)
899.6	-	60,371.02	-	-	-
895	4.6	53,986.17	57,178.60	9,741.54	9,741.54
890	5	33,709.76	43,847.97	8,119.99	17,861.53
885	5	11,998.44	22,854.10	4,232.24	22,093.77
880	5	3,225.48	7,611.96	1,409.62	**23,503.39**

5.3 Existing Tract 53534 Debris Basin 'B'

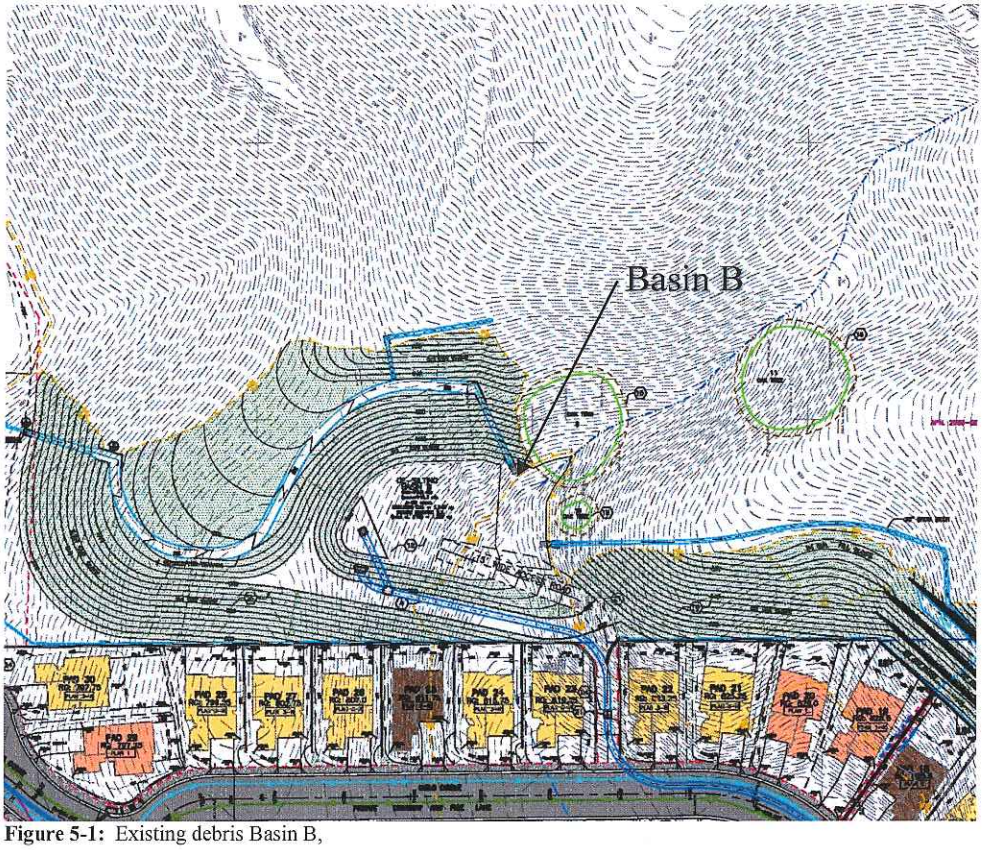

Figure 5-1: Existing debris Basin B,

Tract 53534 was constructed with two large debris basins along the eastern property boundary within the proposed project site. Debris Basin B is the smaller of the two basins and provides debris and detention mitigation for a small hillside drainage, flowing from the south, as well as runoff from the existing terrace drains along the southern slope within tract 53534.

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The proposed Tract 71546 project will protect the existing basin B in place and therefore the capacity will remain unchanged. In addition, the Tract 71546 improvements will not contribute any additional runoff to the basin and therefore leaving the facility in place with not detrimental impacts. The proposed southern slope improvements within tract 71546 will catch slope runoff from a 1.18 acre catchment area (See Area 68M on Proposed Hydrology Map) via mid-slope terrace drains and convey the runoff to the proposed in tract storm drain system however, the slope area currently enters Debris Basin B via a similar existing system (see figure 5-1 above.) Although the proposed slope improvements above the basin will incorporate slope facing blocks and terrace trains, the increase in runoff from the 1 acre area will be negligible due to any increase in impermeable area. It should be noted that Debris Basin B was designed with excess capacity and has additional available capacity. According to the report the required capacity of the basin is 1,242 cubic yards and the basin was designed with a capacity of 1,527 cubic yards of storage. Overall there will be no impacts to the existing basin.

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6.0. IN-TRACT DRAINAGE

The in-tract drainage facilities shall be designed to convey the 50-year storm event from the site via an on-site storm drain scheme including, curb and gutters, v-ditches, terrace drains, catch basins, atrium grate inlets and an underground storm drain system.

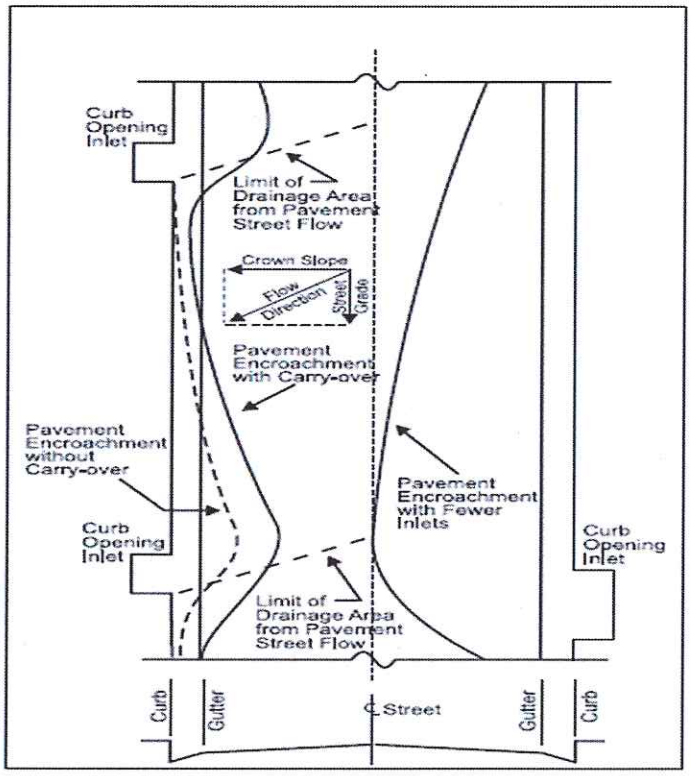
6.1 Street Drainage

All street drainage improvements shall be designed and constructed in accordance with Los Angeles County Public Works Standards. The in-tract streets shall be designed as crowned streets with curb and gutters. Street grades (cross slopes and longitudinal slopes) shall be designed to provide adequate surface water conveyance to the nearest drainage pickup.

The streets shall be designed with sufficient catch basin inlets to provide minimal storm flow spread to allow for a dry lane of travel during a 50 year storm event. Storm flows within the streets will be controlled utilizing curbs and gutters to convey flows to the nearest catch basin.

In all cases, no flows shall exceed the height of the curbs. Concrete cross gutters will be used where flows will cross intersections.

Figure 6-1: Design Criteria for Street Spread and By-Pass Flow



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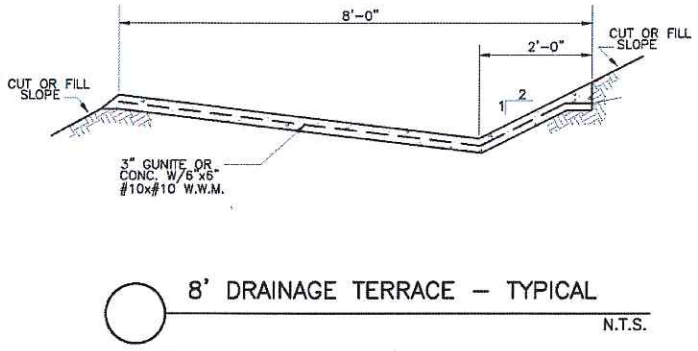
6.2 Terrace Drains

Terrace Drains shall be implemented on all cut and fill slopes higher than 30 feet as outlined in Los Angeles County Public Works standards. All terrace drains shall be designed with a minimal slope that is deemed to be self-cleaning. In order to reduce the chance for terrace drain overflow down the slopes, all terrace drain inlets shall be designed to capture the 50 year event while taking a 50% clogging factor into account.

Figure 6-2: Typical Terrace Drain



6.3 Storm Drain System

The proposed storm drain system will be divided into private and public systems. All drainage facilities outside the public right of way and not located within a dedicated easement will be private systems and maintained by the Home Owners Association. The public storm drain system will be designed to Los Angeles County Standards and dedicated to the county as public drainage facilities.

Private Drains

Private drains will be located throughout the site and include lot drainage, common area drains, terrace drains, back of wall v-ditches, Low Impact Development facilities and associated pipes and appurtances. The private drains shall be designed to convey a 50 year storm event and may be designed using RCP, PVC, HDPE pipes or a combination thereof. A maintenance schedule and agreement encompassing all the private facilities will be established and recorded as Home Owners Association responsibility.

Public Drains

The public storm drain system shall be designed using reinforced concrete pipe and sized to convey the 50 year storm event. The storm drain system shall tie into the existing 96" RCP located at the western property line (adjacent to the Shea Homes Tract 53534) between lots

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seven (7) and nine (9). A proposed 48" line extending from the commercial pad will exit the main Tract entrance, turn south along Las Virgines Road and join the existing arch structure located underneath Las Virgenes Road.

The final drainage and hydrology report shall contain all the pertinent hydraulic calculations using Los Angeles County's (WSPG) Water Surface Pressure Gradient.

6.4 Catch Basins

All in-tract street catch basins shall be designed and constructed in accordance with Los Angeles County Public Works Standards. In tract catch basins shall be curb inlet basins located within the street right of way and sized to capture the 50 year storm event. Bypass flows shall be taken into consideration with on-grade basins, when sizing the next downstream inlets. The addition of grates and local depressions may be utilized in order to sufficiently capture the 50 year event where necessary.

6.5 Storm Water Facility Hydraulic Analysis

Supportive calculations for various drainage structures (PVC pipes, area drains, catch basins, v-ditches, terrace drains, etc.) shall be included in the final hydrology and hydraulics report All the drainage structures shall be sufficiently designed to convey the Q_{50} flows to the corresponding inlet structures.

7.0. LOW IMPACT DEVELOPMENT ANALYSIS

Los Angeles County Regional Planning has conditioned (Ordinance 2008-0063) that in order to protect surface and groundwater quality, maintain the integrity of ecosystems and preserve the physical integrity of receiving waters, new developments must incorporate multifunction site design elements or Best Management Practices for storm water detention and water quality improvements. According to Title 12, Section 84.440, the LID standards include the following general requirements;

1. *Mimic undeveloped storm water and urban runoff rates and volumes in any storm event up to and including the "50-year capital design storm event," as defined by Public Works;*

2. *Prevent pollutants of concern from leaving the development site in storm water as the result of storms, up to and including a water quality design storm event; and*

3. *Minimize hydromodification impacts to natural drainage systems.*

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In order to meet these standards, large scale developments shall prioritize the selection of BMP's to treat storm water pollutants, reduce storm water runoff volume, and promote groundwater infiltration and storm water reuse in an integrated approach protecting water quality and managing water resources. Per the Los Angeles County Low Impact Development requirements, BMP's shall be implemented in the following order of preference:

1. *BMPs that promote infiltration.*

2. *BMPs that store and beneficially use storm water runoff.*

3. *BMPs that utilize the runoff of other water conservation uses including, but not limited to, BMPs that incorporate vegetation to promote pollutant removal and runoff volume reduction and integrate multiple uses, and BMPs that percolate runoff through engineered soil and allow it to discharge downstream slowly.*

4. *If the Director of Public Works determines that compliance with the above (No.3) LID requirements is technically infeasible, in whole or in part, in response to an applicant's submittal, the Director shall require the applicant to submit a proposal for approval by the Director that incorporates design features demonstrating compliance with the LID requirements to the maximum extent practicable.*

7.1 On-Site Infiltration/Treatment Requirements

The excess volume (ΔV) for the LID design storm shall be infiltrated throughout the project site per L.A. County Public Works requirements. This is accomplished on either a lot by lot basis or on a sub-regional scale provided that equivalent benefit can be demonstrated.

Below are the Low Impact Development infiltration requirements for the proposed development. All LID calculations presented are in accordance with the Los Angeles County, Low Impact Design Manual dated January 2009.

7.1.1 Hydrologic Parameters

The total area of the site is 77.55 acres and approximately 54.07 acres will be dedicated open space. The total area required mitigation area is 23.48 acres, which is made up of commercial, single family residential, multi-family residential, senior housing, common use areas and public streets.

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7.1.2 Developed Site Data

Drainage Area	=	15.97 acres
Flow Path Slope	=	5 percent
Flow Path Length	=	1,550 feet
Soil Type	=	35 & 34
Imperviousness	=	42 percent (Appendix E)

7.1.3 LID Design Storm

The design storm used for this project is a 3/4 inch storm over 24 hours as outlined in the L.A. County Low Impact Development Manual.

7.2 Undeveloped Runoff Volume

Using the approved Los Angeles County Volume Calculator the following volume was determined assuming clear flows to represent an undeveloped site condition (0% imperviousness). The flow path length represents the natural channel path and the flow path slope represents the natural slope of the flow path.

Undeveloped Runoff Volume = 4,650.47 cu.ft.

Output Results	
Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.0812
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.108
Time of Concentration (min)	189.0
Clear Peak Flow Rate (cfs)	0.1397
Burned Peak Flow Rate (cfs)	0.1397
24-Hr Clear Runoff Volume (ac-ft)	0.1068
24-Hr Clear Runoff Volume (cu-ft)	4650.4671

7.3 Developed Runoff Volume

Using the approved Los Angeles County Volume Calculator the following volume was calculated using a measured impervious rate representing the developed site (42% imperviousness). The developed site imperviousness calculations have been provided in Appendix E for reference.

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Developed Runoff Volume = 27,373.28 cu.ft.

Output Results	
Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.1438
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.636
Time of Concentration (min)	56.0
Clear Peak Flow Rate (cfs)	1.4574
Burned Peak Flow Rate (cfs)	1.4574
24-Hr Clear Runoff Volume (ac-ft)	0.6284
24-Hr Clear Runoff Volume (cu-ft)	27373.2819

7.4 Excess Volume (ΔV)

This quantity is required to be infiltrated wherever possible at the site level and the BMPs used to accomplish this requirement shall be distributed throughout the project site.

Excess Volume (ΔV) = Developed Runoff Volume – Undeveloped Runoff Volume

Excess Volume (ΔV) = 27,373.28 cu.ft. – 4,650.47 cu.ft. =

Excess Volume (ΔV) = 22,722.81 cu.ft.

7.5 Water Quality Treatment Volume and Flow Rate

The entire volume (ΔV), identified above, must be treated or infiltrated, or, a rate based event can be used to determine the flow rate of runoff that must be treated. The Los Angeles County, Hydrocalc Calculator was used to calculate the Water Quality Treatment Flow Rate.

Water Quality Treatment Flow Volume = 21,604.15 cu.ft.

Water Quality Treatment Flow Rate = 1.46 cfs

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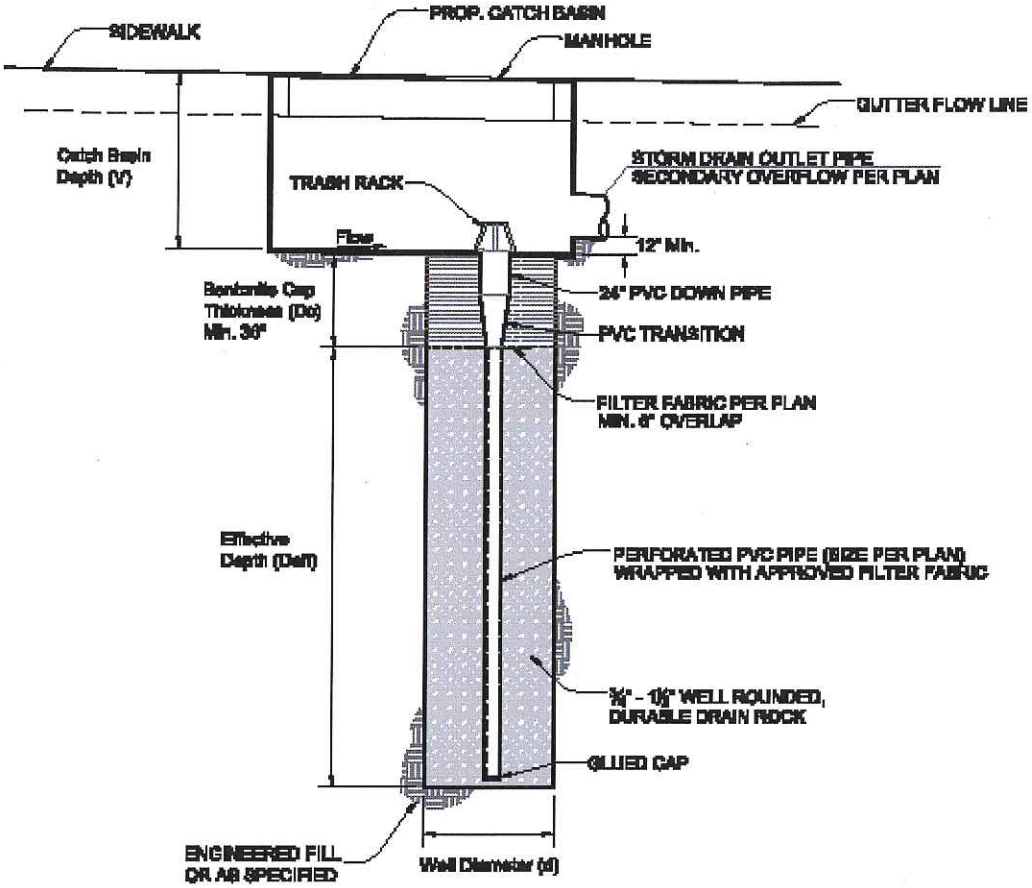
7.6 Infiltration Feasibility

7.6.1 Dry Wells

Implementing infiltration measures within the project site are technically feasible. The current LID compliance consists of installing dry well infiltration units under the proposed street catch basins to intercept runoff from building pads and streets and treat potential source and non-point source pollution (Figure 6-1).

Figure 7-1: Infiltration Dry Well



DRY WELL DETAIL AT STREET CATCH BASIN
NTS

The dry well will be placed below each street catch basin within the development. Minimum well spacing will be assumed to be 12 feet in accordance with designs utilized for seepage pits under the Uniform Building Code.

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The dry well will consist of the following construction, as illustrated in Figure 6-1:

- A drill hole will be made at the low end of the street catch basin using a continuous flight auger to a specified diameter;
- A 24 inch pipe will extend vertically from the bottom of the catch basin, a minimum of 2 to 3 feet (to allow for entrances losses) and then tee into a 12 to 18 inch perforated pipe;
- The perforated pipe, wrapped in a Mirafi (or equivalent) filter fabric) will be placed in the center of the dry well;
- The dry well will then be back filled with ¾ inch to 1-1/2 inch, well rounded drain rock;
- The upper 5 feet of the dry well will be backfilled with a compacted clay or bentonite. The seal material and depth is intended to prevent excess water from draining into the adjacent utility lines, and ensure that the dry well provides suitable later adjacent and vertical support for the overlying subgrade;
- The street catch basin will then be constructed over the top of the dry well with the pipe extending into the bottom of the catch basin. The bottom of the catch basin will be designed to slope to the pipe. The top of the pipe will be equipped with a atrium drain or trash rack to reduce clogging;
- The storm drain lateral will be placed approximately 12 inched above the invert of the dry well pipe to allow sufficient head to build to drain into the pipe.

Based on preliminary test indices and falling head tests on anticipated materials at the site, RJR has estimated an infiltration rate that has been utilized in the design of the dry wells.

Based on the calculations presented in Section 6.1.7, approximately 21,604.15 cubic feet of excess water control volume is required to be treated or infiltrated. The preliminary calculations estimate that approximately twenty-three dry wells that are 3 foot in diameter, 35 feet in length, with 5 foot cap, resulting in an effective length of 30 feet will be required. To account for possible variations in depth, location, adjacent utilities, and provide future redundancy, RJR has suggested that the dry wells be placed under most catch basins. At the present time approximately 19 catch basins are provided, and the dry well will be placed at these locations.

It is important to note that the dry wells can be increased in diameter and increased/decreased in number as required if locations are deemed undesirable or if additional infiltration is required. While the design provides a redundancy to prevent future systems from being installed, if additional systems are required, new dry wells can be drilled in adjacent locations and re-plumbed.

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The dry well infiltration presented above satisfies all required treatment for the LID requirements.

In addition to dry wells, other areas on the site can implement bio-swales such as illustrated in Figures 6-2. Areas such as the Commercial/Retail, the proposed Recreation Area, and the neighborhood park.

7.6.2 Parking Strip Swales/Bio-filtration Planters

A Bio-filtration swale is a form of bio-retention used to partially treat water quality, attenuate flooding potential and convey water away from critical infrastructure. Such a system can be integrated into the proposed project design by utilizing parking strip landscaping which has the ability to capture runoff from the residential lots, sidewalks and gutter flows. Runoff is then filtered/infiltrated within the planters prior to entering the storm drain system.

RJR is proposing that the parkway planters be designed as bio-swales to allow for additional water treatment throughout the site. In addition, landscaping areas around the recreation pad as well as the commercial development can be utilized for treatment facilities. The final number and length of each swale will be determined on the final plans based on dry utility locations, street lights, parking, pedestrian accessibility to sidewalks, etc.

Figure 7-2: Bio-filtration Swale

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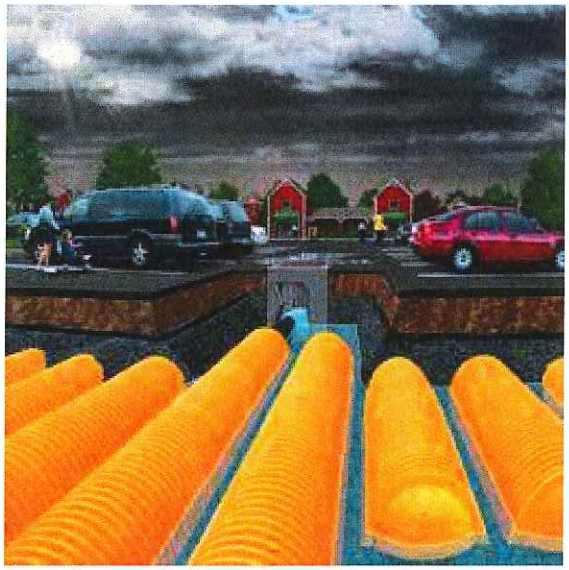
7.6.3 Large Scale Infiltration

A possible alternative or additional feature of the above designs is a larger scale underground infiltration basin. The commercial parking lot encompasses a large surface area which may be utilized. Underground infiltration products such as Stormtech Chambers can be placed under the parking lot. Storm drains can be routed into the chambers and the storm flows are then captured and allowed to infiltrate into the underlying soils.

Figure 7-3: Large Scale Infiltration



7.7 On-site Storage and Reuse

When infiltration is infeasible, the County LID manual requires that on-site storage and reuse of the ΔV should be implemented. The proposed project however will make use of the existing reclaimed water facilities within Las Virgenes Road. The reclaimed water line is located to the south of the proposed site entrance and will be extended into the site for landscape irrigation purposes.

This alternative provides an additional mitigation measure for the tract to satisfy the LID.

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8.0. LIMITATIONS

The above described site assessment, storm water hydrology calculations and water quality treatment calculations are estimates based on the preliminary proposed site plan that was available at the time of this report. The above calculations can be used to aid the final site, storm drain and storm water treatment design for the proposed development.

It should be noted that this report has been prepared solely as a preliminary hydrology and water quality management analysis for the proposed grading and drainage improvements. The water quality calculations are based on the survey provided, visual field measurements, the preliminary, vesting tentative level civil engineering plans designed by RJR, and the architectural and landscape structures designed by others. All recommendations described herein are based on the analysis associated with the above referenced grading and drainage design and preliminary site plans. Any changes in the site plan or reconfiguration of proposed site improvements will render this report void.

Our recommendations have been made in accordance with the custom and practices generally employed by the civil engineering profession. This is in lieu of all other warranties, or representations, either expressed or implied. Based on the available data, RJR has determined the site development is feasible with respect to the downstream facilities, downstream properties, sedimentation and water quality impacts, from a hydrologic engineering standpoint. However, additional findings in subsequent studies may modify or invalidate these findings. It should be noted that the hydrologic model is based on the tentative tract site improvements and assumptions Any variations from these assumptions or preliminary designs will alter the hydrologic model. In addition, an El Nino event or deviation from the typical models may produce results not modeled and accounted for in this study, as is the case in any scientific modeling.

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APPENDIX A
Site Hydrology Information

REFERENCE: Photomapper by AirPhotoUSA, Copyright 1995-2005

P.N. 1344.11

NORTH

SATELLITE IMAGE
CALABASAS HOLDINGS
LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

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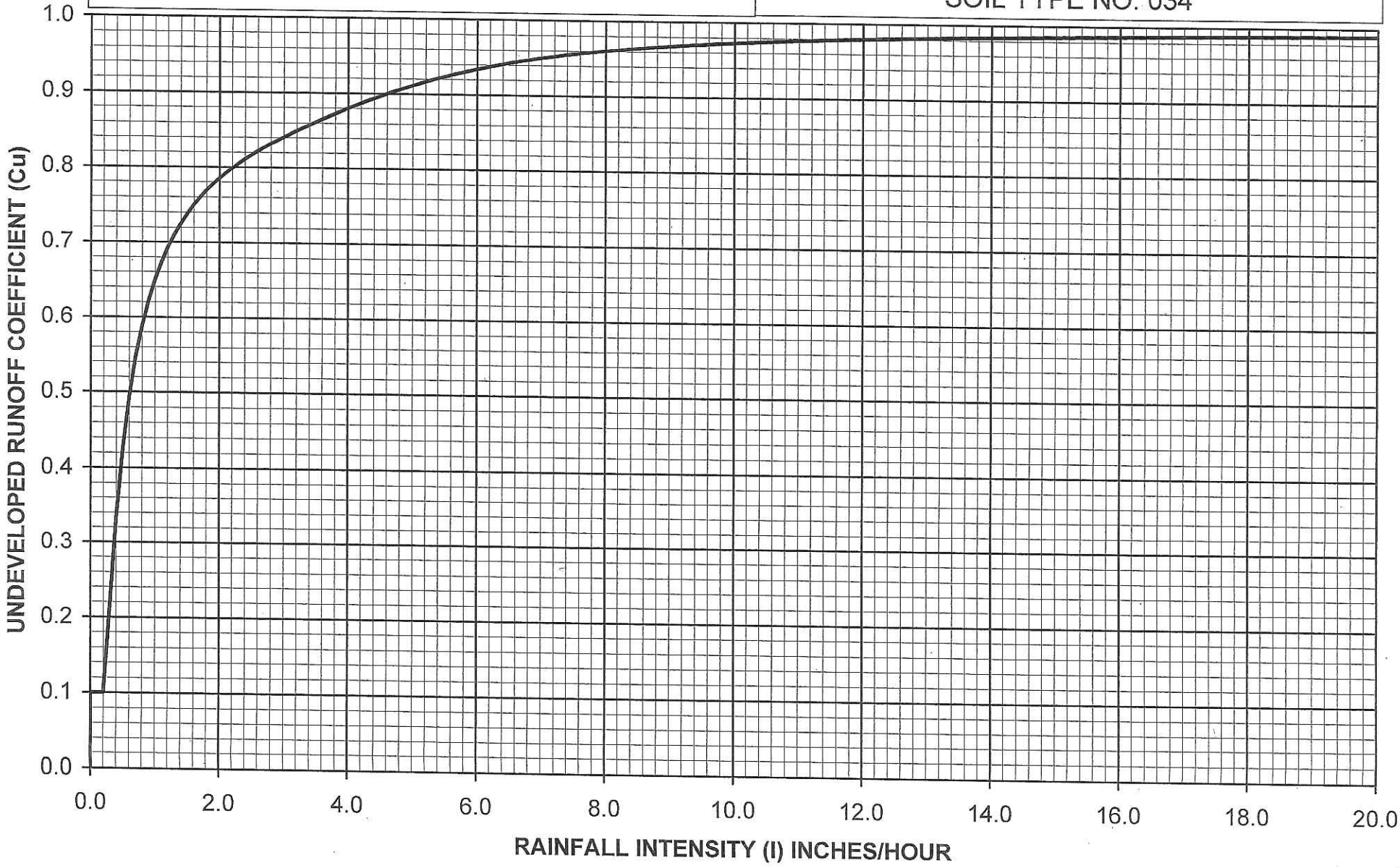
34° 15' 00"
SANTA SUSANA 1-H1.34
-118° 45' 00"
THOUSAND OAKS 1-H1.24
CANOGA PARK 1-H1.26
-118° 37' 30"
MALIBU BEACH 1-H1.15
34° 07' 30"
DPA - 4
DPA - 6
DPA - 7
SITE
SIMI HILLS
SANTA MONICA MTNS
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
CALABASAS
50-YEAR 24-HOUR ISOHYET
1-H1.25
LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 034



File:Soil Curve Data and Graphs 25-49 Tab:GN34

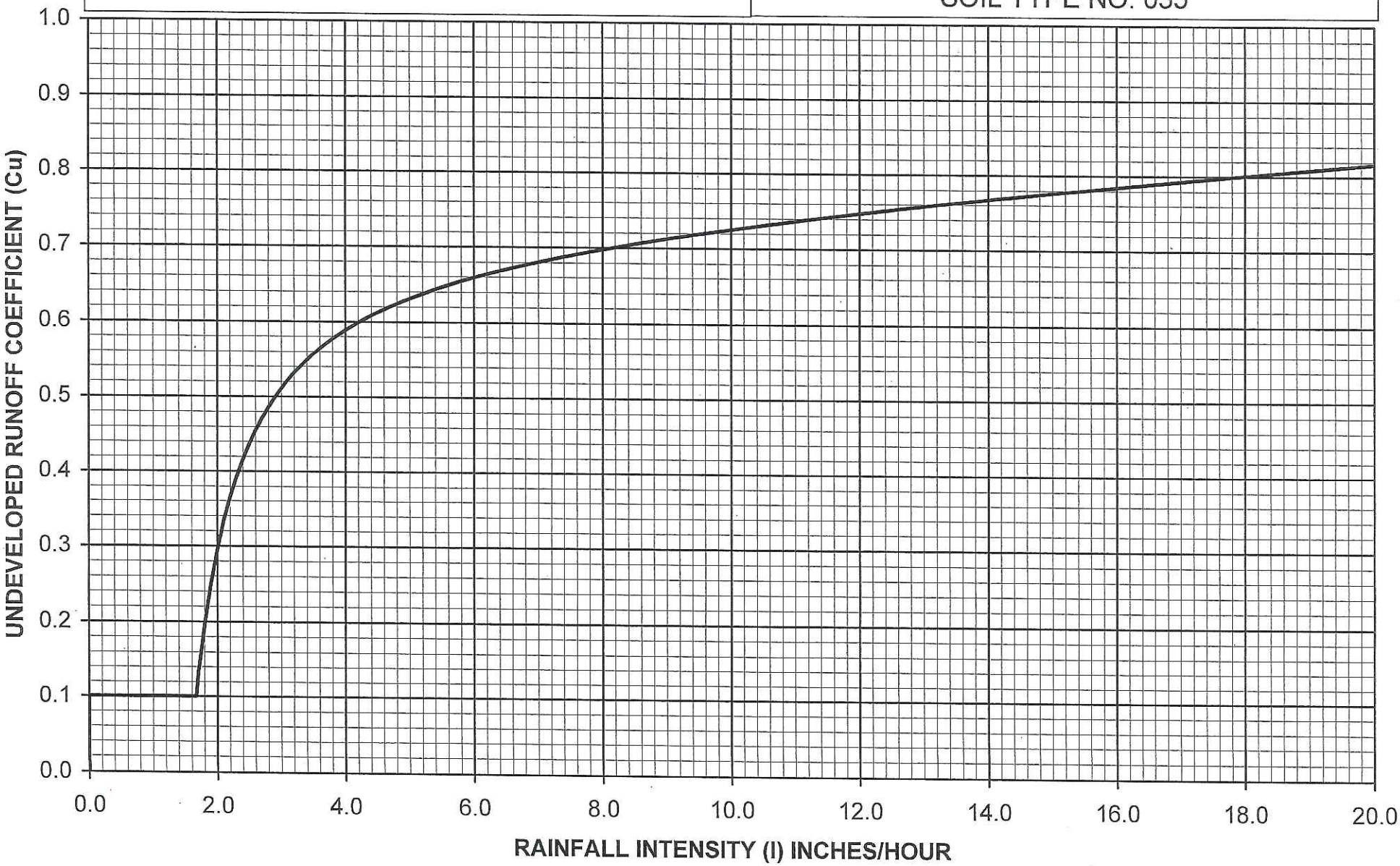
BJW: 06/14/2004

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 035



File:Soil Curve Data and Graphs 25-49 Tab:GN35

BJW: 06/14/2004

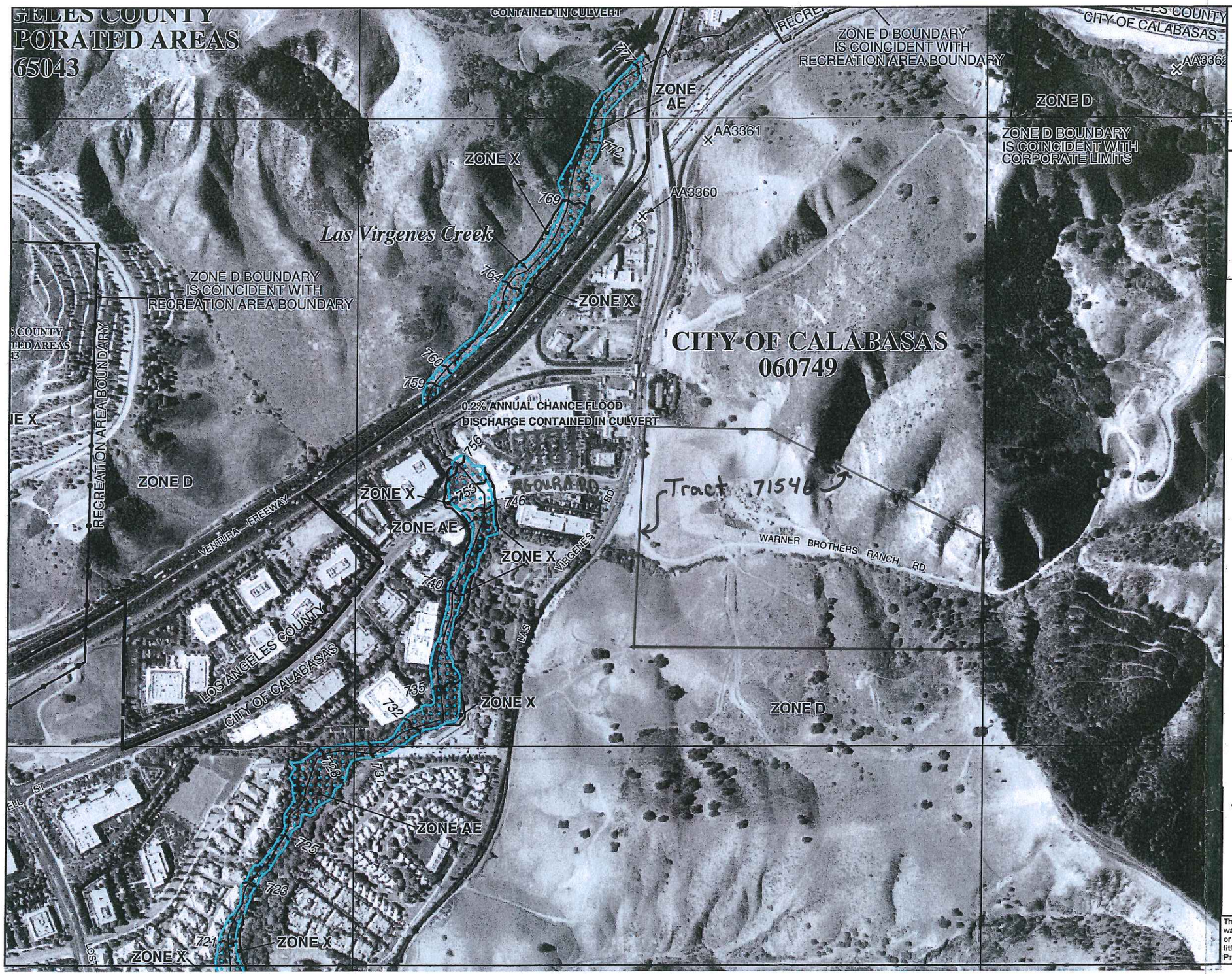
Proportion Impervious Data

Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

Code	Land Use Description	% Impervious
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100



MAP SCALE 1" = 500'

250 0 500 1000 FEET

PANEL 1264F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1264 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES COUNTY	065043	1264	F
CALABASAS, CITY OF	060749	1264	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1264F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

* Site limits are approx.

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX B
Existing Hydrology Calculations

EXISTING 100 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =100 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	52.7	187.09	52.7	187.09	3	2020.	.23270	.00	.00	0.	234	9	A38	.02
1344	2A	29.4	110.34	82.1	287.90	3	2042.	.25470	.00	.00	0.	234	8	A38	.02
1344	3A	.0	.00	82.1	280.60	3	760.	.09210	.00	.00	0.	234	5	A38	.02
1344	4A	22.7	82.68	104.8	335.11	3	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	63.20	119.3	348.56	3	1505.	.34680	.00	.00	0.	234	6	A38	.02
1344	6A	.0	.00	119.3	347.20	4	1306.	.00730	5.75	.00	0.	234	5	A37	.02
1344	7A	22.6	70.66	141.9	374.71	4	2405.	.13100	3.50	.00	0.	234	11	A37	.02
1344	8A	19.8	70.29	161.7	392.11	4	2327.	.27290	3.25	.00	0.	234	9	A38	.02
1344	9A	.0	.00	161.7	391.33	4	613.	.04410	4.50	.00	0.	234	5	A37	.02
1344	10A	19.0	65.59	180.7	410.35	4	2144.	.18100	3.50	.00	0.	234	9	A37	.02
1344	11A	18.2	39.61	198.9	441.44	4	2532.	.26000	3.25	.00	0.	235	14	A37	.02
1344	12A	.0	.00	198.9	440.02	4	500.	.03600	4.75	.00	0.	235	5	A37	.02
1344	13A	6.3	26.66	205.2	443.83	4	1226.	.23270	3.50	.00	0.	234	6	A37	.02
1344	14A	9.3	23.40	214.5	448.65	4	1613.	.19030	3.50	.00	0.	235	11	A37	.02
1344	15B	.3	1.18	.3	1.18	4	254.	.13780	1.00	.00	0.	235	5	A37	.02

CONFLUENCE Q'S

1344 16A TA 1164 QA 448.23 QAB 448.36 QB .13 1344 16B TB 1154 QB 1.11 QBA 314.67 QA 313.57
1344 16AB TAB 1164 QAB 448.36 QA 448.23 QB .13

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	16AB	.3	1.11	214.8	448.36	4	500.	.03600	8.00	.00	0.	235	0	A37	.00
1344	17A	.0	.00	214.8	448.29	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	18A	.0	.00	214.8	448.03	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	19A	.0	.00	214.8	447.80	5	500.	.03600	5.00	.00	0.	235	5	A37	.02

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =100 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1344	1A	52.7	176.66	52.7	176.66	3	2020.	.23270	.00	.00	0.	34	9	A38	.02
1344	2A	29.4	104.47	82.1	271.43	3	2042.	.25470	.00	.00	0.	34	8	A38	.02
1344	3A	.0	.00	82.1	263.71	3	760.	.09210	.00	.00	0.	34	5	A38	.02
1344	4A	22.7	78.16	104.8	313.93	3	1952.	.21880	.00	.00	0.	34	8	A37	.02
1344	5A	14.5	60.38	119.3	324.60	3	1505.	.36010	.00	.00	0.	34	6	A38	.02
1344	6A	.0	.00	119.3	323.16	4	1306.	.00730	5.75	.00	0.	34	5	A37	.02
1344	7A	12.9	42.00	132.2	326.52	4	1786.	.14560	3.25	.00	0.	34	9	A37	.02
1344	8A	16.7	63.63	148.9	336.18	4	1705.	.34310	3.00	.00	0.	34	7	A38	.02
1344	9A	.0	.00	148.9	335.76	4	509.	.01510	6.00	.00	0.	34	5	A37	.02

EXISTING 50 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1344	1A	52.7	165.00	52.7	165.00	3	2020.	.23270	.00	.00	0.	234	9	A38	.02
1344	2A	29.4	97.35	82.1	253.38	3	2042.	.25470	.00	.00	0.	234	8	A38	.02
1344	3A	.0	.00	82.1	246.15	3	760.	.09210	.00	.00	0.	234	5	A38	.02
1344	4A	22.7	72.94	104.8	293.73	3	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	55.74	119.3	304.03	3	1505.	.34680	.00	.00	0.	234	6	A38	.02
1344	6A	.0	.00	119.3	302.63	4	1306.	.00730	5.50	.00	0.	234	5	A37	.02
1344	7A	22.6	62.22	141.9	326.02	4	2405.	.13100	3.50	.00	0.	234	11	A37	.02
1344	8A	19.8	61.99	161.7	341.59	4	2327.	.27290	3.00	.00	0.	234	9	A38	.02
1344	9A	.0	.00	161.7	340.69	4	613.	.04410	4.25	.00	0.	234	5	A37	.02
1344	10A	19.0	57.83	180.7	355.79	4	2144.	.18100	3.25	.00	0.	234	9	A37	.02
1344	11A	18.2	33.87	198.9	381.50	4	2532.	.26000	3.25	.00	0.	235	14	A37	.02
1344	12A	.0	.00	198.9	380.40	4	500.	.03600	4.50	.00	0.	235	5	A37	.02
1344	13A	6.3	23.51	205.2	383.94	4	1226.	.23270	3.25	.00	0.	234	6	A37	.02
1344	14A	9.3	20.19	214.5	387.98	4	1613.	.19030	3.50	.00	0.	235	11	A37	.02
1344	15B	.3	1.03	.3	1.03	4	254.	.13780	1.00	.00	0.	235	5	A37	.02

CONFLUENCE Q'S

1344 16A TA 1164 QA 387.61 QAB 387.73 QB .11 1344 16B TB 1154 QB .97 QBA 269.48 QA 268.51

1344 16AB TAB 1164 QAB 387.73 QA 387.61 QB .11

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	16AB	.3	.97	214.8	387.73	4	500.	.03600	8.00	.00	0.	235	0	A37	.00
1344	17A	.0	.00	214.8	387.59	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	18A	.0	.00	214.8	387.31	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	19A	.0	.00	214.8	387.06	5	500.	.03600	5.00	.00	0.	235	5	A37	.02

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	52.7	154.82	52.7	154.82	3	2020.	.23270	.00	.00	0.	34	9	A38	.02
1344	2A	29.4	91.61	82.1	237.30	3	2042.	.25470	.00	.00	0.	34	8	A38	.02
1344	3A	.0	.00	82.1	230.19	3	760.	.09210	.00	.00	0.	34	5	A38	.02
1344	4A	22.7	68.53	104.8	273.10	3	1952.	.21880	.00	.00	0.	34	8	A37	.02
1344	5A	14.5	52.86	119.3	280.77	3	1505.	.36010	.00	.00	0.	34	6	A38	.02
1344	6A	.0	.00	119.3	279.19	4	1306.	.00730	5.50	.00	0.	34	5	A37	.02
1344	7A	12.9	36.79	132.2	282.42	4	1786.	.14560	3.25	.00	0.	34	9	A37	.02
1344	8A	16.7	55.72	148.9	290.60	4	1705.	.34310	2.75	.00	0.	34	7	A38	.02
1344	9A	.0	.00	148.9	289.68	4	509.	.01510	6.00	.00	0.	34	5	A37	.02

EXISTING 10 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	52.7	114.01	52.7	114.01	3	2020.	.23270	.00	.00	0.	234	9	A38	.02
1344	2A	29.4	67.29	82.1	173.78	3	2042.	.25470	.00	.00	0.	234	8	A38	.02
1344	3A	.0	.00	82.1	168.52	3	760.	.09210	.00	.00	0.	234	5	A38	.02
1344	4A	22.7	50.41	104.8	197.84	3	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	38.53	119.3	203.19	3	1505.	.34680	.00	.00	0.	234	6	A38	.02
1344	6A	.0	.00	119.3	201.47	4	1306.	.00730	4.75	.00	0.	234	5	A37	.02
1344	7A	22.6	42.96	141.9	212.40	4	2405.	.13100	3.00	.00	0.	234	11	A37	.02
1344	8A	19.8	42.84	161.7	221.21	4	2327.	.27290	2.50	.00	0.	234	9	A38	.02
1344	9A	.0	.00	161.7	220.64	4	613.	.04410	3.50	.00	0.	234	5	A37	.02
1344	10A	19.0	39.95	180.7	228.19	4	2144.	.18100	2.75	.00	0.	234	9	A37	.02
1344	11A	18.2	19.37	198.9	240.31	4	2532.	.26000	2.75	.00	0.	235	14	A37	.02
1344	12A	.0	.00	198.9	239.94	4	500.	.03600	3.75	.00	0.	235	5	A37	.02
1344	13A	6.3	16.26	205.2	242.18	4	1226.	.23270	2.75	.00	0.	234	6	A37	.02
1344	14A	9.3	12.21	214.5	245.14	4	1613.	.19030	2.75	.00	0.	235	11	A37	.02
1344	15B	.3	.68	.3	.68	4	254.	.13780	1.00	.00	0.	235	5	A37	.02

CONFLUENCE Q'S

1344 16A TA 1165 QA 244.69 QAB 244.69 QB .00 1344 16B TB 1154 QB .64 QBA 164.64 QA 164.00

1344 16AB TAB 1165 QAB 244.69 QA 244.69 QB .00

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	16AB	.3	.64	214.8	244.69	4	500.	.03600	8.00	.00	0.	235	0	A37	.00
1344	17A	.0	.00	214.8	244.68	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	18A	.0	.00	214.8	244.51	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	19A	.0	.00	214.8	244.47	5	500.	.03600	5.00	.00	0.	235	5	A37	.02

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1344	1A	52.7	104.91	52.7	104.91	3	2020.	.23270	.00	.00	0.	34	9	A38	.02
1344	2A	29.4	62.11	82.1	159.37	3	2042.	.25470	.00	.00	0.	34	8	A38	.02
1344	3A	.0	.00	82.1	153.99	3	760.	.09210	.00	.00	0.	34	5	A38	.02
1344	4A	22.7	46.45	104.8	179.20	3	1952.	.21880	.00	.00	0.	34	8	A37	.02
1344	5A	14.5	35.83	119.3	182.95	3	1505.	.36010	.00	.00	0.	34	6	A38	.02
1344	6A	.0	.00	119.3	180.99	4	1306.	.00730	4.75	.00	0.	34	5	A37	.02
1344	7A	12.9	24.92	132.2	181.85	4	1786.	.14560	2.75	.00	0.	34	9	A37	.02
1344	8A	16.7	37.80	148.9	185.94	4	1705.	.34310	2.25	.00	0.	34	7	A38	.02
1344	9A	.0	.00	148.9	185.12	4	509.	.01510	6.00	.00	0.	34	5	A37	.02

EXISTING 2 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	52.7	56.81	52.7	56.81	3	2020.	.23270	.00	.00	0.	234	9	A38	.02
1344	2A	29.4	33.65	82.1	84.63	3	2042.	.25470	.00	.00	0.	234	8	A38	.02
1344	3A	.0	.00	82.1	80.08	3	760.	.09210	.00	.00	0.	234	5	A38	.02
1344	4A	22.7	25.16	104.8	91.12	3	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	19.45	119.3	91.72	3	1505.	.34680	.00	.00	0.	234	6	A38	.02
1344	6A	.0	.00	119.3	90.64	3	1306.	.00730	.00	.00	0.	234	5	A37	.02
1344	7A	22.6	21.21	141.9	87.43	3	2405.	.13100	.00	.00	0.	234	11	A37	.02
1344	8A	19.8	21.34	161.7	87.59	3	2327.	.27290	.00	.00	0.	234	9	A38	.02
1344	9A	.0	.00	161.7	86.46	3	613.	.04410	.00	.00	0.	234	5	A37	.02
1344	10A	19.0	19.87	180.7	87.79	3	2144.	.18100	.00	.00	0.	234	9	A37	.02
1344	11A	18.2	8.40	198.9	88.57	3	2532.	.26000	.00	.00	-0.	235	14	A37	.02
1344	12A	.0	.00	198.9	87.67	3	500.	.03600	.00	.00	0.	235	5	A37	.02
1344	13A	6.3	8.19	205.2	87.84	3	1226.	.23270	.00	.00	0.	234	6	A37	.02
1344	14A	9.3	4.80	214.5	88.30	3	1613.	.19030	.00	.00	0.	235	11	A37	.02
1344	15B	.3	.24	.3	.24	4	254.	.13780	1.00	.00	0.	235	5	A37	.02

CONFLUENCE Q'S

1344 16A TA 1187 QA 87.95 QAB 87.95 QB .00 1344 16B TB 1154 QB .22 QBA 40.28 QA 40.06

1344 16AB TAB 1187 QAB 87.95 QA 87.95 QB .00

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	16AB	.3	.22	214.8	87.95	4	500.	.03600	8.00	.00	0.	235	0	A37	.00
1344	17A	.0	.00	214.8	87.84	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	18A	.0	.00	214.8	87.79	5	500.	.03600	5.00	.00	0.	235	5	A37	.02
1344	19A	.0	.00	214.8	87.67	5	500.	.03600	5.00	.00	0.	235	5	A37	.02

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\CivilD\lasoilx.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1344	1A	52.7	49.97	52.7	49.97	3	2020.	.23270	.00	.00	0.	34	9	A38	.02
1344	2A	29.4	29.74	82.1	73.72	3	2042.	.25470	.00	.00	0.	34	8	A38	.02
1344	3A	.0	.00	82.1	69.34	3	760.	.09210	.00	.00	0.	34	5	A38	.02
1344	4A	22.7	22.18	104.8	77.30	3	1952.	.21880	.00	.00	0.	34	8	A37	.02
1344	5A	14.5	17.39	119.3	76.54	3	1505.	.36010	.00	.00	0.	34	6	A38	.02
1344	6A	.0	.00	119.3	75.81	3	1306.	.00730	.00	.00	0.	34	5	A37	.02
1344	7A	12.9	11.84	132.2	70.50	3	1786.	.14560	.00	.00	0.	34	9	A37	.02
1344	8A	16.7	18.20	148.9	70.15	3	1705.	.34310	.00	.00	0.	34	7	A38	.02
1344	9A	.0	.00	148.9	69.58	4	509.	.01510	6.00	.00	0.	34	5	A37	.02

APPENDIX C
Proposed Hydrology Calculations

PROPOSED 100 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =100 SOIL DATA FILE: C:\Users\rick.RJRENG\Desktop\LAR04 2186\lasoilx.da

Tentative Tract 71546

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	10.0	36.42	10.0	36.42	1	2020.	.23270	.00	.00	0.	234	8	A37	.02
1344	2A	29.4	107.09	39.4	129.59	1	2042.	.25470	.00	.00	0.	234	8	A37	.02
1344	3A	.0	.00	39.4	124.21	1	760.	.09470	.00	.00	0.	234	1	A37	.00
1344	4A	22.7	82.68	62.1	171.58	1	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	61.37	76.6	183.86	1	1505.	.36010	.00	.00	0.	234	6	A37	.02
1344	6A	.0	.00	76.6	182.67	1	948.	.06650	.00	.00	0.	234	1	A37	.00
1344	7A	12.9	44.53	89.5	201.21	1	2054.	.13880	.00	.00	0.	234	9	A37	.02
1344	8A	16.7	70.68	106.2	208.04	1	1321.	.43150	.00	.00	0.	234	6	A37	.02
1344	9A	.0	.00	106.2	207.60	4	360.	.02500	6.00	.00	0.	34	1	A37	.00
1344	10A	1.3	5.82	107.5	208.24	4	300.	.03000	3.75	.00	0.	34	5	A37	.71
1344	11A	.0	.00	107.5	208.07	4	92.	.02720	6.00	.00	0.	34	1	A37	.00
1344	12A	.0	.00	107.5	208.04	4	22.	.04540	6.00	.00	0.	34	1	A37	.00
1344	13B	14.1	51.36	14.1	51.36	1	1899.	.31070	.00	.00	0.	234	8	A37	.02
1344	14B	.0	.00	14.1	48.22	4	271.	.02000	4.00	.00	0.	34	1	A37	.00
1344	15B	1.1	4.92	15.2	49.33	4	335.	.01190	2.75	.00	0.	34	5	A37	.75
1344	16B	.0	.00	15.2	49.06	3	85.	.02350	4.00	.00	0.	34	1	A37	.00

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* CONFLUENCE Q'S *

* 1344 17A TA 1166 QA 208.04 QAB 233.79 QB 25.75 1344 17B TB 1159 QB 48.90 QBA 231.36 QA 182.45 *

* 1344 17AB TAB 1164 QAB 238.55 QA 204.17 QB 34.38 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	17AB	15.2	48.90	122.7	238.55	4	348.	.03590	6.00	.00	0.	34	0	A37	.00
1344	18A	2.3	10.29	125.0	240.12	4	536.	.03080	4.00	.00	0.	34	5	A37	.74
1344	19A	.0	.00	125.0	239.70	4	116.	.02000	6.00	.00	0.	34	1	A37	.00
1344	20A	.4	1.79	125.4	239.95	4	232.	.05820	3.50	.00	0.	34	5	A37	.80
1344	21A	.0	.00	125.4	239.81	4	140.	.02000	6.00	.00	0.	34	1	A37	.00
1344	22A	1.4	6.26	126.8	240.70	4	361.	.00830	5.00	.00	0.	34	5	A37	.79
1344	23A	.0	.00	126.8	240.40	4	190.	.02000	6.00	.00	0.	34	1	A37	.00
1344	24A	.0	.00	126.8	240.25	4	305.	.02300	4.25	.00	0.	34	5	A37	.68
1344	25A	.0	.00	126.8	240.08	4	48.	.04000	6.00	.00	0.	34	1	A37	.00
1344	26C	4.8	18.72	4.8	18.72	1	1321.	.17030	.00	.00	0.	234	7	A37	.02
1344	27C	1.4	6.31	6.2	18.28	3	380.	.01840	.00	.00	0.	34	5	A37	.07
1344	28C	.0	.00	6.2	17.96	4	223.	.03000	4.00	.00	0.	34	1	A37	.00
1344	29C	1.2	5.37	7.4	19.20	4	326.	.02760	2.00	.00	0.	34	5	A37	.70
1344	30C	.0	.00	7.4	19.13	4	308.	.02000	4.00	.00	0.	34	1	A37	.00
1344	31C	1.7	7.61	9.1	22.32	4	414.	.02170	2.00	.00	0.	34	5	A37	.70
1344	32C	.0	.00	9.1	22.22	4	47.	.02000	4.00	.00	0.	34	1	A37	.00

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*                                                CONFLUENCE Q'S                                                 *
*   1344   33A  TA 1167 QA   240.07 QAC   255.86 QC    15.79    1344   33C  TC 1156 QC    22.19 QCA   211.09 QA   188.89   *
*                            1344   33AC TAC 1165 QAC   257.03 QA   238.62 QC    18.41                          *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	33AC	9.1	22.19	135.9	257.03	4	360.	.14400	6.00	.00	0.	34	0	A37	.00
1344	34D	6.3	26.66	6.3	26.66	1	1212.	.21450	.00	.00	0.	234	6	A37	.02
1344	35D	.0	.00	6.3	23.68	1	51.	.17650	.00	.00	0.	234	1	A37	.00
1344	36D	.3	1.41	6.6	24.26	1	224.	.17860	.00	.00	0.	234	5	A37	.02
1344	37D	.0	.00	6.6	23.83	1	34.	.03000	.00	.00	0.	234	1	A37	.00
1344	38E	5.3	24.90	5.3	24.90	1	860.	.39530	.00	.00	0.	234	5	A37	.02
1344	39E	.0	.00	5.3	22.79	1	74.	.20280	.00	.00	0.	234	1	A37	.00

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*                                                CONFLUENCE Q'S                                                 *
*   1344   40D  TB 1158 QB    23.82 QBC    39.76 QC    15.94    1344    8C  TC 1155 QC    22.66 QCB    41.16 QB    18.50   *
*                            1344    8BC TBC 1156 QBC    42.82 QB    21.32 QC    21.51                          *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	40DE	5.3	22.66	11.9	42.82	1	115.	.03000	.00	.00	0.	234	0	A37	.00
1344	41D	.6	2.82	12.5	43.70	1	372.	.57260	.00	.00	0.	234	5	A37	.02
1344	42D	.0	.00	12.5	43.19	1	133.	.04000	.00	.00	0.	234	1	A37	.00
1344	43D	1.1	5.17	13.6	44.34	1	433.	.49650	.00	.00	0.	234	5	A37	.02
1344	44D	.0	.00	13.6	44.01	1	73.	.02740	.00	.00	0.	234	1	A37	.00
1344	45F	12.2	51.64	12.2	51.64	1	1323.	.24940	.00	.00	0.	234	6	A37	.02
1344	46F	.0	.00	12.2	47.26	1	86.	.08140	.00	.00	0.	234	1	A37	.00
1344	47F	.7	3.29	12.9	48.46	1	340.	.64710	.00	.00	0.	234	5	A37	.02
1344	48F	.0	.00	12.9	48.05	1	100.	.08500	.00	.00	0.	234	1	A37	.00
1344	49DF	12.9	47.75	26.5	89.18	1	246.	.04880	.00	.00	0.	234	0	A37	.00
1344	50D	.9	4.23	27.4	89.08	1	246.	.04000	.00	.00	0.	234	5	A37	.02
1344	51D	1.8	8.46	29.2	89.67	1	675.	.42960	.00	.00	0.	234	5	A37	.02
1344	52D	.0	.00	29.2	88.86	1	240.	.05830	.00	.00	0.	234	1	A37	.00
1344	53D	.7	3.29	29.9	88.67	1	240.	.05000	.00	.00	0.	234	5	A37	.02
1344	54D	.0	.00	29.9	87.87	4	105.	.04200	5.00	.00	0.	34	1	A37	.00
1344	55D	.9	4.02	30.8	88.52	4	190.	.01050	3.25	.00	0.	34	5	A37	.93
1344	56D	.0	.00	30.8	87.98	4	280.	.06960	2.50	.00	0.	34	1	A37	.00
1344	57D	2.2	9.86	33.0	89.47	4	529.	.07720	2.25	.00	0.	34	5	A37	.56
1344	58D	1.4	6.58	34.4	89.75	1	737.	.44100	.00	.00	0.	234	5	A37	.02
1344	59D	.0	.00	34.4	89.09	3	78.	.06500	5.00	.00	0.	34	1	A37	.00
1344	60D	1.2	3.95	1.2	3.95	1	753.	.23770	.00	.00	0.	234	10	A37	.03
1344	61G	1.1	4.91	2.3	7.21	3	415.	.01200	.00	.00	0.	34	5	A37	.84
1344	62G	.0	.00	2.3	6.60	4	33.	.04290	3.00	.00	0.	34	1	A37	.00
1344	63G	.0	.00	2.3	6.59	4	247.	.02020	3.00	.00	0.	34	1	A37	.00

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*                                                CONFLUENCE Q'S                                                 *
*   1344   64D  TB 1166 QB    89.06 QBE    93.43 QE     4.37    1344   32E  TE 1158 QE     6.55 QEB    67.08 QB    60.53   *
*                            1344   32BE TBE 1166 QBE    93.43 QB    89.06 QE     4.37                          *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	RAIN ZONE	PCT IMPV
1344	64DG	2.3	6.55	36.7	93.43	4	113.	.05000	5.00	.00	0.	34	0	A37	.00
1344	65D	.0	.00	36.7	93.40	4	24.	.03000	5.00	.00	0.	34	1	A37	.00
1344	66D	2.0	7.40	38.7	94.49	1	815.	.07360	.00	.00	0.	34	7	A37	.01
1344	67H	1.4	6.26	1.4	6.26	3	602.	.08310	.00	.00	0.	34	5	A37	.79
1344	68H	.0	.00	1.4	5.62	4	76.	.10530	2.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 69D TB 1168 QB 92.32 QBF 93.42 QF 1.10 1344 37F TF 1155 QF 5.58 QFB 59.49 QB 53.91

1344 37BF TBF 1168 QBF 93.42 QB 92.32 QF 1.10

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	RAIN ZONE	PCT IMPV
1344	69DH	1.4	5.58	40.1	93.42	4	80.	.02000	5.00	.00	0.	34	0	A37	.00
1344	70D	.0	.00	40.1	93.25	4	270.	.02000	5.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 71D TA 1153 QA 258.30 QAB 305.18 QB 46.88 1344 39B TB 1169 QB 93.21 QBA 121.53 QA 28.32

1344 39AB TAB 1153 QAB 305.18 QA 258.30 QB 46.88

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	RAIN ZONE	PCT IMPV
1344	71AD	40.1	93.21	95.1	305.18	4	461.	.02820	6.00	.00	0.	34	0	A37	.00
1344	72A	.0	.00	95.1	292.16	4	10.	.02000	6.00	.00	0.	34	1	A37	.00

Peak Flow Hydrologic Analysis

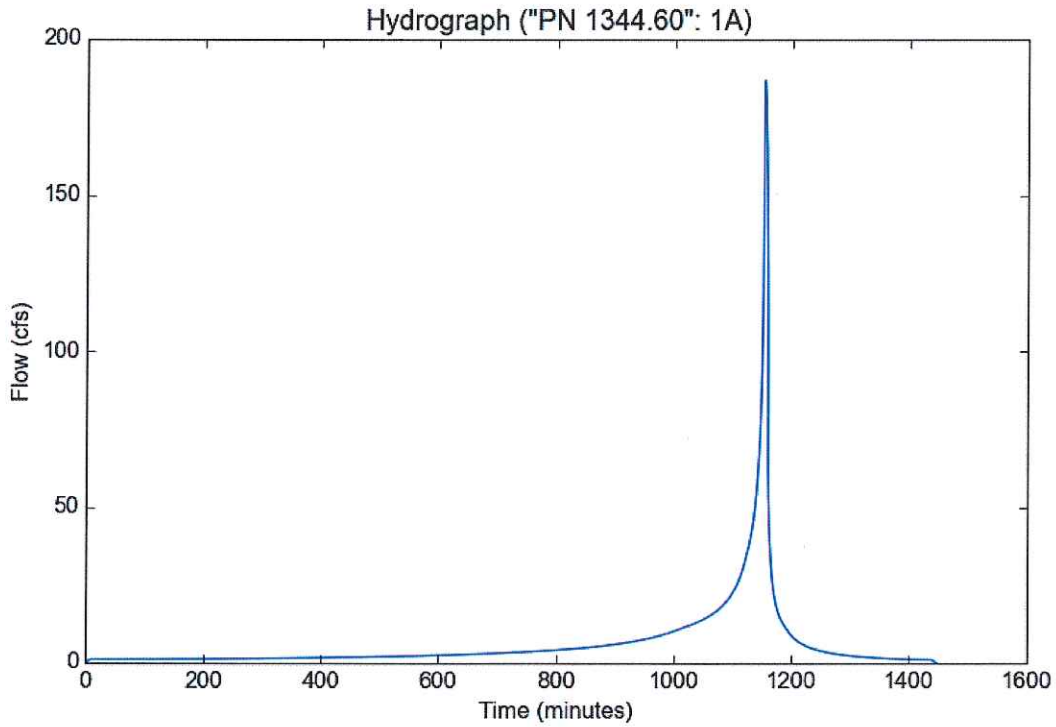
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	1A
Area (ac)	52.7
Flow Path Length (ft)	2020.0
Flow Path Slope (vft/hft)	0.2327
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.0255
Undeveloped Runoff Coefficient (Cu)	0.8809
Developed Runoff Coefficient (Cd)	0.8813
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	186.956
Burned Peak Flow Rate (cfs)	195.583
24-Hr Clear Runoff Volume (ac-ft)	12.9174
24-Hr Clear Runoff Volume (cu-ft)	562681.5923



Peak Flow Hydrologic Analysis

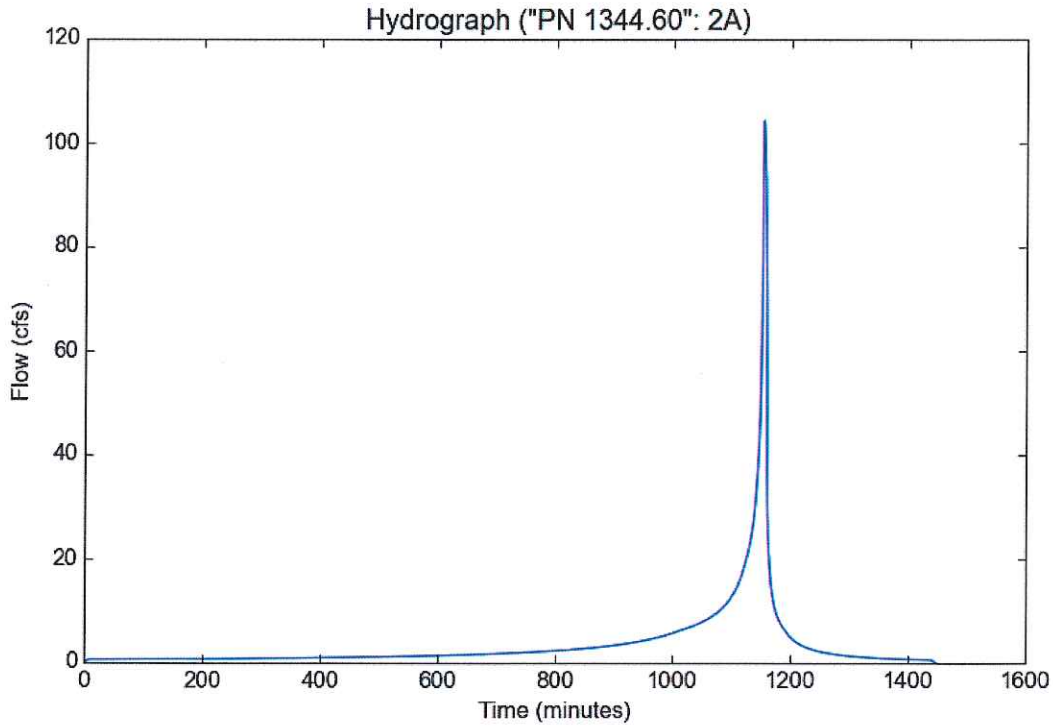
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	2A
Area (ac)	29.4
Flow Path Length (ft)	2042.0
Flow Path Slope (vft/hft)	0.2547
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.0255
Undeveloped Runoff Coefficient (Cu)	0.8809
Developed Runoff Coefficient (Cd)	0.8813
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	104.2981
Burned Peak Flow Rate (cfs)	109.1108
24-Hr Clear Runoff Volume (ac-ft)	7.2063
24-Hr Clear Runoff Volume (cu-ft)	313905.8598



Peak Flow Hydrologic Analysis

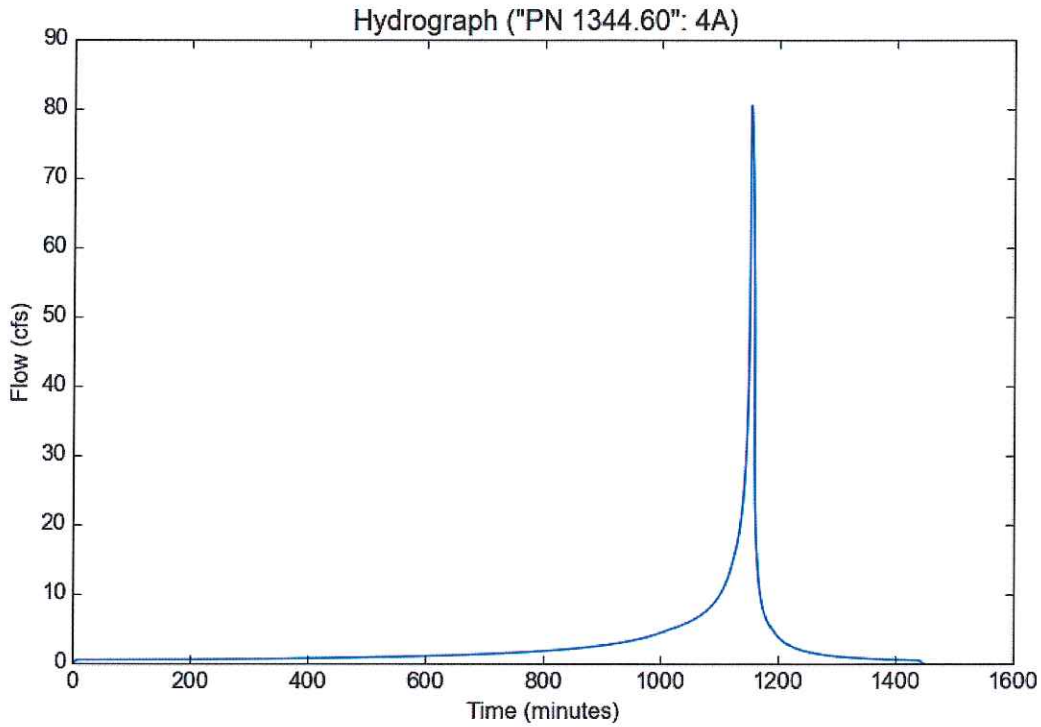
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	4A
Area (ac)	22.7
Flow Path Length (ft)	1952.0
Flow Path Slope (vft/hft)	0.2188
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.0255
Undeveloped Runoff Coefficient (Cu)	0.8809
Developed Runoff Coefficient (Cd)	0.8813
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	80.5294
Burned Peak Flow Rate (cfs)	84.2454
24-Hr Clear Runoff Volume (ac-ft)	5.564
24-Hr Clear Runoff Volume (cu-ft)	242369.4904



Peak Flow Hydrologic Analysis

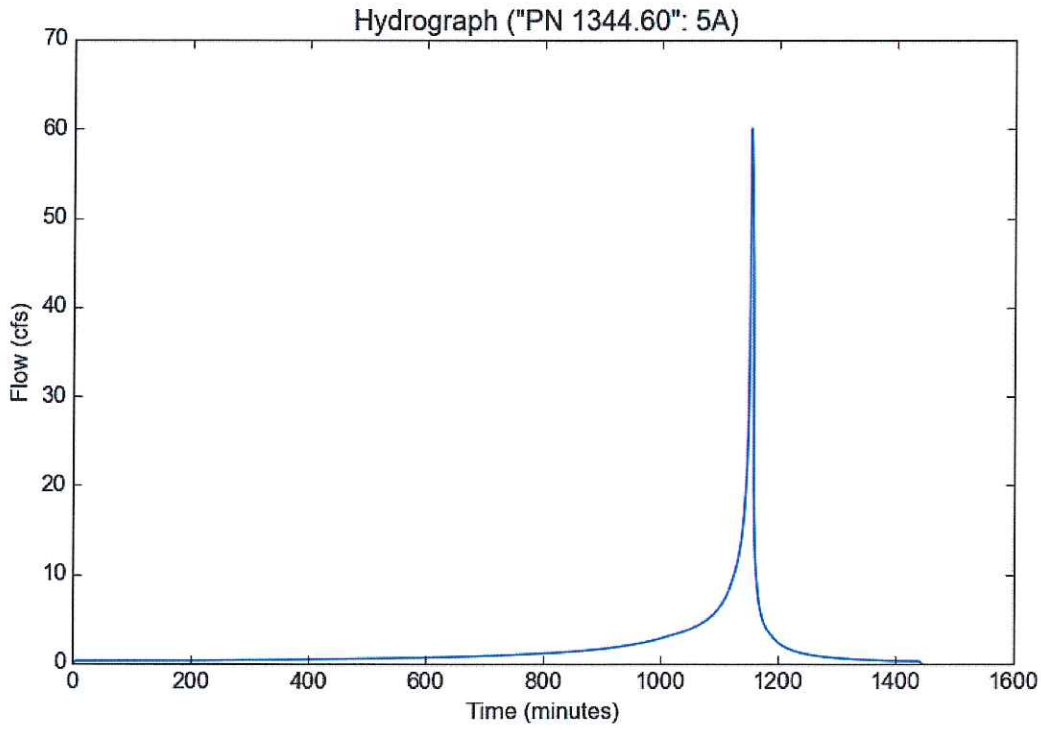
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	5A
Area (ac)	14.5
Flow Path Length (ft)	1505.0
Flow Path Slope (vft/hft)	0.3601
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.6083
Undeveloped Runoff Coefficient (Cu)	0.8991
Developed Runoff Coefficient (Cd)	0.8991
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	60.0785
Burned Peak Flow Rate (cfs)	62.4327
24-Hr Clear Runoff Volume (ac-ft)	3.5574
24-Hr Clear Runoff Volume (cu-ft)	154959.2847



Peak Flow Hydrologic Analysis

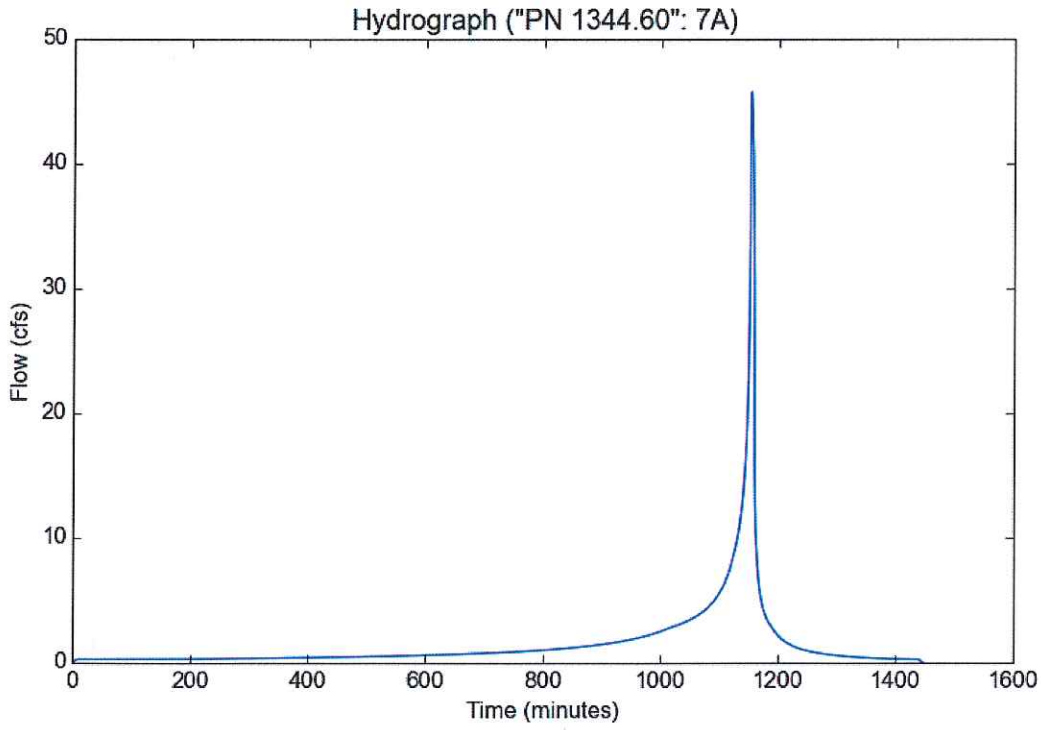
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	7A
Area (ac)	12.9
Flow Path Length (ft)	2054.0
Flow Path Slope (vft/hft)	0.1388
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.0255
Undeveloped Runoff Coefficient (Cu)	0.8809
Developed Runoff Coefficient (Cd)	0.8813
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	45.7634
Burned Peak Flow Rate (cfs)	47.8752
24-Hr Clear Runoff Volume (ac-ft)	3.1619
24-Hr Clear Runoff Volume (cu-ft)	137734.2038



Peak Flow Hydrologic Analysis

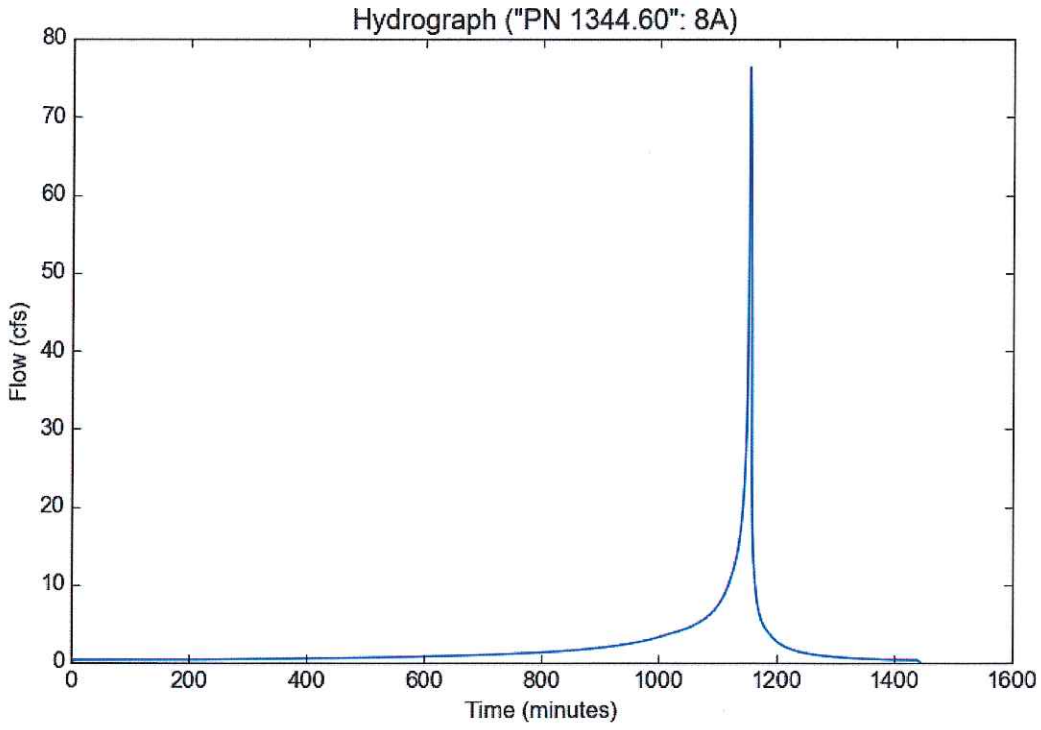
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	8A
Area (ac)	16.7
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.4315
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	76.4223
Burned Peak Flow Rate (cfs)	79.0449
24-Hr Clear Runoff Volume (ac-ft)	4.0996
24-Hr Clear Runoff Volume (cu-ft)	178577.2149



Peak Flow Hydrologic Analysis

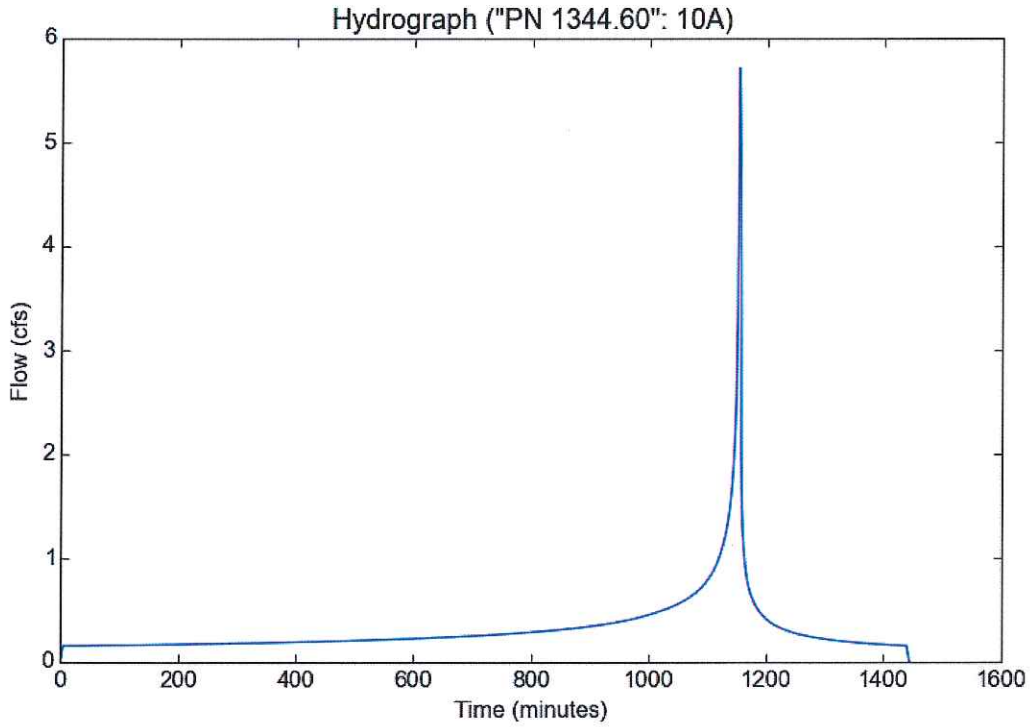
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	10A
Area (ac)	1.26
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.71
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9034
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.7149
Burned Peak Flow Rate (cfs)	5.9308
24-Hr Clear Runoff Volume (ac-ft)	0.6468
24-Hr Clear Runoff Volume (cu-ft)	28174.656



Peak Flow Hydrologic Analysis

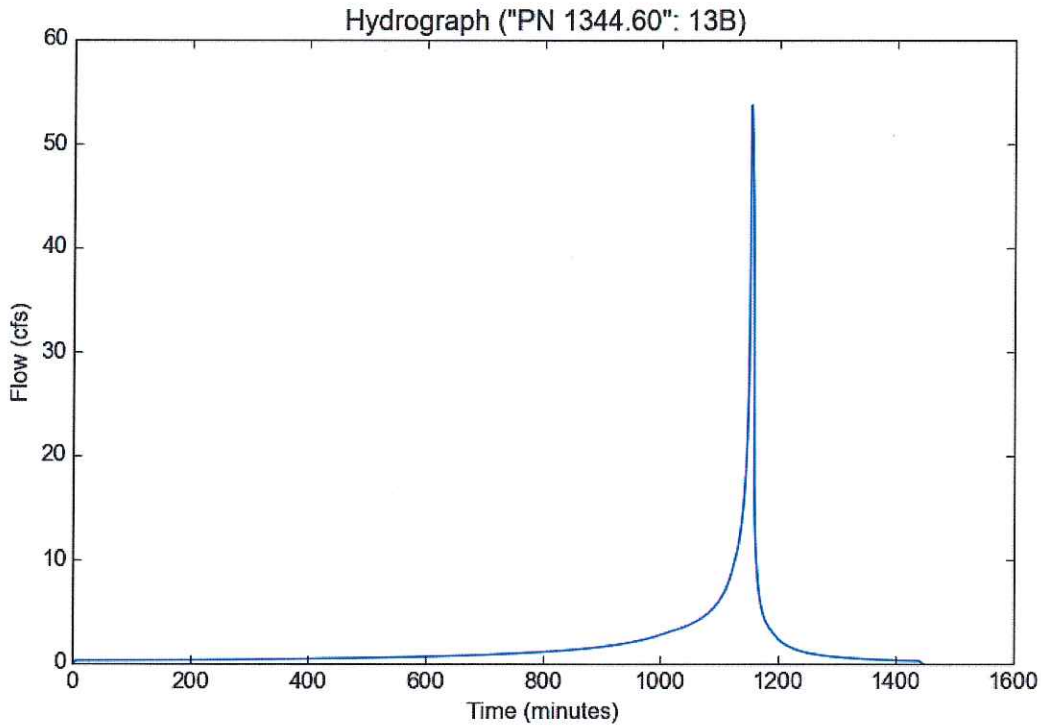
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	13B
Area (ac)	14.1
Flow Path Length (ft)	1899.0
Flow Path Slope (vft/hft)	0.3107
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.2862
Undeveloped Runoff Coefficient (Cu)	0.889
Developed Runoff Coefficient (Cd)	0.8892
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	53.7426
Burned Peak Flow Rate (cfs)	56.0559
24-Hr Clear Runoff Volume (ac-ft)	3.4576
24-Hr Clear Runoff Volume (cu-ft)	150612.3914



Peak Flow Hydrologic Analysis

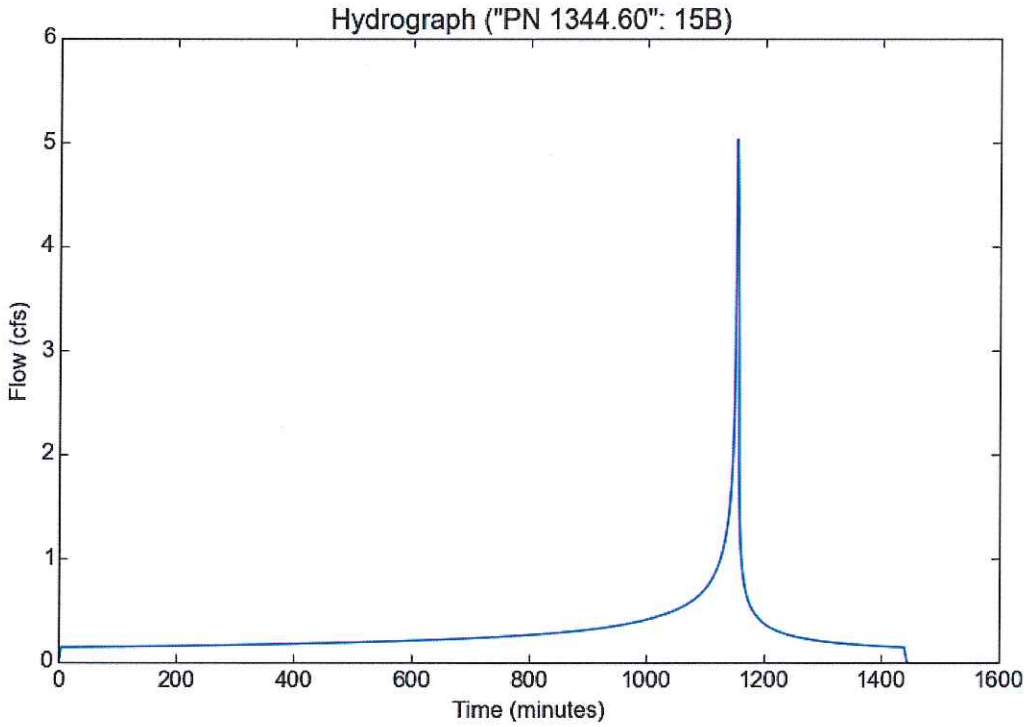
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	15B
Area (ac)	1.11
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0119
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.75
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9029
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.0319
Burned Peak Flow Rate (cfs)	5.2231
24-Hr Clear Runoff Volume (ac-ft)	0.587
24-Hr Clear Runoff Volume (cu-ft)	25571.3145



Peak Flow Hydrologic Analysis

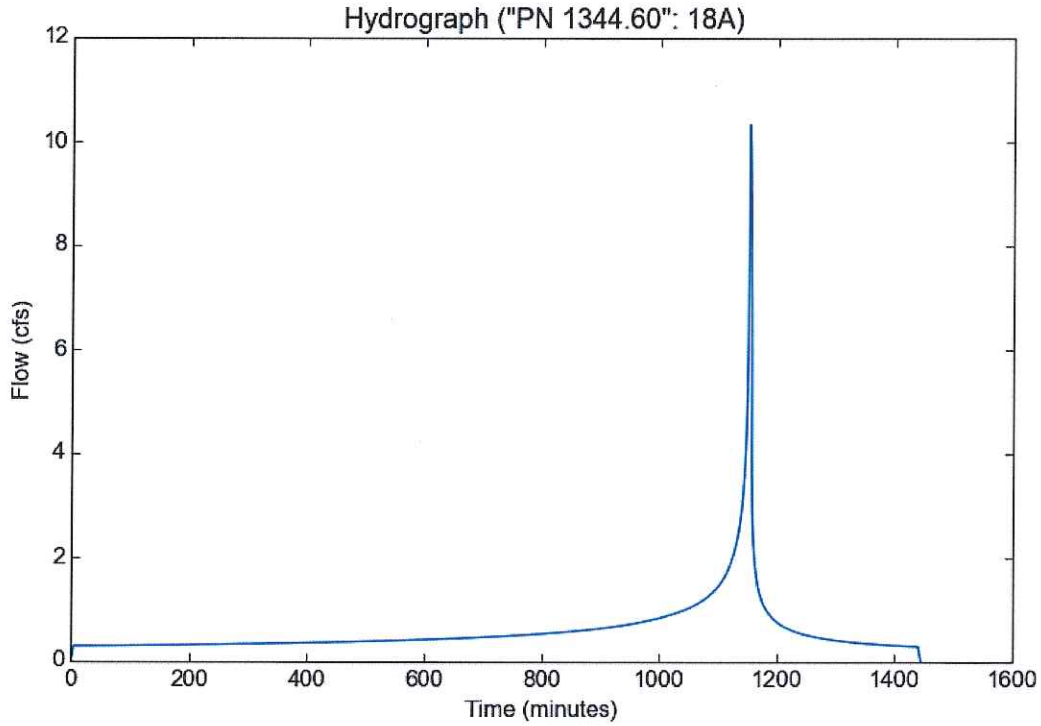
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	18A
Area (ac)	2.28
Flow Path Length (ft)	536.0
Flow Path Slope (vft/hft)	0.0308
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.74
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.903
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.3372
Burned Peak Flow Rate (cfs)	10.7293
24-Hr Clear Runoff Volume (ac-ft)	1.197
24-Hr Clear Runoff Volume (cu-ft)	52139.3243



Peak Flow Hydrologic Analysis

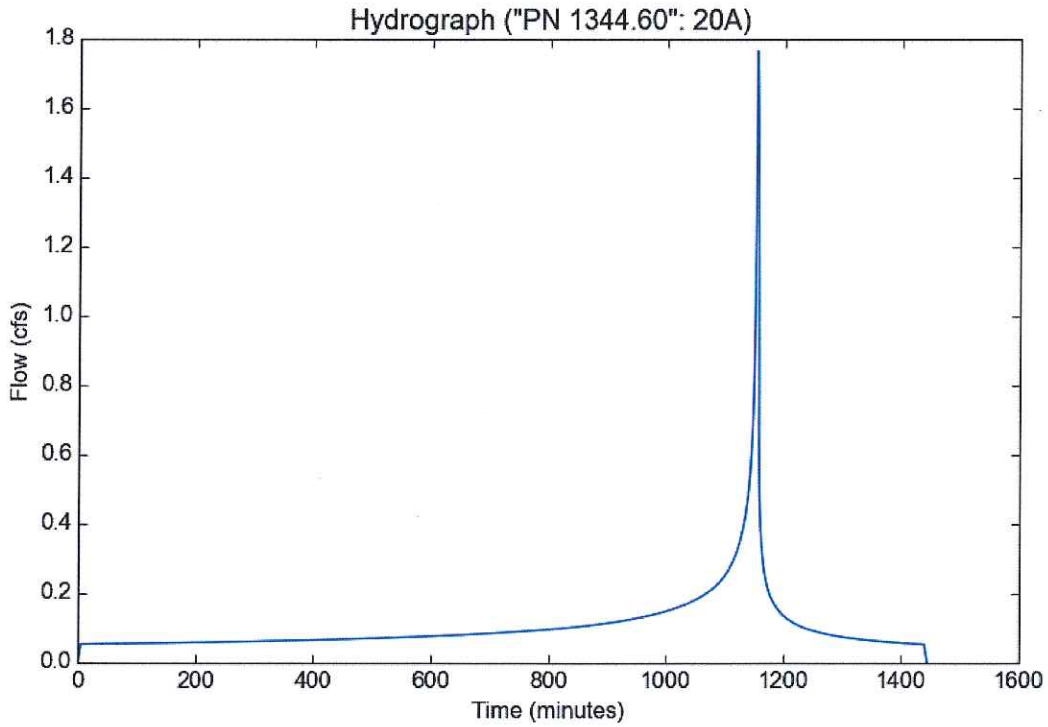
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	20A
Area (ac)	0.39
Flow Path Length (ft)	232.0
Flow Path Slope (vft/hft)	0.0582
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.8
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9023
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7668
Burned Peak Flow Rate (cfs)	1.8344
24-Hr Clear Runoff Volume (ac-ft)	0.2138
24-Hr Clear Runoff Volume (cu-ft)	9314.2522



Peak Flow Hydrologic Analysis

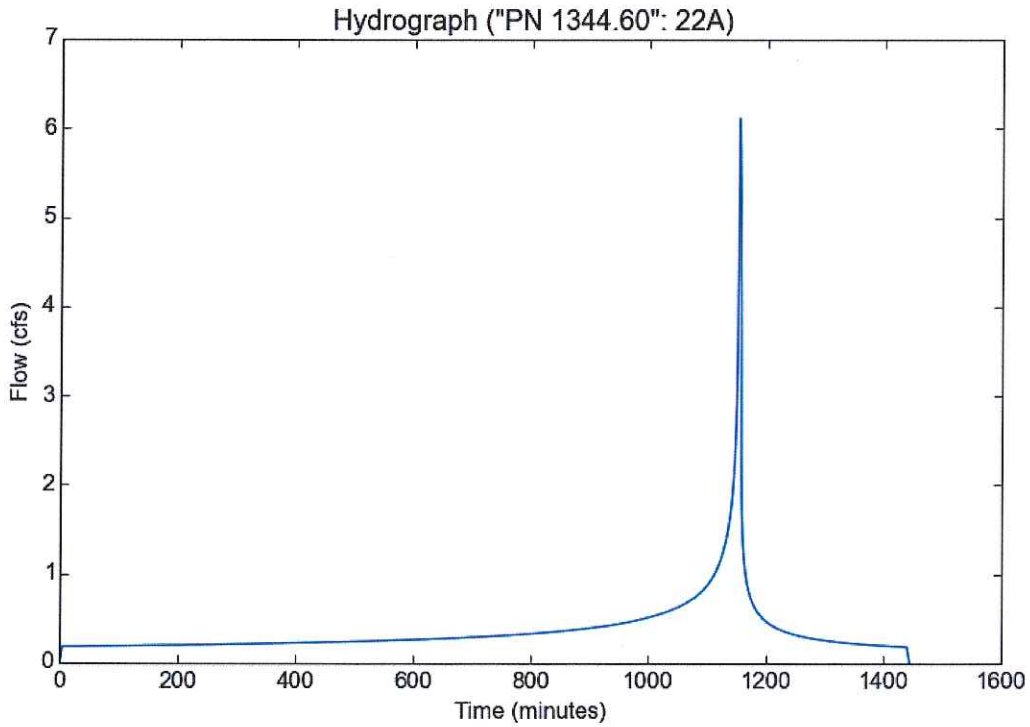
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	22A
Area (ac)	1.35
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.0083
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9025
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.1167
Burned Peak Flow Rate (cfs)	6.3503
24-Hr Clear Runoff Volume (ac-ft)	0.7349
24-Hr Clear Runoff Volume (cu-ft)	32013.3632



Peak Flow Hydrologic Analysis

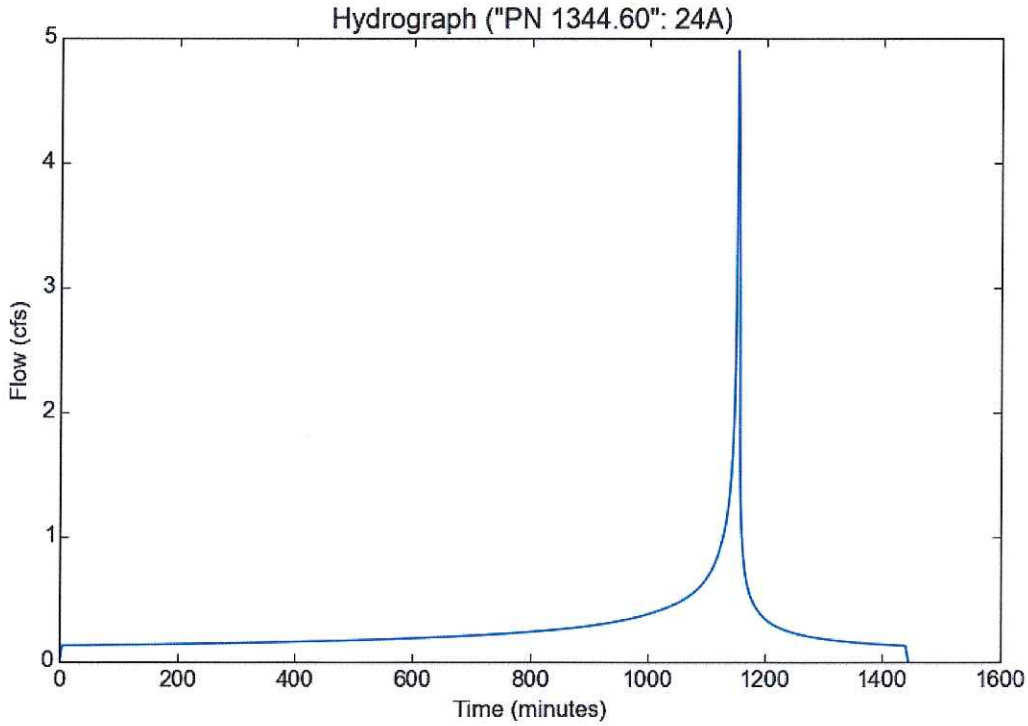
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	24A
Area (ac)	1.08
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.023
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.68
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9037
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.9004
Burned Peak Flow Rate (cfs)	5.0848
24-Hr Clear Runoff Volume (ac-ft)	0.5418
24-Hr Clear Runoff Volume (cu-ft)	23601.8356



Peak Flow Hydrologic Analysis

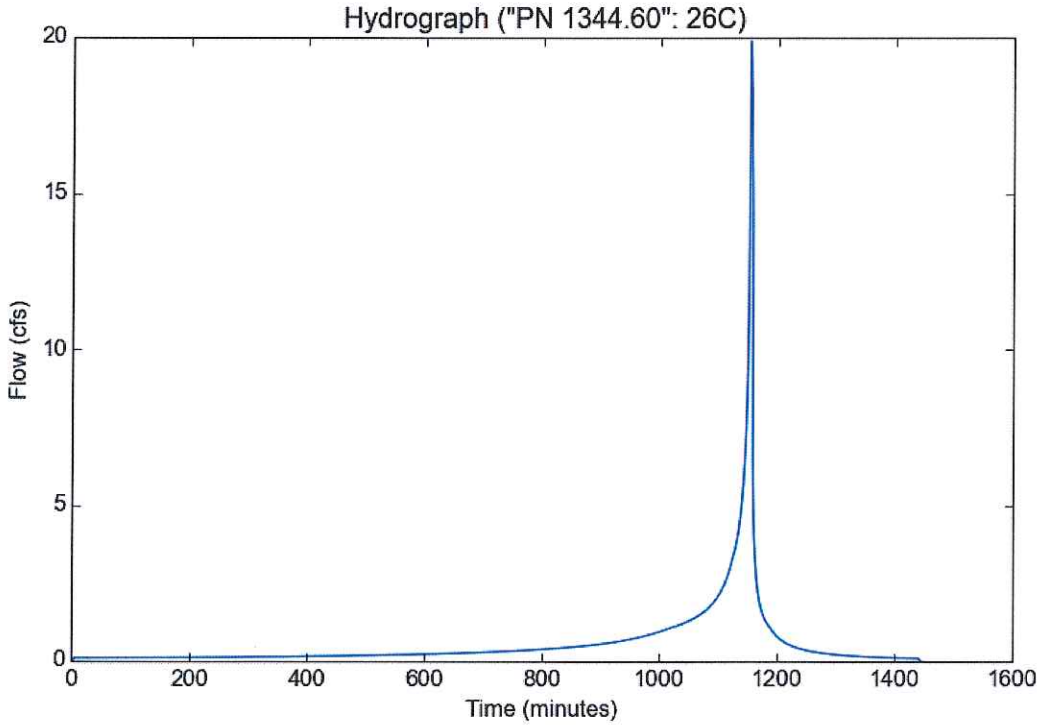
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	26C
Area (ac)	4.8
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.1703
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.6083
Undeveloped Runoff Coefficient (Cu)	0.8991
Developed Runoff Coefficient (Cd)	0.8991
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	19.8881
Burned Peak Flow Rate (cfs)	20.6674
24-Hr Clear Runoff Volume (ac-ft)	1.1776
24-Hr Clear Runoff Volume (cu-ft)	51296.8667



Peak Flow Hydrologic Analysis

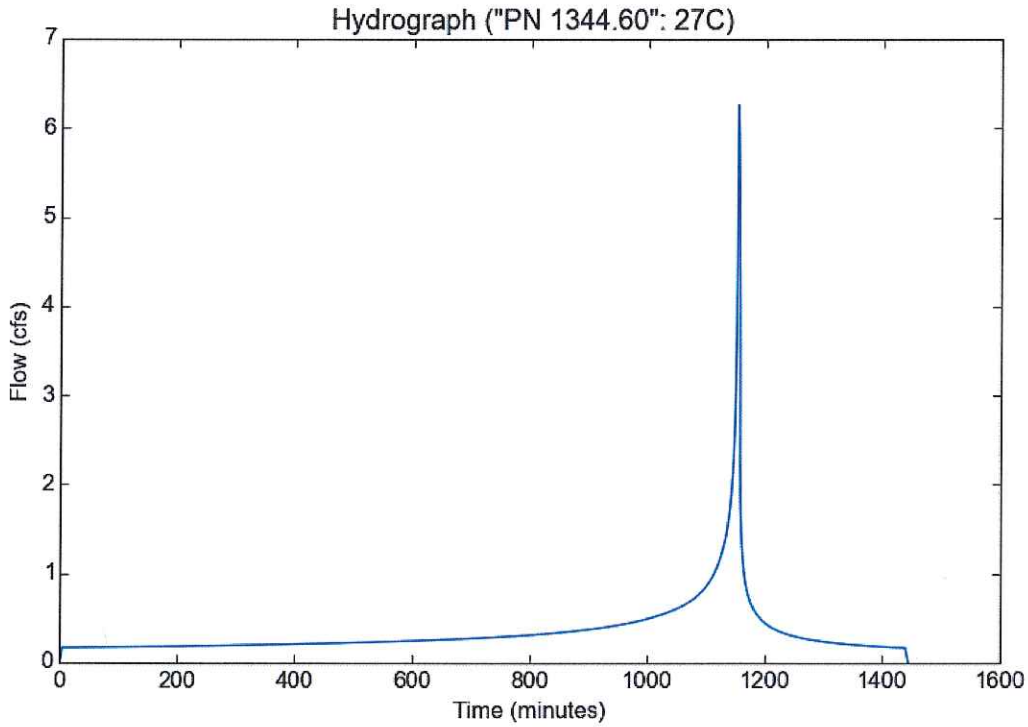
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	27C
Area (ac)	1.38
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.0184
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9035
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.26
Burned Peak Flow Rate (cfs)	6.4962
24-Hr Clear Runoff Volume (ac-ft)	0.703
24-Hr Clear Runoff Volume (cu-ft)	30624.6048



Peak Flow Hydrologic Analysis

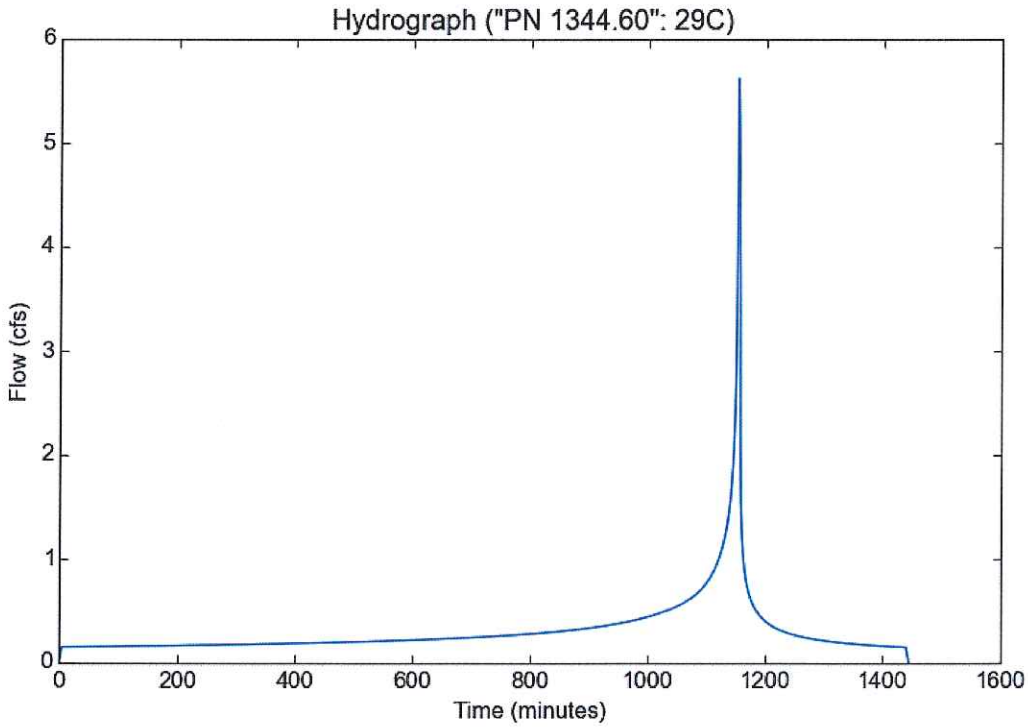
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	29C
Area (ac)	1.24
Flow Path Length (ft)	326.0
Flow Path Slope (vft/hft)	0.0276
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9035
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.6249
Burned Peak Flow Rate (cfs)	5.8371
24-Hr Clear Runoff Volume (ac-ft)	0.6317
24-Hr Clear Runoff Volume (cu-ft)	27517.7608



Peak Flow Hydrologic Analysis

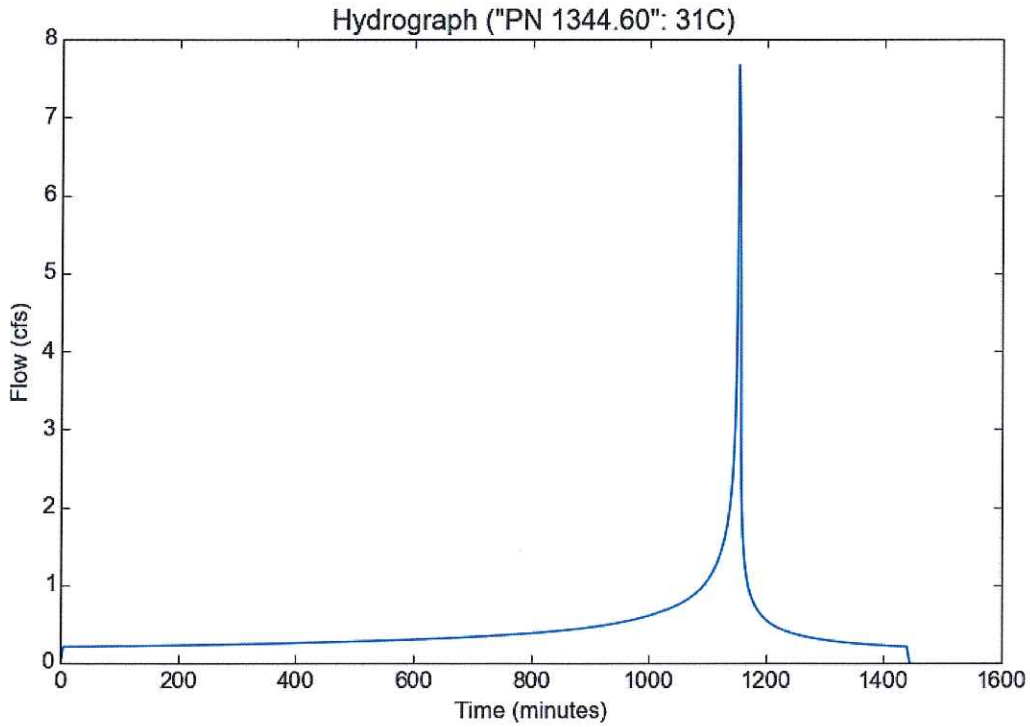
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	31C
Area (ac)	1.69
Flow Path Length (ft)	414.0
Flow Path Slope (vft/hft)	0.0217
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9035
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.6662
Burned Peak Flow Rate (cfs)	7.9555
24-Hr Clear Runoff Volume (ac-ft)	0.861
24-Hr Clear Runoff Volume (cu-ft)	37504.045



Peak Flow Hydrologic Analysis

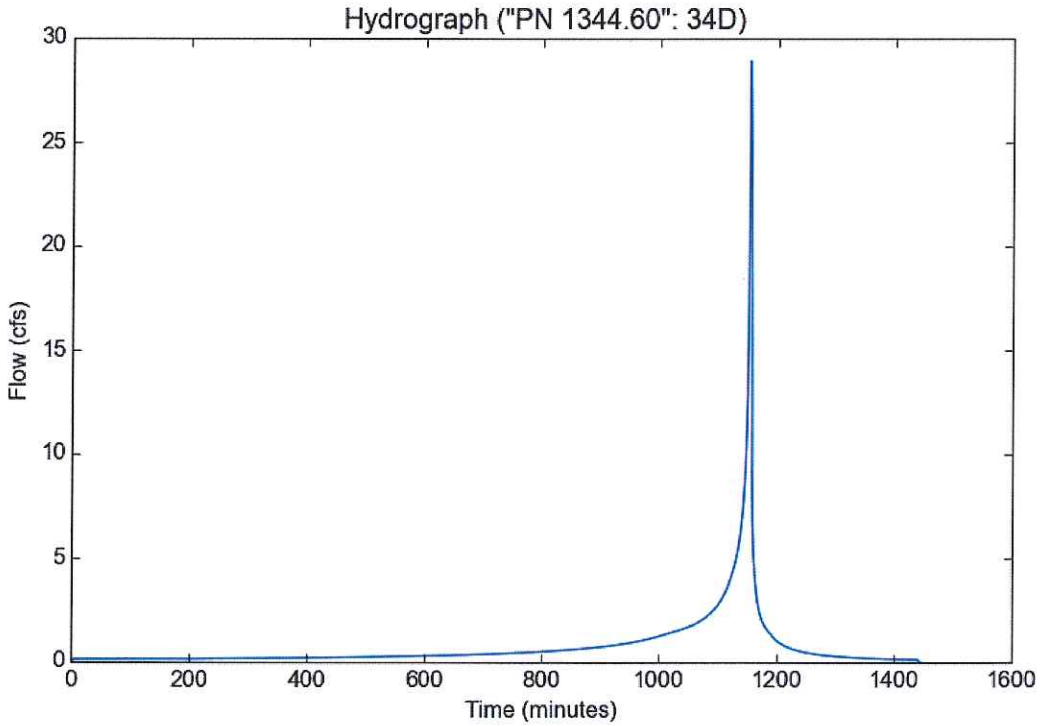
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	34D
Area (ac)	6.32
Flow Path Length (ft)	1212.0
Flow Path Slope (vft/hft)	0.2145
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	28.9215
Burned Peak Flow Rate (cfs)	29.914
24-Hr Clear Runoff Volume (ac-ft)	1.5515
24-Hr Clear Runoff Volume (cu-ft)	67581.3173



Peak Flow Hydrologic Analysis

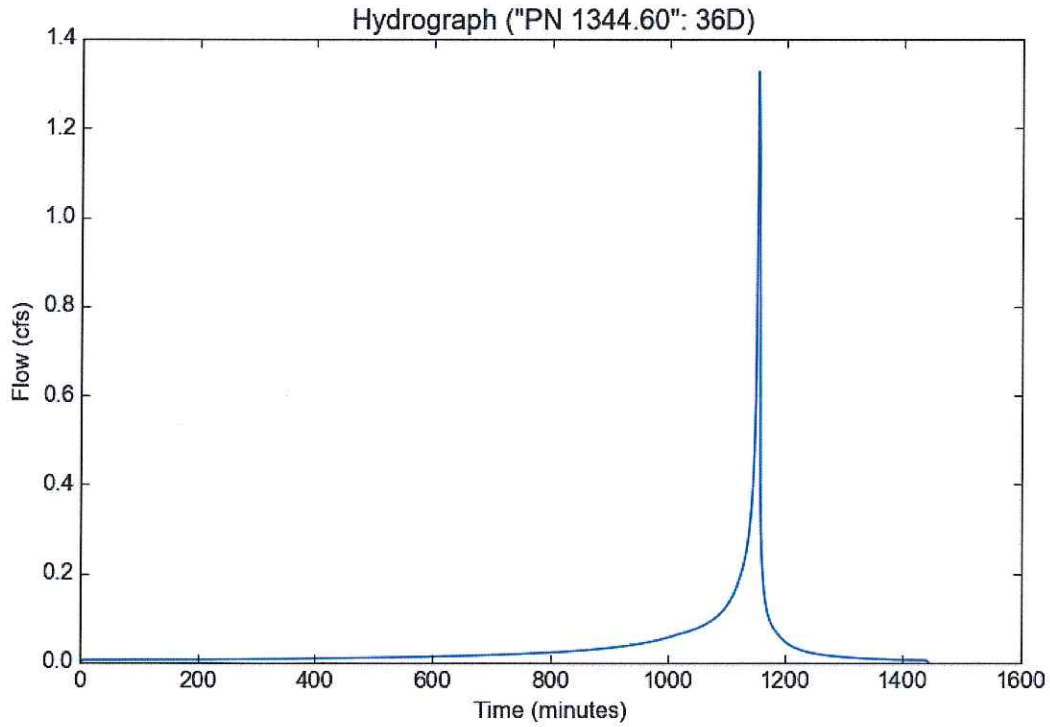
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	36D
Area (ac)	0.29
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1786
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.3271
Burned Peak Flow Rate (cfs)	1.3726
24-Hr Clear Runoff Volume (ac-ft)	0.0712
24-Hr Clear Runoff Volume (cu-ft)	3101.0415



Peak Flow Hydrologic Analysis

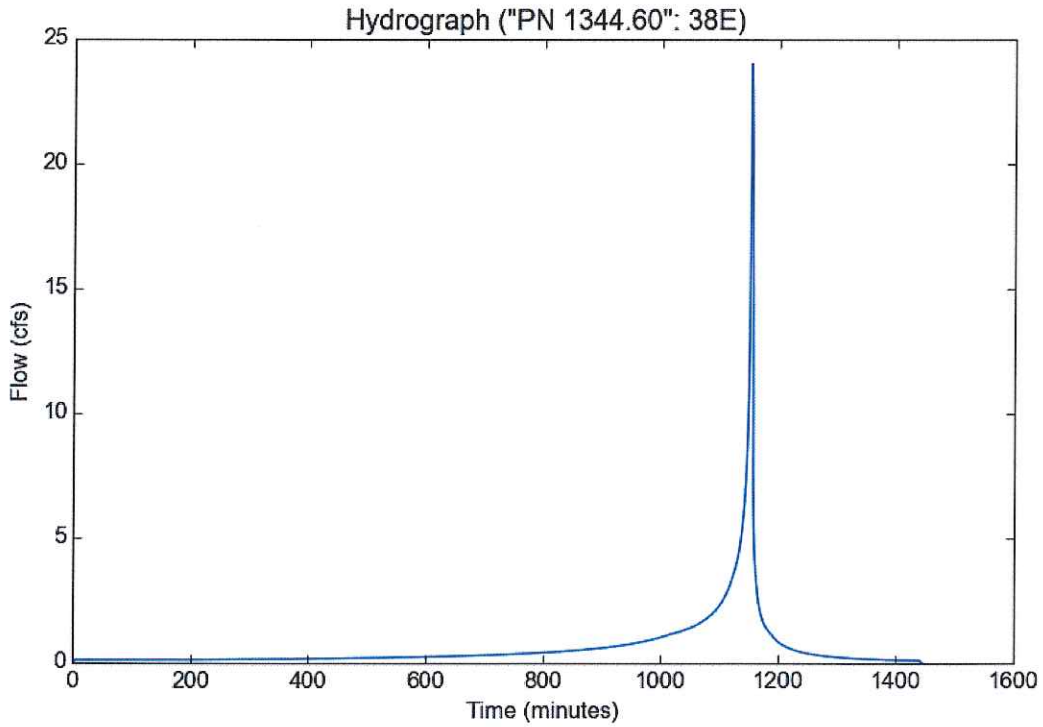
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	38E
Area (ac)	5.25
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.3953
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	24.025
Burned Peak Flow Rate (cfs)	24.8495
24-Hr Clear Runoff Volume (ac-ft)	1.2888
24-Hr Clear Runoff Volume (cu-ft)	56139.5436



Peak Flow Hydrologic Analysis

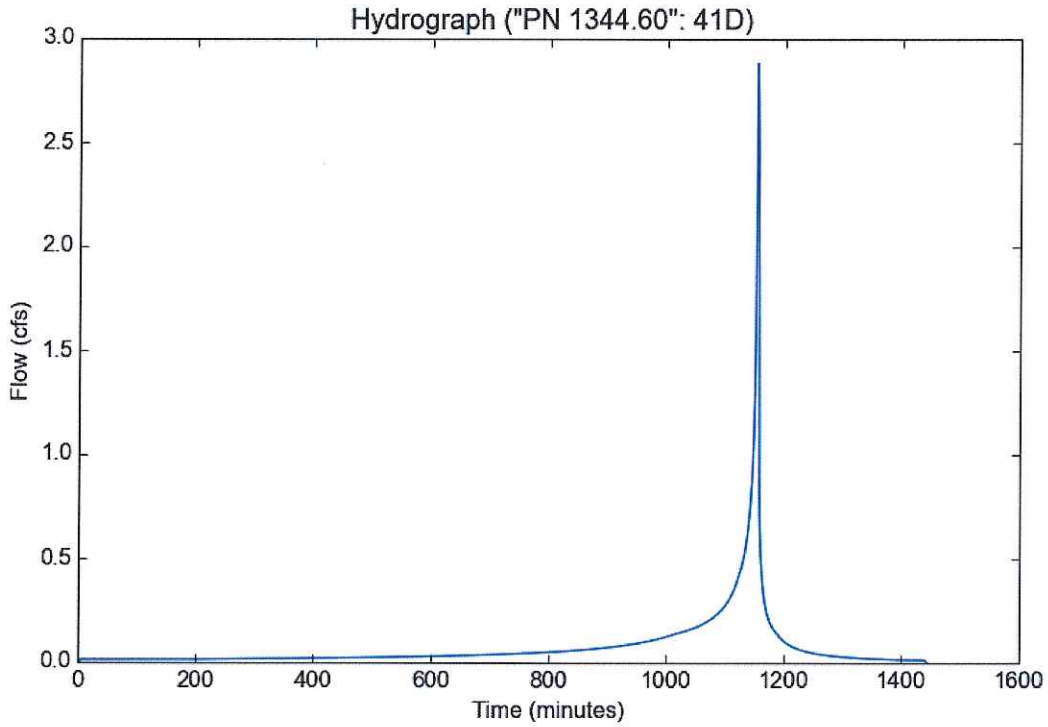
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	41D
Area (ac)	0.63
Flow Path Length (ft)	372.0
Flow Path Slope (vft/hft)	0.5726
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.883
Burned Peak Flow Rate (cfs)	2.9819
24-Hr Clear Runoff Volume (ac-ft)	0.1547
24-Hr Clear Runoff Volume (cu-ft)	6736.7452



Peak Flow Hydrologic Analysis

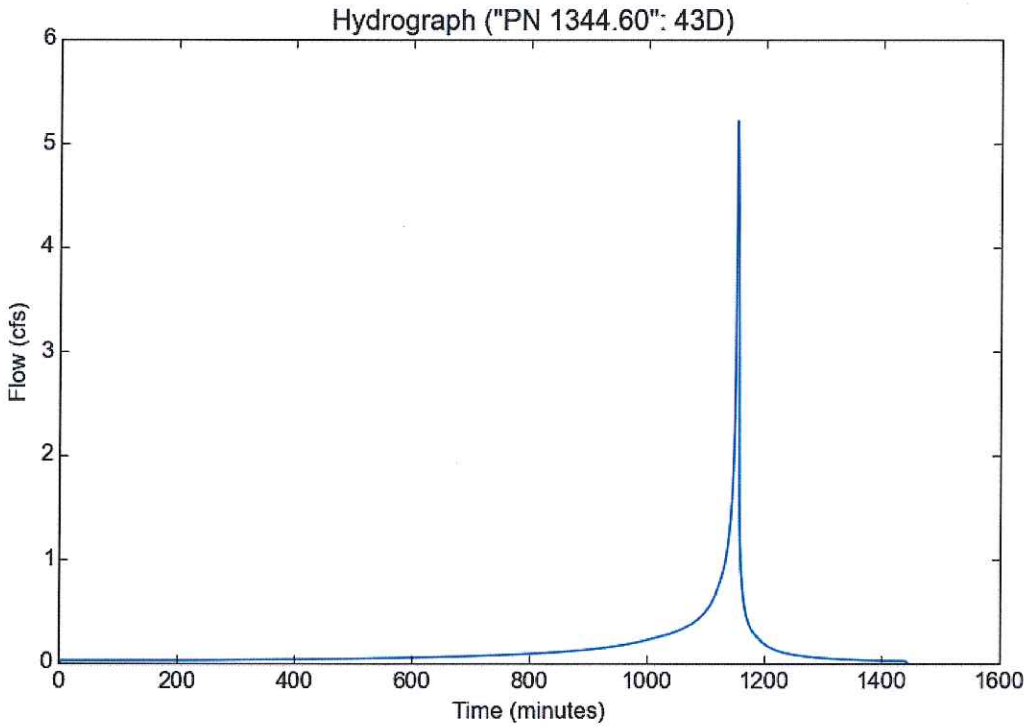
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	43D
Area (ac)	1.14
Flow Path Length (ft)	433.0
Flow Path Slope (vft/hft)	0.4965
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.2168
Burned Peak Flow Rate (cfs)	5.3959
24-Hr Clear Runoff Volume (ac-ft)	0.2799
24-Hr Clear Runoff Volume (cu-ft)	12190.3009



Peak Flow Hydrologic Analysis

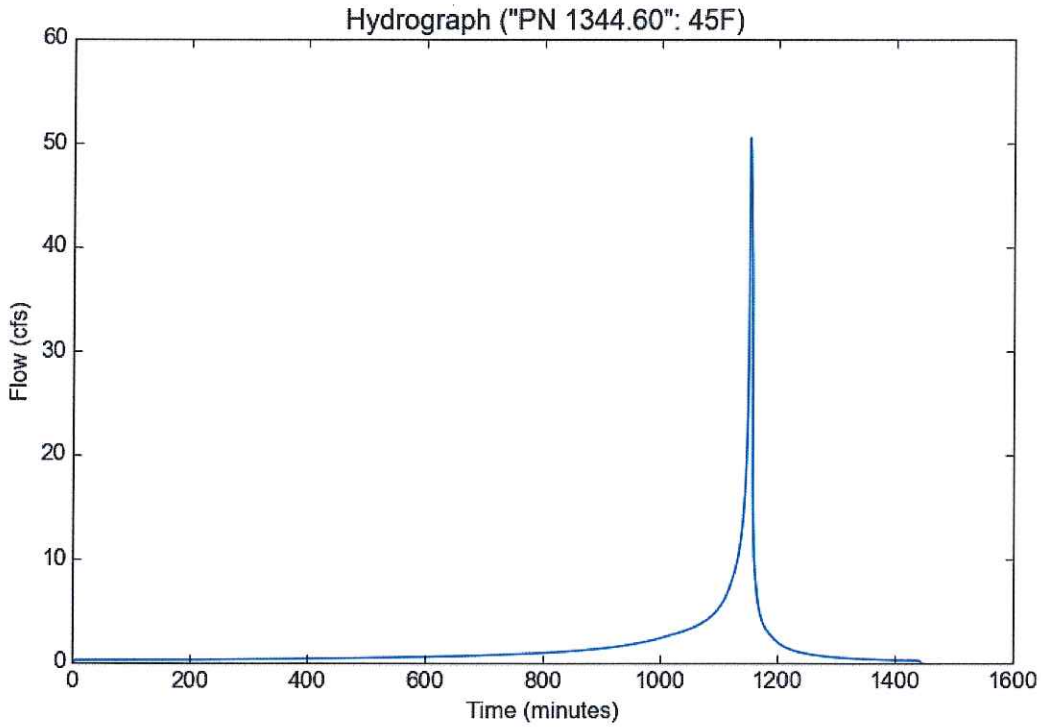
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	45F
Area (ac)	12.2
Flow Path Length (ft)	1323.0
Flow Path Slope (vft/hft)	0.2494
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.6083
Undeveloped Runoff Coefficient (Cu)	0.8991
Developed Runoff Coefficient (Cd)	0.8991
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	50.5488
Burned Peak Flow Rate (cfs)	52.5296
24-Hr Clear Runoff Volume (ac-ft)	2.9931
24-Hr Clear Runoff Volume (cu-ft)	130379.5361



Peak Flow Hydrologic Analysis

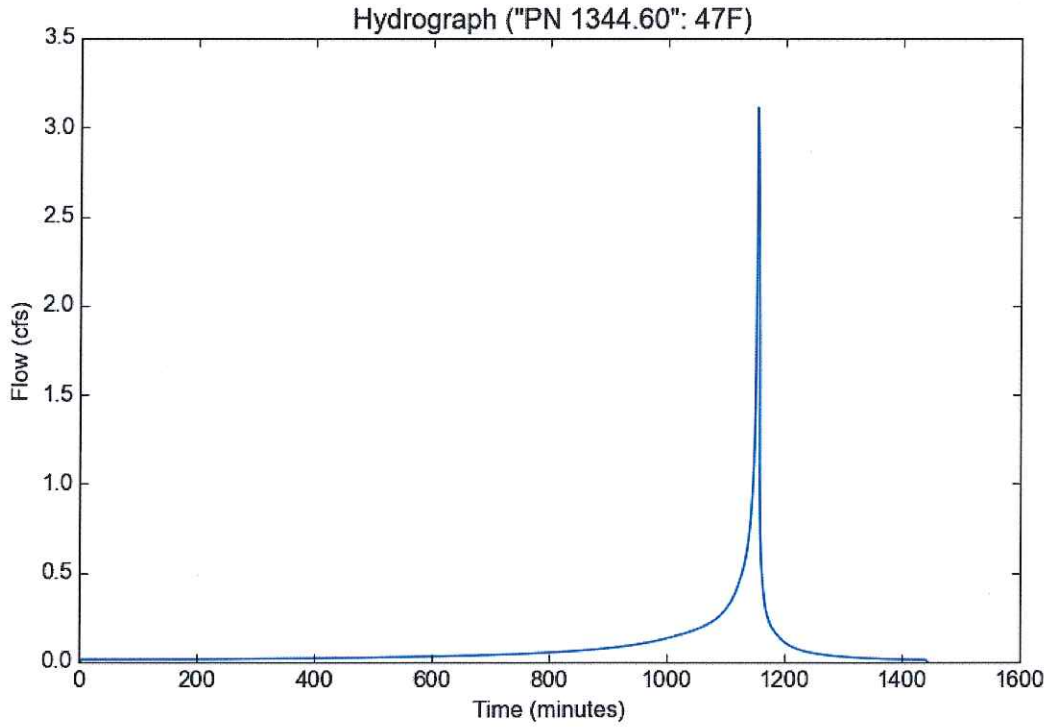
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	47F
Area (ac)	0.68
Flow Path Length (ft)	340.0
Flow Path Slope (vft/hft)	0.6471
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.1118
Burned Peak Flow Rate (cfs)	3.2186
24-Hr Clear Runoff Volume (ac-ft)	0.1669
24-Hr Clear Runoff Volume (cu-ft)	7271.4076



Peak Flow Hydrologic Analysis

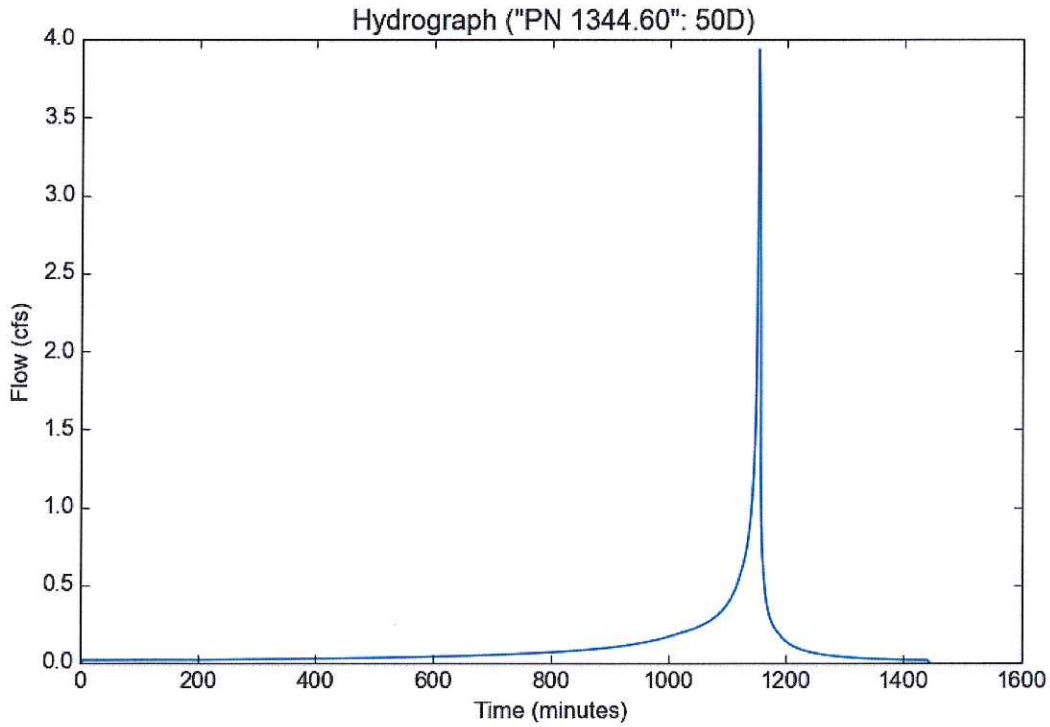
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	50D
Area (ac)	0.86
Flow Path Length (ft)	246.0
Flow Path Slope (vft/hft)	0.0488
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9355
Burned Peak Flow Rate (cfs)	4.0706
24-Hr Clear Runoff Volume (ac-ft)	0.2111
24-Hr Clear Runoff Volume (cu-ft)	9196.1919



Peak Flow Hydrologic Analysis

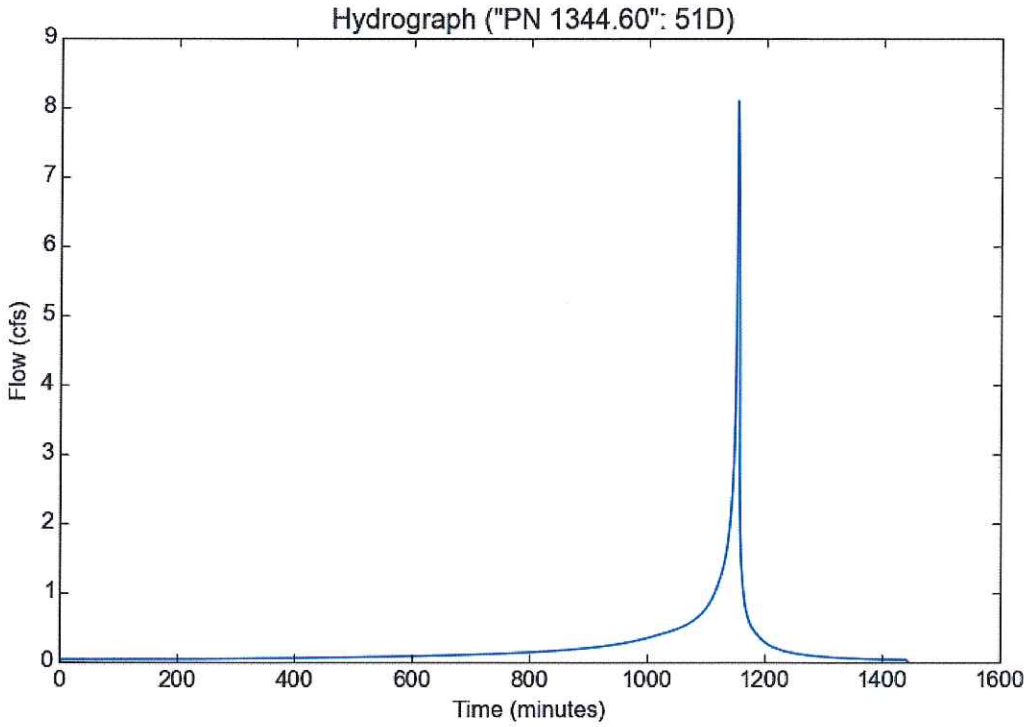
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	51D
Area (ac)	1.77
Flow Path Length (ft)	675.0
Flow Path Slope (vft/hft)	0.4296
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.0998
Burned Peak Flow Rate (cfs)	8.3778
24-Hr Clear Runoff Volume (ac-ft)	0.4345
24-Hr Clear Runoff Volume (cu-ft)	18927.0461



Peak Flow Hydrologic Analysis

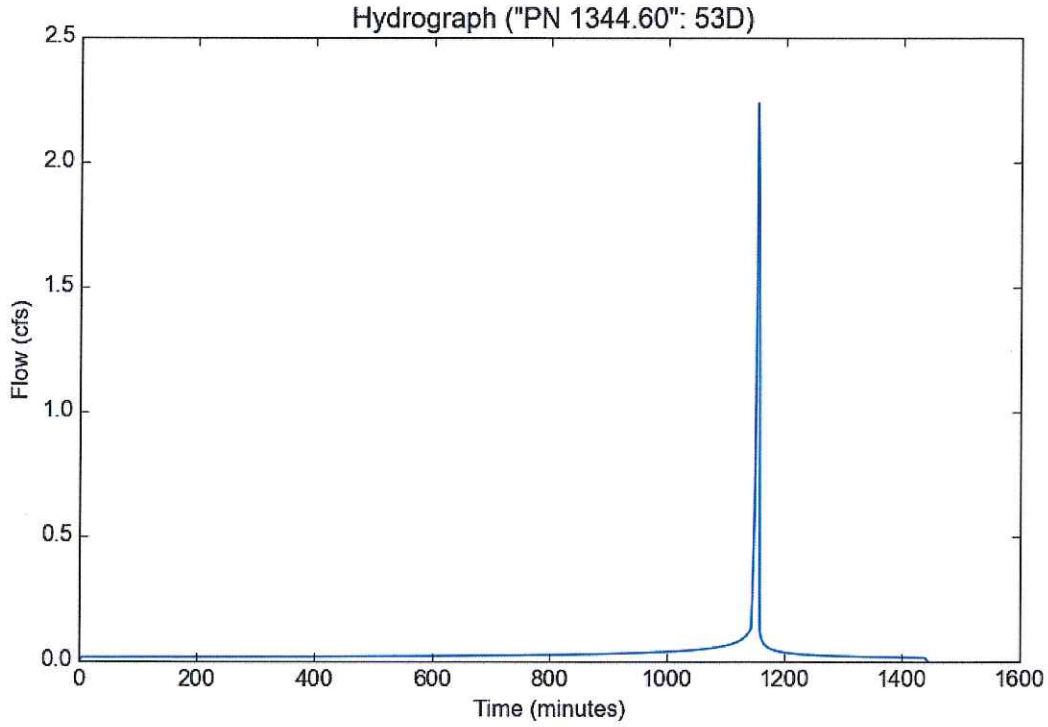
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	53D
Area (ac)	0.7
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.0583
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.6369
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2384
Burned Peak Flow Rate (cfs)	2.6893
24-Hr Clear Runoff Volume (ac-ft)	0.0724
24-Hr Clear Runoff Volume (cu-ft)	3152.7082



Peak Flow Hydrologic Analysis

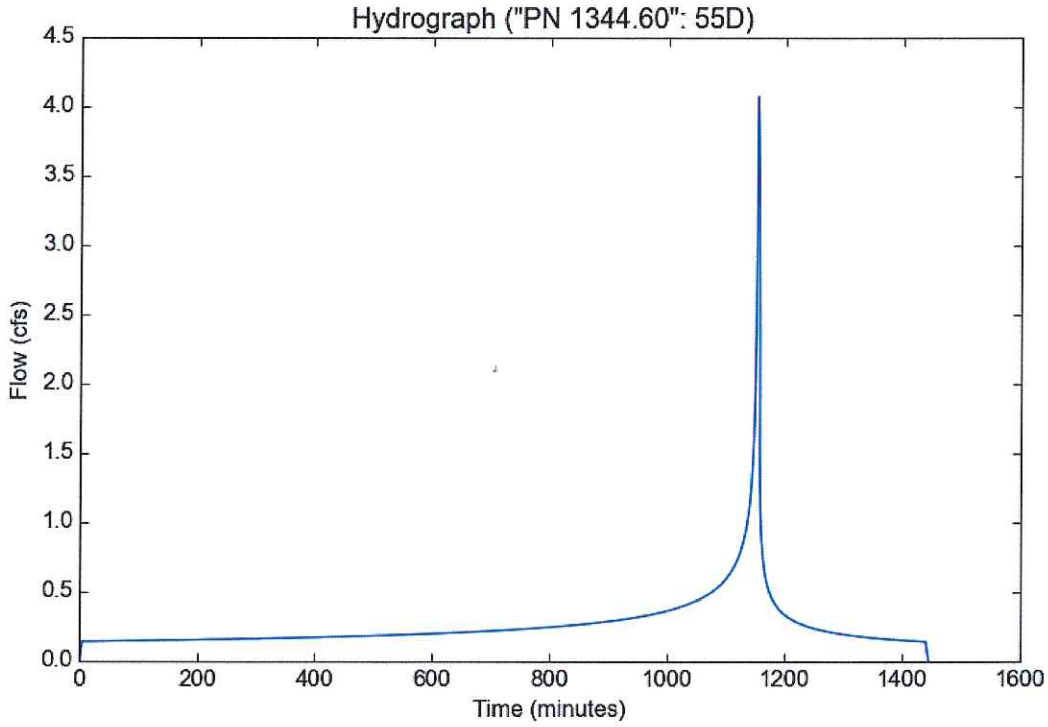
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	55D
Area (ac)	0.93
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.0105
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.9
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.8732
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0769
Burned Peak Flow Rate (cfs)	4.2862
24-Hr Clear Runoff Volume (ac-ft)	0.5325
24-Hr Clear Runoff Volume (cu-ft)	23196.1382



Peak Flow Hydrologic Analysis

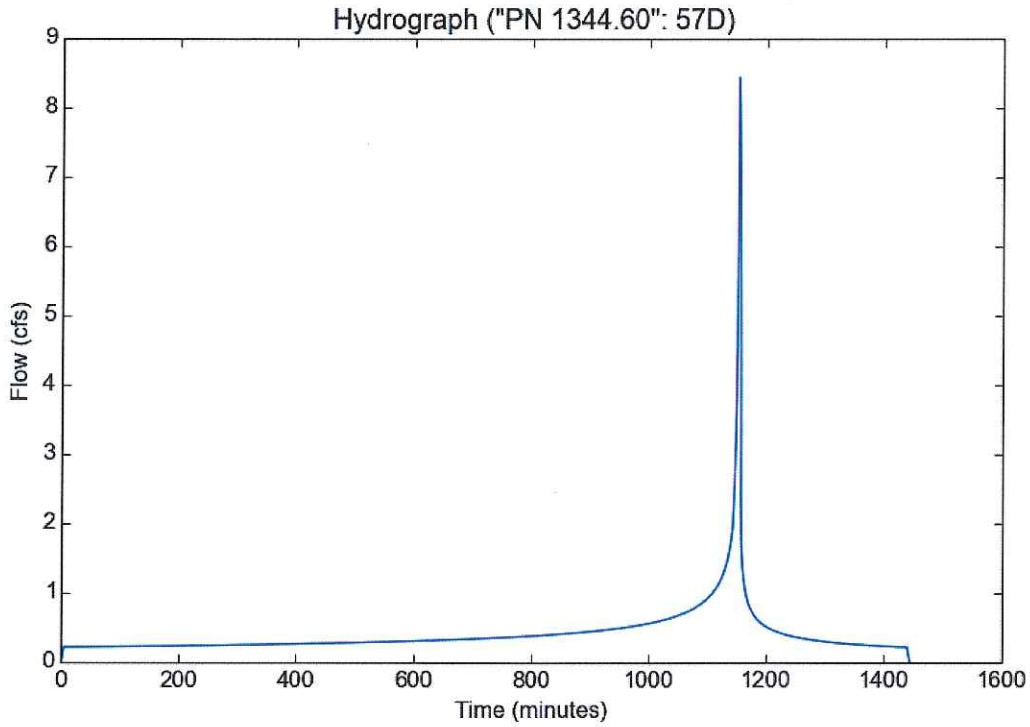
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	57D
Area (ac)	2.15
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.1615
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.56
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.7819
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.4399
Burned Peak Flow Rate (cfs)	9.2718
24-Hr Clear Runoff Volume (ac-ft)	0.8413
24-Hr Clear Runoff Volume (cu-ft)	36647.827



Peak Flow Hydrologic Analysis

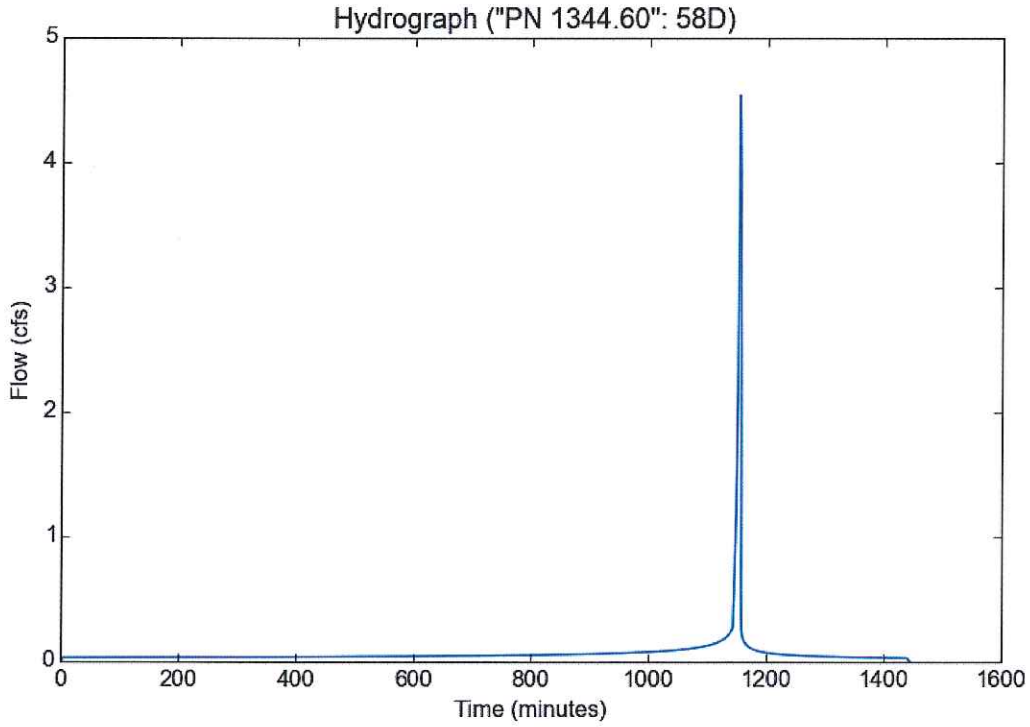
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	58D
Area (ac)	1.42
Flow Path Length (ft)	737.0
Flow Path Slope (vft/hft)	0.441
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.6369
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.5407
Burned Peak Flow Rate (cfs)	5.4554
24-Hr Clear Runoff Volume (ac-ft)	0.1468
24-Hr Clear Runoff Volume (cu-ft)	6395.4938



Peak Flow Hydrologic Analysis

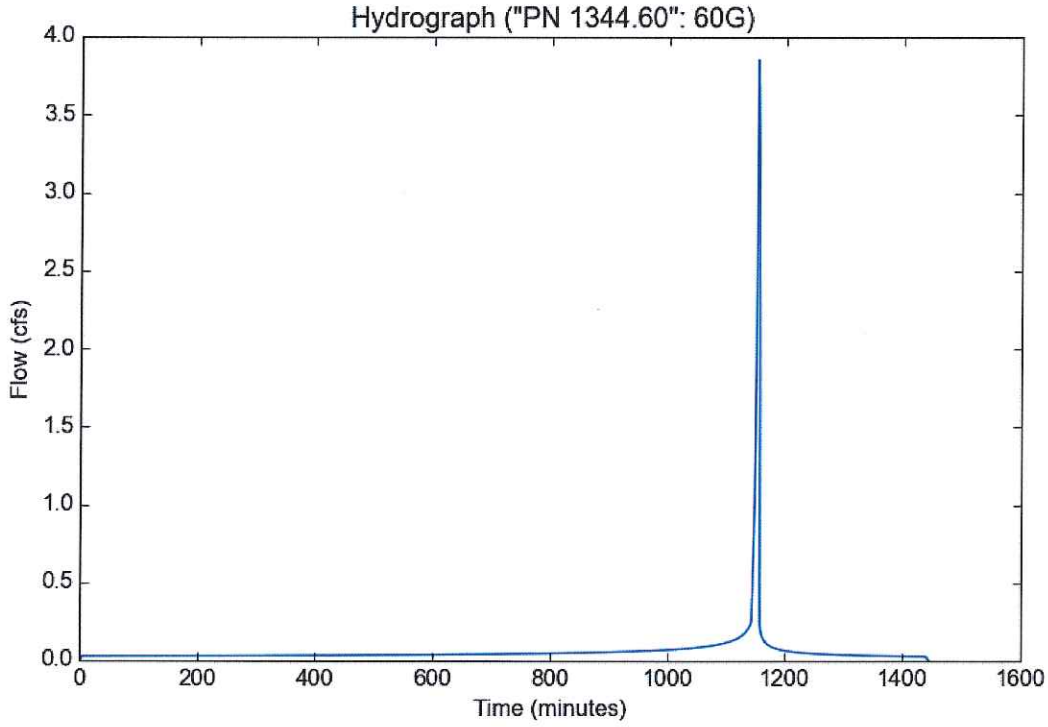
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	60G
Area (ac)	1.2
Flow Path Length (ft)	753.0
Flow Path Slope (vft/hft)	0.2377
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.03
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.6396
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.8534
Burned Peak Flow Rate (cfs)	4.6207
24-Hr Clear Runoff Volume (ac-ft)	0.1305
24-Hr Clear Runoff Volume (cu-ft)	5683.3456



Peak Flow Hydrologic Analysis

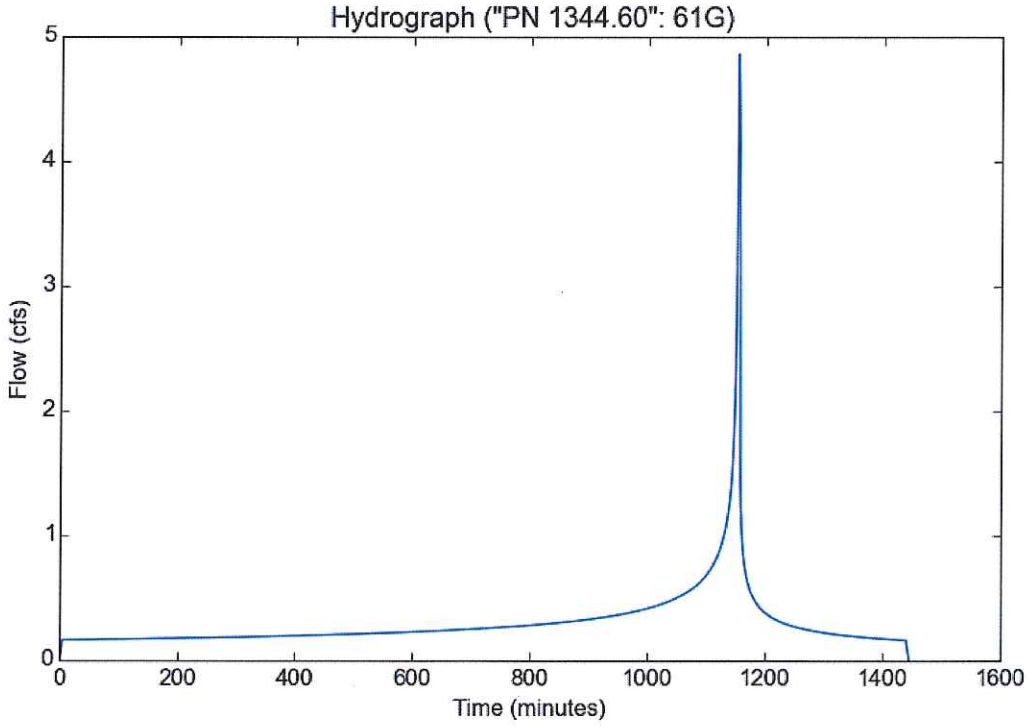
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	61G
Area (ac)	1.13
Flow Path Length (ft)	415.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.84
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.6315
Developed Runoff Coefficient (Cd)	0.857
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.8623
Burned Peak Flow Rate (cfs)	5.1489
24-Hr Clear Runoff Volume (ac-ft)	0.6109
24-Hr Clear Runoff Volume (cu-ft)	26609.8834



Peak Flow Hydrologic Analysis

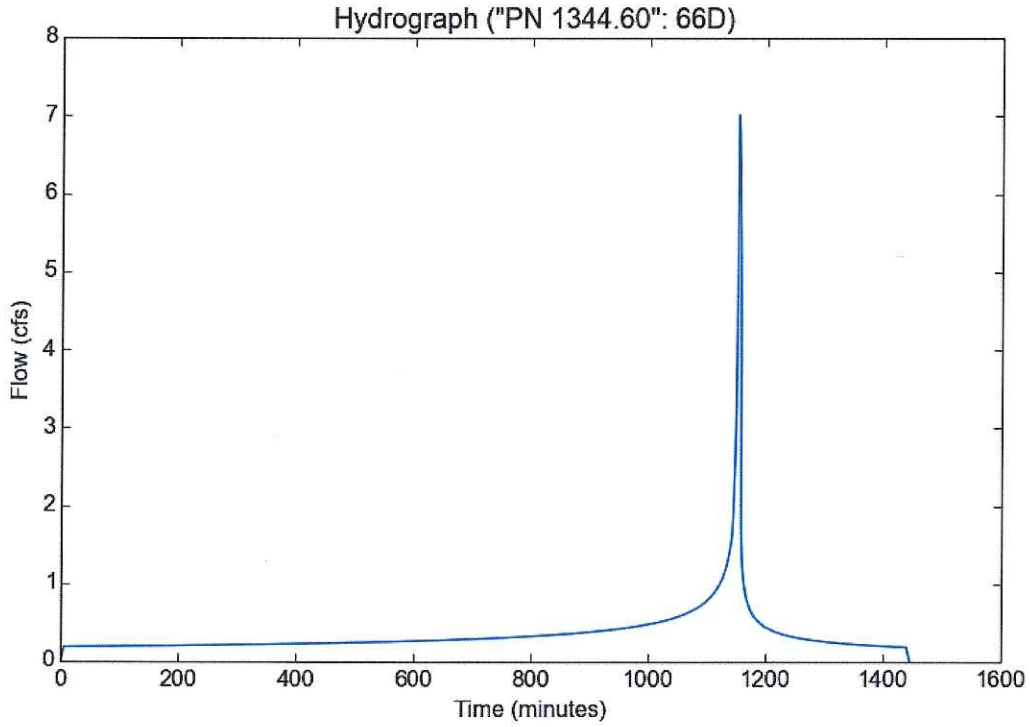
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	66D
Area (ac)	2.01
Flow Path Length (ft)	815.0
Flow Path Slope (vft/hft)	0.0736
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.5
Soil Type	35
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	4.6083
Undeveloped Runoff Coefficient (Cu)	0.6145
Developed Runoff Coefficient (Cd)	0.7572
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	7.014
Burned Peak Flow Rate (cfs)	7.7992
24-Hr Clear Runoff Volume (ac-ft)	0.7223
24-Hr Clear Runoff Volume (cu-ft)	31461.2794



Peak Flow Hydrologic Analysis

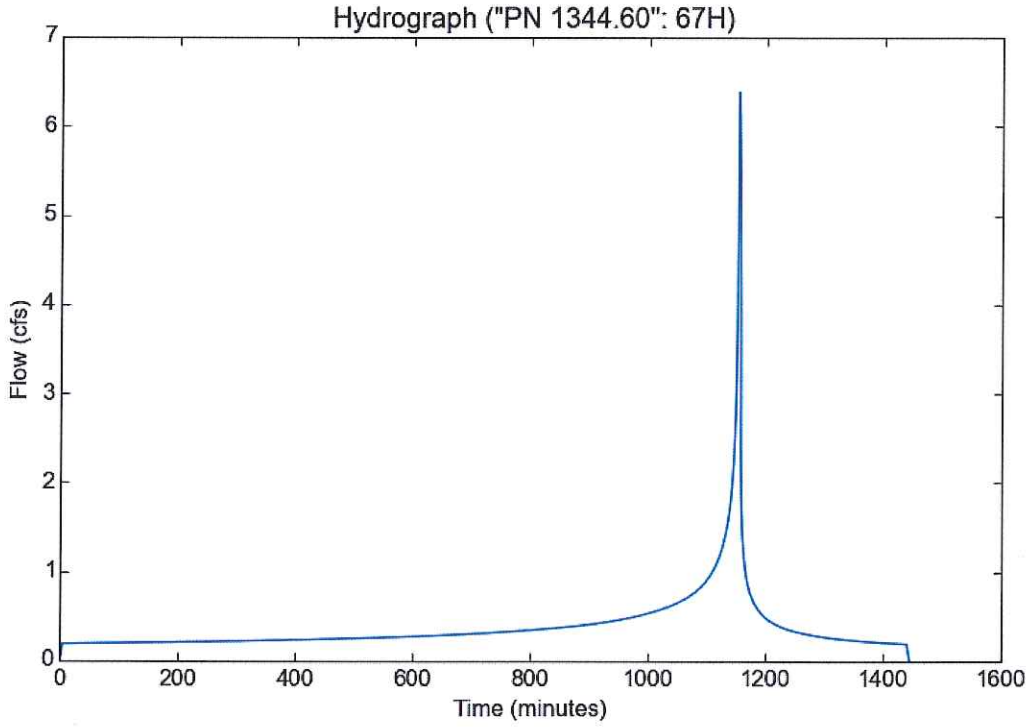
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	67H
Area (ac)	1.41
Flow Path Length (ft)	602.0
Flow Path Slope (vft/hft)	0.0831
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9025
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.3886
Burned Peak Flow Rate (cfs)	6.6326
24-Hr Clear Runoff Volume (ac-ft)	0.7676
24-Hr Clear Runoff Volume (cu-ft)	33436.1793



Peak Flow Hydrologic Analysis

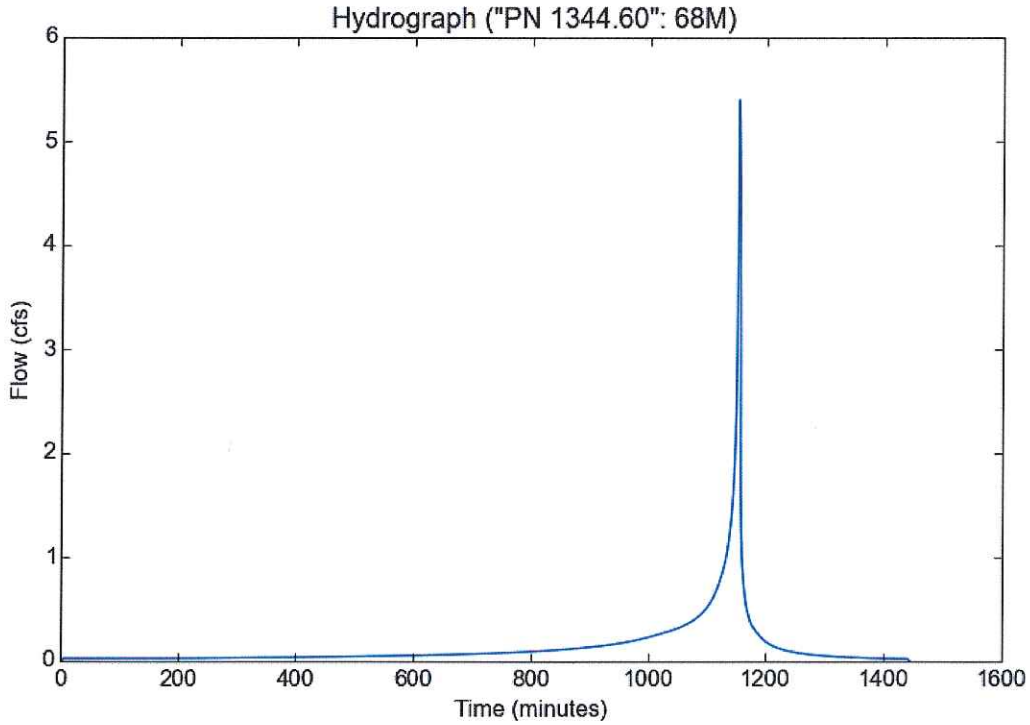
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 100 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	68M
Area (ac)	1.18
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.0314
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	100-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (100-yr) Rainfall Depth (in)	8.415
Peak Intensity (in/hr)	5.0206
Undeveloped Runoff Coefficient (Cu)	0.9117
Developed Runoff Coefficient (Cd)	0.9115
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.3999
Burned Peak Flow Rate (cfs)	5.5852
24-Hr Clear Runoff Volume (ac-ft)	0.2897
24-Hr Clear Runoff Volume (cu-ft)	12618.0308



PROPOSED 50 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\Users\rick.RJRENG\Desktop\LAR04 2186\lasoilx.da

Tentative Tract 71546

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	10.0	32.13	10.0	32.13	1	2020.	.23270	.00	.00	0.	234	8	A37	.02
1344	2A	29.4	94.46	39.4	113.56	1	2042.	.25470	.00	.00	0.	234	8	A37	.02
1344	3A	.0	.00	39.4	108.46	1	760.	.09470	.00	.00	0.	234	1	A37	.00
1344	4A	22.7	72.94	62.1	148.14	1	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	54.11	76.6	158.14	1	1505.	.36010	.00	.00	0.	234	6	A37	.02
1344	6A	.0	.00	76.6	157.23	1	948.	.06650	.00	.00	0.	234	1	A37	.00
1344	7A	12.9	39.26	89.5	172.83	1	2054.	.13880	.00	.00	0.	234	9	A37	.02
1344	8A	16.7	62.32	106.2	178.26	1	1321.	.43150	.00	.00	0.	234	6	A37	.02
1344	9A	.0	.00	106.2	177.69	4	360.	.02500	6.00	.00	0.	34	1	A37	.00
1344	10A	1.3	5.16	107.5	178.34	4	300.	.03000	3.50	.00	0.	34	5	A37	.71
1344	11A	.0	.00	107.5	178.13	4	92.	.02720	6.00	.00	0.	34	1	A37	.00
1344	12A	.0	.00	107.5	178.06	4	22.	.04540	6.00	.00	0.	34	1	A37	.00
1344	13B	14.1	45.30	14.1	45.30	1	1899.	.31070	.00	.00	0.	234	8	A37	.02
1344	14B	.0	.00	14.1	42.37	4	271.	.02000	4.00	.00	0.	34	1	A37	.00
1344	15B	1.1	4.37	15.2	43.22	4	335.	.01190	2.50	.00	0.	34	5	A37	.75
1344	16B	.0	.00	15.2	42.94	3	85.	.02350	4.00	.00	0.	34	1	A37	.00

****

CONFLUENCE Q'S

1344 17A TA 1167 QA 178.06 QAB 198.37 QB 20.31 1344 17B TB 1160 QB 42.79 QBA 198.90 QA 156.11

1344 17AB TAB 1164 QAB 204.34 QA 173.12 QB 31.22

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	17AB	15.2	42.79	122.7	204.34	4	348.	.03590	6.00	.00	0.	34	0	A37	.00
1344	18A	2.3	9.13	125.0	205.55	4	536.	.03080	3.75	.00	0.	34	5	A37	.74
1344	19A	.0	.00	125.0	205.35	4	116.	.02000	6.00	.00	0.	34	1	A37	.00
1344	20A	.4	1.59	125.4	205.50	4	232.	.05820	3.25	.00	0.	34	5	A37	.80
1344	21A	.0	.00	125.4	205.35	4	140.	.02000	6.00	.00	0.	34	1	A37	.00
1344	22A	1.4	5.56	126.8	206.20	4	361.	.00830	4.75	.00	0.	34	5	A37	.79
1344	23A	.0	.00	126.8	205.87	4	190.	.02000	6.00	.00	0.	34	1	A37	.00
1344	24A	.0	.00	126.8	205.86	4	305.	.02300	4.00	.00	0.	34	5	A37	.68
1344	25A	.0	.00	126.8	205.71	4	48.	.04000	6.00	.00	0.	34	1	A37	.00
1344	26C	4.8	16.51	4.8	16.51	1	1321.	.17030	.00	.00	0.	234	7	A37	.02
1344	27C	1.4	5.53	6.2	15.81	3	380.	.01840	.00	.00	0.	34	5	A37	.07
1344	28C	.0	.00	6.2	15.54	4	223.	.03000	4.00	.00	0.	34	1	A37	.00
1344	29C	1.2	4.76	7.4	16.61	4	326.	.02760	2.00	.00	0.	34	5	A37	.70
1344	30C	.0	.00	7.4	16.56	4	308.	.02000	4.00	.00	0.	34	1	A37	.00
1344	31C	1.7	6.74	9.1	19.39	4	414.	.02170	2.00	.00	0.	34	5	A37	.70
1344	32C	.0	.00	9.1	19.28	4	47.	.02000	4.00	.00	0.	34	1	A37	.00

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*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344   33A  TA 1167 QA   205.69 QAC   219.91 QC    14.22    1344   33C  TC 1156 QC    19.27 QCA   179.60 QA   160.33   *
*                              1344   33AC TAC 1166 QAC   220.34 QA   204.99 QC    15.35                                  *
*****************************************************************************************************************************
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	33AC	9.1	19.27	135.9	220.34	4	360.	.14400	6.00	.00	0.	34	0	A37	.00
1344	34D	6.3	23.51	6.3	23.51	1	1212.	.21450	.00	.00	0.	234	6	A37	.02
1344	35D	.0	.00	6.3	20.80	1	51.	.17650	.00	.00	0.	234	1	A37	.00
1344	36D	.3	1.24	6.6	21.30	1	224.	.17860	.00	.00	0.	234	5	A37	.02
1344	37D	.0	.00	6.6	20.95	1	34.	.03000	.00	.00	0.	234	1	A37	.00
1344	38E	5.3	21.98	5.3	21.98	1	860.	.39530	.00	.00	0.	234	5	A37	.02
1344	39E	.0	.00	5.3	20.09	1	74.	.20280	.00	.00	0.	234	1	A37	.00

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*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344    40D  TB 1158 QB    20.91 QBC    35.20 QC    14.29    1344    8C  TC 1155 QC    19.92 QCB    35.65 QB    15.73   *
*                              1344    8BC TBC 1156 QBC    37.31 QB    18.24 QC    19.07                                  *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	40DE	5.3	19.92	11.9	37.31	1	115.	.03000	.00	.00	0.	234	0	A37	.00
1344	41D	.6	2.49	12.5	38.13	1	372.	.57260	.00	.00	0.	234	5	A37	.02
1344	42D	.0	.00	12.5	37.69	1	133.	.04000	.00	.00	0.	234	1	A37	.00
1344	43D	1.1	4.56	13.6	38.51	1	433.	.49650	.00	.00	0.	234	5	A37	.02
1344	44D	.0	.00	13.6	38.33	1	73.	.02740	.00	.00	0.	234	1	A37	.00
1344	45F	12.2	45.53	12.2	45.53	1	1323.	.24940	.00	.00	0.	234	6	A37	.02
1344	46F	.0	.00	12.2	41.36	1	86.	.08140	.00	.00	0.	234	1	A37	.00
1344	47F	.7	2.90	12.9	42.26	1	340.	.64710	.00	.00	0.	234	5	A37	.02
1344	48F	.0	.00	12.9	42.20	1	100.	.08500	.00	.00	0.	234	1	A37	.00
1344	49DF	12.9	41.69	26.5	77.51	1	246.	.04880	.00	.00	0.	234	0	A37	.00
1344	50D	.9	3.73	27.4	77.34	1	246.	.04000	.00	.00	0.	234	5	A37	.02
1344	51D	1.8	7.47	29.2	77.64	1	675.	.42960	.00	.00	0.	234	5	A37	.02
1344	52D	.0	.00	29.2	76.93	1	240.	.05830	.00	.00	0.	234	1	A37	.00
1344	53D	.7	2.90	29.9	76.78	1	240.	.05000	.00	.00	0.	234	5	A37	.02
1344	54D	.0	.00	29.9	76.06	4	105.	.04200	5.00	.00	0.	34	1	A37	.00
1344	55D	.9	3.58	30.8	76.65	4	190.	.01050	3.25	.00	0.	34	5	A37	.93
1344	56D	.0	.00	30.8	76.58	4	280.	.06960	2.25	.00	0.	34	1	A37	.00
1344	57D	2.2	8.72	33.0	77.52	4	529.	.07720	2.25	.00	0.	34	5	A37	.56
1344	58D	1.4	5.81	34.4	78.13	1	737.	.44100	.00	.00	0.	234	5	A37	.02
1344	59D	.0	.00	34.4	77.53	3	78.	.06500	5.00	.00	0.	34	1	A37	.00
1344	60G	1.2	3.48	1.2	3.48	1	753.	.23770	.00	.00	0.	234	10	A37	.03
1344	61G	1.1	4.37	2.3	6.34	3	415.	.01200	.00	.00	0.	34	5	A37	.84
1344	62G	.0	.00	2.3	5.77	4	33.	.04290	3.00	.00	0.	34	1	A37	.00
1344	63G	.0	.00	2.3	5.77	4	247.	.02020	3.00	.00	0.	34	1	A37	.00

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*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344   64D  TB 1166 QB    77.37 QBE    81.29 QE     3.92    1344   32E  TE 1158 QE     5.73 QEB    57.21 QB    51.48   *
*                              1344   32BE TBE 1166 QBE    81.29 QB    77.37 QE     3.92                                  *
*****************************************************************************************************************************
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONTROL Z	SOIL Q(CFS)	NAME	RAIN TC	PCT ZONE	IMPV
1344	64DG	2.3	5.73	36.7	81.29	4	113.	.05000	5.00	.00	0.	34	0	A37	.00
1344	65D	.0	.00	36.7	81.18	4	24.	.03000	5.00	.00	0.	34	1	A37	.00
1344	66D	2.0	6.48	38.7	82.07	1	815.	.07360	.00	.00	0.	34	7	A37	.01
1344	67H	1.4	5.56	1.4	5.56	3	602.	.08310	.00	.00	0.	34	5	A37	.79
1344	68H	.0	.00	1.4	4.96	4	76.	.10530	2.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 69D TB 1169 QB 80.12 QBF 81.05 QF .93 1344 37F TF 1155 QF 4.93 QFB 50.45 QB 45.52

1344 37BF TBF 1169 QBF 81.05 QB 80.12 QF .93

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONTROL Z	SOIL Q(CFS)	NAME	RAIN TC	PCT ZONE	IMPV
1344	69DH	1.4	4.93	40.1	81.05	4	80.	.02000	5.00	.00	0.	34	0	A37	.00
1344	70D	.0	.00	40.1	80.99	4	270.	.02000	5.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 71A TA 1153 QA 223.79 QAB 263.53 QB 39.74 1344 39B TB 1170 QB 80.59 QBA 103.75 QA 23.16

1344 39AB TAB 1153 QAB 263.53 QA 223.79 QB 39.74

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONTROL Z	SOIL Q(CFS)	NAME	RAIN TC	PCT ZONE	IMPV
1344	71AD	40.1	80.59	94.1	263.53	4	461.	.02820	6.00	.00	0.	34	0	A37	.00
1344	72A	.0	.00	94.1	252.17	4	10.	.02000	6.00	.00	0.	34	1	A37	.00

Peak Flow Hydrologic Analysis

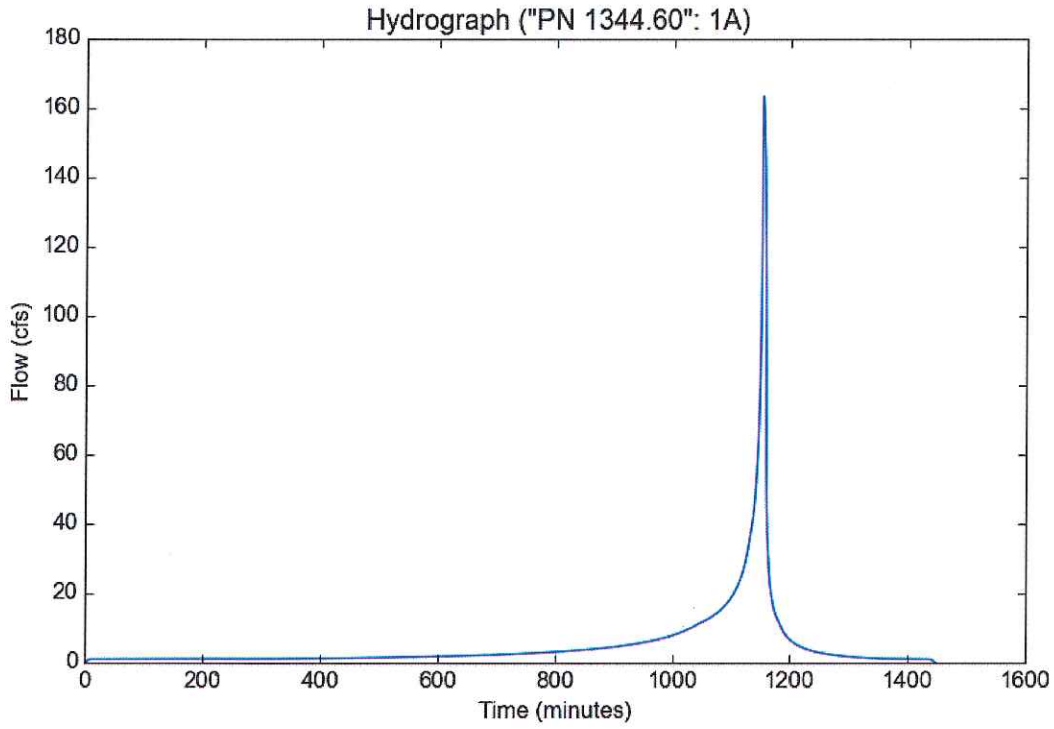
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	1A
Area (ac)	52.7
Flow Path Length (ft)	2020.0
Flow Path Slope (vft/hft)	0.2327
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.5878
Undeveloped Runoff Coefficient (Cu)	0.8638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	163.47
Burned Peak Flow Rate (cfs)	172.093
24-Hr Clear Runoff Volume (ac-ft)	10.5633
24-Hr Clear Runoff Volume (cu-ft)	460137.3706



Peak Flow Hydrologic Analysis

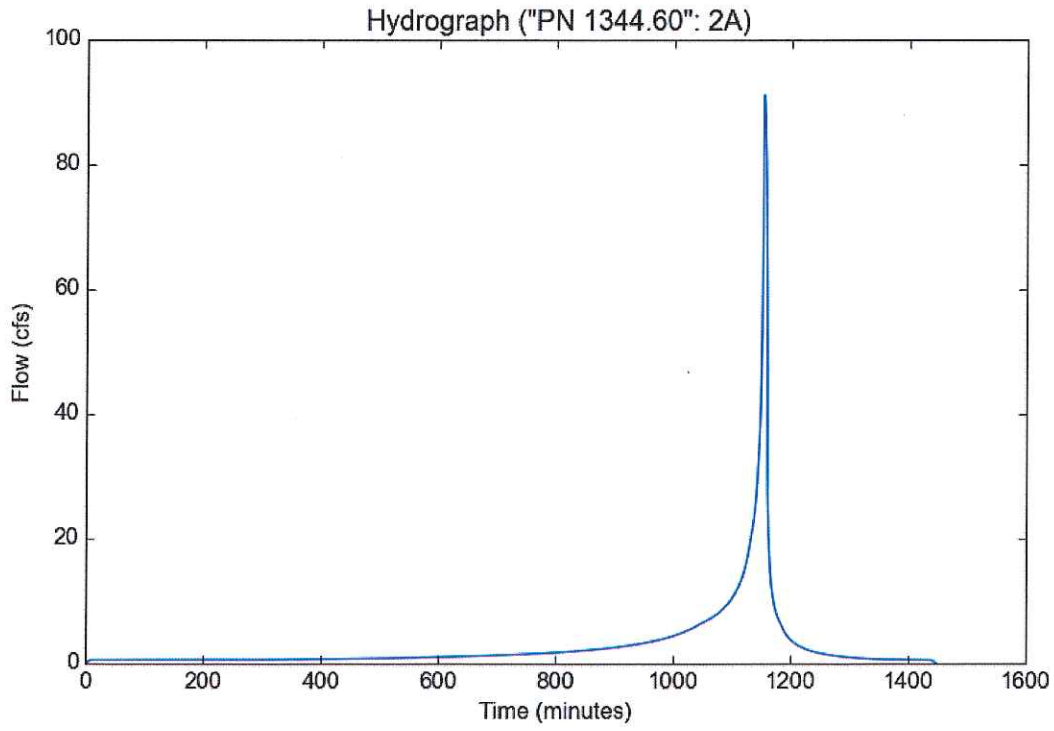
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	2A
Area (ac)	29.4
Flow Path Length (ft)	2042.0
Flow Path Slope (vft/hft)	0.2547
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.5878
Undeveloped Runoff Coefficient (Cu)	0.8638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	91.1958
Burned Peak Flow Rate (cfs)	96.0063
24-Hr Clear Runoff Volume (ac-ft)	5.893
24-Hr Clear Runoff Volume (cu-ft)	256699.0265



Peak Flow Hydrologic Analysis

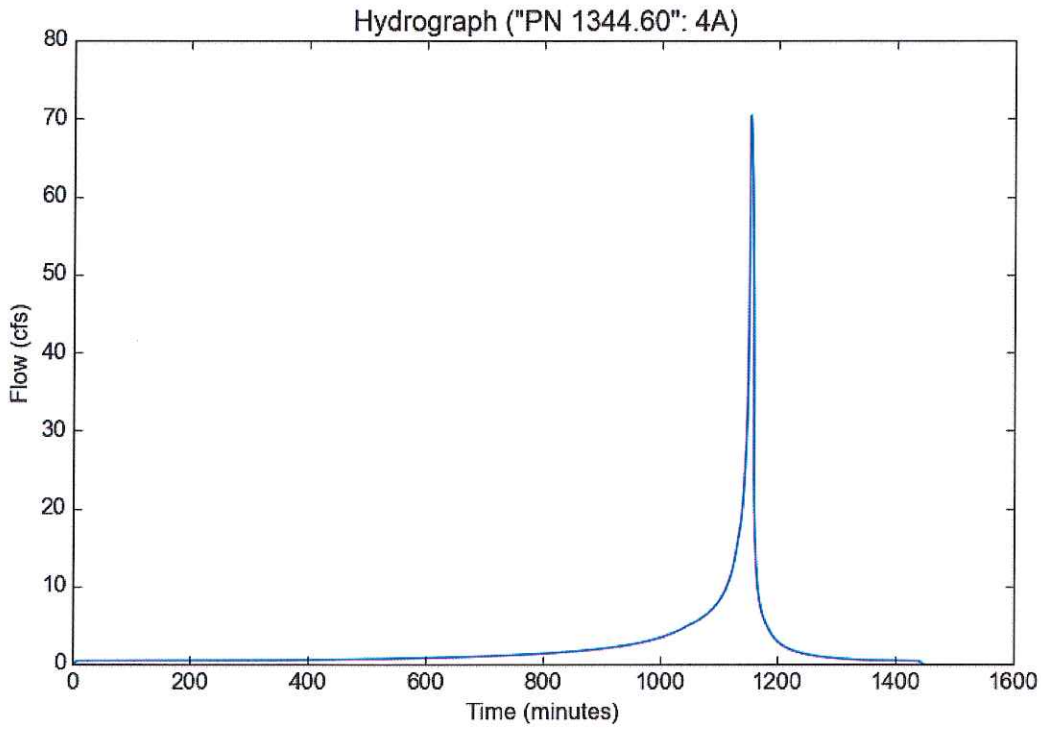
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	4A
Area (ac)	22.7
Flow Path Length (ft)	1952.0
Flow Path Slope (vft/hft)	0.2188
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.5878
Undeveloped Runoff Coefficient (Cu)	0.8638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	70.4131
Burned Peak Flow Rate (cfs)	74.1273
24-Hr Clear Runoff Volume (ac-ft)	4.55
24-Hr Clear Runoff Volume (cu-ft)	198199.5885



Peak Flow Hydrologic Analysis

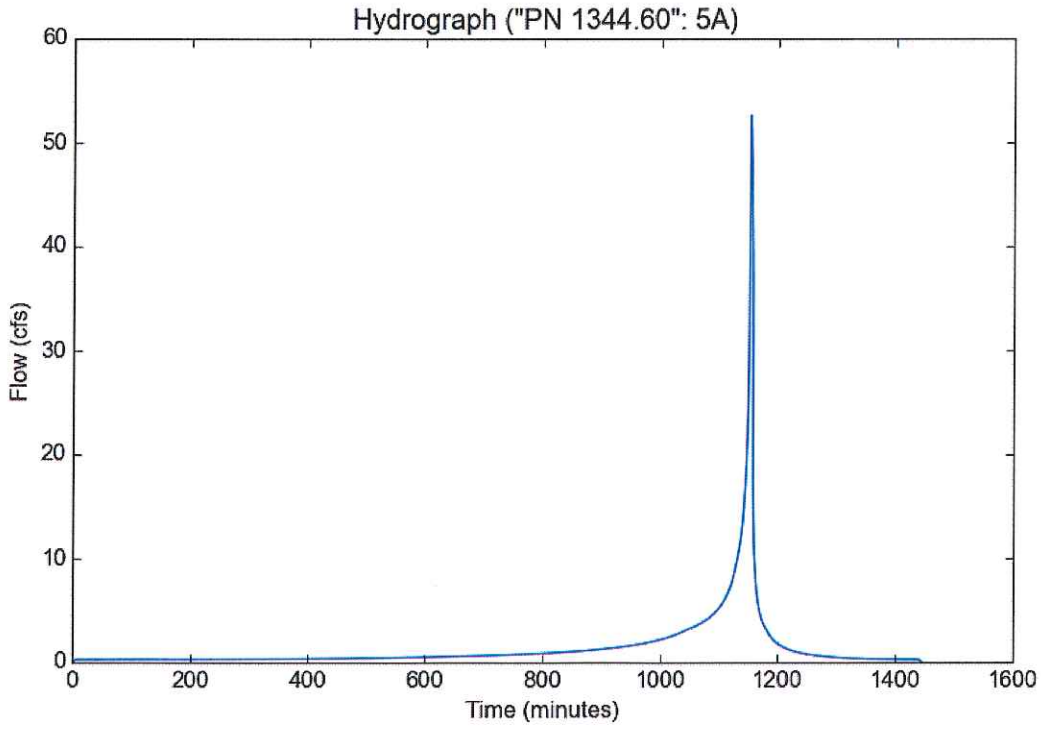
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	5A
Area (ac)	14.5
Flow Path Length (ft)	1505.0
Flow Path Slope (vft/hft)	0.3601
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.8834
Developed Runoff Coefficient (Cd)	0.8838
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	52.6327
Burned Peak Flow Rate (cfs)	55.0105
24-Hr Clear Runoff Volume (ac-ft)	2.9094
24-Hr Clear Runoff Volume (cu-ft)	126732.4655



Peak Flow Hydrologic Analysis

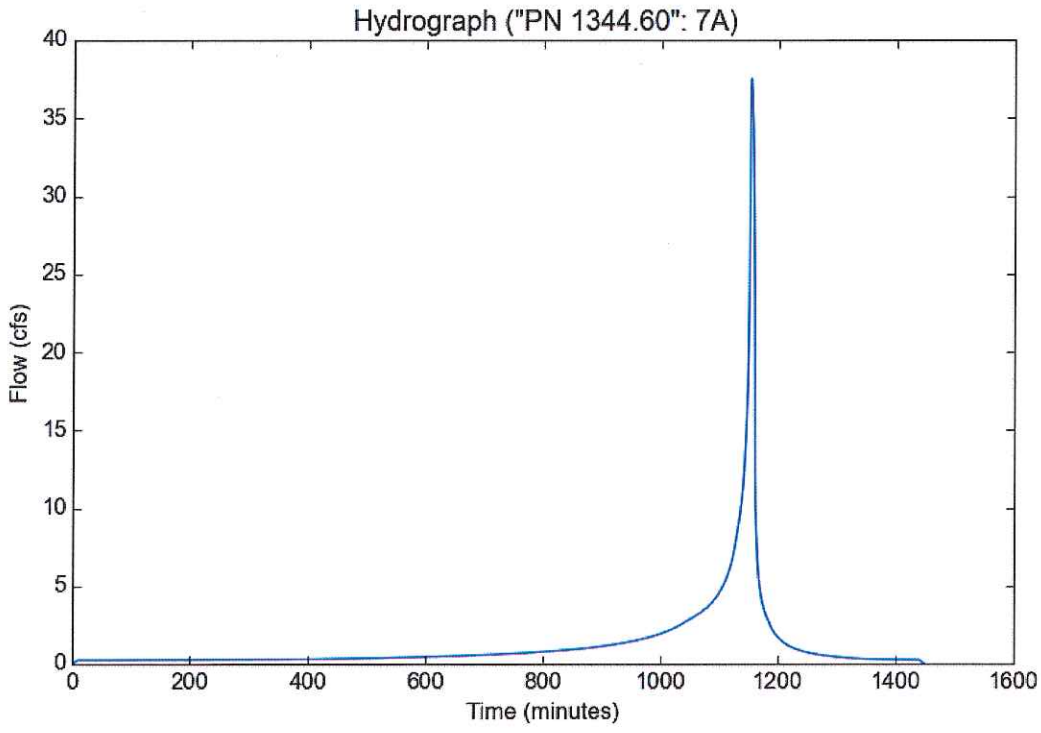
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	7A
Area (ac)	12.9
Flow Path Length (ft)	2054.0
Flow Path Slope (vft/hft)	0.1388
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.3946
Undeveloped Runoff Coefficient (Cu)	0.8562
Developed Runoff Coefficient (Cd)	0.8571
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	37.5328
Burned Peak Flow Rate (cfs)	39.6224
24-Hr Clear Runoff Volume (ac-ft)	2.5848
24-Hr Clear Runoff Volume (cu-ft)	112592.8009



Peak Flow Hydrologic Analysis

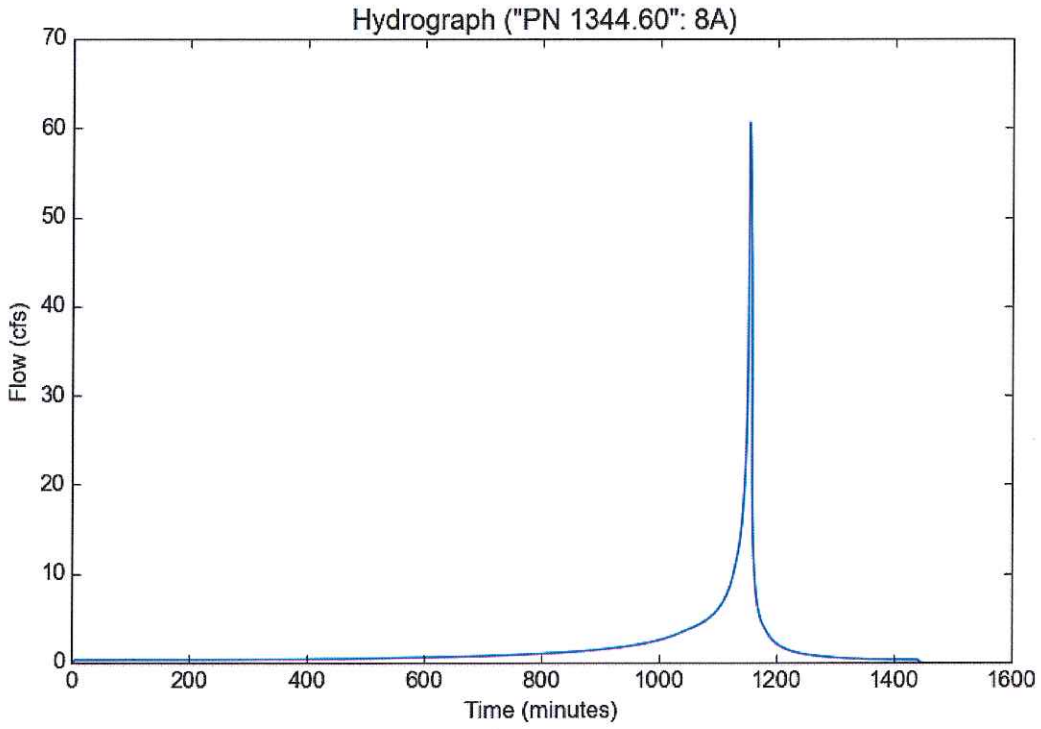
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	8A
Area (ac)	16.7
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.4315
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.8834
Developed Runoff Coefficient (Cd)	0.8838
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	60.6184
Burned Peak Flow Rate (cfs)	63.3569
24-Hr Clear Runoff Volume (ac-ft)	3.3508
24-Hr Clear Runoff Volume (cu-ft)	145960.8396



Peak Flow Hydrologic Analysis

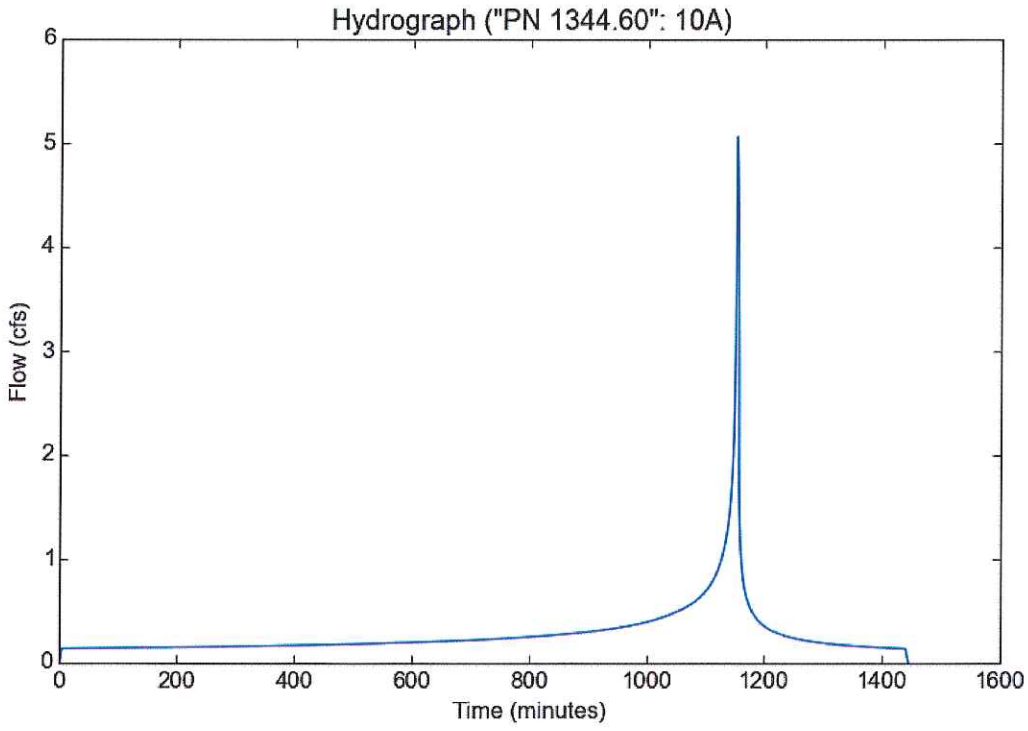
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	10A
Area (ac)	1.26
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.71
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.066
Burned Peak Flow Rate (cfs)	5.2649
24-Hr Clear Runoff Volume (ac-ft)	0.5697
24-Hr Clear Runoff Volume (cu-ft)	24818.2049



Peak Flow Hydrologic Analysis

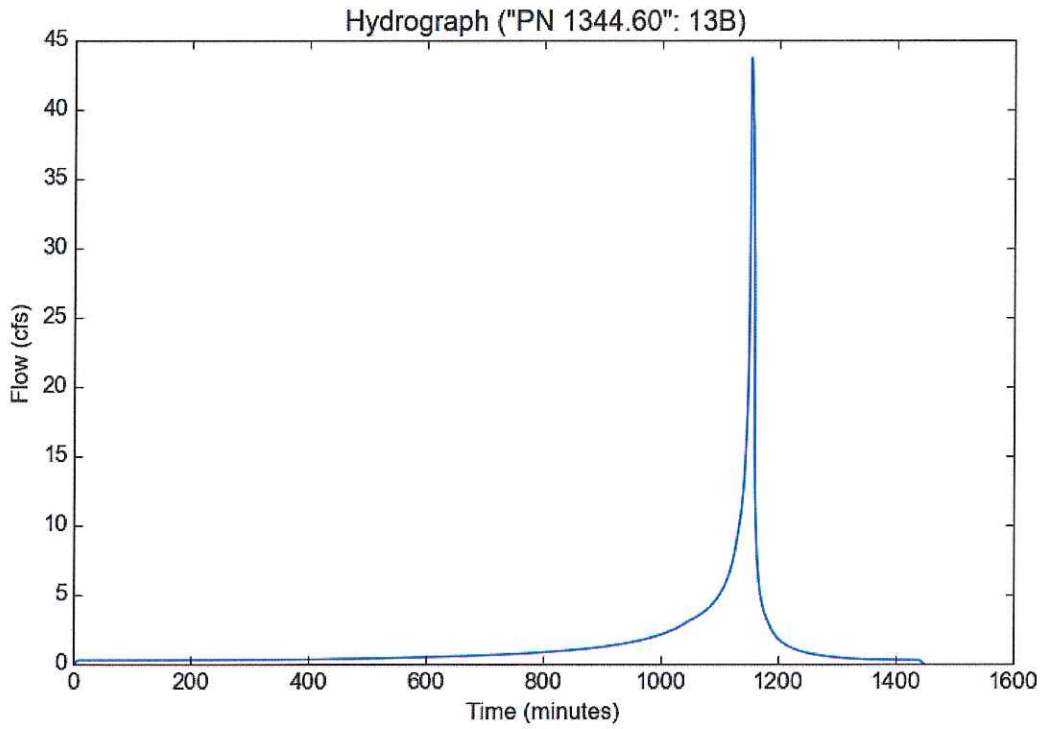
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	13B
Area (ac)	14.1
Flow Path Length (ft)	1899.0
Flow Path Slope (vft/hft)	0.3107
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.5878
Undeveloped Runoff Coefficient (Cu)	0.8638
Developed Runoff Coefficient (Cd)	0.8646
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	43.7368
Burned Peak Flow Rate (cfs)	46.0438
24-Hr Clear Runoff Volume (ac-ft)	2.8262
24-Hr Clear Runoff Volume (cu-ft)	123110.7576



Peak Flow Hydrologic Analysis

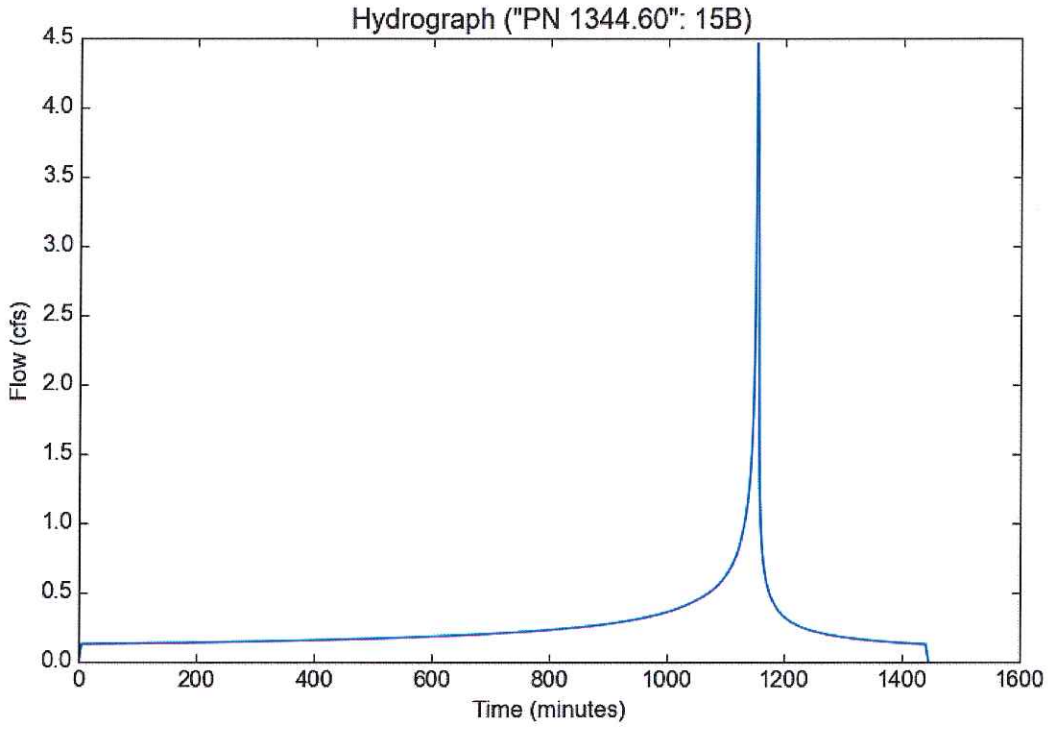
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	15B
Area (ac)	1.11
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0119
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.75
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8987
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.4639
Burned Peak Flow Rate (cfs)	4.6388
24-Hr Clear Runoff Volume (ac-ft)	0.5181
24-Hr Clear Runoff Volume (cu-ft)	22568.3949



Peak Flow Hydrologic Analysis

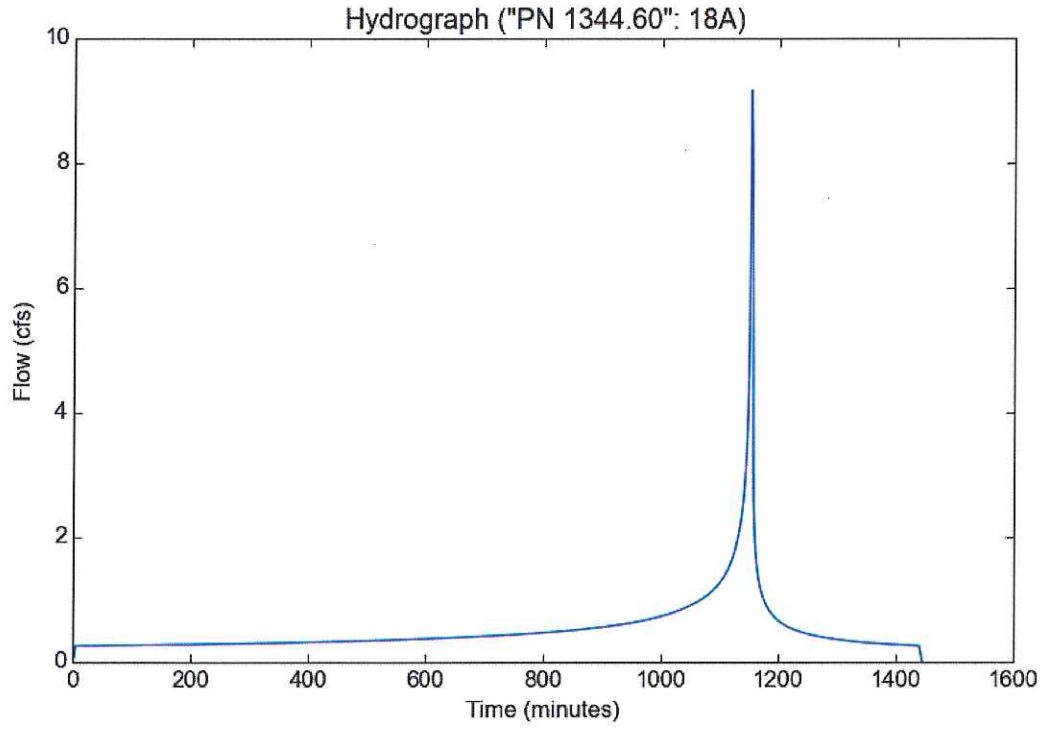
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	18A
Area (ac)	2.28
Flow Path Length (ft)	536.0
Flow Path Slope (vft/hft)	0.0308
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.74
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8987
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.1686
Burned Peak Flow Rate (cfs)	9.5281
24-Hr Clear Runoff Volume (ac-ft)	1.0559
24-Hr Clear Runoff Volume (cu-ft)	45994.8104



Peak Flow Hydrologic Analysis

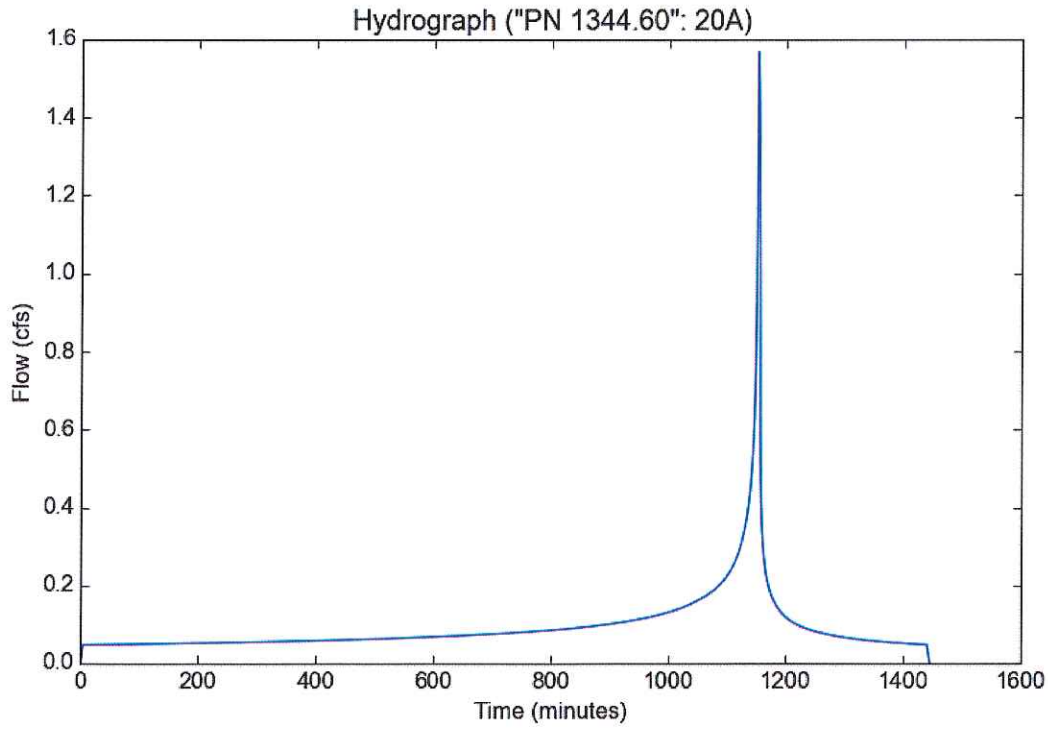
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	20A
Area (ac)	0.39
Flow Path Length (ft)	232.0
Flow Path Slope (vft/hft)	0.0582
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.8
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.899
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.5688
Burned Peak Flow Rate (cfs)	1.6301
24-Hr Clear Runoff Volume (ac-ft)	0.1891
24-Hr Clear Runoff Volume (cu-ft)	8238.9494



Peak Flow Hydrologic Analysis

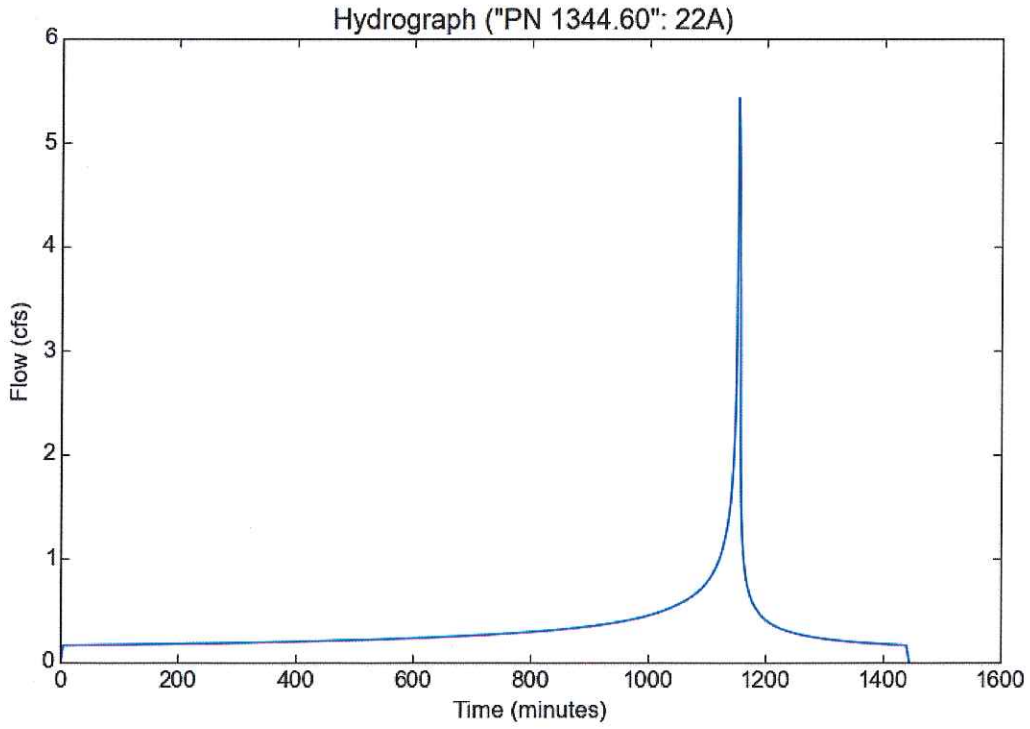
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	22A
Area (ac)	1.35
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.0083
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8989
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.4303
Burned Peak Flow Rate (cfs)	5.6426
24-Hr Clear Runoff Volume (ac-ft)	0.6498
24-Hr Clear Runoff Volume (cu-ft)	28305.1618



Peak Flow Hydrologic Analysis

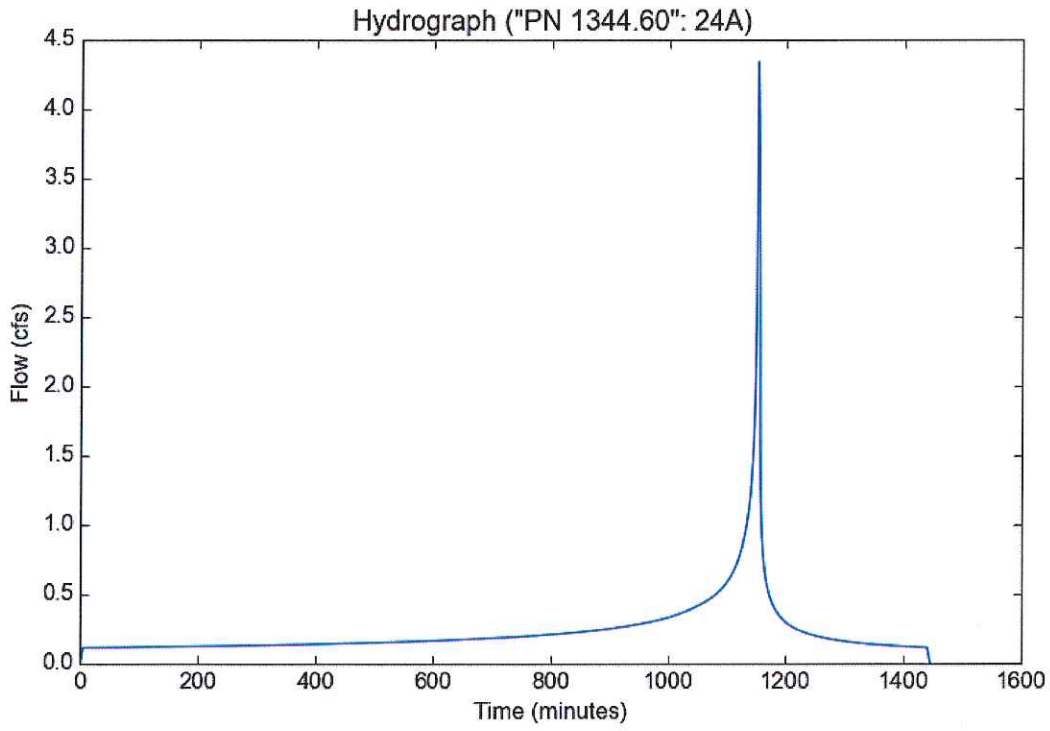
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	24A
Area (ac)	1.08
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.023
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.68
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8984
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.3415
Burned Peak Flow Rate (cfs)	4.5123
24-Hr Clear Runoff Volume (ac-ft)	0.4765
24-Hr Clear Runoff Volume (cu-ft)	20758.4787



Peak Flow Hydrologic Analysis

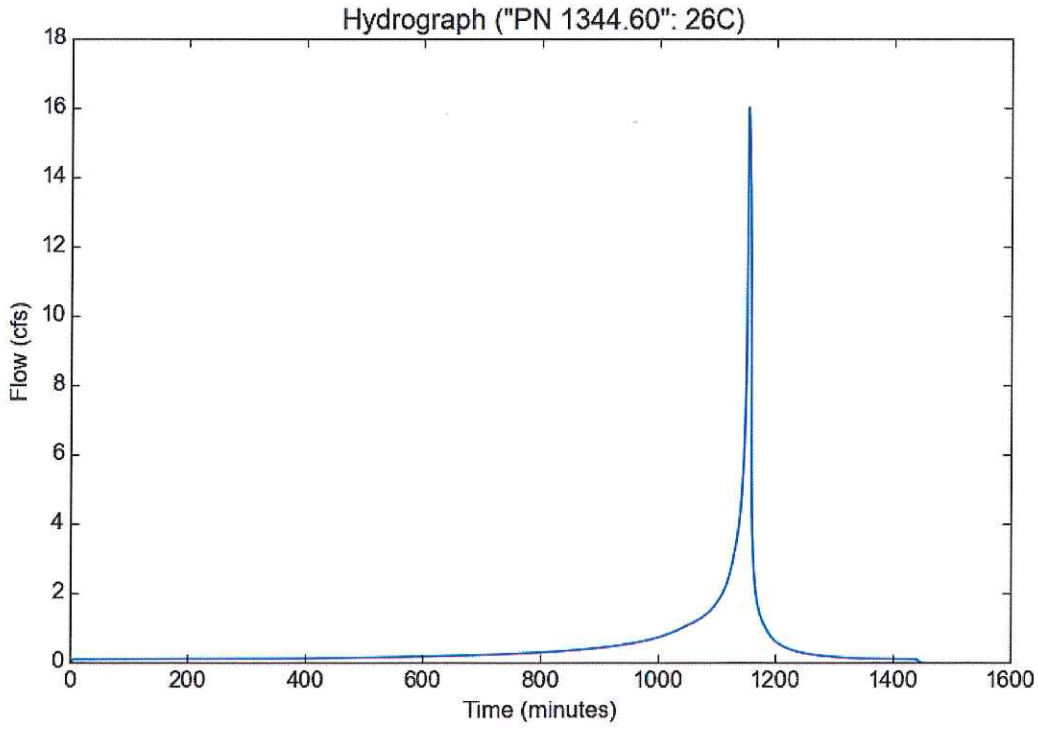
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	26C
Area (ac)	4.8
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.1703
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	3.8202
Undeveloped Runoff Coefficient (Cu)	0.873
Developed Runoff Coefficient (Cd)	0.8735
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	16.0181
Burned Peak Flow Rate (cfs)	16.8062
24-Hr Clear Runoff Volume (ac-ft)	0.9626
24-Hr Clear Runoff Volume (cu-ft)	41929.3487



Peak Flow Hydrologic Analysis

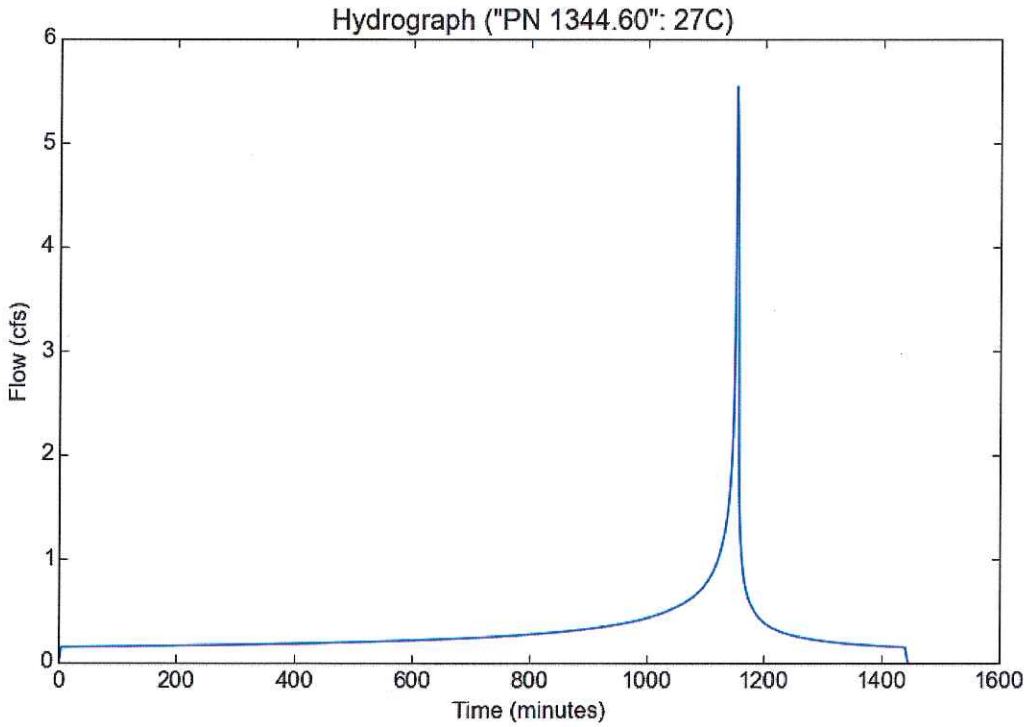
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	27C
Area (ac)	1.38
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.0184
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.5482
Burned Peak Flow Rate (cfs)	5.7662
24-Hr Clear Runoff Volume (ac-ft)	0.619
24-Hr Clear Runoff Volume (cu-ft)	26962.8032



Peak Flow Hydrologic Analysis

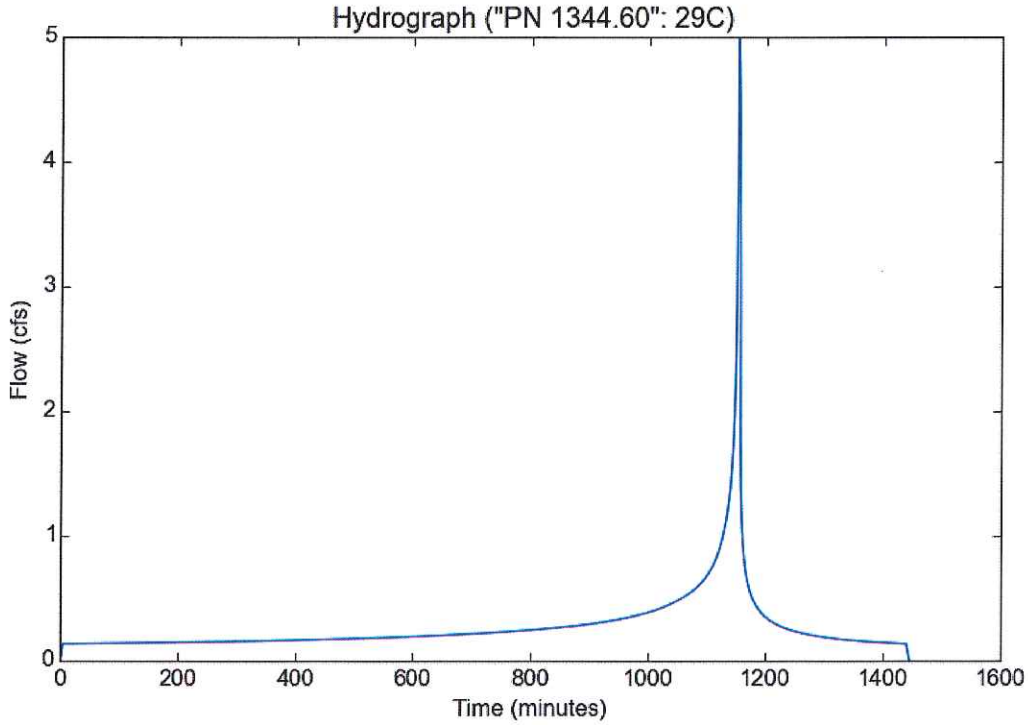
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	29C
Area (ac)	1.24
Flow Path Length (ft)	326.0
Flow Path Slope (vft/hft)	0.0276
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.9853
Burned Peak Flow Rate (cfs)	5.1812
24-Hr Clear Runoff Volume (ac-ft)	0.5562
24-Hr Clear Runoff Volume (cu-ft)	24227.4464



Peak Flow Hydrologic Analysis

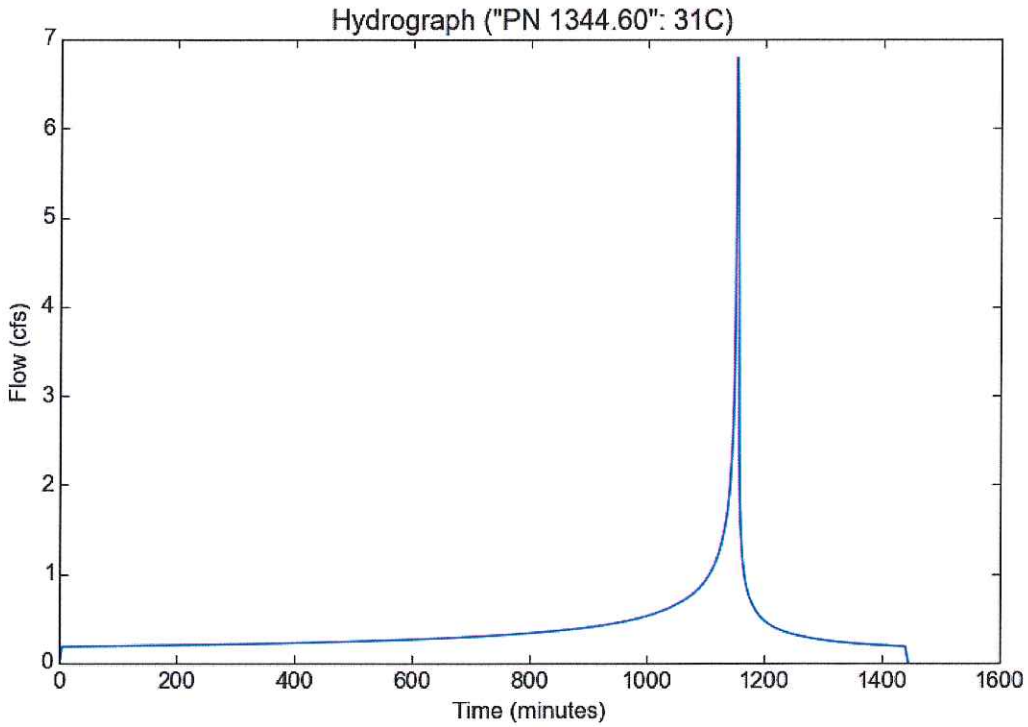
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	31C
Area (ac)	1.69
Flow Path Length (ft)	414.0
Flow Path Slope (vft/hft)	0.0217
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.7945
Burned Peak Flow Rate (cfs)	7.0615
24-Hr Clear Runoff Volume (ac-ft)	0.758
24-Hr Clear Runoff Volume (cu-ft)	33019.6648



Peak Flow Hydrologic Analysis

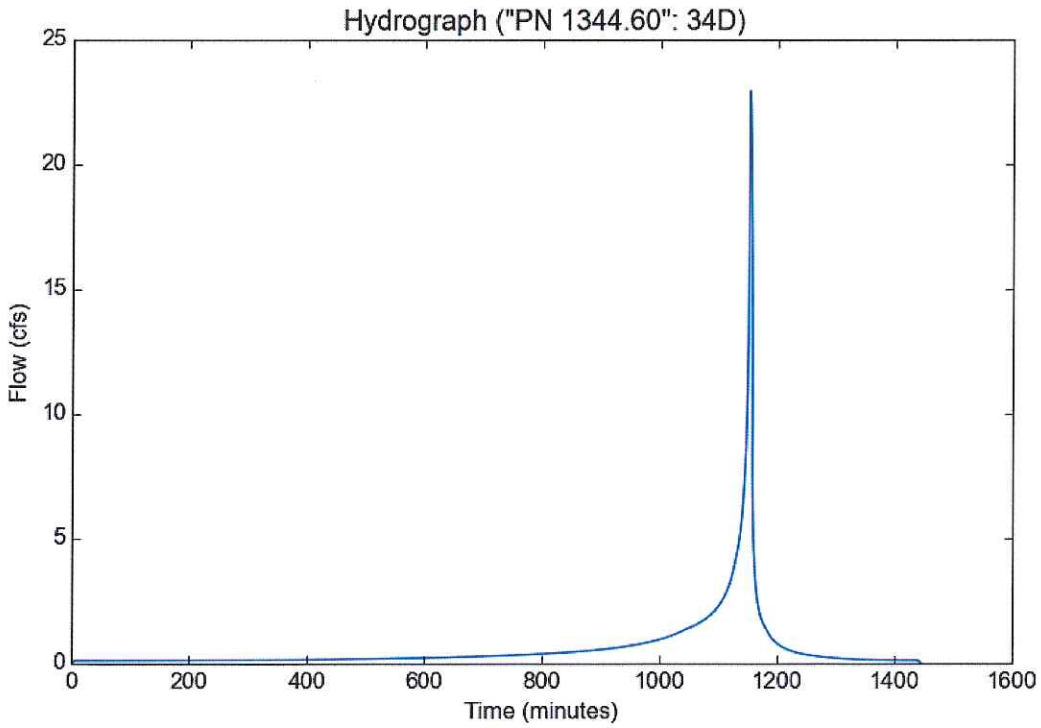
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	34D
Area (ac)	6.32
Flow Path Length (ft)	1212.0
Flow Path Slope (vft/hft)	0.2145
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.8834
Developed Runoff Coefficient (Cd)	0.8838
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	22.9406
Burned Peak Flow Rate (cfs)	23.977
24-Hr Clear Runoff Volume (ac-ft)	1.2681
24-Hr Clear Runoff Volume (cu-ft)	55237.8746



Peak Flow Hydrologic Analysis

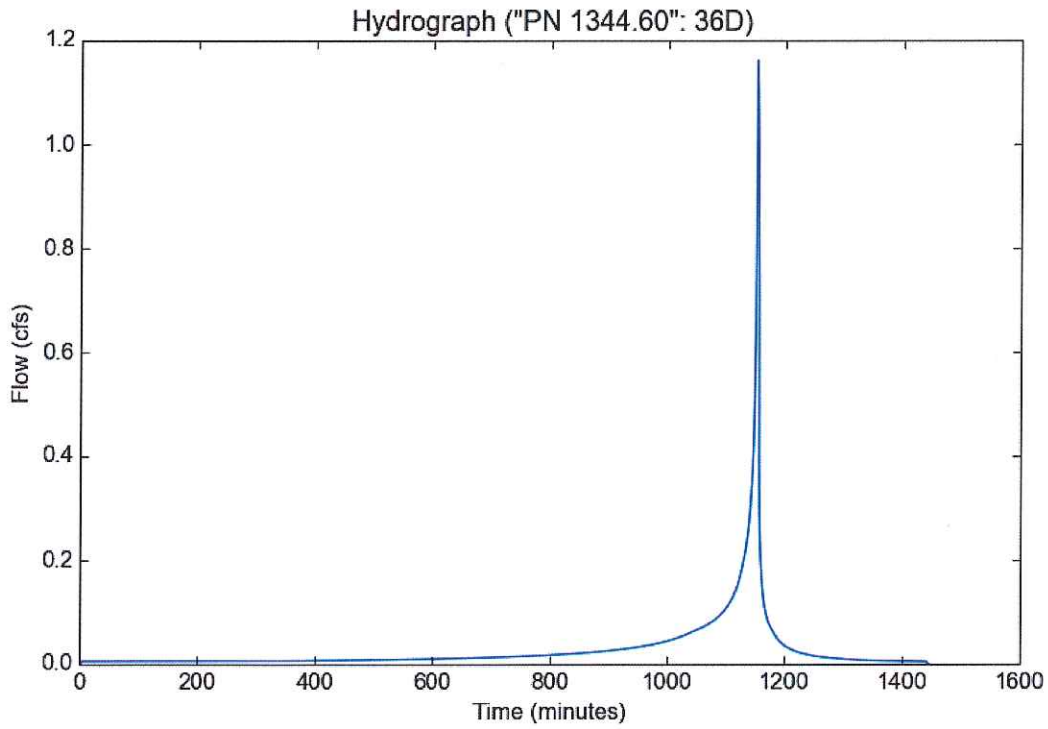
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	36D
Area (ac)	0.29
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1786
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1614
Burned Peak Flow Rate (cfs)	1.2088
24-Hr Clear Runoff Volume (ac-ft)	0.0582
24-Hr Clear Runoff Volume (cu-ft)	2536.043



Peak Flow Hydrologic Analysis

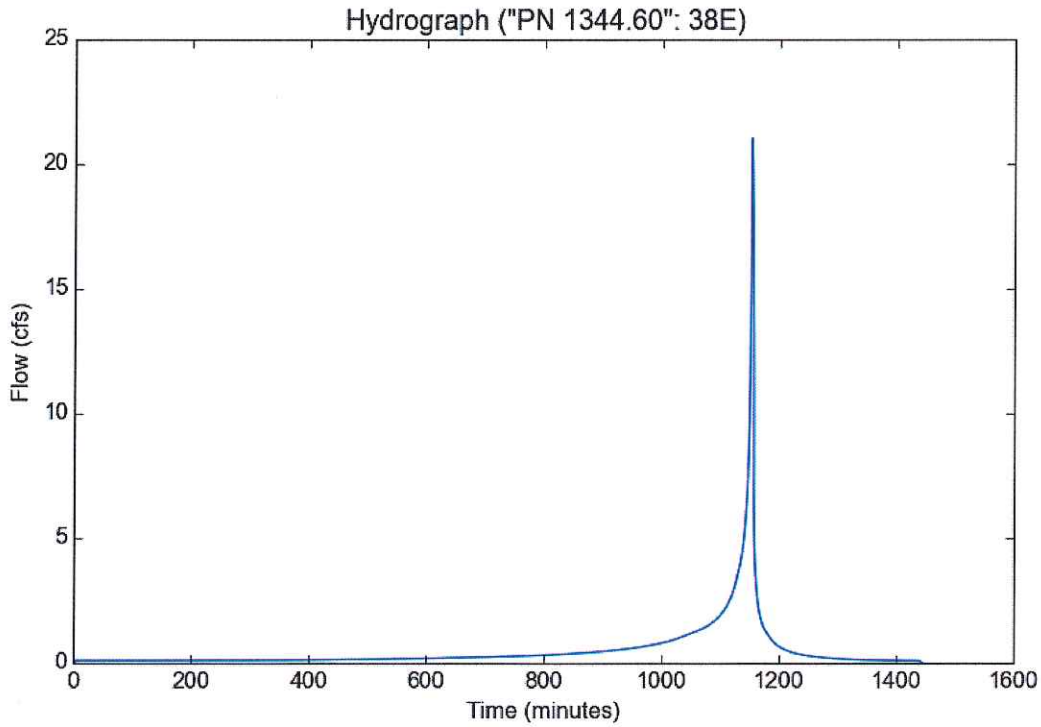
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	38E
Area (ac)	5.25
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.3953
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.0258
Burned Peak Flow Rate (cfs)	21.8835
24-Hr Clear Runoff Volume (ac-ft)	1.054
24-Hr Clear Runoff Volume (cu-ft)	45911.1235



Peak Flow Hydrologic Analysis

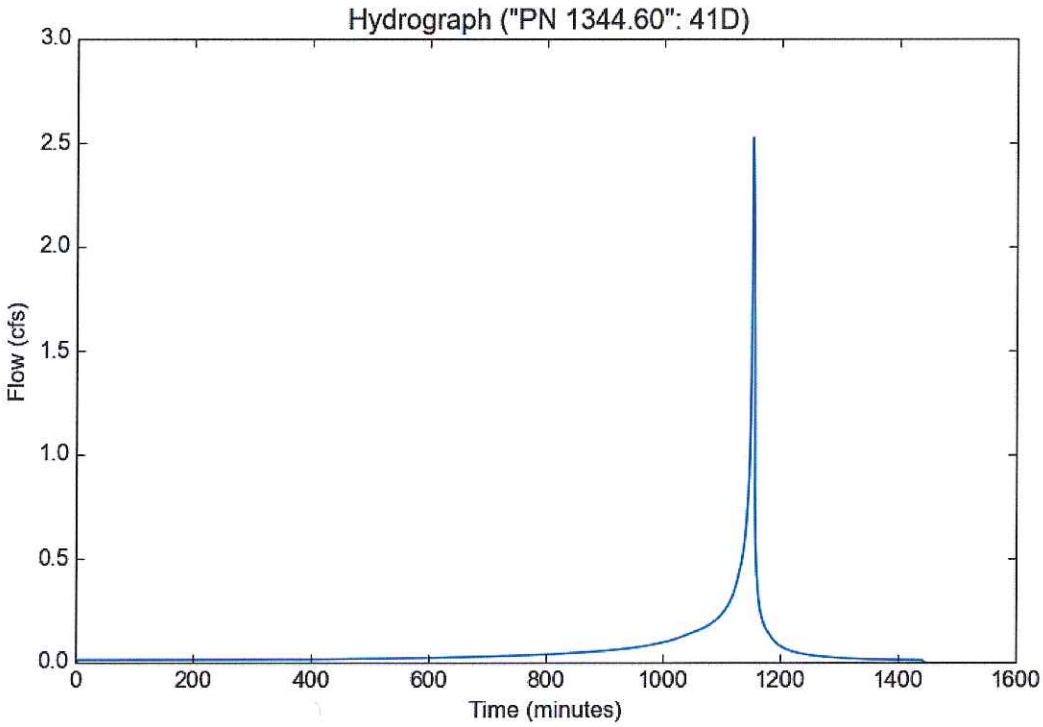
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	41D
Area (ac)	0.63
Flow Path Length (ft)	372.0
Flow Path Slope (vft/hft)	0.5726
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5231
Burned Peak Flow Rate (cfs)	2.626
24-Hr Clear Runoff Volume (ac-ft)	0.1265
24-Hr Clear Runoff Volume (cu-ft)	5509.3348



Peak Flow Hydrologic Analysis

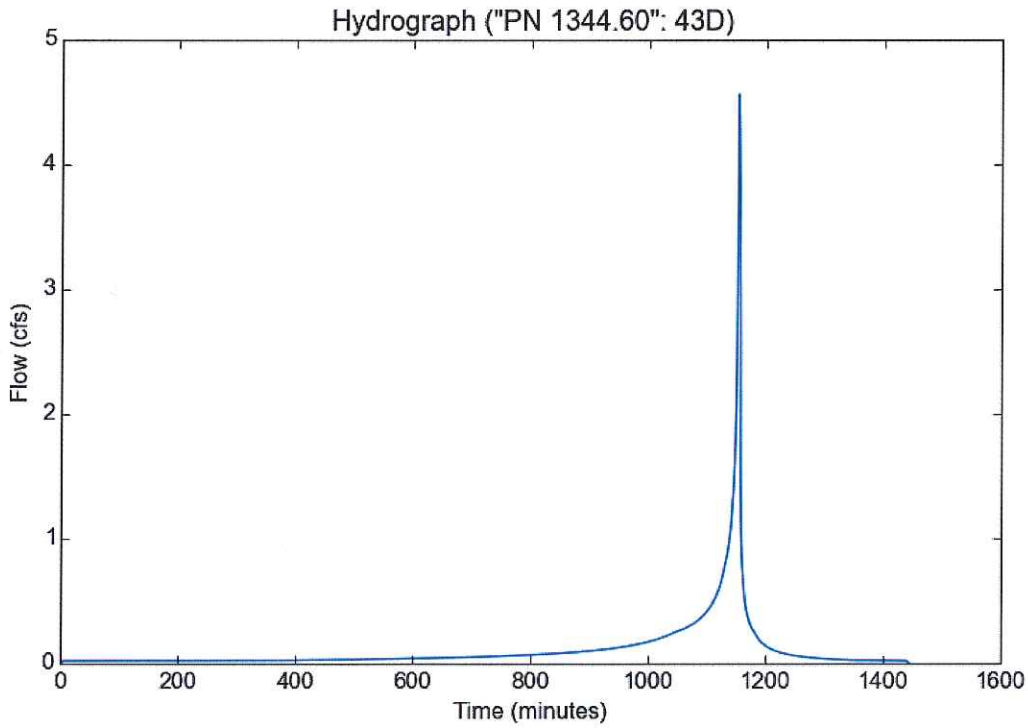
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	43D
Area (ac)	1.14
Flow Path Length (ft)	433.0
Flow Path Slope (vft/hft)	0.4965
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.5656
Burned Peak Flow Rate (cfs)	4.7518
24-Hr Clear Runoff Volume (ac-ft)	0.2289
24-Hr Clear Runoff Volume (cu-ft)	9969.2725



Peak Flow Hydrologic Analysis

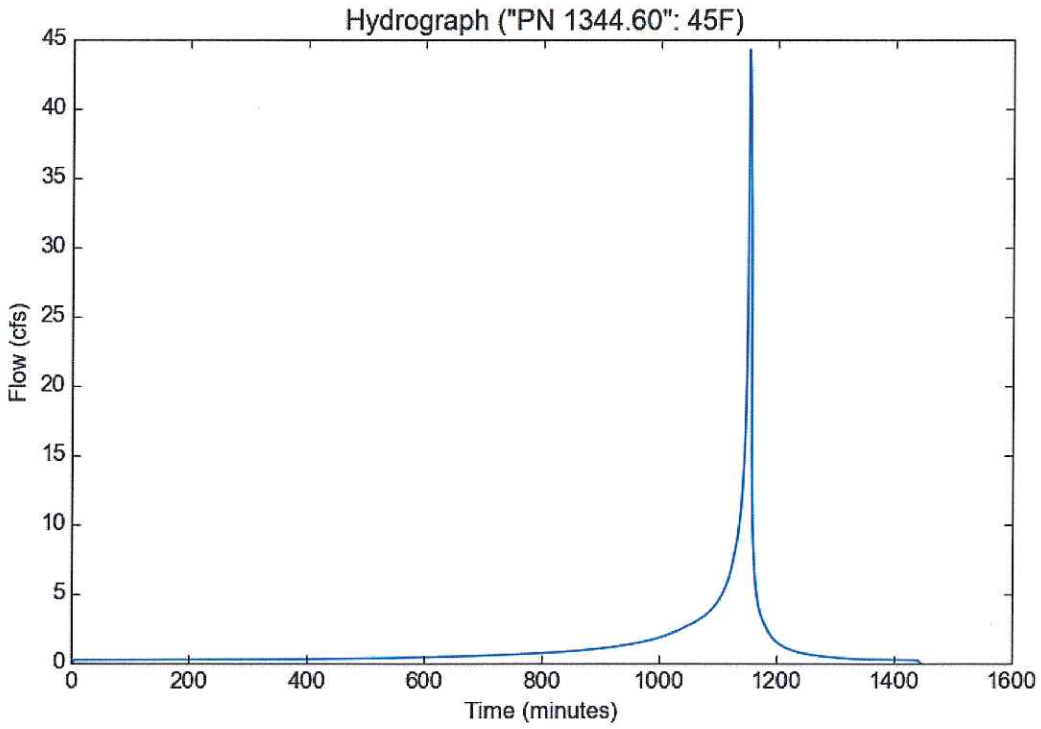
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	45F
Area (ac)	12.2
Flow Path Length (ft)	1323.0
Flow Path Slope (vft/hft)	0.2494
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.8834
Developed Runoff Coefficient (Cd)	0.8838
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	44.2841
Burned Peak Flow Rate (cfs)	46.2847
24-Hr Clear Runoff Volume (ac-ft)	2.4479
24-Hr Clear Runoff Volume (cu-ft)	106630.0744



Peak Flow Hydrologic Analysis

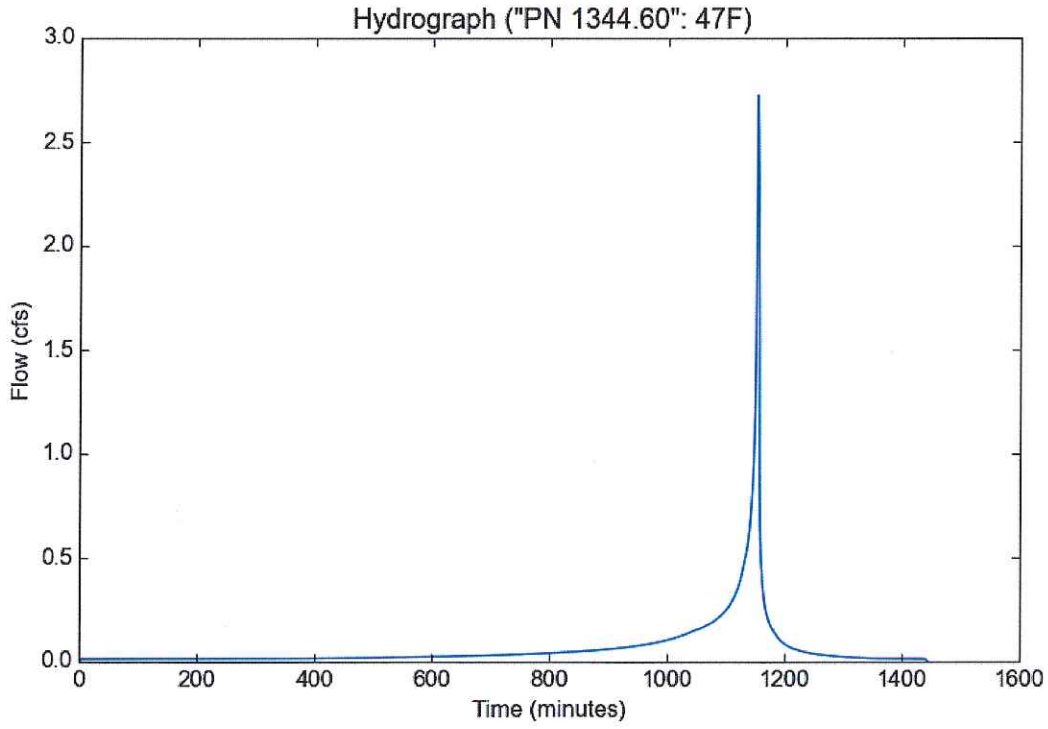
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	47F
Area (ac)	0.68
Flow Path Length (ft)	340.0
Flow Path Slope (vft/hft)	0.6471
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.7233
Burned Peak Flow Rate (cfs)	2.8344
24-Hr Clear Runoff Volume (ac-ft)	0.1365
24-Hr Clear Runoff Volume (cu-ft)	5946.5836



Peak Flow Hydrologic Analysis

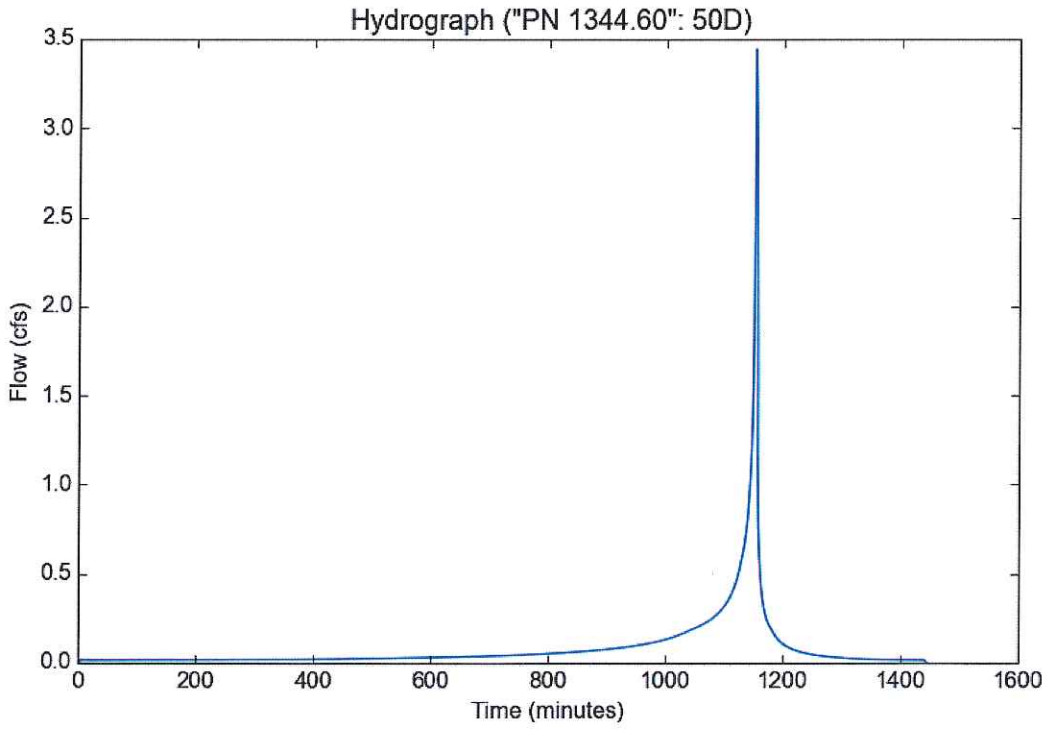
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	50D
Area (ac)	0.86
Flow Path Length (ft)	246.0
Flow Path Slope (vft/hft)	0.0488
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4442
Burned Peak Flow Rate (cfs)	3.5847
24-Hr Clear Runoff Volume (ac-ft)	0.1727
24-Hr Clear Runoff Volume (cu-ft)	7520.6793



Peak Flow Hydrologic Analysis

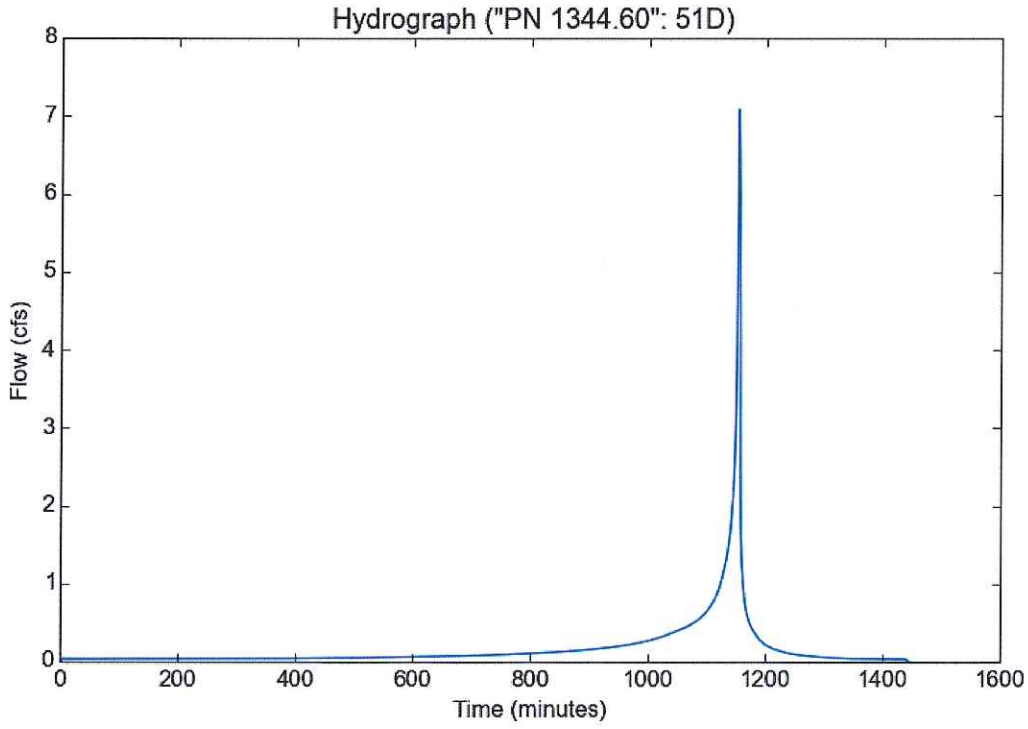
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	51D
Area (ac)	1.77
Flow Path Length (ft)	675.0
Flow Path Slope (vft/hft)	0.4296
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.0887
Burned Peak Flow Rate (cfs)	7.3779
24-Hr Clear Runoff Volume (ac-ft)	0.3553
24-Hr Clear Runoff Volume (cu-ft)	15478.6073



Peak Flow Hydrologic Analysis

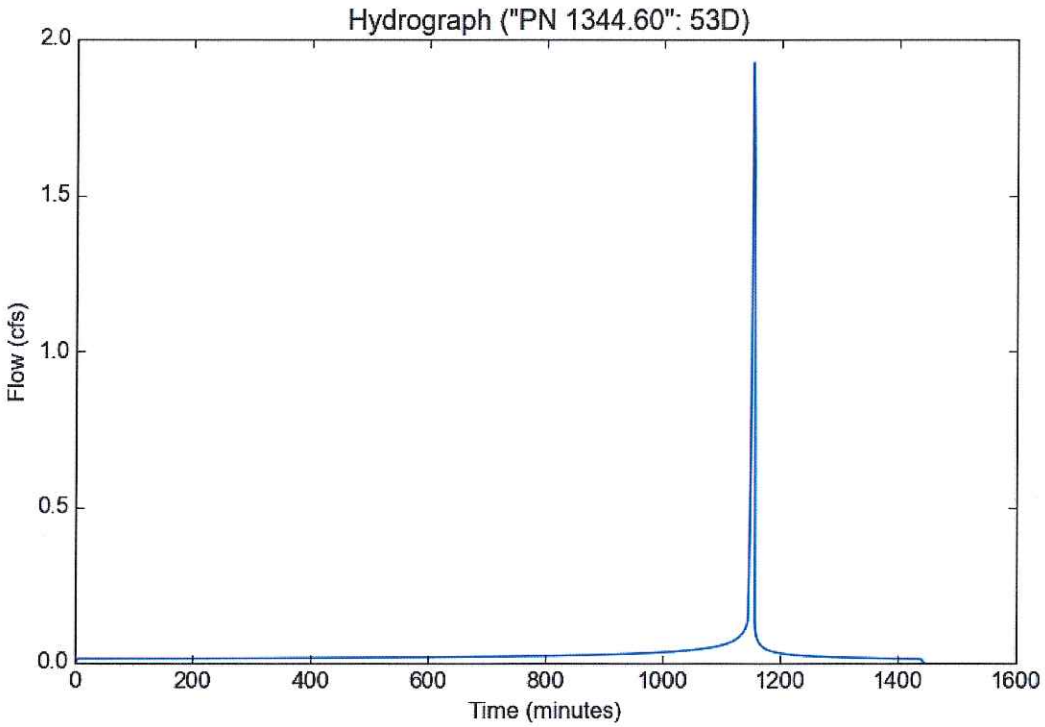
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	53D
Area (ac)	0.7
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.0583
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.6088
Developed Runoff Coefficient (Cd)	0.6146
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9252
Burned Peak Flow Rate (cfs)	2.3449
24-Hr Clear Runoff Volume (ac-ft)	0.0628
24-Hr Clear Runoff Volume (cu-ft)	2735.5573



Peak Flow Hydrologic Analysis

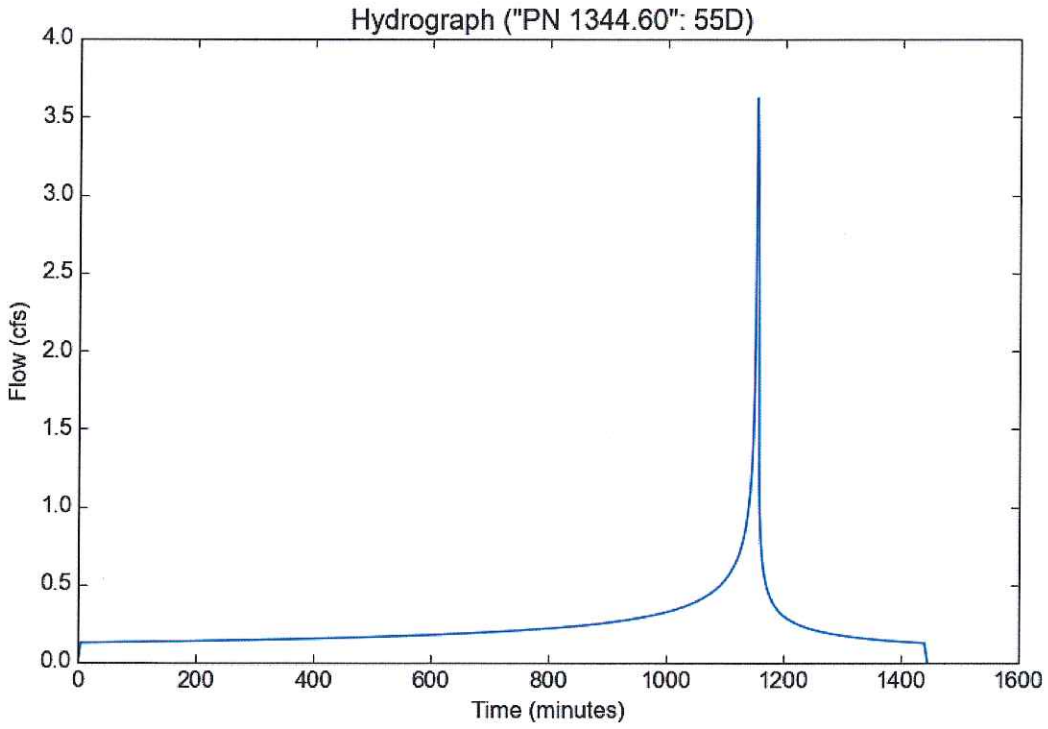
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	55D
Area (ac)	0.93
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.0105
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.9
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.6088
Developed Runoff Coefficient (Cd)	0.8709
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.6241
Burned Peak Flow Rate (cfs)	3.811
24-Hr Clear Runoff Volume (ac-ft)	0.4744
24-Hr Clear Runoff Volume (cu-ft)	20663.8414



Peak Flow Hydrologic Analysis

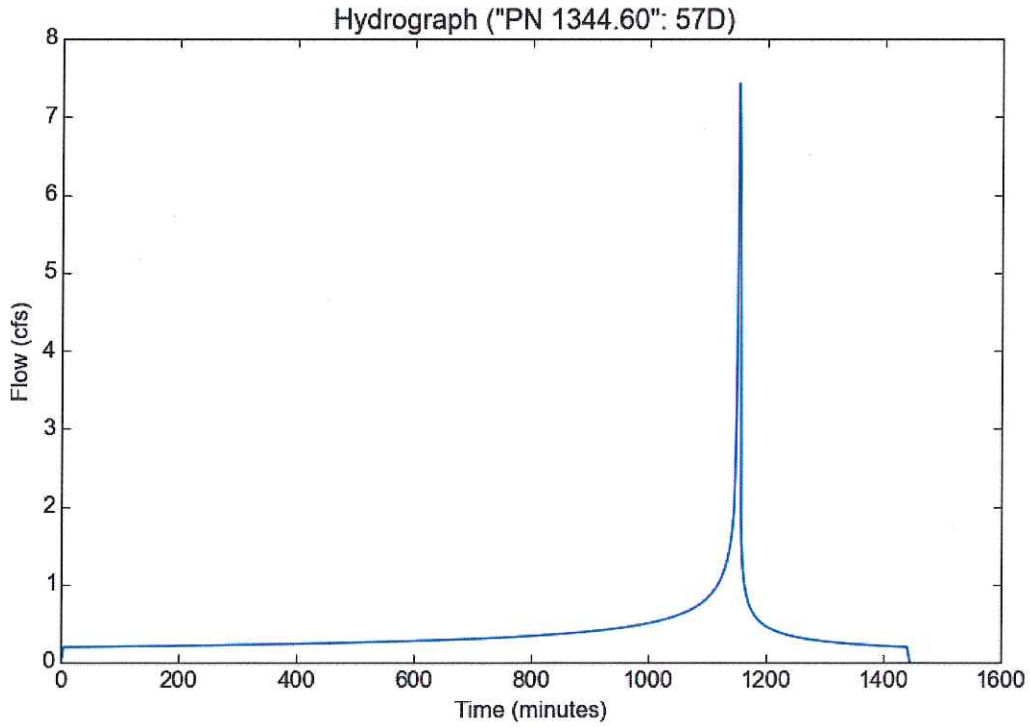
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	57D
Area (ac)	2.15
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.1615
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.56
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.6088
Developed Runoff Coefficient (Cd)	0.7719
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.4259
Burned Peak Flow Rate (cfs)	8.1891
24-Hr Clear Runoff Volume (ac-ft)	0.7475
24-Hr Clear Runoff Volume (cu-ft)	32560.4277



Peak Flow Hydrologic Analysis

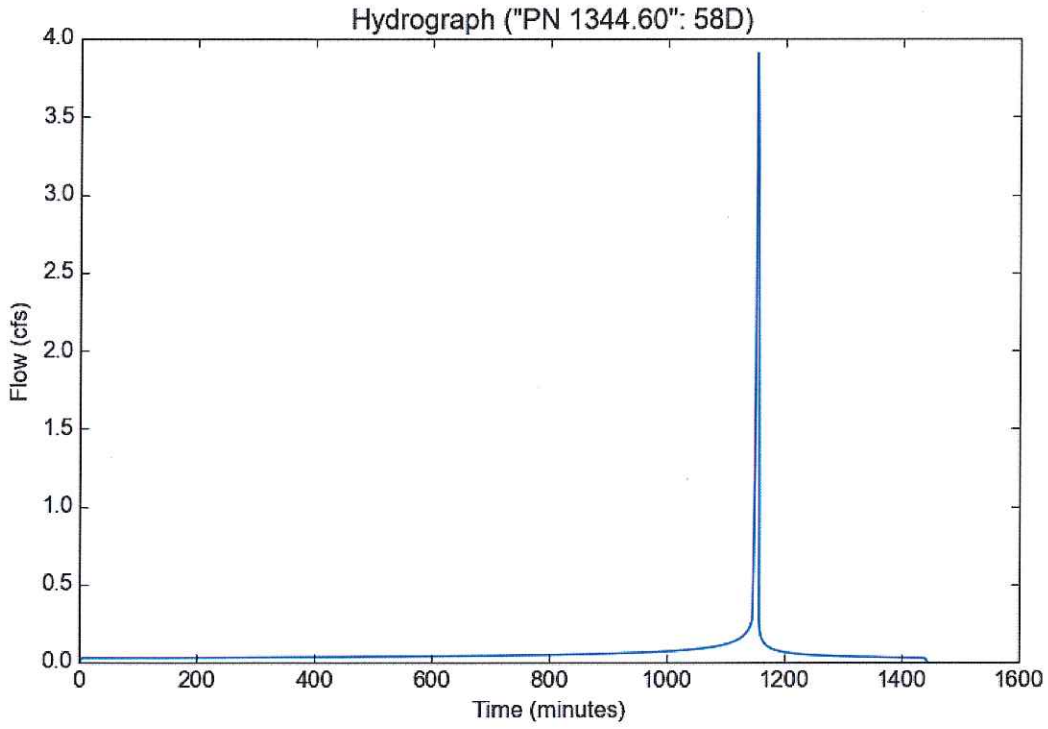
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	58D
Area (ac)	1.42
Flow Path Length (ft)	737.0
Flow Path Slope (vft/hft)	0.441
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.6088
Developed Runoff Coefficient (Cd)	0.6146
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9054
Burned Peak Flow Rate (cfs)	4.7569
24-Hr Clear Runoff Volume (ac-ft)	0.1274
24-Hr Clear Runoff Volume (cu-ft)	5549.2734



Peak Flow Hydrologic Analysis

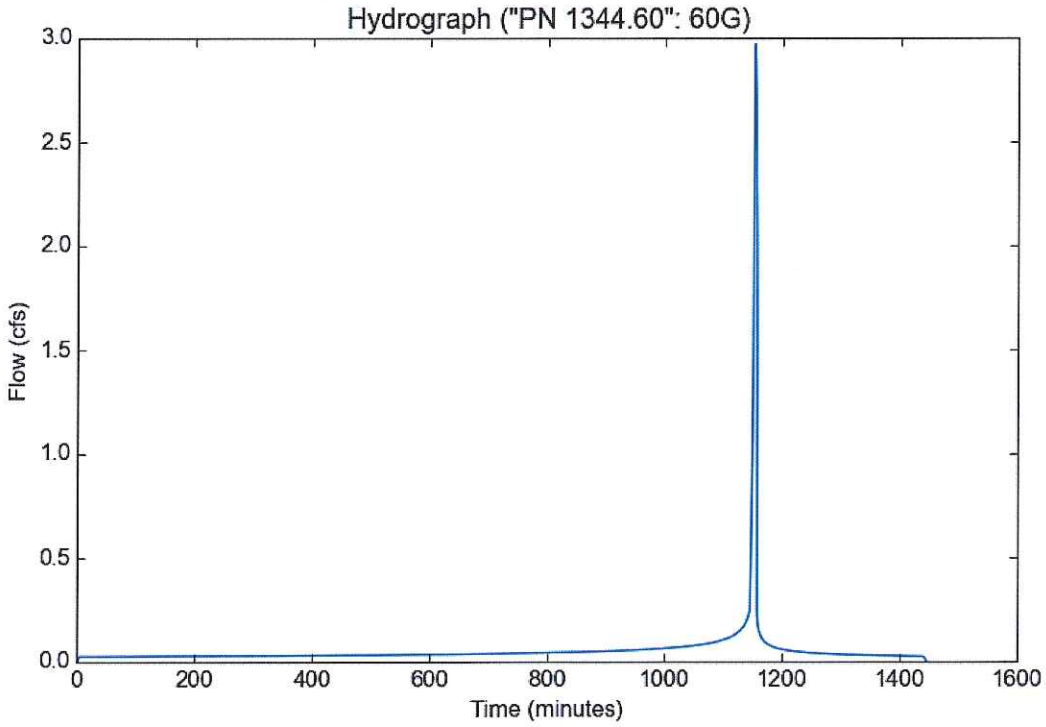
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	60G
Area (ac)	1.2
Flow Path Length (ft)	753.0
Flow Path Slope (vft/hft)	0.2377
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.03
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.5932
Developed Runoff Coefficient (Cd)	0.6024
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.9693
Burned Peak Flow Rate (cfs)	3.6423
24-Hr Clear Runoff Volume (ac-ft)	0.1134
24-Hr Clear Runoff Volume (cu-ft)	4941.4634



Peak Flow Hydrologic Analysis

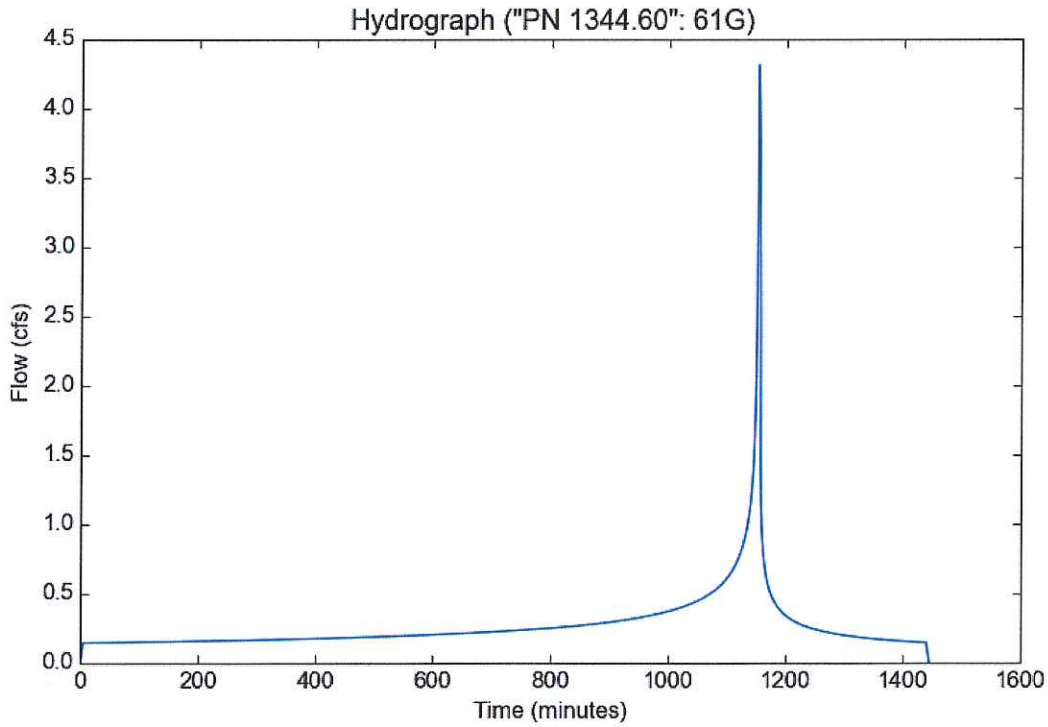
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	61G
Area (ac)	1.13
Flow Path Length (ft)	415.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.84
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.6088
Developed Runoff Coefficient (Cd)	0.8534
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.3152
Burned Peak Flow Rate (cfs)	4.5729
24-Hr Clear Runoff Volume (ac-ft)	0.544
24-Hr Clear Runoff Volume (cu-ft)	23696.88



Peak Flow Hydrologic Analysis

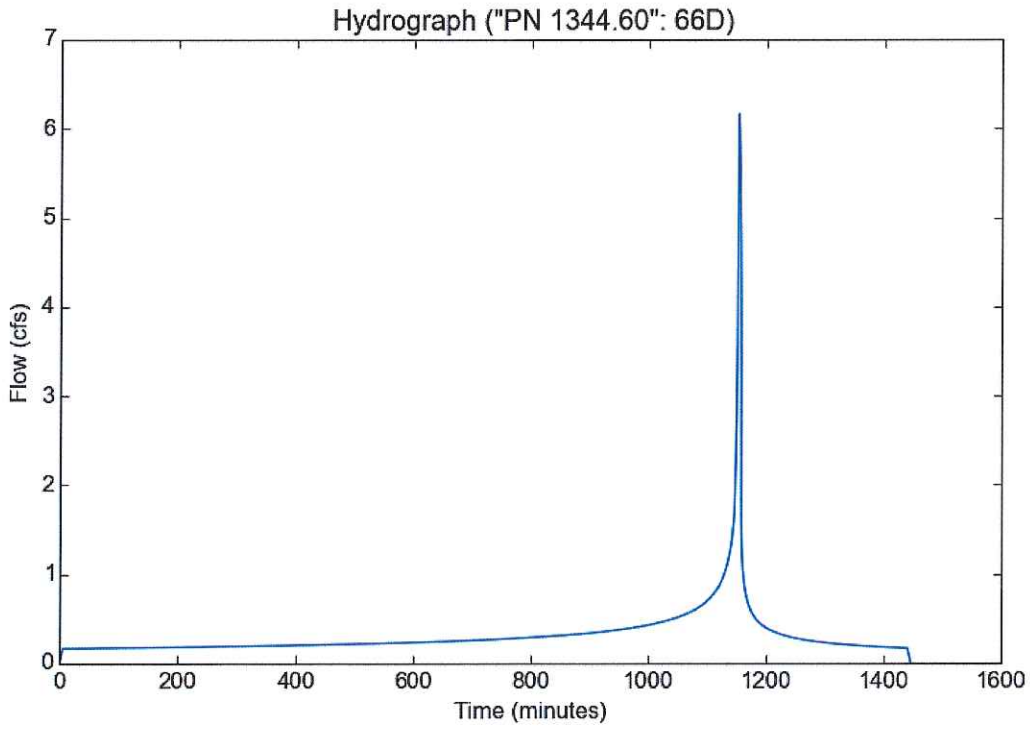
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	66D
Area (ac)	2.01
Flow Path Length (ft)	815.0
Flow Path Slope (vft/hft)	0.0736
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.5
Soil Type	35
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.1072
Undeveloped Runoff Coefficient (Cu)	0.5932
Developed Runoff Coefficient (Cd)	0.7466
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	6.1638
Burned Peak Flow Rate (cfs)	6.8823
24-Hr Clear Runoff Volume (ac-ft)	0.6412
24-Hr Clear Runoff Volume (cu-ft)	27932.6763



Peak Flow Hydrologic Analysis

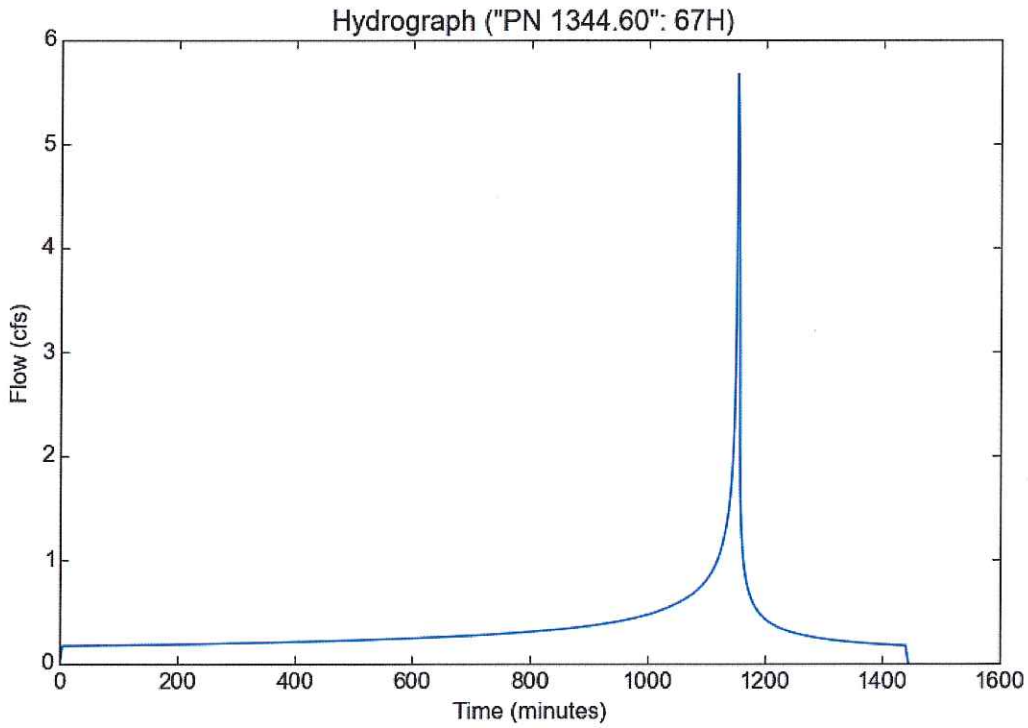
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	67H
Area (ac)	1.41
Flow Path Length (ft)	602.0
Flow Path Slope (vft/hft)	0.0831
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.8989
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.6717
Burned Peak Flow Rate (cfs)	5.8934
24-Hr Clear Runoff Volume (ac-ft)	0.6787
24-Hr Clear Runoff Volume (cu-ft)	29563.169



Peak Flow Hydrologic Analysis

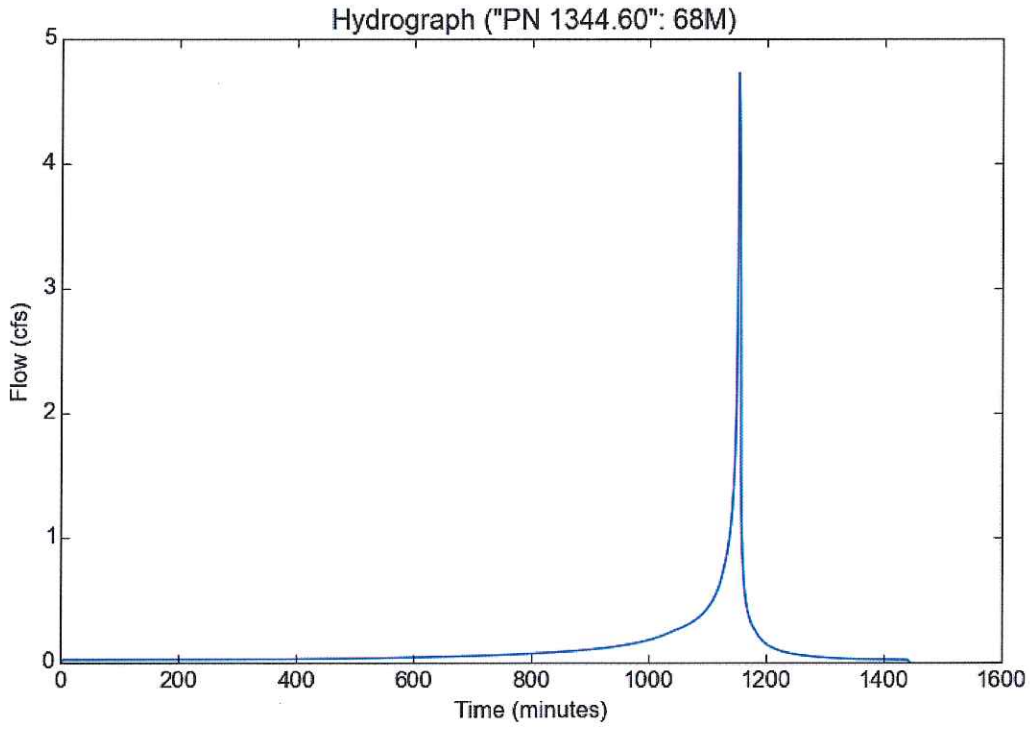
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 50 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	68M
Area (ac)	1.18
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.0314
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	50-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.5
Peak Intensity (in/hr)	4.4747
Undeveloped Runoff Coefficient (Cu)	0.8949
Developed Runoff Coefficient (Cd)	0.895
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.7258
Burned Peak Flow Rate (cfs)	4.9186
24-Hr Clear Runoff Volume (ac-ft)	0.2369
24-Hr Clear Runoff Volume (cu-ft)	10319.0716



PROPOSED 10 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\Users\rick.RJRENG\Desktop\LAR04 2186\lasoilx.da

Tentative Tract 71546

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
1344	1A	10.0	22.21	10.0	22.21	1	2020.	.23270	.00	.00	0.	234	8	A37	.02
1344	2A	29.4	65.28	39.4	76.89	1	2042.	.25470	.00	.00	0.	234	8	A37	.02
1344	3A	.0	.00	39.4	72.70	1	760.	.09470	.00	.00	0.	234	1	A37	.00
1344	4A	22.7	50.41	62.1	95.51	1	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	37.42	76.6	100.97	1	1505.	.36010	.00	.00	0.	234	6	A37	.02
1344	6A	.0	.00	76.6	100.32	1	948.	.06650	.00	.00	0.	234	1	A37	.00
1344	7A	12.9	27.13	89.5	108.93	1	2054.	.13880	.00	.00	0.	234	9	A37	.02
1344	8A	16.7	43.10	106.2	111.06	1	1321.	.43150	.00	.00	0.	234	6	A37	.02
1344	9A	.0	.00	106.2	110.81	4	360.	.02500	6.00	.00	0.	34	1	A37	.00
1344	10A	1.3	3.63	107.5	111.25	4	300.	.03000	3.00	.00	0.	34	5	A37	.71
1344	11A	.0	.00	107.5	111.19	4	92.	.02720	6.00	.00	0.	34	1	A37	.00
1344	12A	.0	.00	107.5	111.16	4	22.	.04540	6.00	.00	0.	34	1	A37	.00
1344	13B	14.1	31.31	14.1	31.31	1	1899.	.31070	.00	.00	0.	234	8	A37	.02
1344	14B	.0	.00	14.1	28.58	4	271.	.02000	4.00	.00	0.	34	1	A37	.00
1344	15B	1.1	3.08	15.2	29.34	4	335.	.01190	2.25	.00	0.	34	5	A37	.75
1344	16B	.0	.00	15.2	29.06	3	85.	.02350	4.00	.00	0.	34	1	A37	.00

****

CONFLUENCE Q'S

1344 17A TA 1169 QA 111.16 QAB 123.00 QB 11.84 1344 17B TB 1160 QB 28.96 QBA 124.65 QA 95.69

1344 17AB TAB 1165 QAB 127.18 QA 106.78 QB 20.40

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	17AB	15.2	28.96	122.7	127.18	4	348.	.03590	6.00	.00	0.	34	0	A37	.00
1344	18A	2.3	6.43	125.0	127.98	4	536.	.03080	3.25	.00	0.	34	5	A37	.74
1344	19A	.0	.00	125.0	127.82	4	116.	.02000	6.00	.00	0.	34	1	A37	.00
1344	20A	.4	1.12	125.4	127.95	4	232.	.05820	2.75	.00	0.	34	5	A37	.80
1344	21A	.0	.00	125.4	127.94	4	140.	.02000	6.00	.00	0.	34	1	A37	.00
1344	22A	1.4	3.93	126.8	128.49	4	361.	.00830	4.00	.00	0.	34	5	A37	.79
1344	23A	.0	.00	126.8	128.33	4	190.	.02000	6.00	.00	0.	34	1	A37	.00
1344	24A	.0	.00	126.8	128.26	4	305.	.02300	3.25	.00	0.	34	5	A37	.68
1344	25A	.0	.00	126.8	128.16	4	48.	.04000	6.00	.00	0.	34	1	A37	.00
1344	26C	4.8	11.41	4.8	11.41	1	1321.	.17030	.00	.00	0.	234	7	A37	.02
1344	27C	1.4	3.76	6.2	10.38	3	380.	.01840	.00	.00	0.	34	5	A37	.07
1344	28C	.0	.00	6.2	10.22	4	223.	.03000	4.00	.00	0.	34	1	A37	.00
1344	29C	1.2	3.35	7.4	10.87	4	326.	.02760	2.00	.00	0.	34	5	A37	.70
1344	30C	.0	.00	7.4	10.82	4	308.	.02000	4.00	.00	0.	34	1	A37	.00
1344	31C	1.7	4.74	9.1	12.70	4	414.	.02170	2.00	.00	0.	34	5	A37	.70
1344	32C	.0	.00	9.1	12.61	4	47.	.02000	4.00	.00	0.	34	1	A37	.00

```
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344   33A  TA 1169 QA   128.15 QAC   137.05 QC     8.90    1344   33C  TC 1156 QC    12.60 QCA   109.38 QA    96.78   *
*                              1344   33AC TAC 1163 QAC   138.52 QA   126.91 QC    11.61                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
   LOCATION     AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z     Q(CFS) NAME  TC   ZONE  IMPV
   1344   33AC     9.1      12.60      135.9    138.52   4      360.   .14400      6.00   .00      0.   34    0    A37   .00
   1344   34D      6.3      16.26        6.3     16.26   1     1212.   .21450       .00   .00      0.   234   6    A37   .02
   1344   35D       .0        .00        6.3     14.04   1       51.   .17650       .00   .00      0.   234   1    A37   .00
   1344   36D       .3        .86        6.6     14.29   1      224.   .17860       .00   .00      0.   234   5    A37   .02
   1344   37D       .0        .00        6.6     14.10   1       34.   .03000       .00   .00      0.   234   1    A37   .00
   1344   38E      5.3      15.20        5.3     15.20   1      860.   .39530       .00   .00      0.   234   5    A37   .02
   1344   39E       .0        .00        5.3     13.64   1       74.   .20280       .00   .00      0.   234   1    A37   .00
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344   40D  TB 1159 QB    13.98 QBC    22.55 QC     8.57    1344    8C  TC 1155 QC    13.41 QCB    22.98 QB     9.57   *
*                              1344    8BC TBC 1157 QBC    24.93 QB    12.92 QC    12.01                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
   LOCATION     AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z     Q(CFS) NAME  TC   ZONE  IMPV
   1344   40DE     5.3      13.41       11.9     24.93   1      115.   .03000       .00   .00      0.   234   0    A37   .00
   1344   41D       .6       1.72       12.5     25.13   1      372.   .57260       .00   .00      0.   234   5    A37   .02
   1344   42D       .0        .00       12.5     25.03   1      133.   .04000       .00   .00      0.   234   1    A37   .00
   1344   43D      1.1       3.16       13.6     25.50   1      433.   .49650       .00   .00      0.   234   5    A37   .02
   1344   44D       .0        .00       13.6     25.29   1       73.   .02740       .00   .00      0.   234   1    A37   .00
   1344   45F     12.2      31.48       12.2     31.48   1     1323.   .24940       .00   .00      0.   234   6    A37   .02
   1344   46F       .0        .00       12.2     27.99   1       86.   .08140       .00   .00      0.   234   1    A37   .00
   1344   47F       .7       2.01       12.9     28.81   1      340.   .64710       .00   .00      0.   234   5    A37   .02
   1344   48F       .0        .00       12.9     28.34   1      100.   .08500       .00   .00      0.   234   1    A37   .00
   1344   49DF    12.9      28.26       26.5     51.23   1      246.   .04880       .00   .00      0.   234   0    A37   .00
   1344   50D       .9       2.58       27.4     51.07   1      246.   .04000       .00   .00      0.   234   5    A37   .02
   1344   51D      1.8       5.16       29.2     51.08   1      675.   .42960       .00   .00      0.   234   5    A37   .02
   1344   52D       .0        .00       29.2     50.71   1      240.   .05830       .00   .00      0.   234   1    A37   .00
   1344   53D       .7       2.01       29.9     50.57   1      240.   .05000       .00   .00      0.   234   5    A37   .02
   1344   54D       .0        .00       29.9     50.14   4      105.   .04200      5.00   .00      0.    34   1    A37   .00
   1344   55D       .9       2.54       30.8     50.50   4      190.   .01050      2.75   .00      0.    34   5    A37   .93
   1344   56D       .0        .00       30.8     50.22   4      280.   .06960      2.00   .00      0.    34   1    A37   .00
   1344   57D      2.2       6.09       33.0     50.97   4      529.   .07720      2.00   .00      0.    34   5    A37   .56
   1344   58D      1.4       4.02       34.4     51.11   1      737.   .44100       .00   .00      0.   234   5    A37   .02
   1344   59D       .0        .00       34.4     50.76   3       78.   .06500      5.00   .00      0.    34   1    A37   .00
   1344   60G      1.2       2.41        1.2      2.41   1      753.   .23770       .00   .00      0.   234  10    A37   .03
   1344   61G      1.1       3.09        2.3      4.32   3      415.   .01200       .00   .00      0.    34   5    A37   .84
   1344   62G       .0        .00        2.3      3.87   4       33.   .04290      3.00   .00      0.    34   1    A37   .00
   1344   63G       .0        .00        2.3      3.87   4      247.   .02020      3.00   .00      0.    34   1    A37   .00
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*   1344   64D  TB 1168 QB    50.69 QBE    53.17 QE     2.48    1344   32E  TE 1158 QE     3.84 QEB    35.43 QB    31.59   *
*                              1344   32BE TBE 1168 QBE    53.17 QB    50.69 QE     2.48                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
```

LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
1344	64DG	2.3	3.84	36.7	53.17	4	113.	.05000	5.00	.00	0.	34	0	A37	.00
1344	65D	.0	.00	36.7	53.11	4	24.	.03000	5.00	.00	0.	34	1	A37	.00
1344	66D	2.0	4.39	38.7	53.55	1	815.	.07360	.00	.00	0.	34	7	A37	.01
1344	67H	1.4	3.93	1.4	3.93	3	602.	.08310	.00	.00	0.	34	5	A37	.79
1344	68H	.0	.00	1.4	3.43	4	76.	.10530	2.00	.00	0.	34	1	A37	.00

* CONFLUENCE Q'S *

* 1344 69D TB 1171 QB 51.93 QBF 52.53 QF .60 1344 37F TF 1155 QF 3.40 QFB 30.31 QB 26.91 *

* 1344 37BF TBF 1171 QBF 52.53 QB 51.93 QF .60 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	69DH	1.4	3.40	40.1	52.53	4	80.	.02000	5.00	.00	0.	34	0	A37	.00
1344	70D	.0	.00	40.1	52.44	4	270.	.02000	5.00	.00	0.	34	1	A37	.00

* CONFLUENCE Q'S *

* 1344 71D TA 1153 QA 134.61 QAB 158.52 QB 23.91 1344 39B TB 1172 QB 52.35 QBA 64.05 QA 11.70 *

* 1344 39AB TAB 1153 QAB 158.52 QA 134.61 QB 23.91 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	71AD	40.1	52.35	87.1	158.52	4	461.	.02820	6.00	.00	0.	34	0	A37	.00
1344	72A	.0	.00	87.1	151.82	4	10.	.02000	6.00	.00	0.	34	1	A37	.00

Peak Flow Hydrologic Analysis

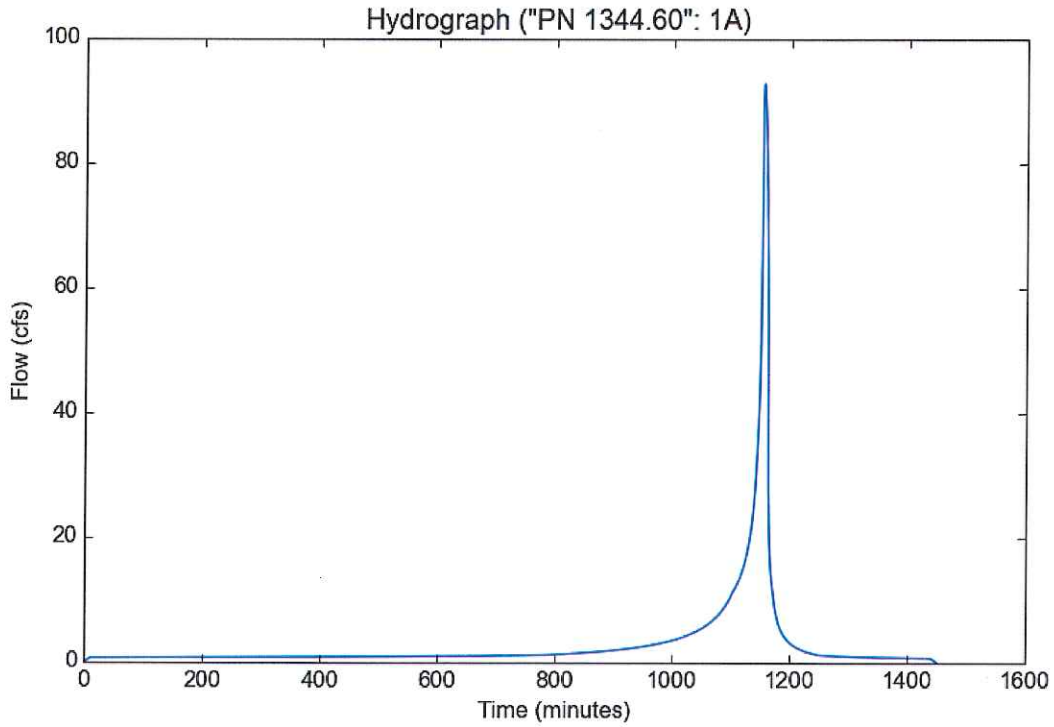
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	1A
Area (ac)	52.7
Flow Path Length (ft)	2020.0
Flow Path Slope (vft/hft)	0.2327
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.2056
Undeveloped Runoff Coefficient (Cu)	0.7967
Developed Runoff Coefficient (Cd)	0.7987
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	92.8411
Burned Peak Flow Rate (cfs)	100.1315
24-Hr Clear Runoff Volume (ac-ft)	5.9988
24-Hr Clear Runoff Volume (cu-ft)	261307.44



Peak Flow Hydrologic Analysis

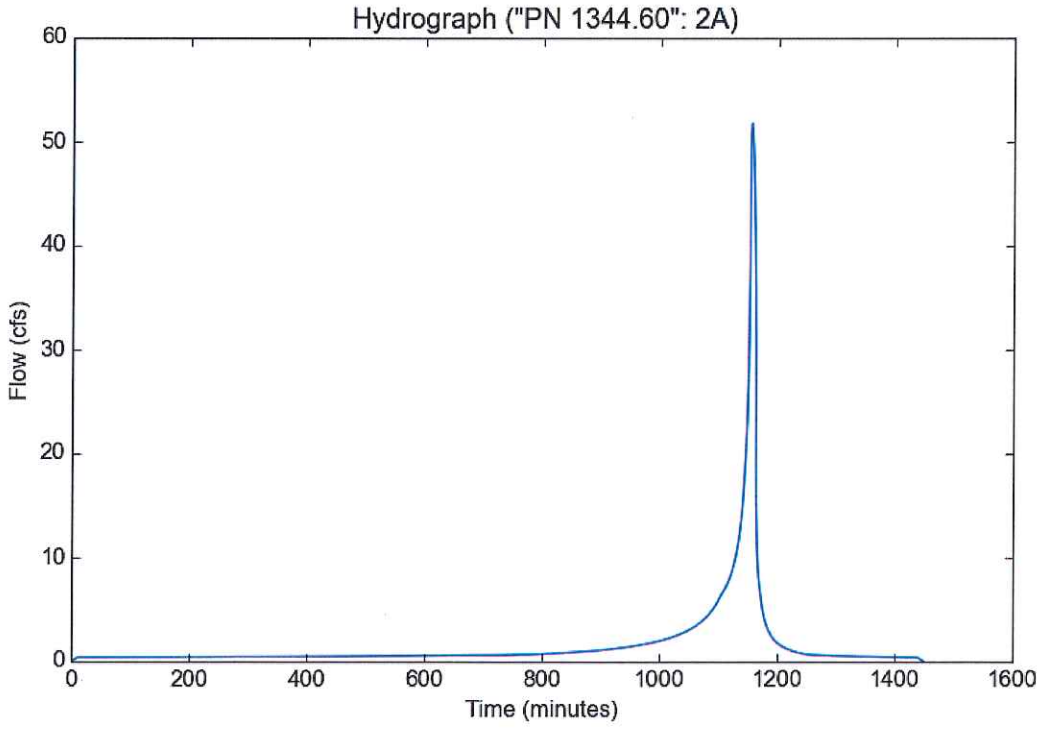
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	2A
Area (ac)	29.4
Flow Path Length (ft)	2042.0
Flow Path Slope (vft/hft)	0.2547
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.2056
Undeveloped Runoff Coefficient (Cu)	0.7967
Developed Runoff Coefficient (Cd)	0.7987
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	51.7937
Burned Peak Flow Rate (cfs)	55.8608
24-Hr Clear Runoff Volume (ac-ft)	3.3466
24-Hr Clear Runoff Volume (cu-ft)	145776.8261



Peak Flow Hydrologic Analysis

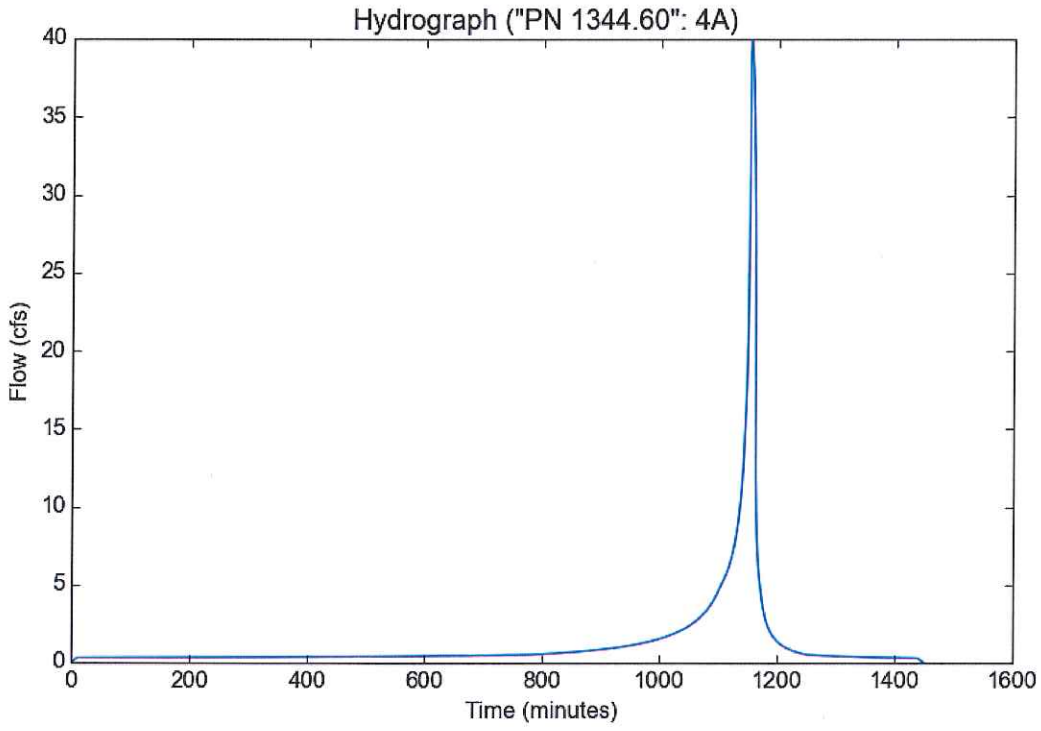
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	4A
Area (ac)	22.7
Flow Path Length (ft)	1952.0
Flow Path Slope (vft/hft)	0.2188
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.2056
Undeveloped Runoff Coefficient (Cu)	0.7967
Developed Runoff Coefficient (Cd)	0.7987
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	39.9904
Burned Peak Flow Rate (cfs)	43.1306
24-Hr Clear Runoff Volume (ac-ft)	2.5839
24-Hr Clear Runoff Volume (cu-ft)	112555.5766



Peak Flow Hydrologic Analysis

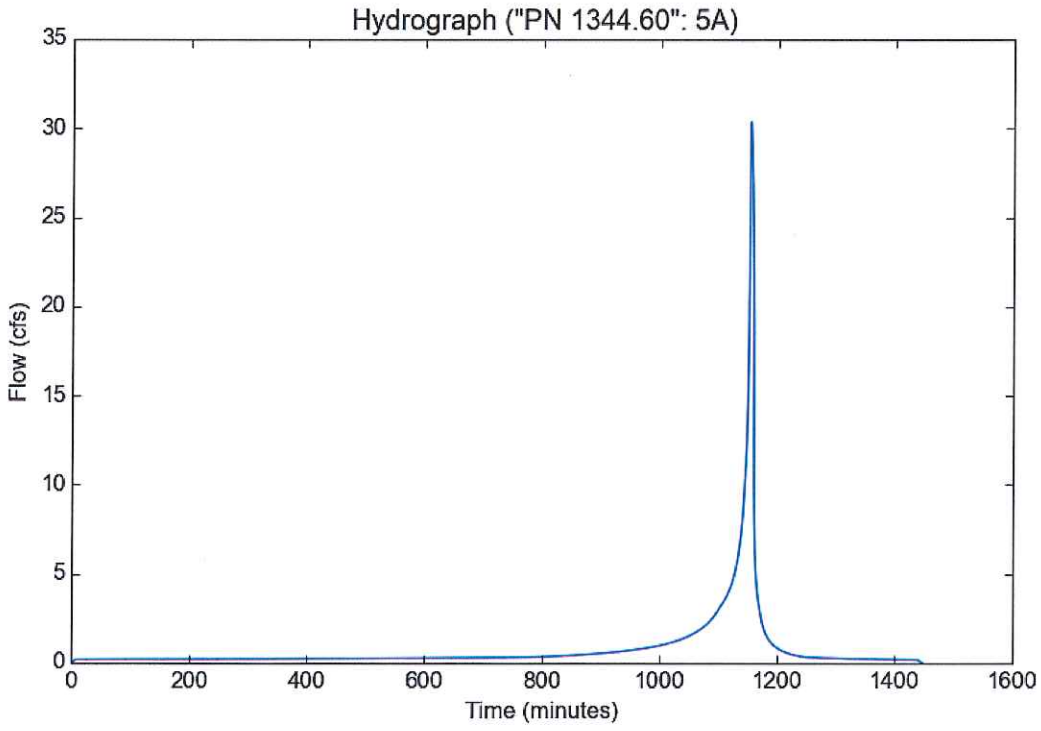
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	5A
Area (ac)	14.5
Flow Path Length (ft)	1505.0
Flow Path Slope (vft/hft)	0.3601
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.5617
Undeveloped Runoff Coefficient (Cu)	0.8164
Developed Runoff Coefficient (Cd)	0.8181
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	30.3869
Burned Peak Flow Rate (cfs)	32.5459
24-Hr Clear Runoff Volume (ac-ft)	1.6512
24-Hr Clear Runoff Volume (cu-ft)	71927.4495



Peak Flow Hydrologic Analysis

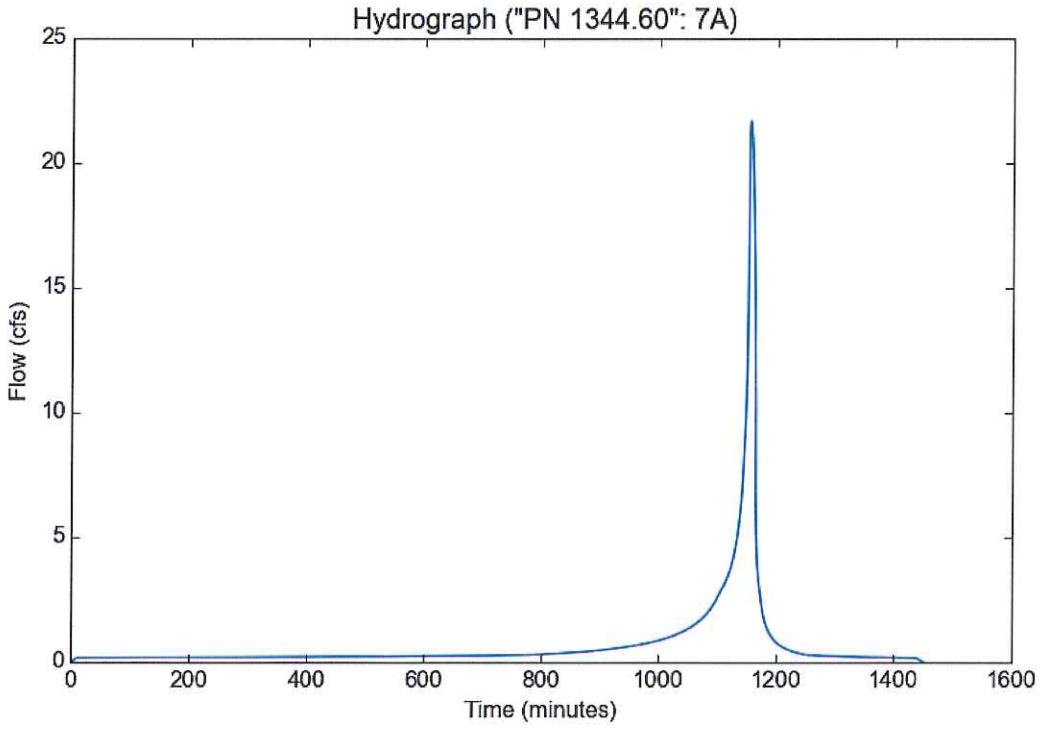
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	7A
Area (ac)	12.9
Flow Path Length (ft)	2054.0
Flow Path Slope (vft/hft)	0.1388
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.1172
Undeveloped Runoff Coefficient (Cu)	0.7918
Developed Runoff Coefficient (Cd)	0.7939
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	21.6841
Burned Peak Flow Rate (cfs)	23.4258
24-Hr Clear Runoff Volume (ac-ft)	1.4683
24-Hr Clear Runoff Volume (cu-ft)	63959.9357



Peak Flow Hydrologic Analysis

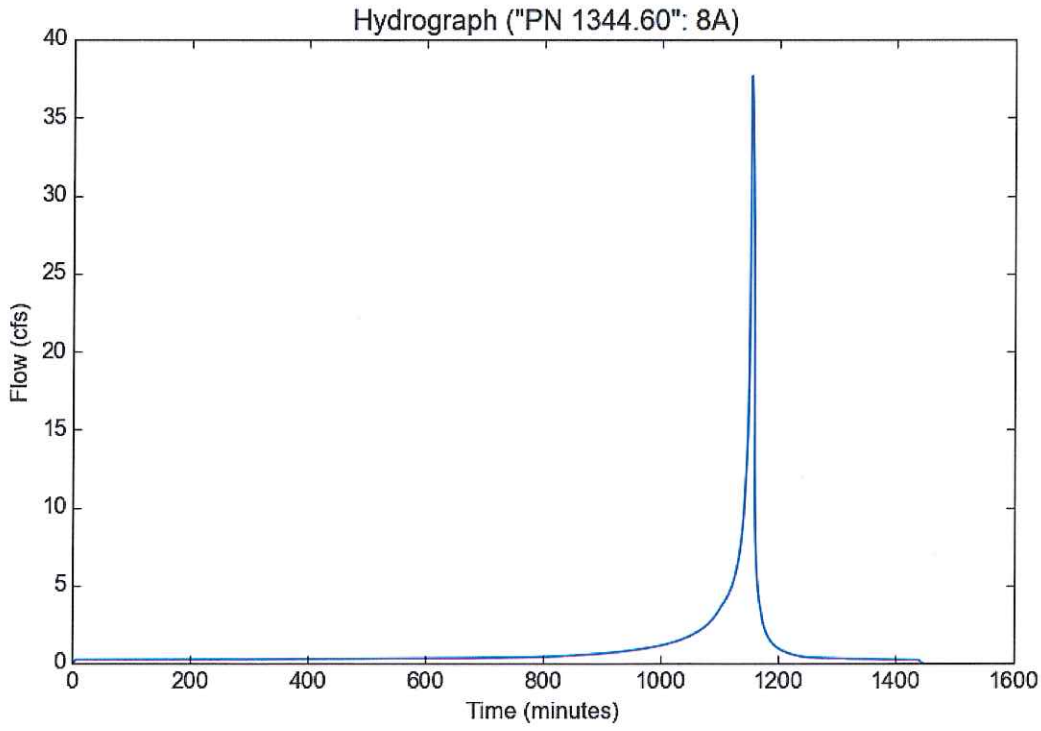
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	8A
Area (ac)	16.7
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.4315
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.7276
Undeveloped Runoff Coefficient (Cu)	0.8256
Developed Runoff Coefficient (Cd)	0.8271
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	37.6744
Burned Peak Flow Rate (cfs)	40.2167
24-Hr Clear Runoff Volume (ac-ft)	1.9024
24-Hr Clear Runoff Volume (cu-ft)	82868.186



Peak Flow Hydrologic Analysis

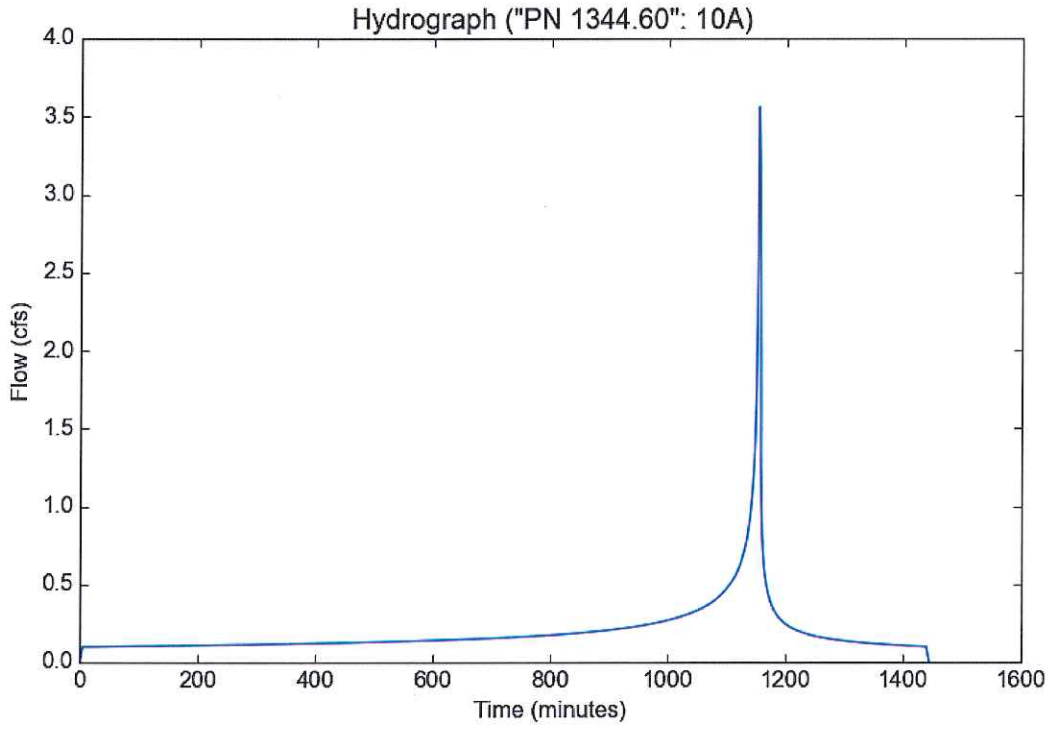
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	10A
Area (ac)	1.26
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.71
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.885
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5628
Burned Peak Flow Rate (cfs)	3.7159
24-Hr Clear Runoff Volume (ac-ft)	0.3959
24-Hr Clear Runoff Volume (cu-ft)	17244.2997



Peak Flow Hydrologic Analysis

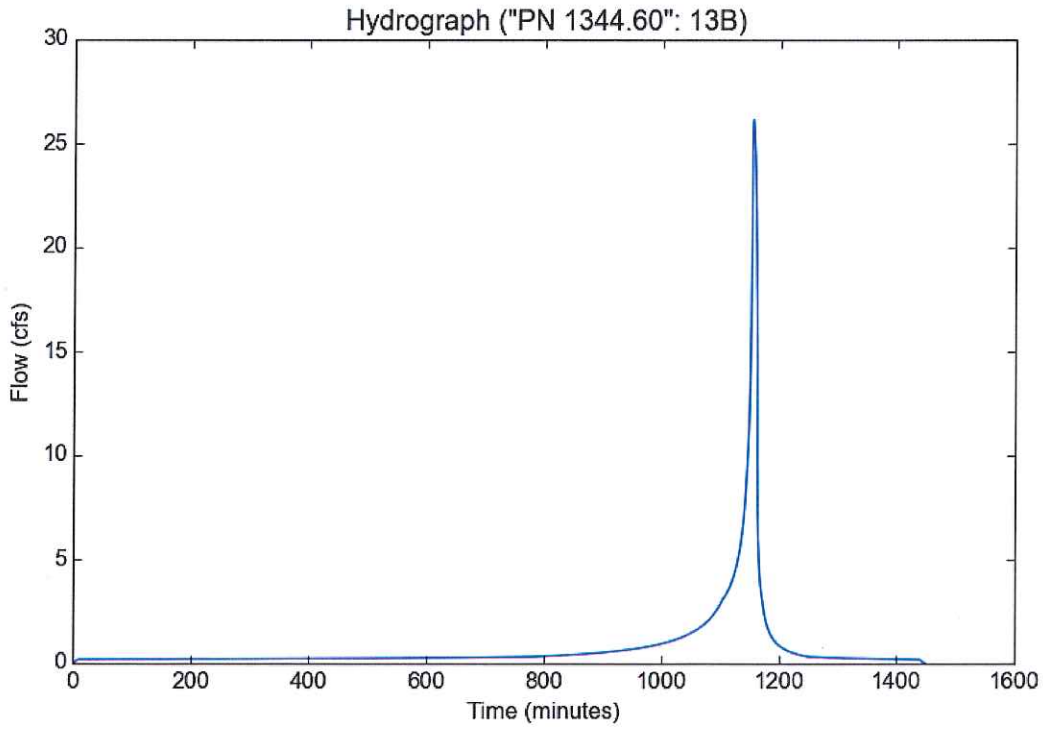
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	13B
Area (ac)	14.1
Flow Path Length (ft)	1899.0
Flow Path Slope (vft/hft)	0.3107
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.3066
Undeveloped Runoff Coefficient (Cu)	0.8023
Developed Runoff Coefficient (Cd)	0.8042
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	26.1563
Burned Peak Flow Rate (cfs)	28.1556
24-Hr Clear Runoff Volume (ac-ft)	1.6051
24-Hr Clear Runoff Volume (cu-ft)	69918.2375



Peak Flow Hydrologic Analysis

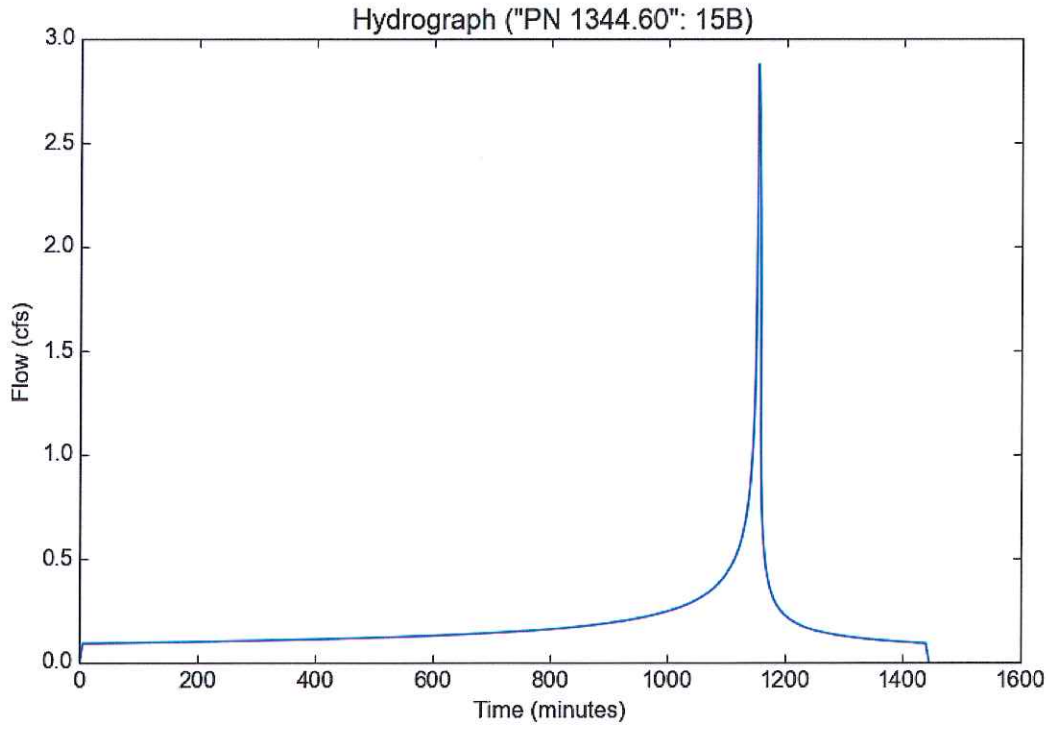
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	15B
Area (ac)	1.11
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0119
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.75
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8842
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.8783
Burned Peak Flow Rate (cfs)	3.0013
24-Hr Clear Runoff Volume (ac-ft)	0.3616
24-Hr Clear Runoff Volume (cu-ft)	15751.6239



Peak Flow Hydrologic Analysis

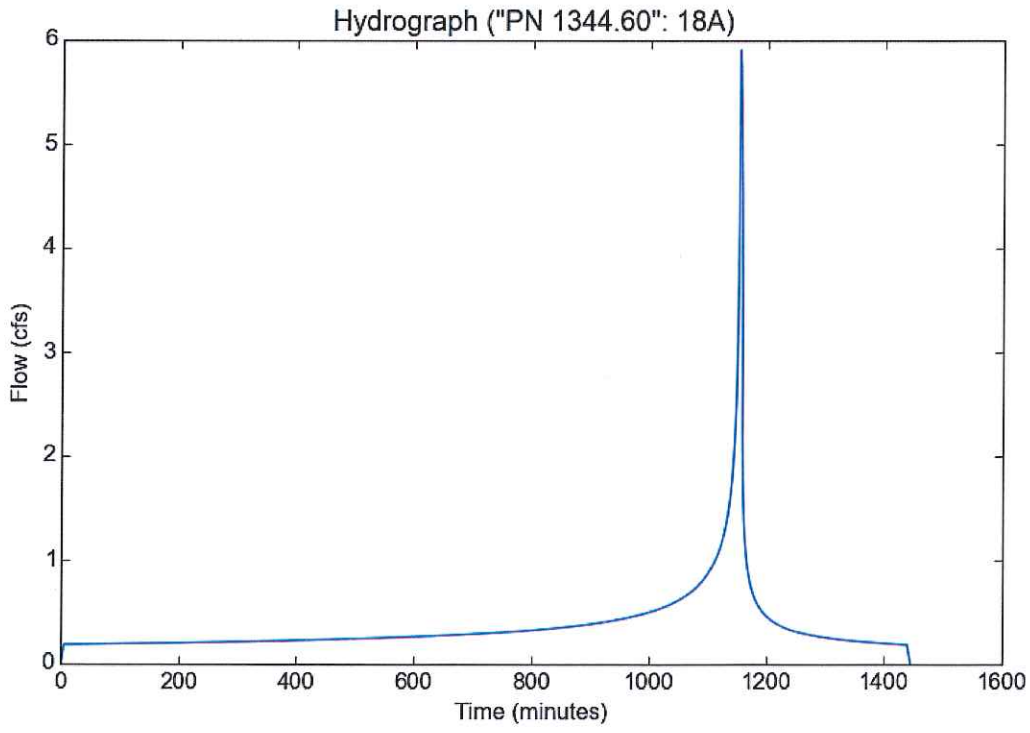
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	18A
Area (ac)	2.28
Flow Path Length (ft)	536.0
Flow Path Slope (vft/hft)	0.0308
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.74
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8836
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	5.908
Burned Peak Flow Rate (cfs)	6.1621
24-Hr Clear Runoff Volume (ac-ft)	0.7361
24-Hr Clear Runoff Volume (cu-ft)	32066.5354



Peak Flow Hydrologic Analysis

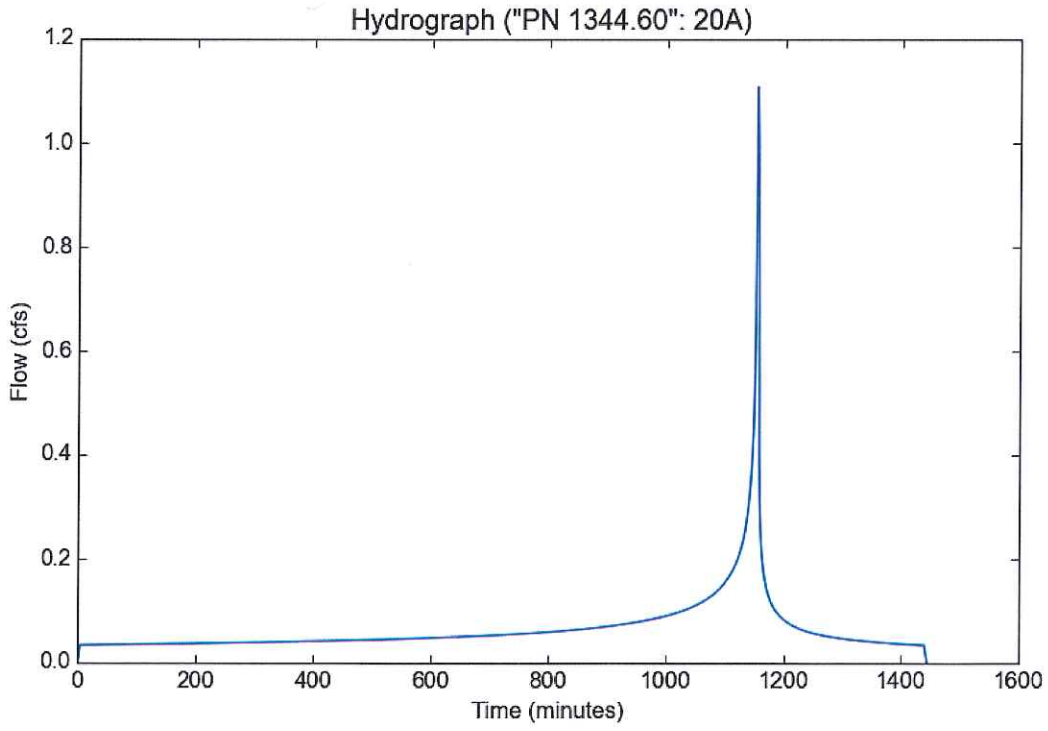
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	20A
Area (ac)	0.39
Flow Path Length (ft)	232.0
Flow Path Slope (vft/hft)	0.0582
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.8
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8897
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1086
Burned Peak Flow Rate (cfs)	1.154
24-Hr Clear Runoff Volume (ac-ft)	0.1327
24-Hr Clear Runoff Volume (cu-ft)	5781.0223



Peak Flow Hydrologic Analysis

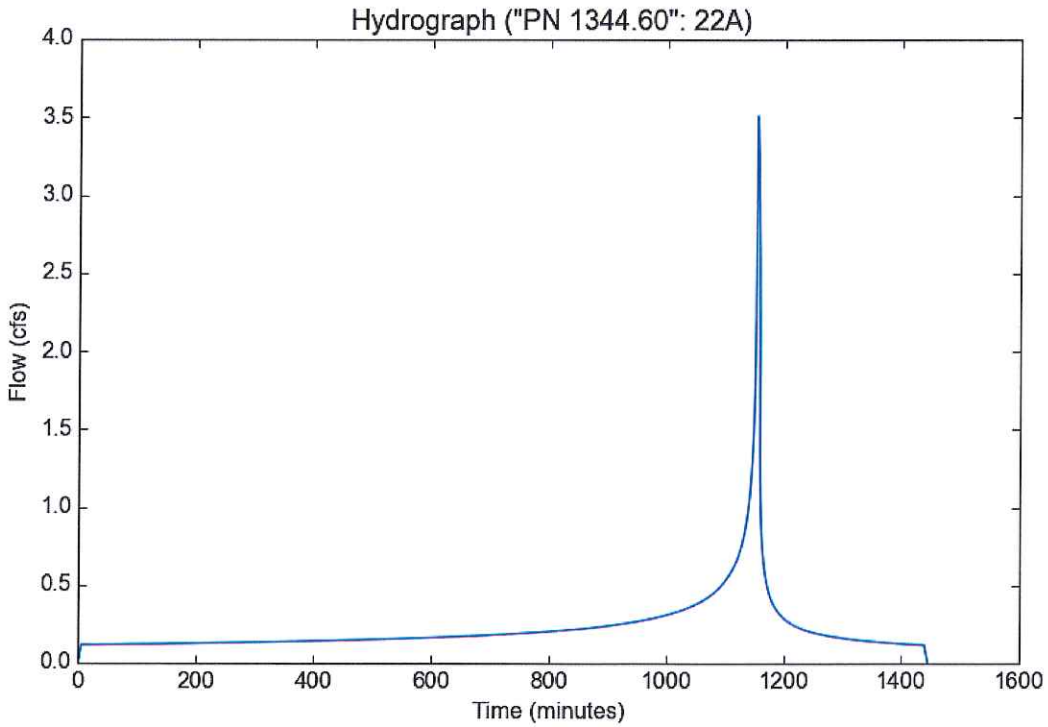
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	22A
Area (ac)	1.35
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.0083
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8868
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.5106
Burned Peak Flow Rate (cfs)	3.657
24-Hr Clear Runoff Volume (ac-ft)	0.4555
24-Hr Clear Runoff Volume (cu-ft)	19839.8444



Peak Flow Hydrologic Analysis

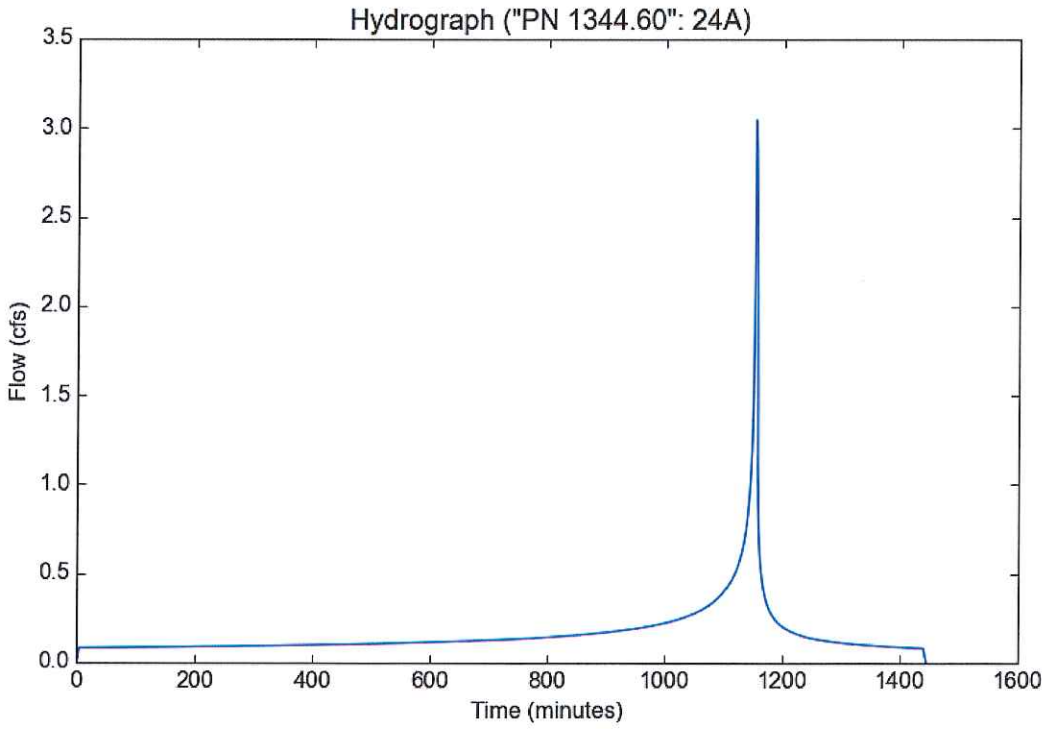
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	24A
Area (ac)	1.08
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.023
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.68
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8835
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.0485
Burned Peak Flow Rate (cfs)	3.1815
24-Hr Clear Runoff Volume (ac-ft)	0.3299
24-Hr Clear Runoff Volume (cu-ft)	14371.4428



Peak Flow Hydrologic Analysis

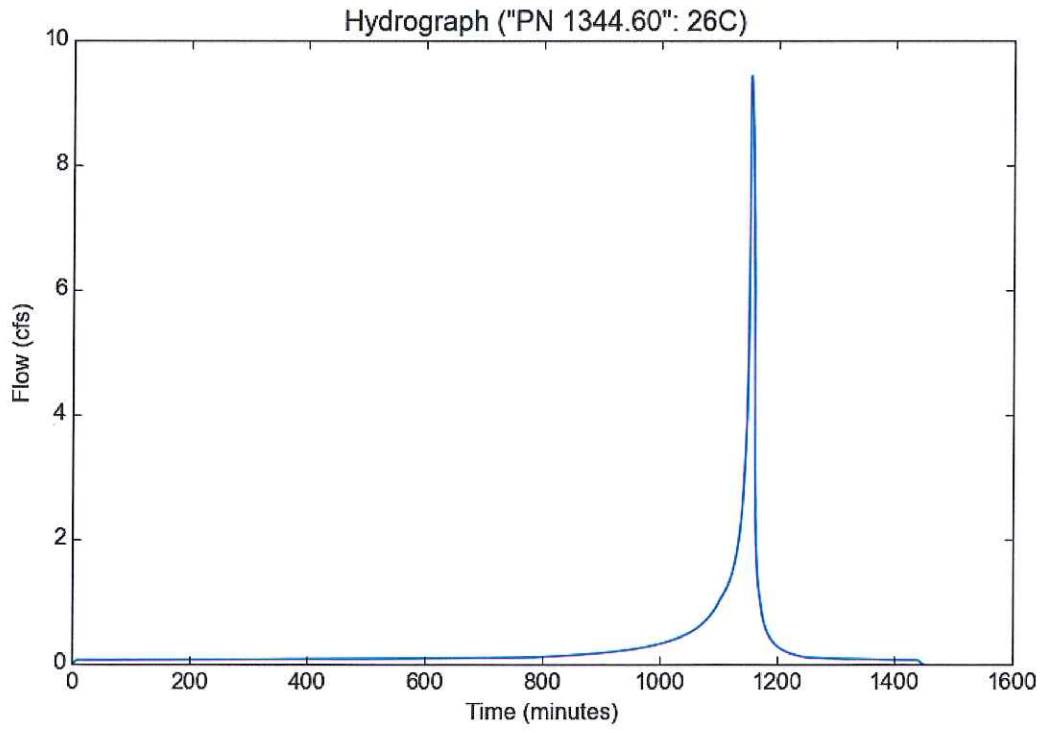
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	26C
Area (ac)	4.8
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.1703
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.4237
Undeveloped Runoff Coefficient (Cu)	0.8088
Developed Runoff Coefficient (Cd)	0.8106
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	9.4303
Burned Peak Flow Rate (cfs)	10.1279
24-Hr Clear Runoff Volume (ac-ft)	0.5465
24-Hr Clear Runoff Volume (cu-ft)	23805.1938



Peak Flow Hydrologic Analysis

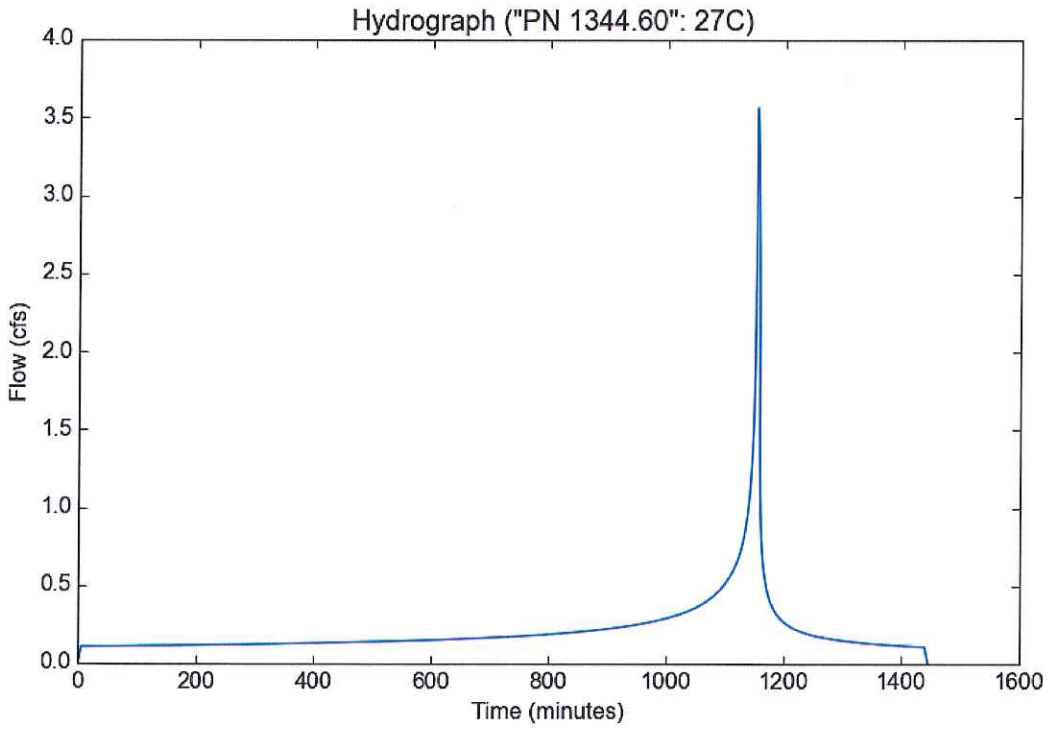
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	27C
Area (ac)	1.38
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.0184
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8811
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.5657
Burned Peak Flow Rate (cfs)	3.7228
24-Hr Clear Runoff Volume (ac-ft)	0.4295
24-Hr Clear Runoff Volume (cu-ft)	18711.0626



Peak Flow Hydrologic Analysis

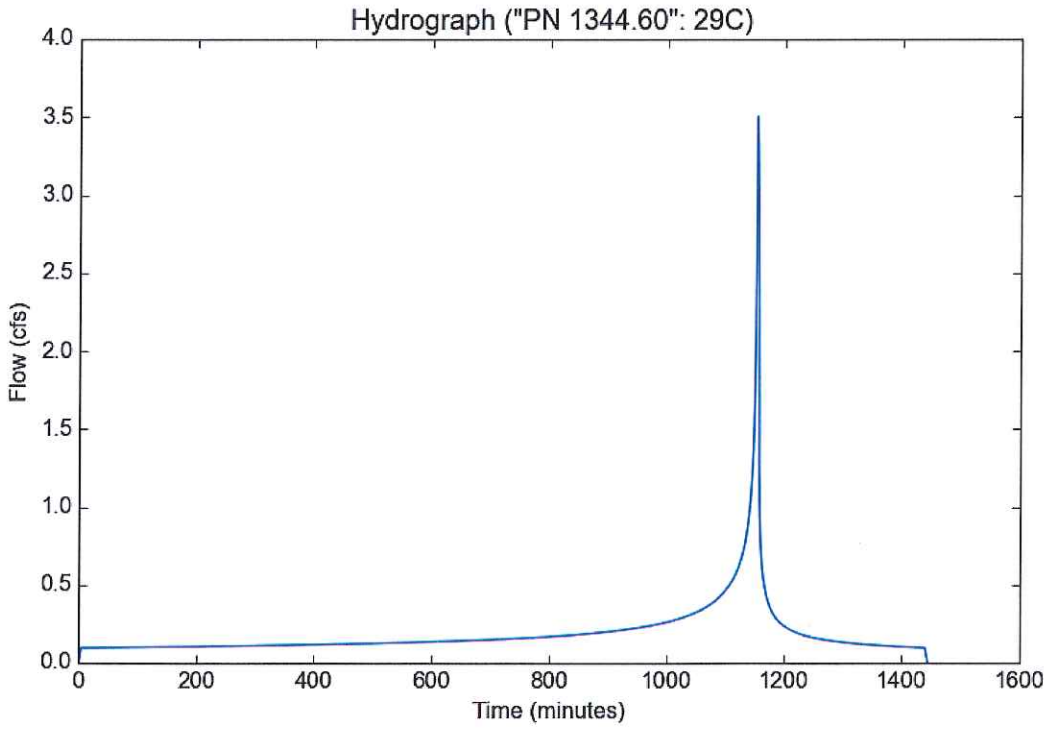
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	29C
Area (ac)	1.24
Flow Path Length (ft)	326.0
Flow Path Slope (vft/hft)	0.0276
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8845
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.5042
Burned Peak Flow Rate (cfs)	3.6556
24-Hr Clear Runoff Volume (ac-ft)	0.386
24-Hr Clear Runoff Volume (cu-ft)	16813.9023



Peak Flow Hydrologic Analysis

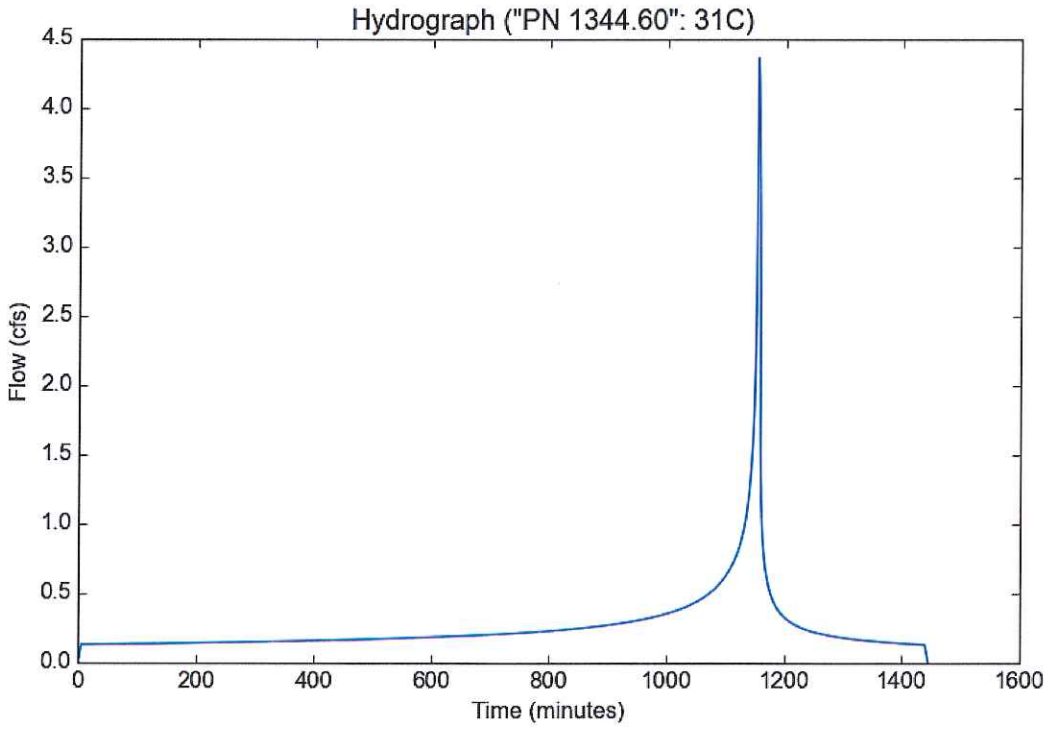
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	31C
Area (ac)	1.69
Flow Path Length (ft)	414.0
Flow Path Slope (vft/hft)	0.0217
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8811
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	4.3667
Burned Peak Flow Rate (cfs)	4.5591
24-Hr Clear Runoff Volume (ac-ft)	0.526
24-Hr Clear Runoff Volume (cu-ft)	22914.2723



Peak Flow Hydrologic Analysis

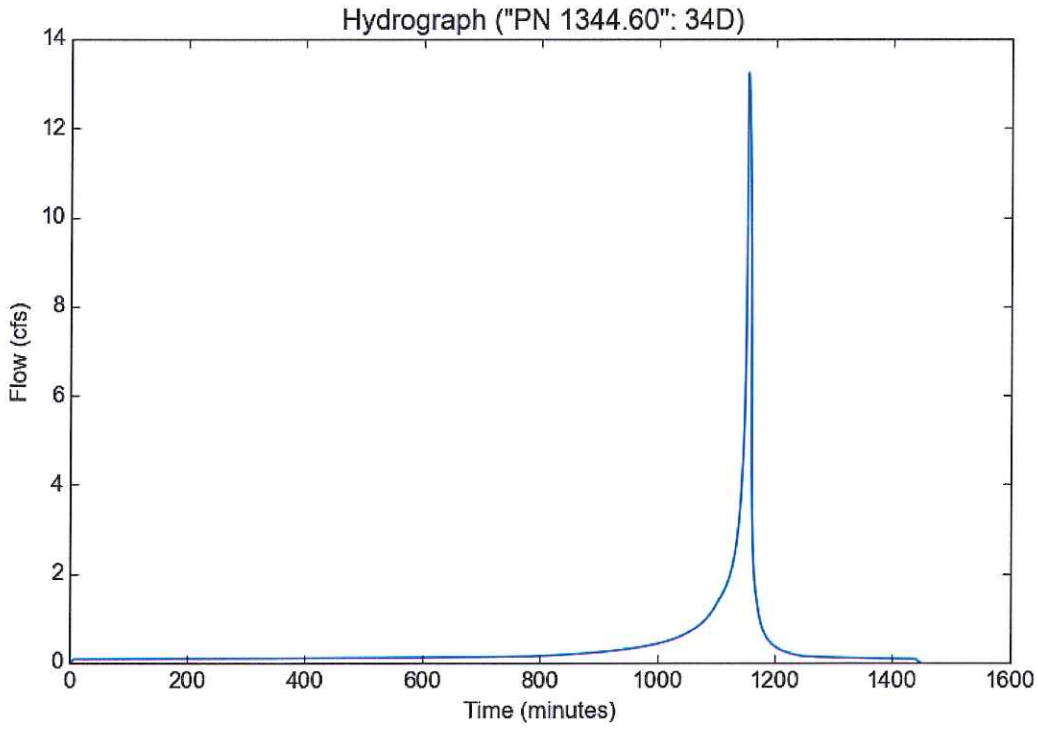
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	34D
Area (ac)	6.32
Flow Path Length (ft)	1212.0
Flow Path Slope (vft/hft)	0.2145
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.5617
Undeveloped Runoff Coefficient (Cu)	0.8164
Developed Runoff Coefficient (Cd)	0.8181
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	13.2445
Burned Peak Flow Rate (cfs)	14.1855
24-Hr Clear Runoff Volume (ac-ft)	0.7197
24-Hr Clear Runoff Volume (cu-ft)	31350.4469



Peak Flow Hydrologic Analysis

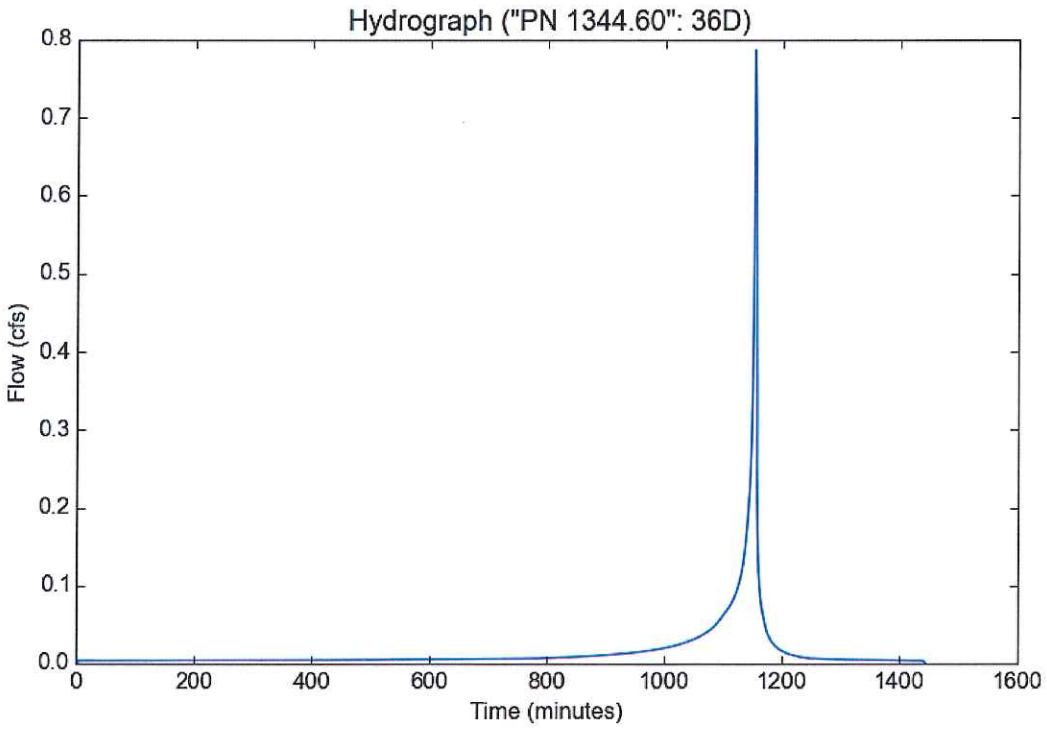
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	36D
Area (ac)	0.29
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1786
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.787
Burned Peak Flow Rate (cfs)	0.8332
24-Hr Clear Runoff Volume (ac-ft)	0.0331
24-Hr Clear Runoff Volume (cu-ft)	1440.5914



Peak Flow Hydrologic Analysis

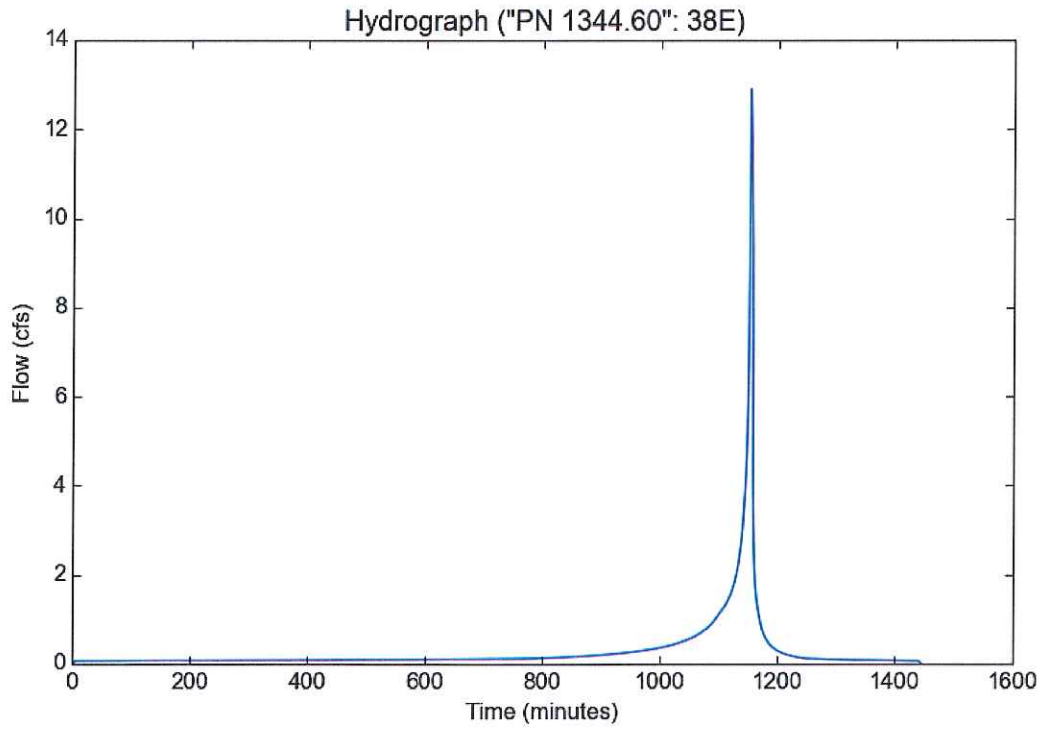
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	38E
Area (ac)	5.25
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.3953
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8382
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	12.905
Burned Peak Flow Rate (cfs)	13.7183
24-Hr Clear Runoff Volume (ac-ft)	0.5984
24-Hr Clear Runoff Volume (cu-ft)	26064.9347



Peak Flow Hydrologic Analysis

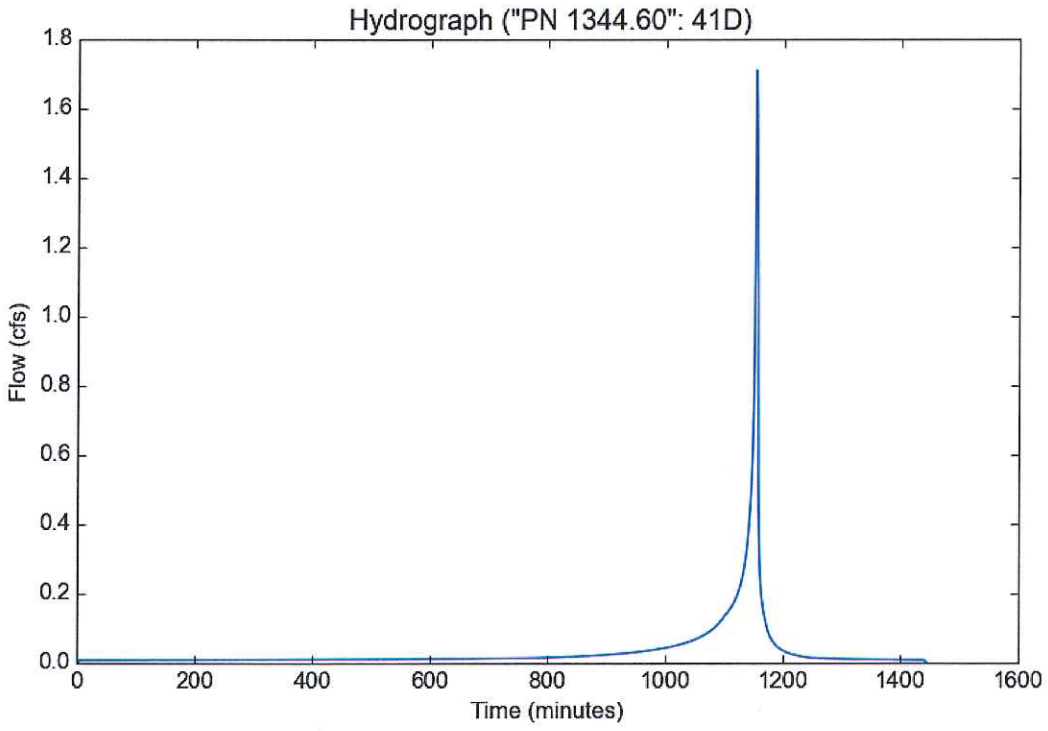
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	41D
Area (ac)	0.63
Flow Path Length (ft)	372.0
Flow Path Slope (vft/hft)	0.5726
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7097
Burned Peak Flow Rate (cfs)	1.81
24-Hr Clear Runoff Volume (ac-ft)	0.0718
24-Hr Clear Runoff Volume (cu-ft)	3129.5606



Peak Flow Hydrologic Analysis

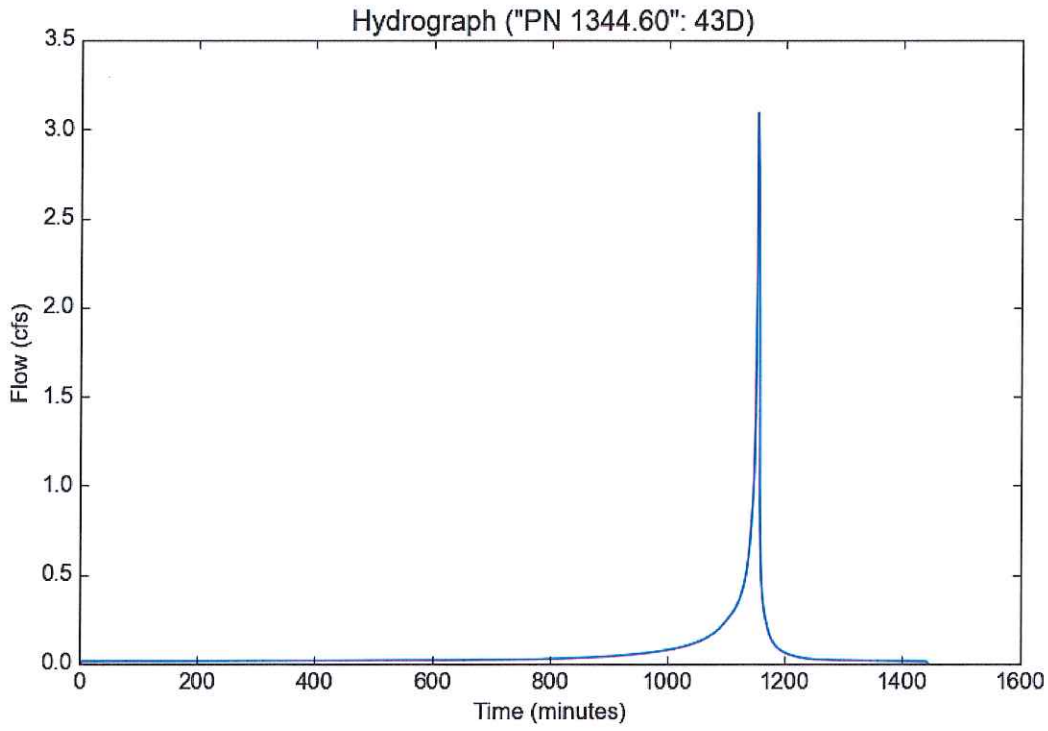
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	43D
Area (ac)	1.14
Flow Path Length (ft)	433.0
Flow Path Slope (vft/hft)	0.4965
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.0937
Burned Peak Flow Rate (cfs)	3.2752
24-Hr Clear Runoff Volume (ac-ft)	0.13
24-Hr Clear Runoff Volume (cu-ft)	5663.0144



Peak Flow Hydrologic Analysis

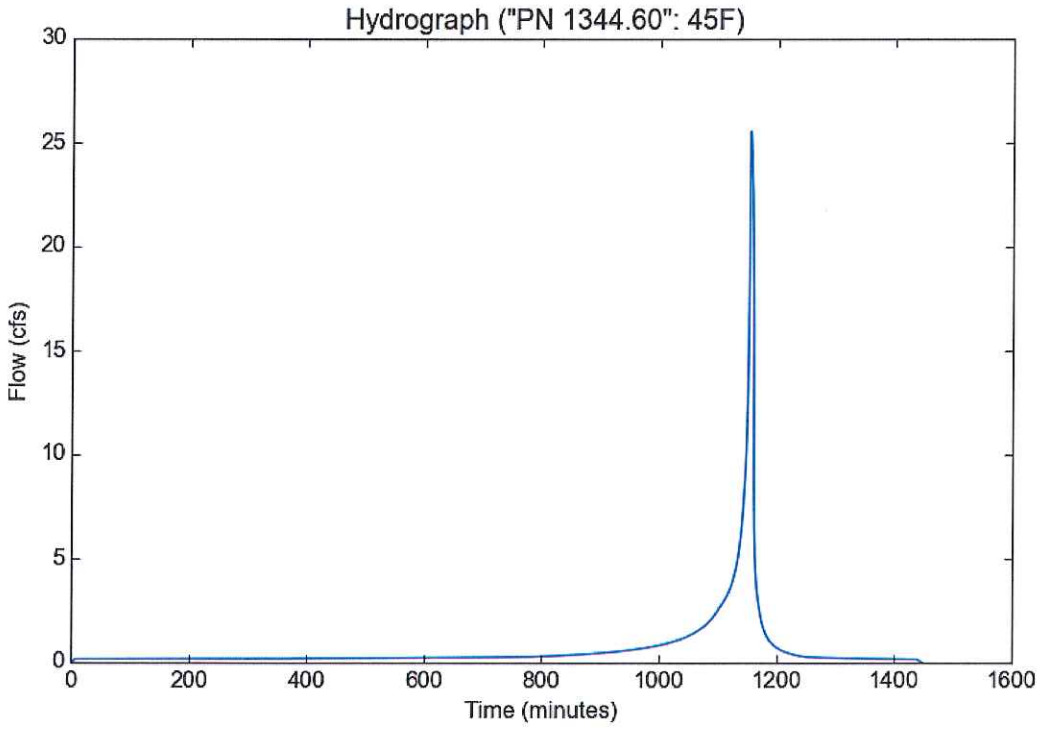
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	45F
Area (ac)	12.2
Flow Path Length (ft)	1323.0
Flow Path Slope (vft/hft)	0.2494
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.5617
Undeveloped Runoff Coefficient (Cu)	0.8164
Developed Runoff Coefficient (Cd)	0.8181
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	25.5669
Burned Peak Flow Rate (cfs)	27.3835
24-Hr Clear Runoff Volume (ac-ft)	1.3893
24-Hr Clear Runoff Volume (cu-ft)	60518.2678



Peak Flow Hydrologic Analysis

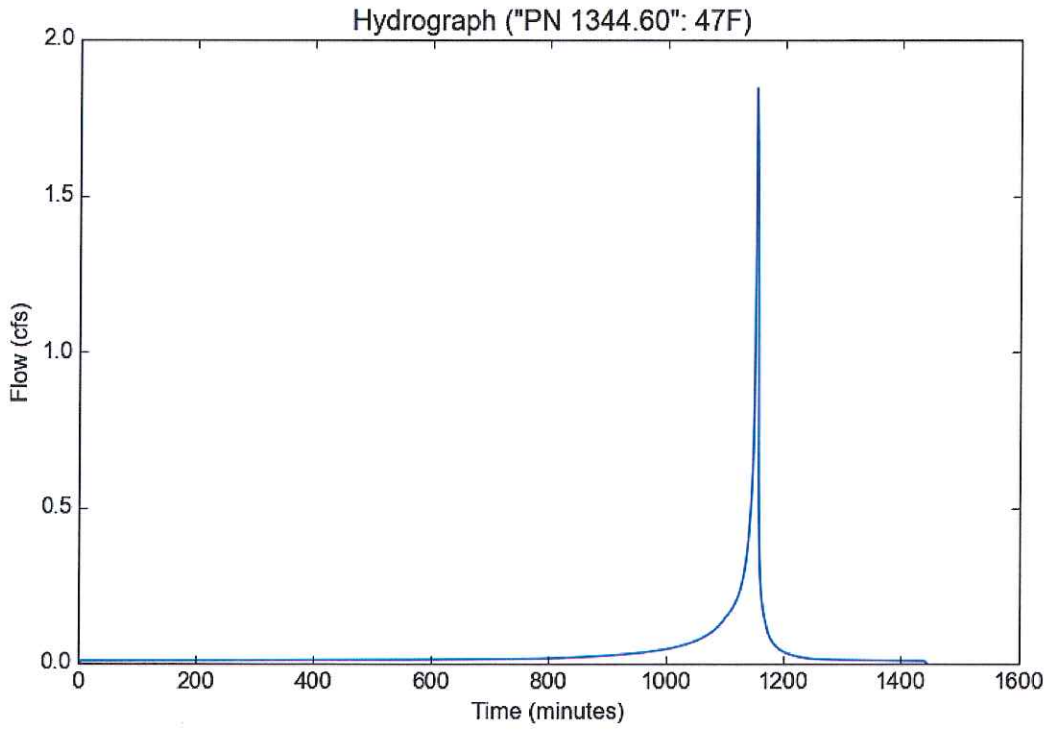
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	47F
Area (ac)	0.68
Flow Path Length (ft)	340.0
Flow Path Slope (vft/hft)	0.6471
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8454
Burned Peak Flow Rate (cfs)	1.9536
24-Hr Clear Runoff Volume (ac-ft)	0.0775
24-Hr Clear Runoff Volume (cu-ft)	3377.9384



Peak Flow Hydrologic Analysis

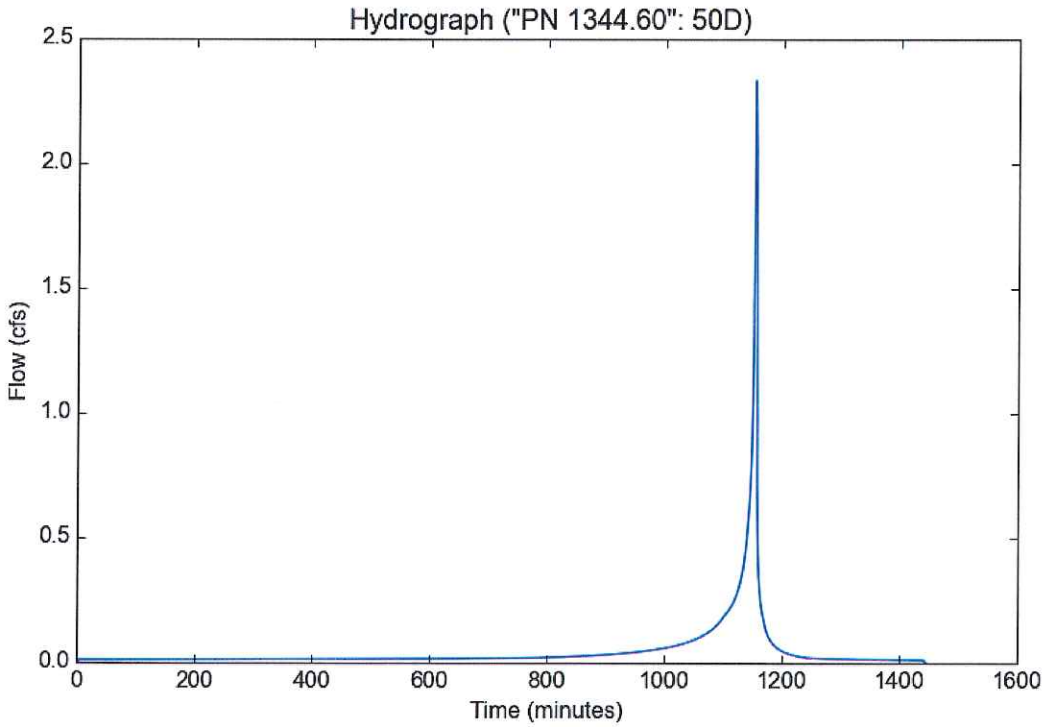
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	50D
Area (ac)	0.86
Flow Path Length (ft)	246.0
Flow Path Slope (vft/hft)	0.0488
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3338
Burned Peak Flow Rate (cfs)	2.4708
24-Hr Clear Runoff Volume (ac-ft)	0.0981
24-Hr Clear Runoff Volume (cu-ft)	4272.0986



Peak Flow Hydrologic Analysis

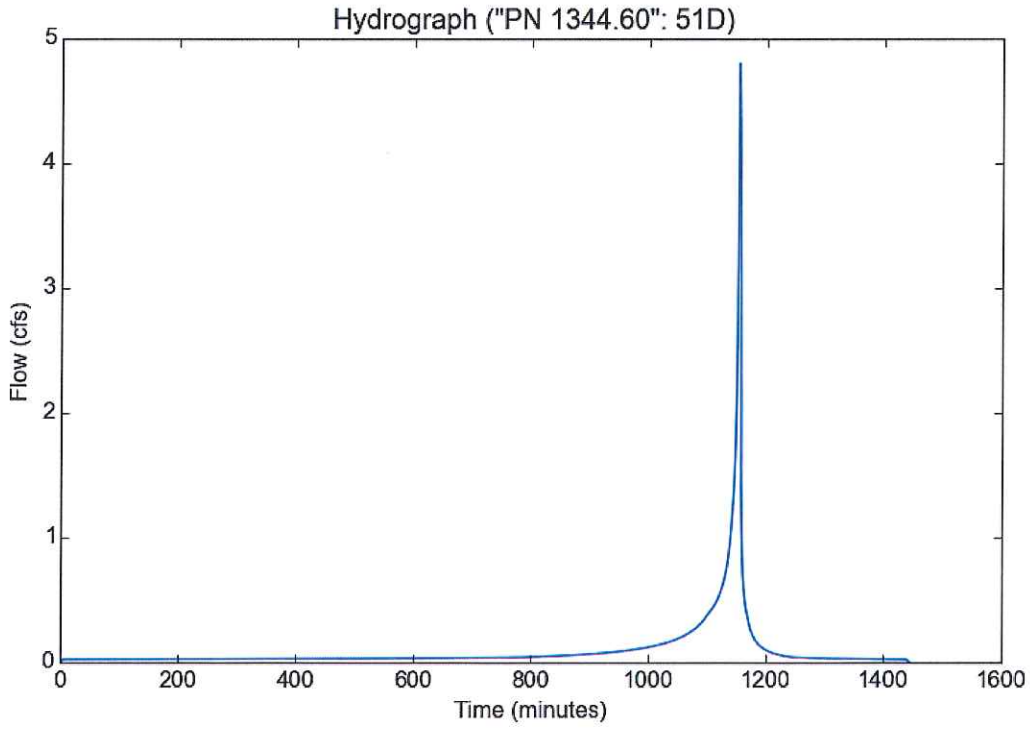
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	51D
Area (ac)	1.77
Flow Path Length (ft)	675.0
Flow Path Slope (vft/hft)	0.4296
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.8034
Burned Peak Flow Rate (cfs)	5.0852
24-Hr Clear Runoff Volume (ac-ft)	0.2018
24-Hr Clear Runoff Volume (cu-ft)	8792.575



Peak Flow Hydrologic Analysis

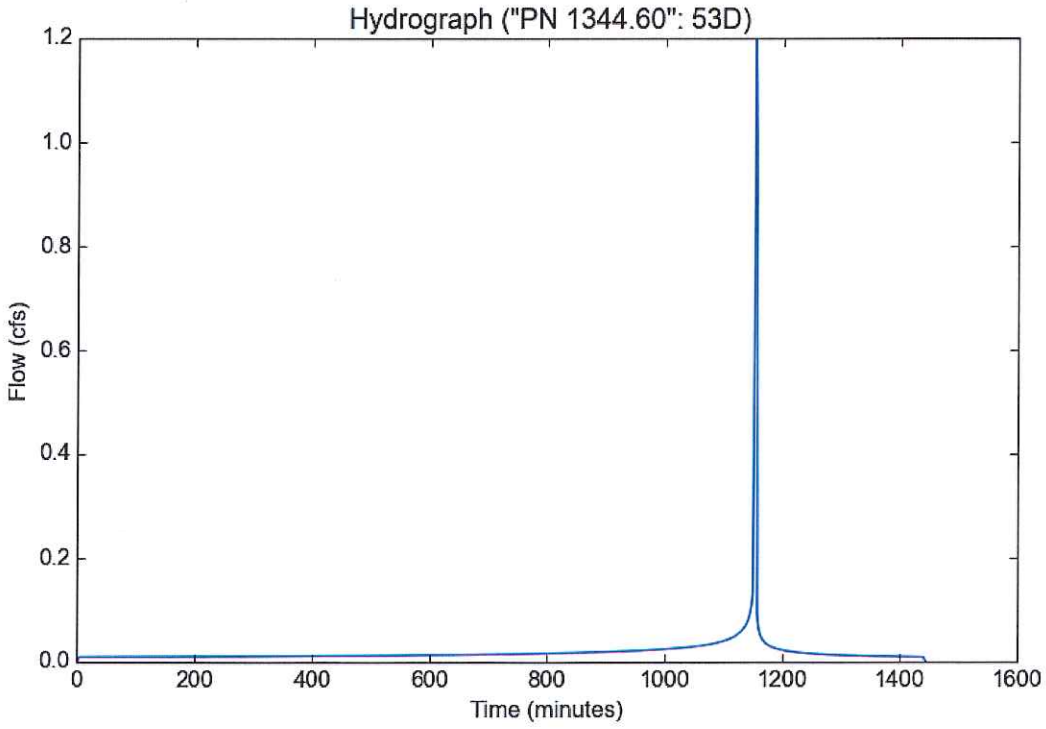
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	53D
Area (ac)	0.7
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.0583
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.529
Developed Runoff Coefficient (Cd)	0.5364
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1997
Burned Peak Flow Rate (cfs)	1.5427
24-Hr Clear Runoff Volume (ac-ft)	0.0419
24-Hr Clear Runoff Volume (cu-ft)	1823.389



Peak Flow Hydrologic Analysis

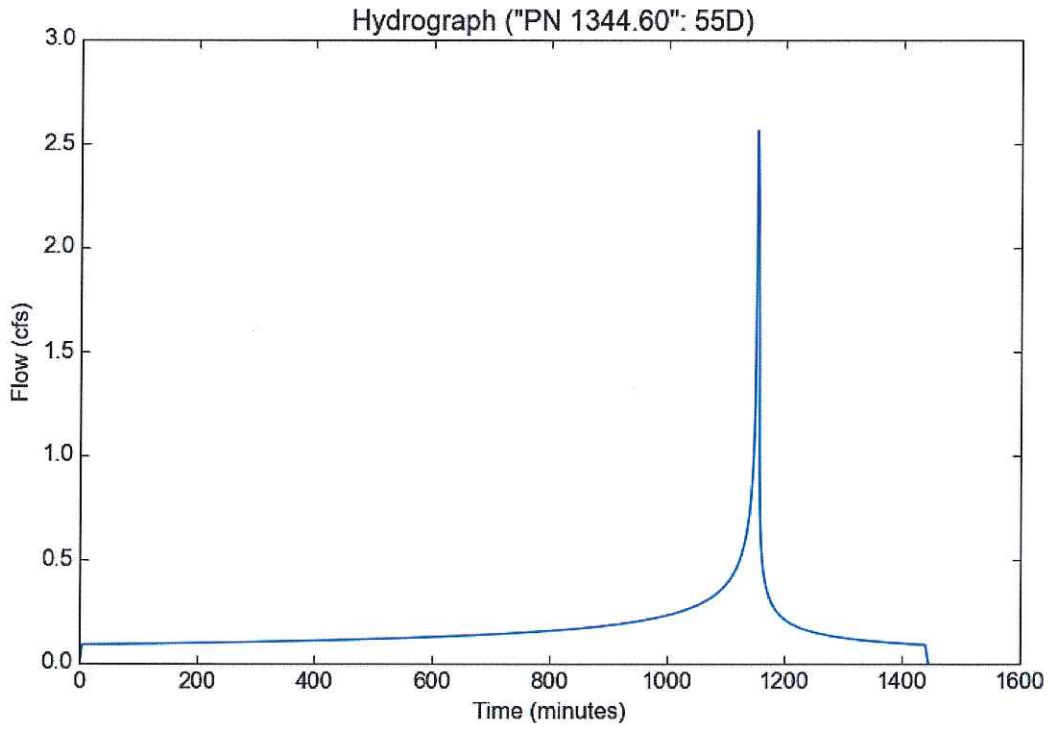
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	55D
Area (ac)	0.93
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.0105
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.9
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.529
Developed Runoff Coefficient (Cd)	0.8629
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5639
Burned Peak Flow Rate (cfs)	2.6987
24-Hr Clear Runoff Volume (ac-ft)	0.3383
24-Hr Clear Runoff Volume (cu-ft)	14736.3861



Peak Flow Hydrologic Analysis

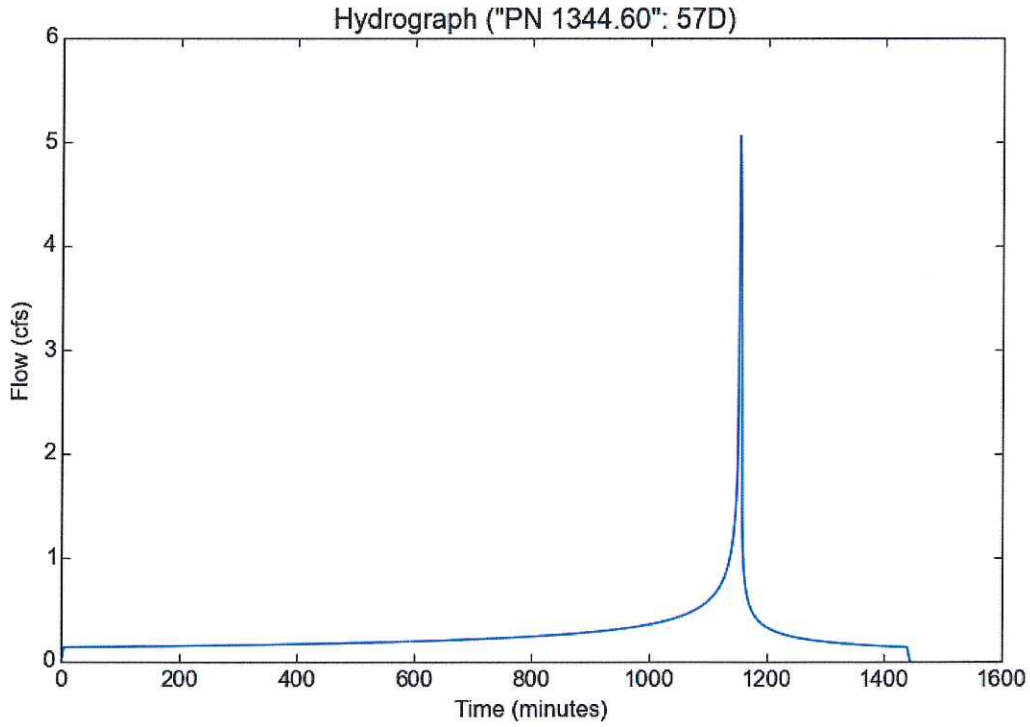
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	57D
Area (ac)	2.15
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.1615
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.56
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.529
Developed Runoff Coefficient (Cd)	0.7368
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.0609
Burned Peak Flow Rate (cfs)	5.6592
24-Hr Clear Runoff Volume (ac-ft)	0.5296
24-Hr Clear Runoff Volume (cu-ft)	23069.1516



Peak Flow Hydrologic Analysis

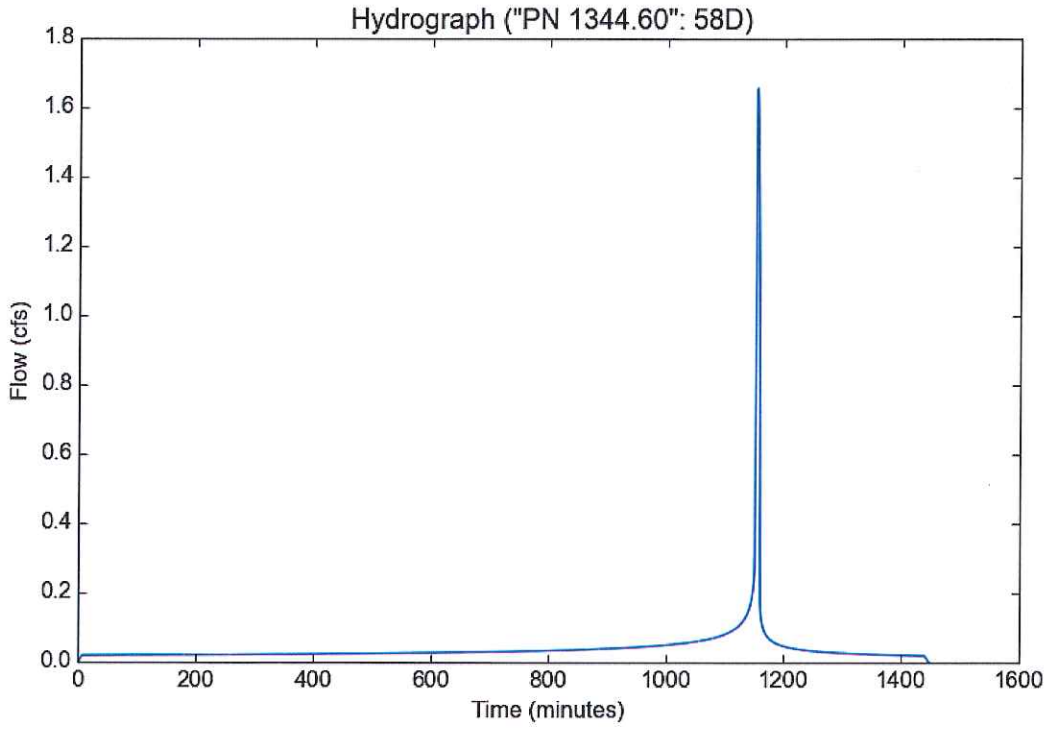
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	58D
Area (ac)	1.42
Flow Path Length (ft)	737.0
Flow Path Slope (vft/hft)	0.441
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.5617
Undeveloped Runoff Coefficient (Cu)	0.4463
Developed Runoff Coefficient (Cd)	0.4554
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	1.6566
Burned Peak Flow Rate (cfs)	2.2895
24-Hr Clear Runoff Volume (ac-ft)	0.0833
24-Hr Clear Runoff Volume (cu-ft)	3628.8817



Peak Flow Hydrologic Analysis

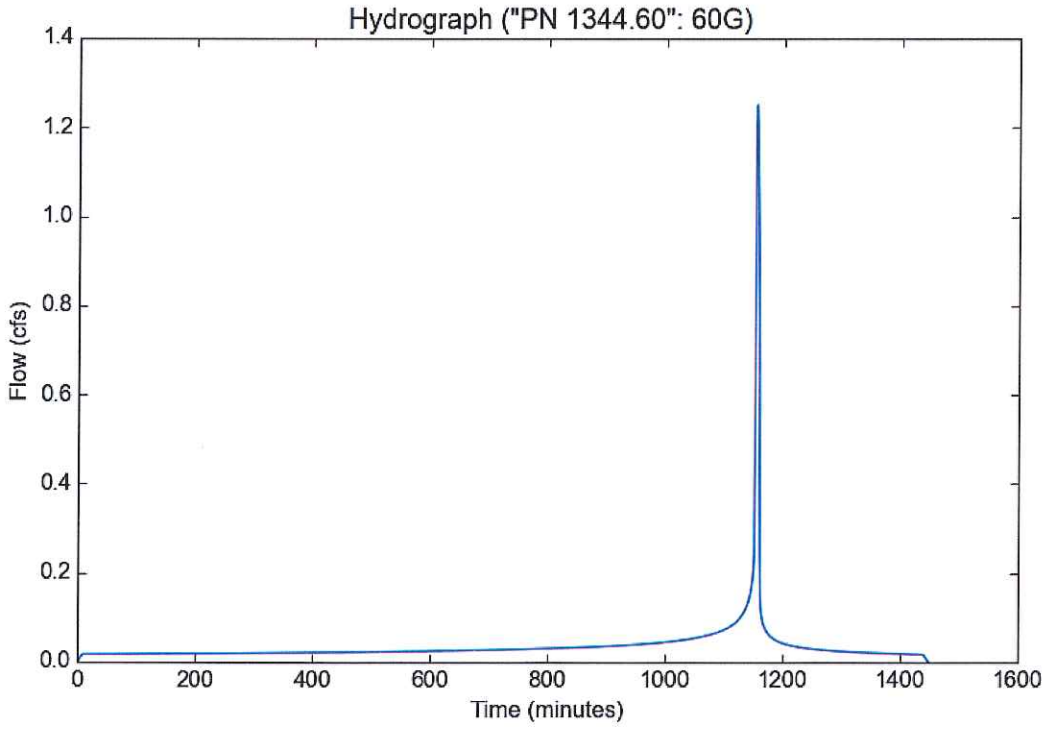
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	60G
Area (ac)	1.2
Flow Path Length (ft)	753.0
Flow Path Slope (vft/hft)	0.2377
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.03
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.4237
Undeveloped Runoff Coefficient (Cu)	0.4156
Developed Runoff Coefficient (Cd)	0.4301
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.2509
Burned Peak Flow Rate (cfs)	1.7757
24-Hr Clear Runoff Volume (ac-ft)	0.0738
24-Hr Clear Runoff Volume (cu-ft)	3216.278



Peak Flow Hydrologic Analysis

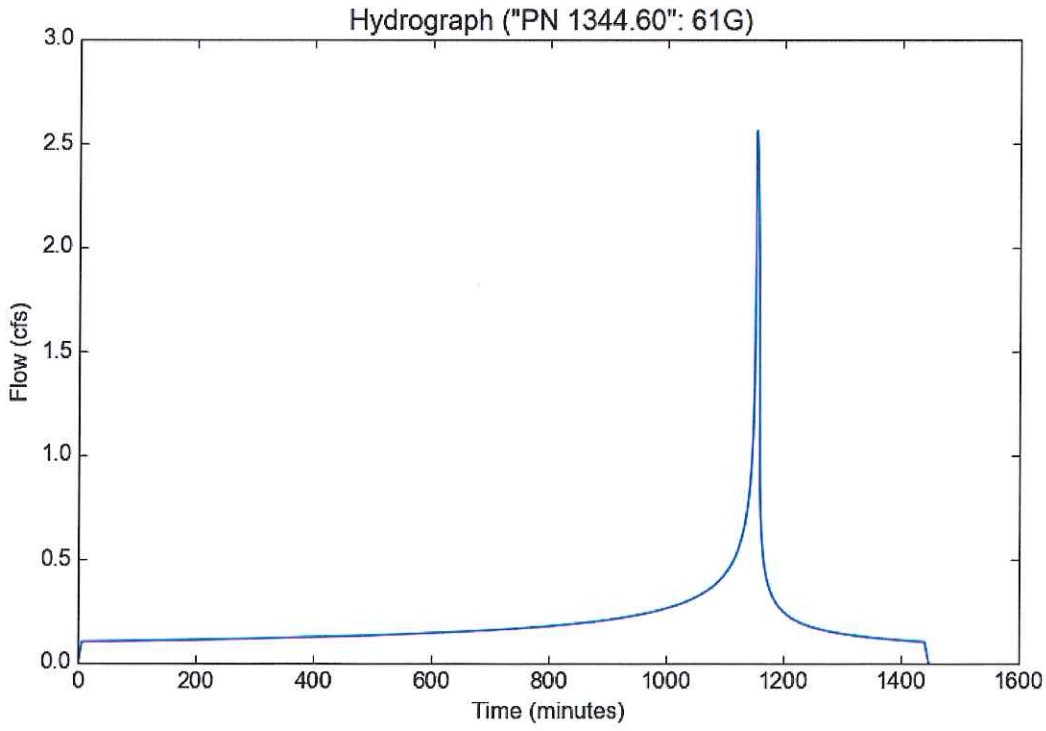
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	61G
Area (ac)	1.13
Flow Path Length (ft)	415.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.84
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.7276
Undeveloped Runoff Coefficient (Cu)	0.4709
Developed Runoff Coefficient (Cd)	0.8313
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	2.5624
Burned Peak Flow Rate (cfs)	2.7301
24-Hr Clear Runoff Volume (ac-ft)	0.3875
24-Hr Clear Runoff Volume (cu-ft)	16879.8194



Peak Flow Hydrologic Analysis

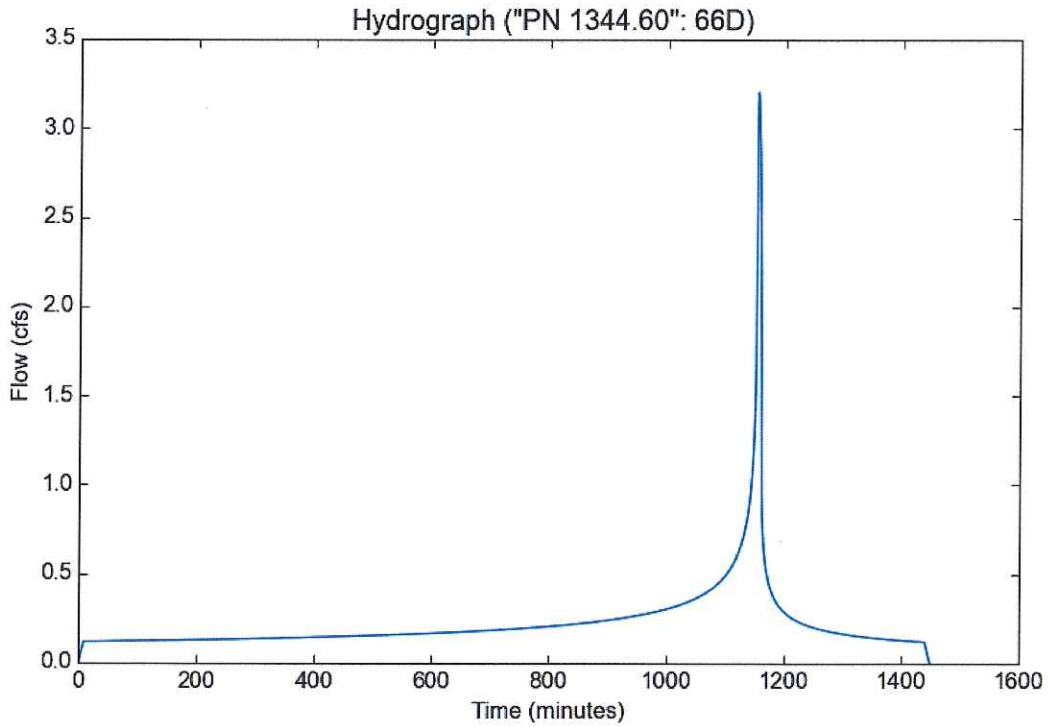
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	66D
Area (ac)	2.01
Flow Path Length (ft)	815.0
Flow Path Slope (vft/hft)	0.0736
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.5
Soil Type	35
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.4237
Undeveloped Runoff Coefficient (Cu)	0.4156
Developed Runoff Coefficient (Cd)	0.6578
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	3.2045
Burned Peak Flow Rate (cfs)	3.7324
24-Hr Clear Runoff Volume (ac-ft)	0.4517
24-Hr Clear Runoff Volume (cu-ft)	19674.6221



Peak Flow Hydrologic Analysis

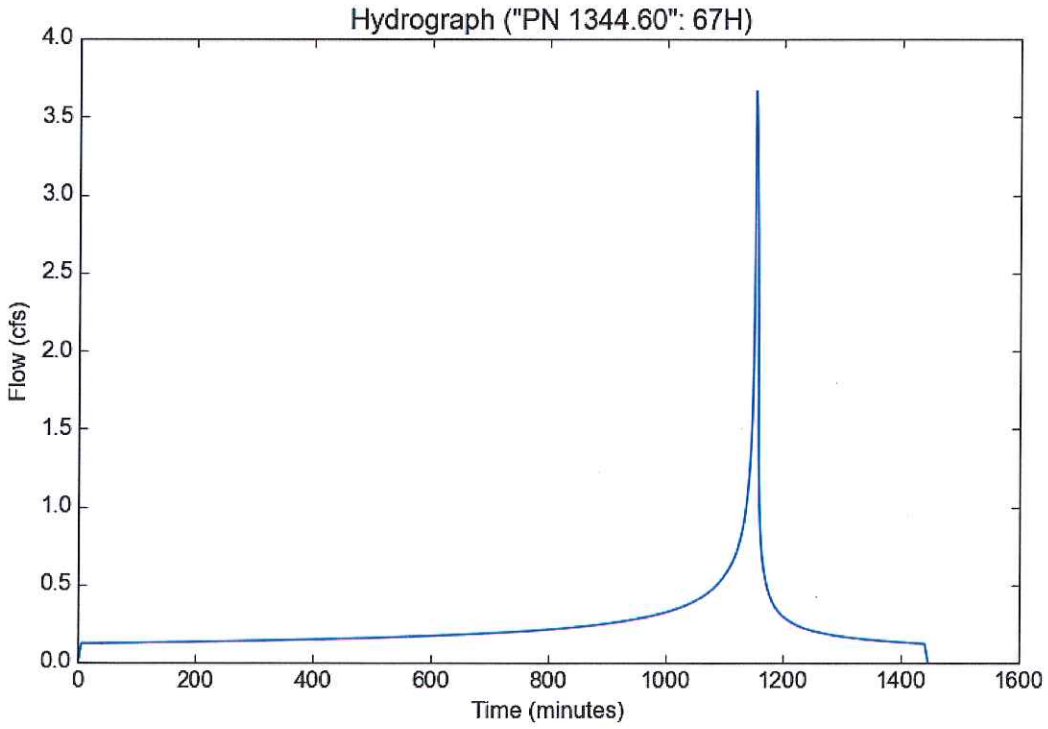
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	67H
Area (ac)	1.41
Flow Path Length (ft)	602.0
Flow Path Slope (vft/hft)	0.0831
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	2.9326
Undeveloped Runoff Coefficient (Cu)	0.8369
Developed Runoff Coefficient (Cd)	0.8868
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.6667
Burned Peak Flow Rate (cfs)	3.8195
24-Hr Clear Runoff Volume (ac-ft)	0.4757
24-Hr Clear Runoff Volume (cu-ft)	20721.6153



Peak Flow Hydrologic Analysis

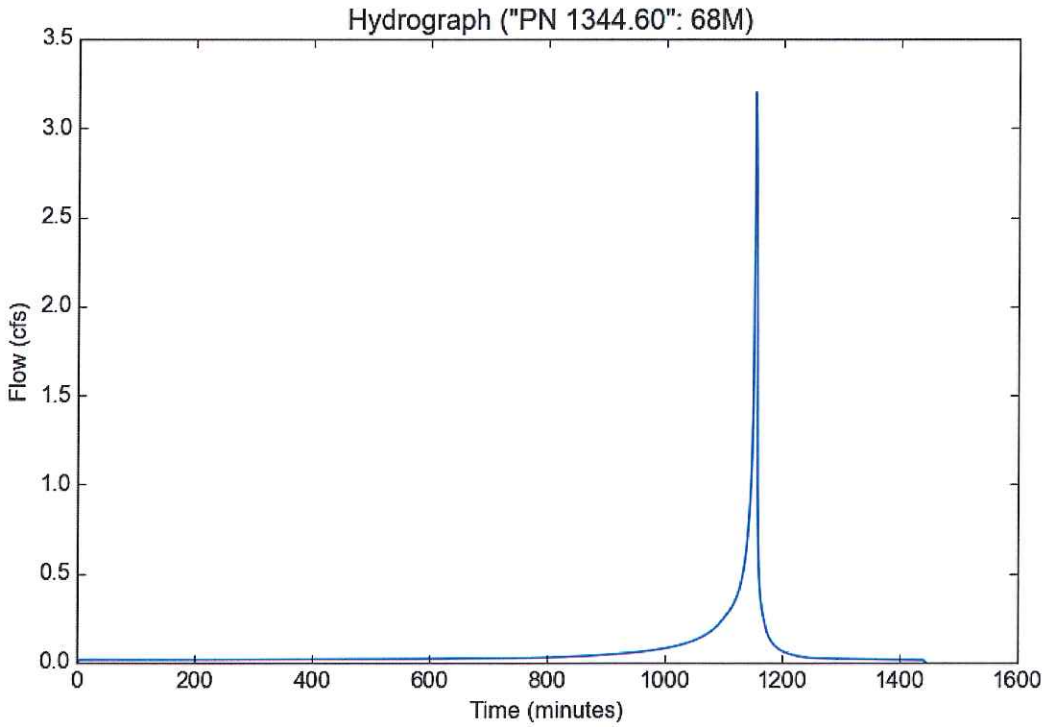
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 10 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	68M
Area (ac)	1.18
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.0314
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	10-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	5.355
Peak Intensity (in/hr)	3.1949
Undeveloped Runoff Coefficient (Cu)	0.8484
Developed Runoff Coefficient (Cd)	0.8494
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2023
Burned Peak Flow Rate (cfs)	3.3901
24-Hr Clear Runoff Volume (ac-ft)	0.1346
24-Hr Clear Runoff Volume (cu-ft)	5861.7167



PROPOSED 2 YEAR

Version 11.2, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\Users\rick.RJRENG\Desktop\LAR04 2186\lasoilx.da

Tentative Tract 71546

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1344	1A	10.0	11.08	10.0	11.08	1	2020.	.23270	.00	.00	0.	234	8	A37	.02
1344	2A	29.4	32.59	39.4	36.38	1	2042.	.25470	.00	.00	0.	234	8	A37	.02
1344	3A	.0	.00	39.4	33.12	1	760.	.09470	.00	.00	0.	234	1	A37	.00
1344	4A	22.7	25.16	62.1	39.29	1	1952.	.21880	.00	.00	0.	234	8	A37	.02
1344	5A	14.5	18.86	76.6	41.68	1	1505.	.36010	.00	.00	0.	234	6	A37	.02
1344	6A	.0	.00	76.6	40.91	1	948.	.06650	.00	.00	0.	234	1	A37	.00
1344	7A	12.9	13.49	89.5	42.09	1	2054.	.13880	.00	.00	0.	234	9	A37	.02
1344	8A	16.7	21.72	106.2	43.02	1	1321.	.43150	.00	.00	0.	234	6	A37	.02
1344	9A	.0	.00	106.2	42.94	4	360.	.02500	6.00	.00	0.	34	1	A37	.00
1344	10A	1.3	1.91	107.5	43.11	4	300.	.03000	2.25	.00	0.	34	5	A37	.71
1344	11A	.0	.00	107.5	43.11	4	92.	.02720	6.00	.00	0.	34	1	A37	.00
1344	12A	.0	.00	107.5	43.10	4	22.	.04540	6.00	.00	0.	34	1	A37	.00
1344	13B	14.1	15.63	14.1	15.63	1	1899.	.31070	.00	.00	0.	234	8	A37	.02
1344	14B	.0	.00	14.1	13.52	4	271.	.02000	4.00	.00	0.	34	1	A37	.00
1344	15B	1.1	1.63	15.2	13.84	4	335.	.01190	2.00	.00	0.	34	5	A37	.75
1344	16B	.0	.00	15.2	13.69	3	85.	.02350	4.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 17A TA 1175 QA 43.10 QAB 46.87 QB 3.77 1344 17B TB 1162 QB 13.60 QBA 48.18 QA 34.57
1344 17AB TAB 1159 QAB 49.91 QA 37.88 QB 12.03

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	17AB	15.2	13.60	122.7	49.91	4	348.	.03590	6.00	.00	0.	34	0	A37	.00
1344	18A	2.3	3.40	125.0	50.56	4	536.	.03080	2.25	.00	0.	34	5	A37	.74
1344	19A	.0	.00	125.0	50.41	4	116.	.02000	6.00	.00	0.	34	1	A37	.00
1344	20A	.4	.60	125.4	50.50	4	232.	.05820	2.00	.00	0.	34	5	A37	.80
1344	21A	.0	.00	125.4	50.38	4	140.	.02000	6.00	.00	0.	34	1	A37	.00
1344	22A	1.4	2.08	126.8	50.74	4	361.	.00830	2.75	.00	0.	34	5	A37	.79
1344	23A	.0	.00	126.8	50.52	4	190.	.02000	6.00	.00	0.	34	1	A37	.00
1344	24A	.0	.00	126.8	50.45	4	305.	.02300	2.25	.00	0.	34	5	A37	.68
1344	25A	.0	.00	126.8	50.20	4	48.	.04000	6.00	.00	0.	34	1	A37	.00
1344	26C	4.8	5.72	4.8	5.72	1	1321.	.17030	.00	.00	0.	234	7	A37	.02
1344	27C	1.4	1.84	6.2	4.65	3	380.	.01840	.00	.00	0.	34	5	A37	.07
1344	28C	.0	.00	6.2	4.50	4	223.	.03000	4.00	.00	0.	34	1	A37	.00
1344	29C	1.2	1.76	7.4	4.75	4	326.	.02760	2.00	.00	0.	34	5	A37	.70
1344	30C	.0	.00	7.4	4.73	4	308.	.02000	4.00	.00	0.	34	1	A37	.00
1344	31C	1.7	2.49	9.1	5.57	4	414.	.02170	2.00	.00	0.	34	5	A37	.70
1344	32C	.0	.00	9.1	5.54	4	47.	.02000	4.00	.00	0.	34	1	A37	.00

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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*   1344   33A  TA 1165 QA    50.19 QAC    55.15 QC     4.95    1344   33C  TC 1156 QC     5.54 QCA    39.25 QA    33.71   *
*                             1344   33AC TAC 1165 QAC    55.15 QA    50.19 QC     4.95                                   *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	33AC	9.1	5.54	135.9	55.15	4	360.	.14400	6.00	.00	0.	34	0	A37	.00
1344	2B	6.3	8.19	6.3	8.19	1	1212.	.21450	.00	.00	0.	234	6	A37	.02
1344	3B	.0	.00	6.3	6.56	1	51.	.17650	.00	.00	0.	234	1	A37	.00
1344	4B	.3	.44	6.6	6.60	1	224.	.17860	.00	.00	0.	234	5	A37	.02
1344	5B	.0	.00	6.6	6.51	1	34.	.03000	.00	.00	0.	234	1	A37	.00
1344	6C	5.3	7.70	5.3	7.70	1	860.	.39530	.00	.00	0.	234	5	A37	.02
1344	7C	.0	.00	5.3	6.53	1	74.	.20280	.00	.00	0.	234	1	A37	.00

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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*   1344    8B  TB 1160 QB     6.50 QBC    10.43 QC     3.93    1344    8C  TC 1156 QC     6.51 QCB    10.61 QB     4.10   *
*                             1344    8BC TBC 1158 QBC    11.32 QB     5.73 QC     5.59                                   *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
1344	8BC	5.3	6.51	11.9	11.32	1	115.	.03000	.00	.00	0.	234	0	A37	.00
1344	9B	.6	.87	12.5	11.37	1	372.	.57260	.00	.00	0.	234	5	A37	.02
1344	10B	.0	.00	12.5	11.28	1	133.	.04000	.00	.00	0.	234	1	A37	.00
1344	11B	1.1	1.60	13.6	11.39	1	433.	.49650	.00	.00	0.	234	5	A37	.02
1344	12B	.0	.00	13.6	11.28	1	73.	.02740	.00	.00	0.	234	1	A37	.00
1344	13D	12.2	15.86	12.2	15.86	1	1323.	.24940	.00	.00	0.	234	6	A37	.02
1344	14D	.0	.00	12.2	13.41	1	86.	.08140	.00	.00	0.	234	1	A37	.00
1344	15D	.7	1.02	12.9	13.54	1	340.	.64710	.00	.00	0.	234	5	A37	.02
1344	16D	.0	.00	12.9	13.36	1	100.	.08500	.00	.00	0.	234	1	A37	.00
1344	17BD	12.9	13.33	26.5	22.70	1	246.	.04880	.00	.00	0.	234	0	A37	.00
1344	18B	.9	1.31	27.4	22.62	1	246.	.04000	.00	.00	0.	234	5	A37	.02
1344	19B	1.8	2.62	29.2	22.62	1	675.	.42960	.00	.00	0.	234	5	A37	.02
1344	20B	.0	.00	29.2	22.31	1	240.	.05830	.00	.00	0.	234	1	A37	.00
1344	21B	.7	1.02	29.9	22.25	1	240.	.05000	.00	.00	0.	234	5	A37	.02
1344	22B	.0	.00	29.9	21.97	4	105.	.04200	5.00	.00	0.	34	1	A37	.00
1344	23B	.9	1.37	30.8	22.16	4	190.	.01050	2.00	.00	0.	34	5	A37	.93
1344	24B	.0	.00	30.8	22.02	4	280.	.06960	2.00	.00	0.	34	1	A37	.00
1344	25B	2.2	3.15	33.0	22.34	4	529.	.07720	2.00	.00	0.	34	5	A37	.56
1344	26B	1.4	2.03	34.4	22.35	1	737.	.44100	.00	.00	0.	234	5	A37	.02
1344	27B	.0	.00	34.4	22.15	3	78.	.06500	5.00	.00	0.	34	1	A37	.00
1344	28E	1.2	1.19	1.2	1.19	1	753.	.23770	.00	.00	0.	234	10	A37	.03
1344	29E	1.1	1.65	2.3	2.11	3	415.	.01200	.00	.00	0.	34	5	A37	.84
1344	30E	.0	.00	2.3	1.82	4	33.	.04290	3.00	.00	0.	34	1	A37	.00
1344	31E	.0	.00	2.3	1.82	4	247.	.02020	3.00	.00	0.	34	1	A37	.00

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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*   1344   32B  TB 1173 QB    22.09 QBE    23.04 QE      .96    1344   32E  TE 1159 QE     1.80 QEB    13.58 QB    11.78   *
*                             1344   32BE TBE 1172 QBE    23.11 QB    22.07 QE     1.04                                   *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	PCT ZONE	IMPV
1344	32BE	2.3	1.80	36.7	23.11	4	113.	.05000	5.00	.00	0.	34	0	A37	.00
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
1344	33B	.0	.00	36.7	23.06	4	24.	.03000	5.00	.00	0.	34	1	A37	.00
1344	34B	2.0	2.11	38.7	23.15	1	815.	.07360	.00	.00	0.	34	7	A37	.01
1344	35F	1.4	2.08	1.4	2.08	3	602.	.08310	.00	.00	0.	34	5	A37	.79
1344	36F	.0	.00	1.4	1.78	4	76.	.10530	2.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 37B TB 1177 QB 22.19 QBF 22.44 QF .26 1344 37F TF 1156 QF 1.77 QFB 11.73 QB 9.96

1344 37BF TBF 1177 QBF 22.44 QB 22.19 QF .26

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	PCT ZONE	IMPV
1344	37BF	1.4	1.77	40.1	22.44	4	80.	.02000	5.00	.00	0.	34	0	A37	.00
1344	38B	.0	.00	40.1	22.43	4	270.	.02000	5.00	.00	0.	34	1	A37	.00

CONFLUENCE Q'S

1344 39A TA 1153 QA 56.45 QAB 64.77 QB 8.32 1344 39B TB 1178 QB 22.35 QBA 24.98 QA 2.62

1344 39AB TAB 1153 QAB 64.77 QA 56.45 QB 8.32

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	RAIN TC	PCT ZONE	IMPV
1344	39AB	40.1	22.35	79.1	64.77	4	461.	.02820	6.00	.00	0.	34	0	A37	.00
1344	40A	.0	.00	79.1	61.79	4	10.	.02000	6.00	.00	0.	34	1	A37	.00

Peak Flow Hydrologic Analysis

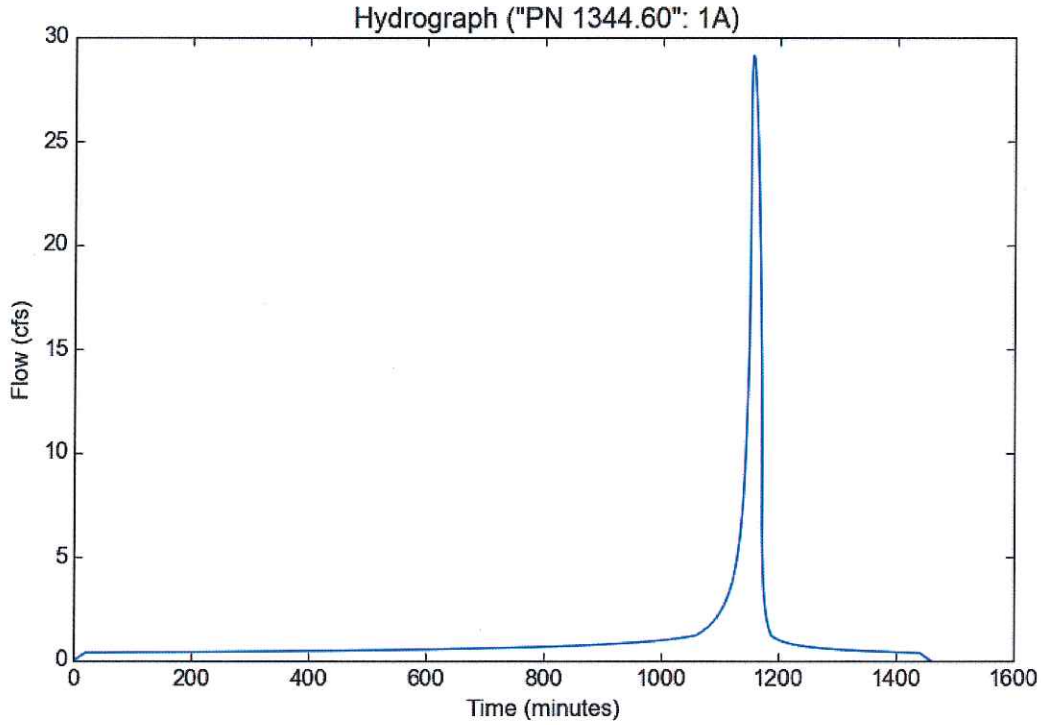
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	1A
Area (ac)	52.7
Flow Path Length (ft)	2020.0
Flow Path Slope (vft/hft)	0.2327
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.9026
Undeveloped Runoff Coefficient (Cu)	0.6065
Developed Runoff Coefficient (Cd)	0.6124
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	29.1315
Burned Peak Flow Rate (cfs)	33.9654
24-Hr Clear Runoff Volume (ac-ft)	2.3143
24-Hr Clear Runoff Volume (cu-ft)	100811.9936



Peak Flow Hydrologic Analysis

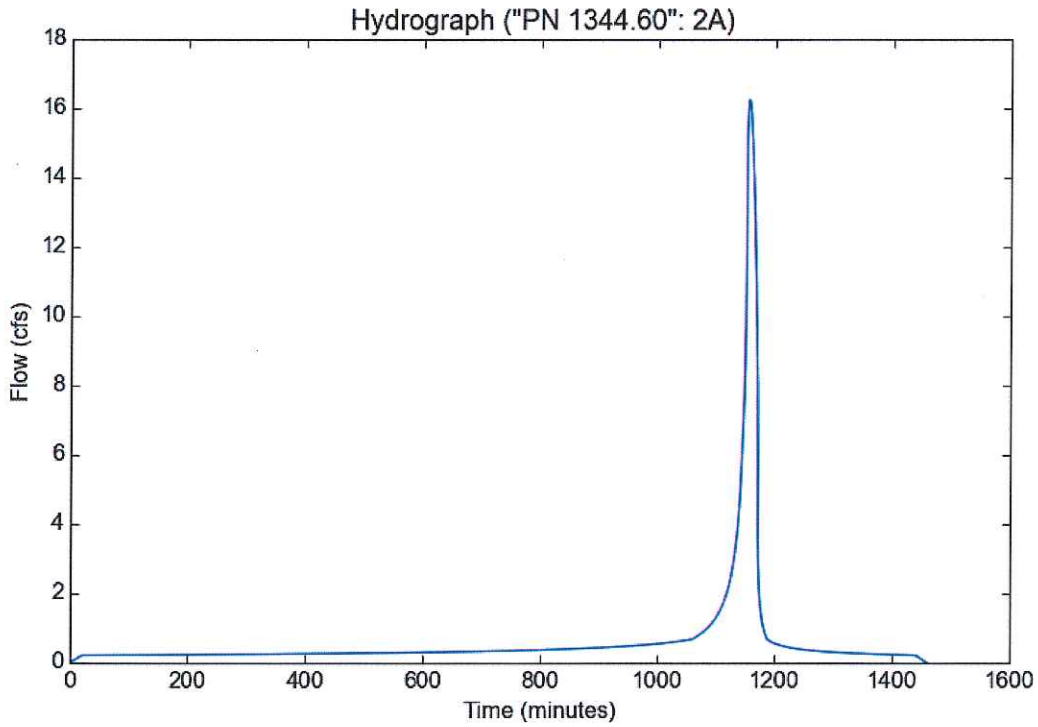
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	2A
Area (ac)	29.4
Flow Path Length (ft)	2042.0
Flow Path Slope (vft/hft)	0.2547
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.9026
Undeveloped Runoff Coefficient (Cu)	0.6065
Developed Runoff Coefficient (Cd)	0.6124
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	16.2517
Burned Peak Flow Rate (cfs)	18.9484
24-Hr Clear Runoff Volume (ac-ft)	1.2911
24-Hr Clear Runoff Volume (cu-ft)	56240.467



Peak Flow Hydrologic Analysis

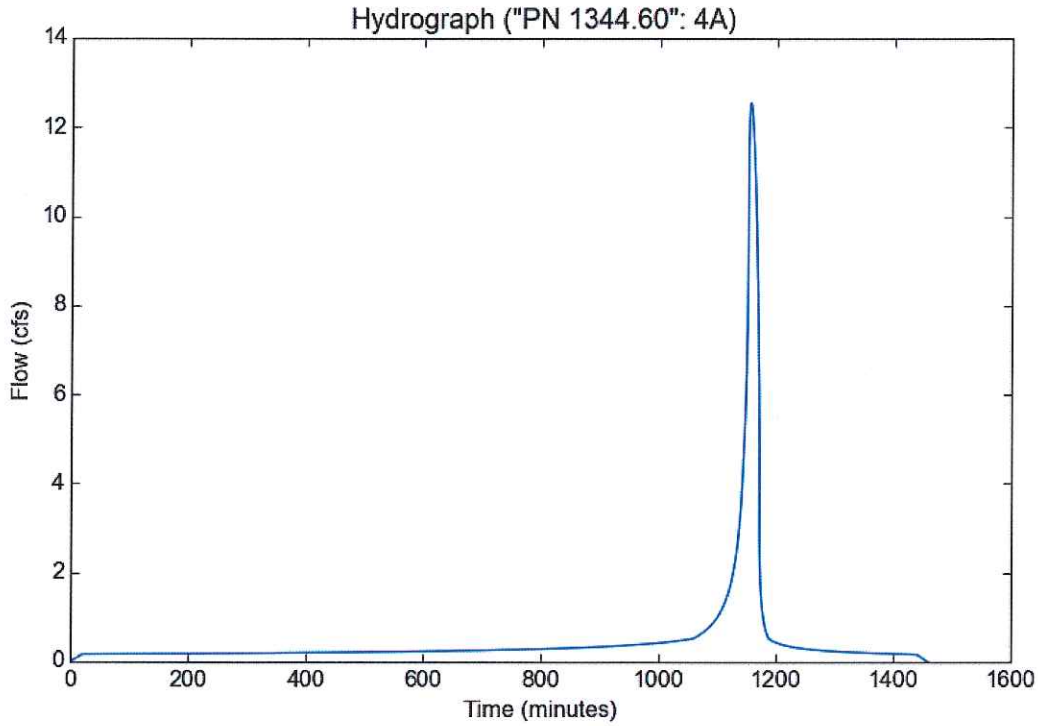
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	4A
Area (ac)	22.7
Flow Path Length (ft)	1952.0
Flow Path Slope (vft/hft)	0.2188
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.9026
Undeveloped Runoff Coefficient (Cu)	0.6065
Developed Runoff Coefficient (Cd)	0.6124
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	12.5481
Burned Peak Flow Rate (cfs)	14.6303
24-Hr Clear Runoff Volume (ac-ft)	0.9969
24-Hr Clear Runoff Volume (cu-ft)	43423.762



Peak Flow Hydrologic Analysis

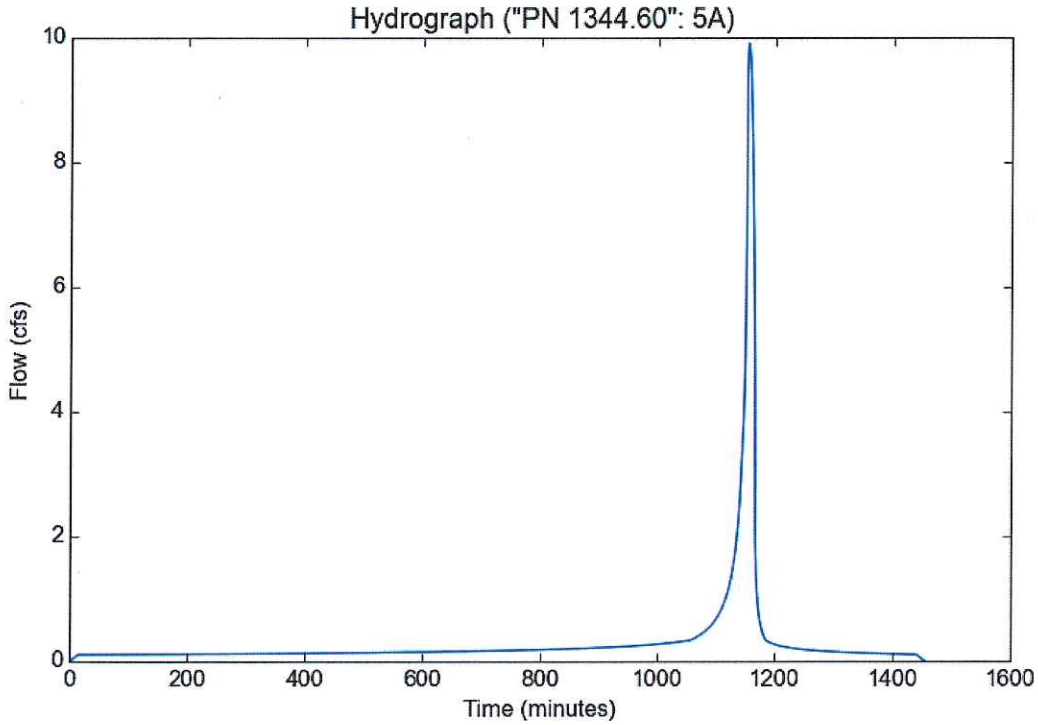
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	5A
Area (ac)	14.5
Flow Path Length (ft)	1505.0
Flow Path Slope (vft/hft)	0.3601
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.0333
Undeveloped Runoff Coefficient (Cu)	0.6563
Developed Runoff Coefficient (Cd)	0.6611
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	9.9059
Burned Peak Flow Rate (cfs)	11.2765
24-Hr Clear Runoff Volume (ac-ft)	0.6436
24-Hr Clear Runoff Volume (cu-ft)	28034.0824



Peak Flow Hydrologic Analysis

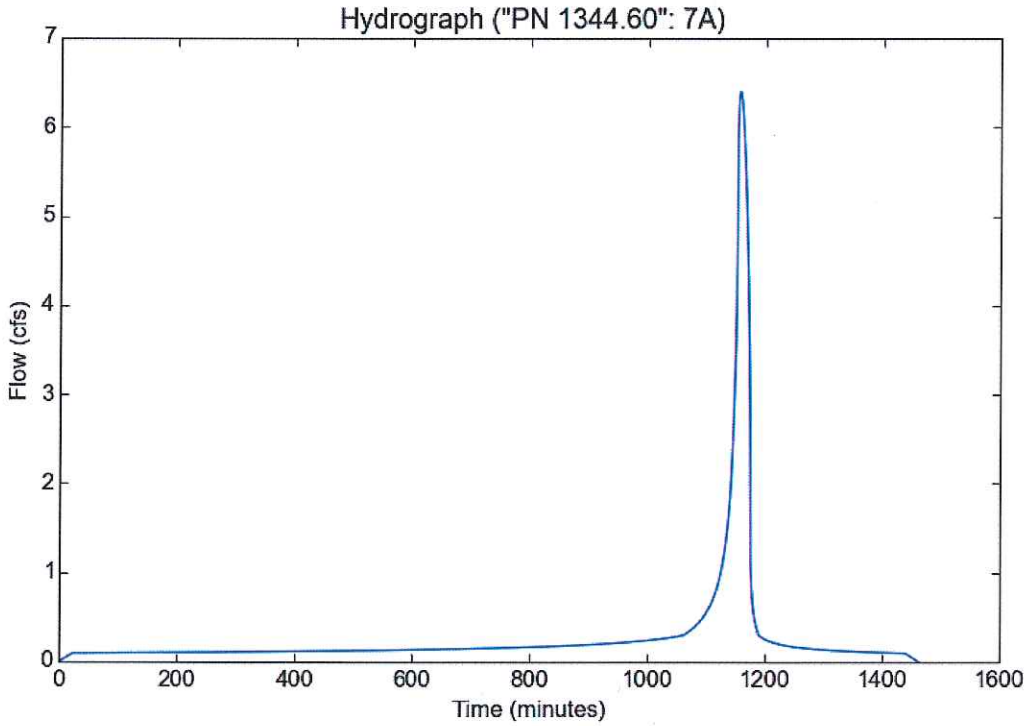
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	7A
Area (ac)	12.9
Flow Path Length (ft)	2054.0
Flow Path Slope (vft/hft)	0.1388
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.8452
Undeveloped Runoff Coefficient (Cu)	0.5807
Developed Runoff Coefficient (Cd)	0.5871
Time of Concentration (min)	23.0
Clear Peak Flow Rate (cfs)	6.4011
Burned Peak Flow Rate (cfs)	7.5644
24-Hr Clear Runoff Volume (ac-ft)	0.5634
24-Hr Clear Runoff Volume (cu-ft)	24543.8297



Peak Flow Hydrologic Analysis

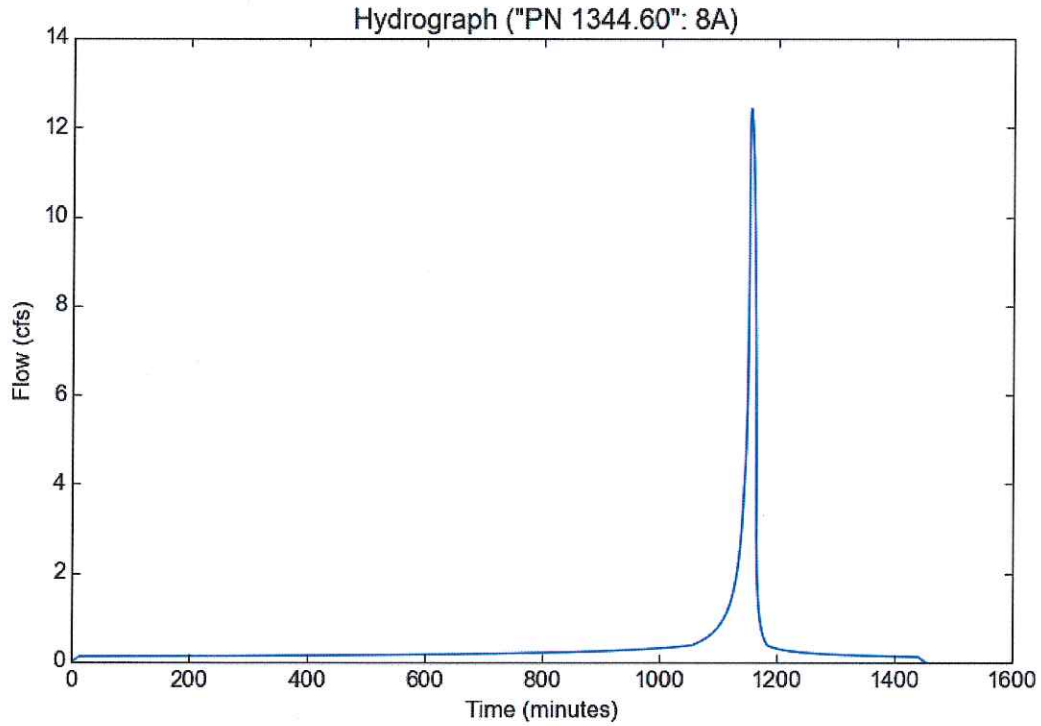
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	8A
Area (ac)	16.7
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.4315
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.1052
Undeveloped Runoff Coefficient (Cu)	0.6689
Developed Runoff Coefficient (Cd)	0.6735
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	12.4308
Burned Peak Flow Rate (cfs)	14.0806
24-Hr Clear Runoff Volume (ac-ft)	0.7426
24-Hr Clear Runoff Volume (cu-ft)	32349.5823



Peak Flow Hydrologic Analysis

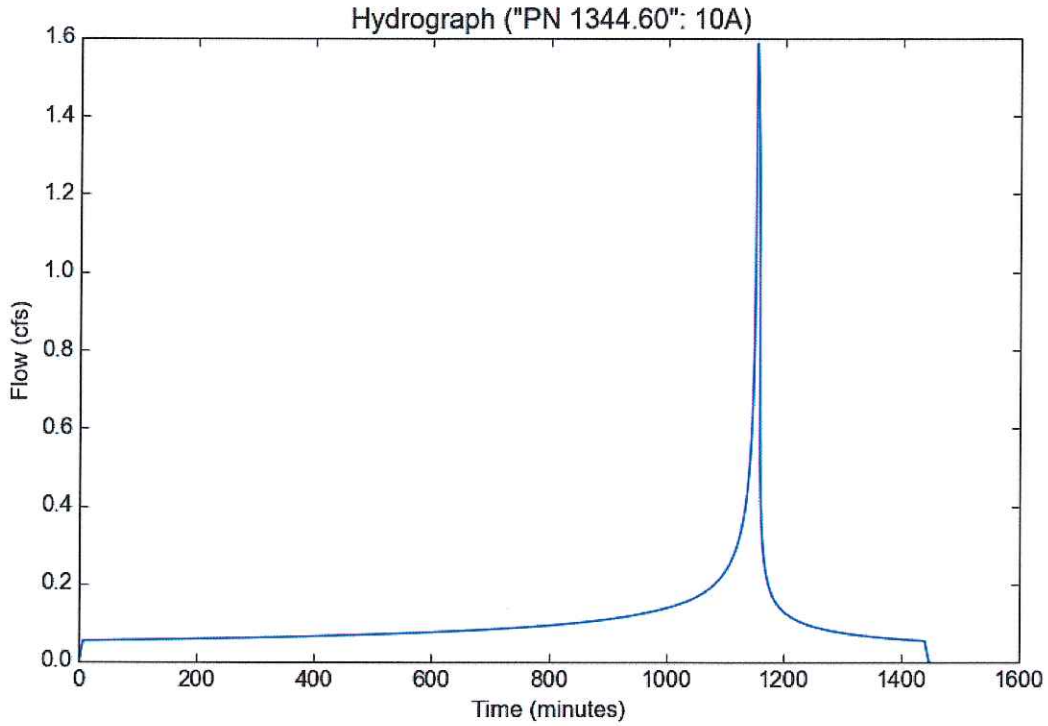
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	10A
Area (ac)	1.26
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.71
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.4784
Undeveloped Runoff Coefficient (Cu)	0.7344
Developed Runoff Coefficient (Cd)	0.852
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	1.587
Burned Peak Flow Rate (cfs)	1.667
24-Hr Clear Runoff Volume (ac-ft)	0.2082
24-Hr Clear Runoff Volume (cu-ft)	9068.8723



Peak Flow Hydrologic Analysis

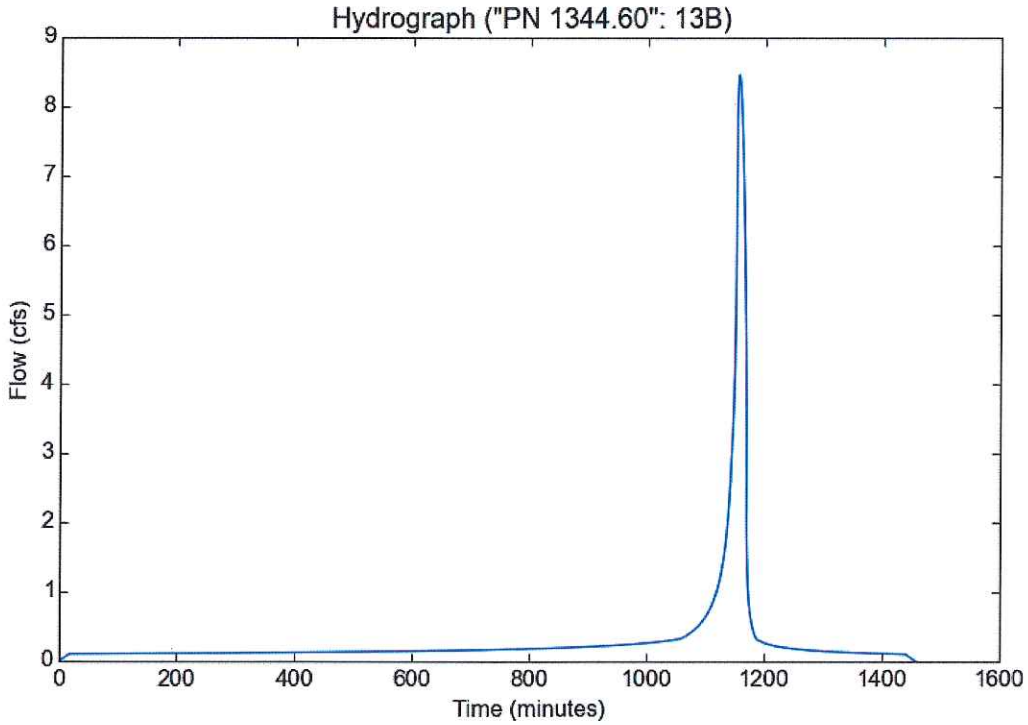
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	13B
Area (ac)	14.1
Flow Path Length (ft)	1899.0
Flow Path Slope (vft/hft)	0.3107
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.9484
Undeveloped Runoff Coefficient (Cu)	0.6272
Developed Runoff Coefficient (Cd)	0.6327
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	8.4605
Burned Peak Flow Rate (cfs)	9.7626
24-Hr Clear Runoff Volume (ac-ft)	0.6218
24-Hr Clear Runoff Volume (cu-ft)	27086.0967



Peak Flow Hydrologic Analysis

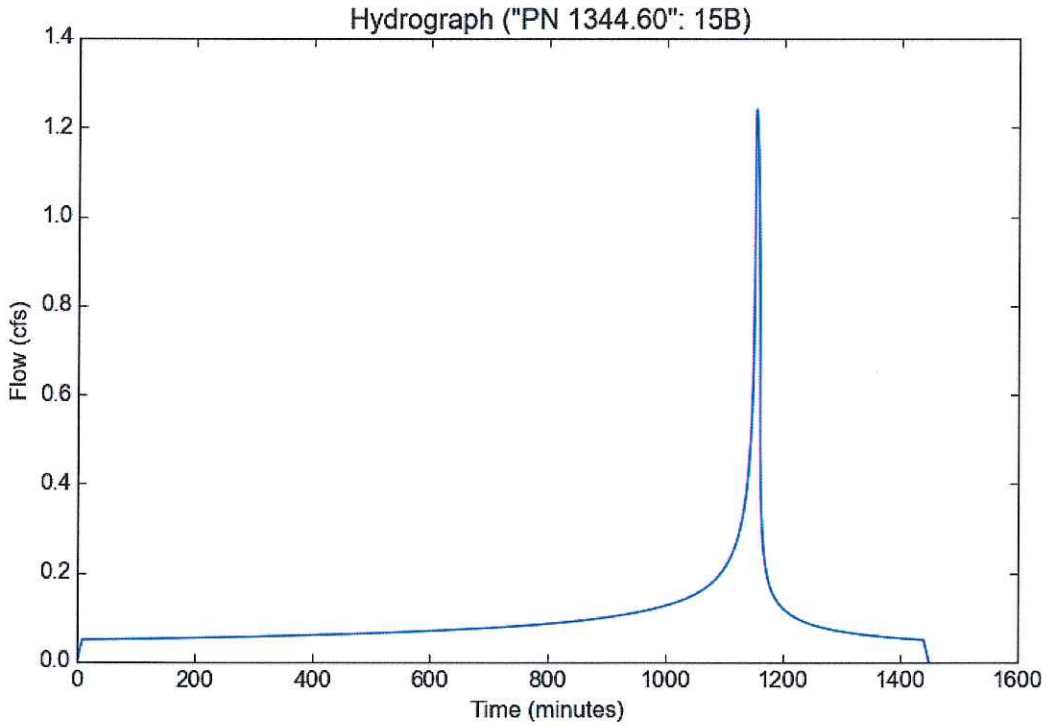
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	15B
Area (ac)	1.11
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0119
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.75
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3137
Undeveloped Runoff Coefficient (Cu)	0.7055
Developed Runoff Coefficient (Cd)	0.8514
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.2415
Burned Peak Flow Rate (cfs)	1.3029
24-Hr Clear Runoff Volume (ac-ft)	0.1911
24-Hr Clear Runoff Volume (cu-ft)	8325.8635



Peak Flow Hydrologic Analysis

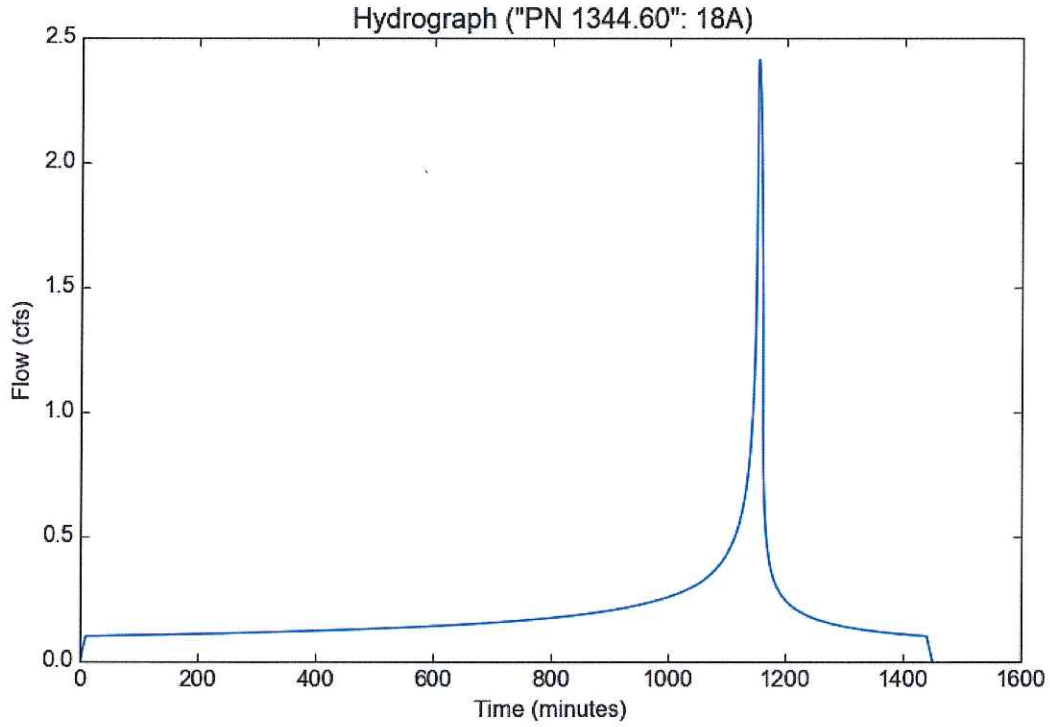
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	18A
Area (ac)	2.28
Flow Path Length (ft)	536.0
Flow Path Slope (vft/hft)	0.0308
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.74
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.2502
Undeveloped Runoff Coefficient (Cu)	0.6943
Developed Runoff Coefficient (Cd)	0.8465
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	2.4131
Burned Peak Flow Rate (cfs)	2.5359
24-Hr Clear Runoff Volume (ac-ft)	0.3886
24-Hr Clear Runoff Volume (cu-ft)	16927.2048



Peak Flow Hydrologic Analysis

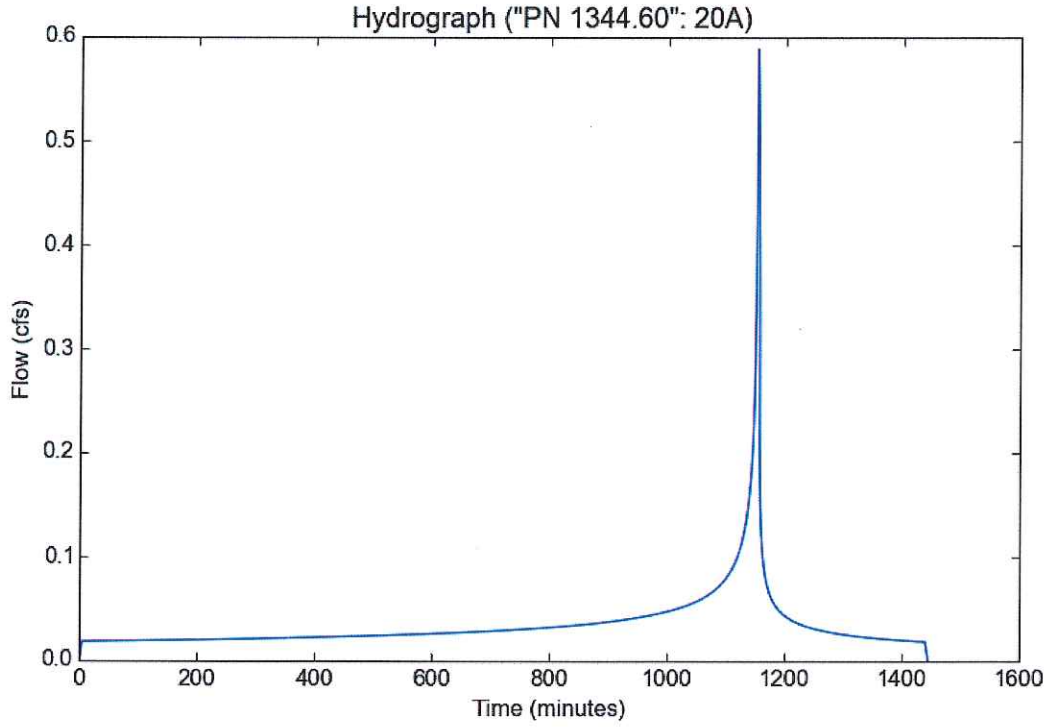
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	20A
Area (ac)	0.39
Flow Path Length (ft)	232.0
Flow Path Slope (vft/hft)	0.0582
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.8
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.7317
Undeveloped Runoff Coefficient (Cu)	0.76
Developed Runoff Coefficient (Cd)	0.872
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5889
Burned Peak Flow Rate (cfs)	0.6147
24-Hr Clear Runoff Volume (ac-ft)	0.0706
24-Hr Clear Runoff Volume (cu-ft)	3074.289



Peak Flow Hydrologic Analysis

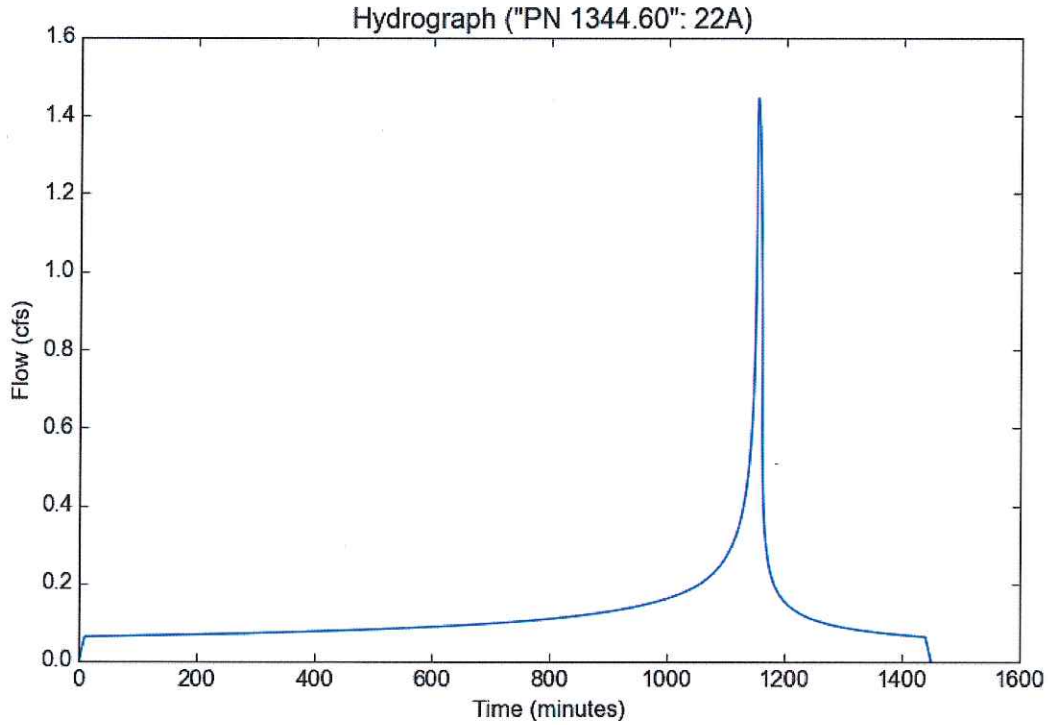
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	22A
Area (ac)	1.35
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.0083
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.2502
Undeveloped Runoff Coefficient (Cu)	0.6943
Developed Runoff Coefficient (Cd)	0.8568
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	1.4461
Burned Peak Flow Rate (cfs)	1.514
24-Hr Clear Runoff Volume (ac-ft)	0.2419
24-Hr Clear Runoff Volume (cu-ft)	10536.6994



Peak Flow Hydrologic Analysis

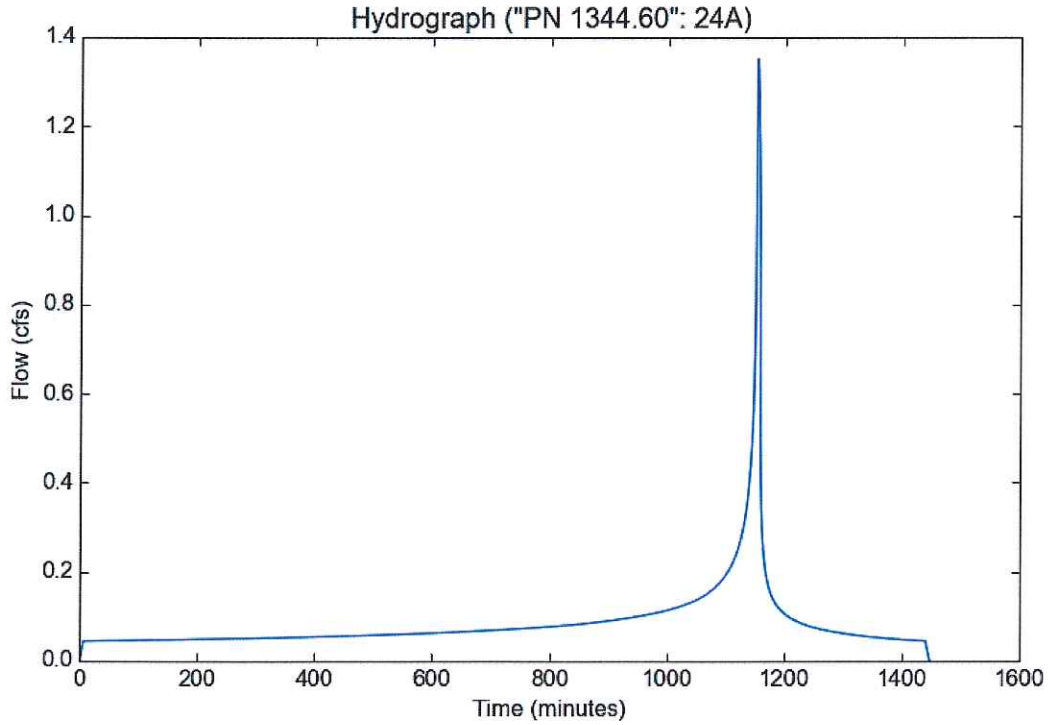
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	24A
Area (ac)	1.08
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.023
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.68
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.4784
Undeveloped Runoff Coefficient (Cu)	0.7344
Developed Runoff Coefficient (Cd)	0.847
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	1.3524
Burned Peak Flow Rate (cfs)	1.4232
24-Hr Clear Runoff Volume (ac-ft)	0.1728
24-Hr Clear Runoff Volume (cu-ft)	7526.7899



Peak Flow Hydrologic Analysis

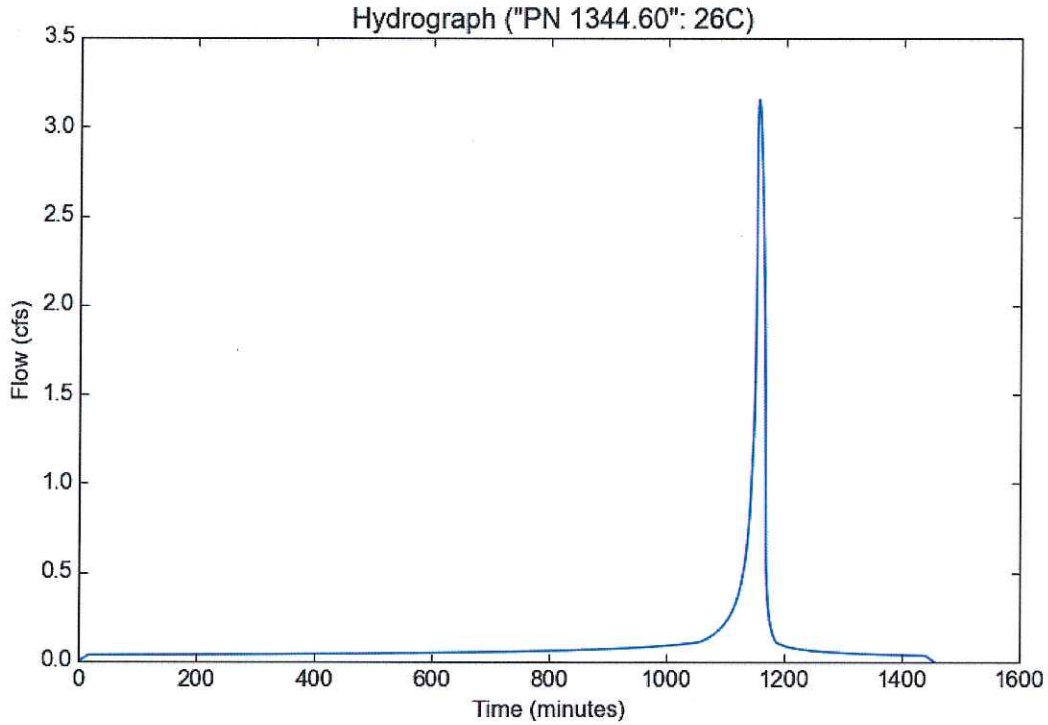
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	26C
Area (ac)	4.8
Flow Path Length (ft)	1321.0
Flow Path Slope (vft/hft)	0.1703
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.0024
Undeveloped Runoff Coefficient (Cu)	0.6509
Developed Runoff Coefficient (Cd)	0.6558
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	3.1557
Burned Peak Flow Rate (cfs)	3.5999
24-Hr Clear Runoff Volume (ac-ft)	0.2127
24-Hr Clear Runoff Volume (cu-ft)	9265.3511



Peak Flow Hydrologic Analysis

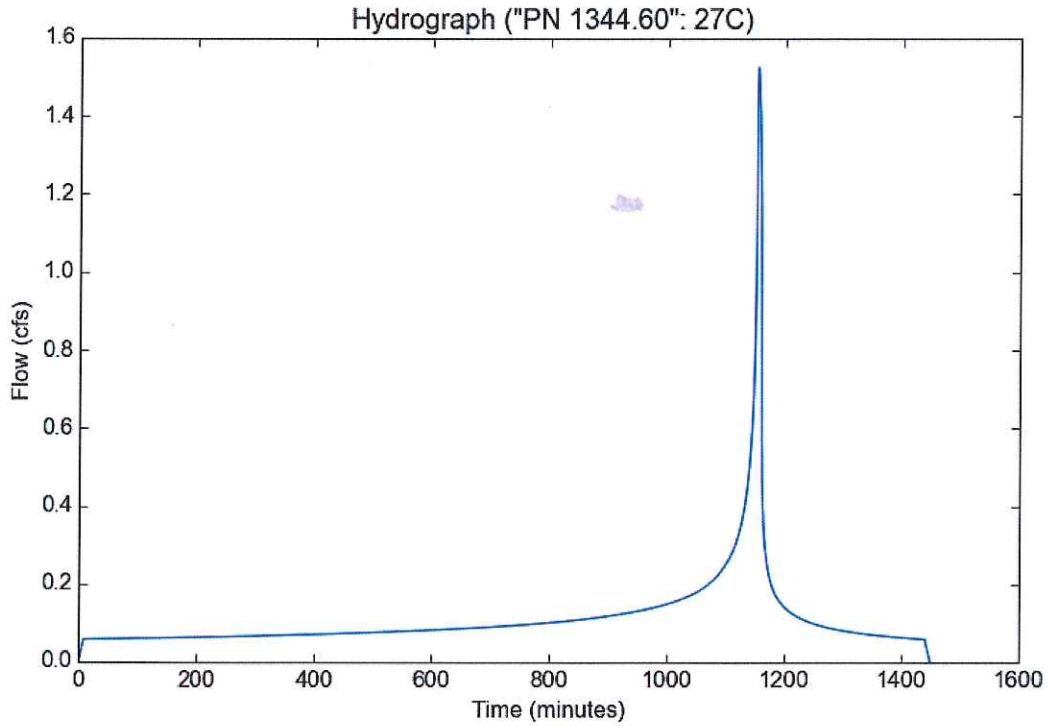
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	27C
Area (ac)	1.38
Flow Path Length (ft)	380.0
Flow Path Slope (vft/hft)	0.0184
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3137
Undeveloped Runoff Coefficient (Cu)	0.7055
Developed Runoff Coefficient (Cd)	0.8416
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.5258
Burned Peak Flow Rate (cfs)	1.6072
24-Hr Clear Runoff Volume (ac-ft)	0.2256
24-Hr Clear Runoff Volume (cu-ft)	9825.7539



Peak Flow Hydrologic Analysis

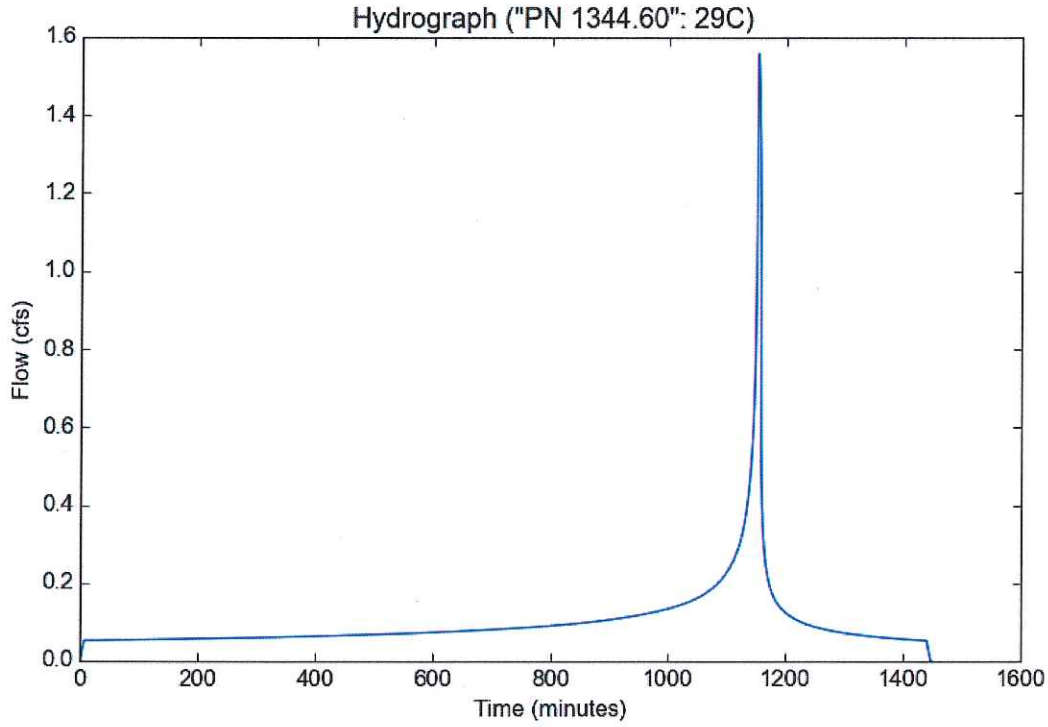
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	29C
Area (ac)	1.24
Flow Path Length (ft)	326.0
Flow Path Slope (vft/hft)	0.0276
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.4784
Undeveloped Runoff Coefficient (Cu)	0.7344
Developed Runoff Coefficient (Cd)	0.8503
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	1.5588
Burned Peak Flow Rate (cfs)	1.6384
24-Hr Clear Runoff Volume (ac-ft)	0.2027
24-Hr Clear Runoff Volume (cu-ft)	8830.5712



Peak Flow Hydrologic Analysis

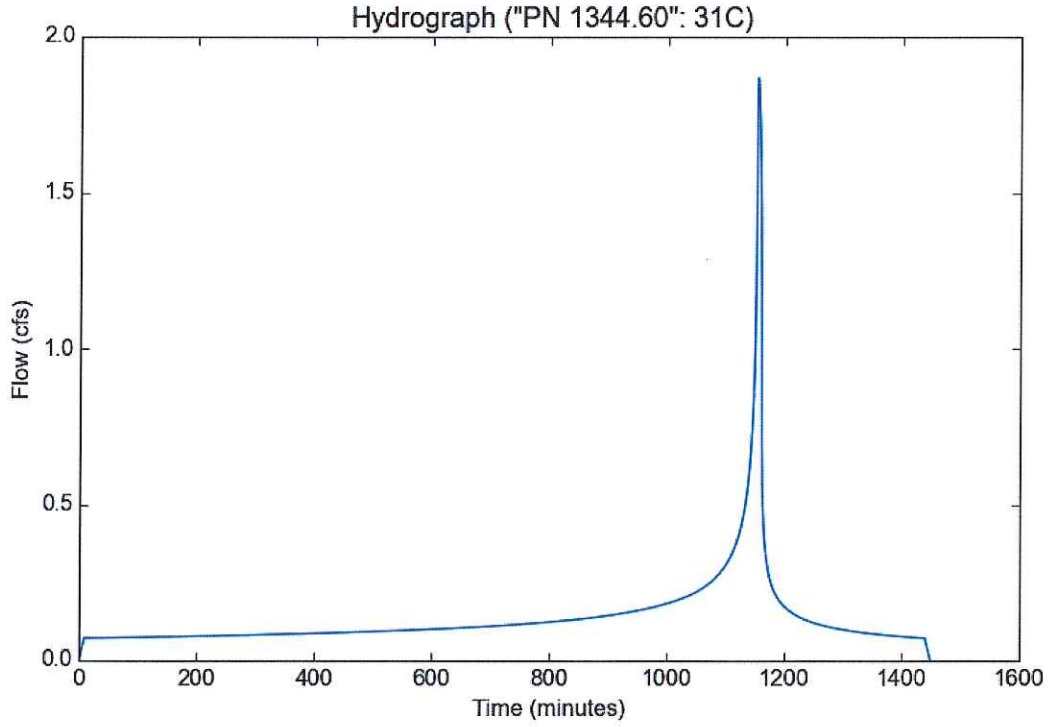
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	31C
Area (ac)	1.69
Flow Path Length (ft)	414.0
Flow Path Slope (vft/hft)	0.0217
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.7
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3137
Undeveloped Runoff Coefficient (Cu)	0.7055
Developed Runoff Coefficient (Cd)	0.8416
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.8686
Burned Peak Flow Rate (cfs)	1.9683
24-Hr Clear Runoff Volume (ac-ft)	0.2762
24-Hr Clear Runoff Volume (cu-ft)	12032.9885



Peak Flow Hydrologic Analysis

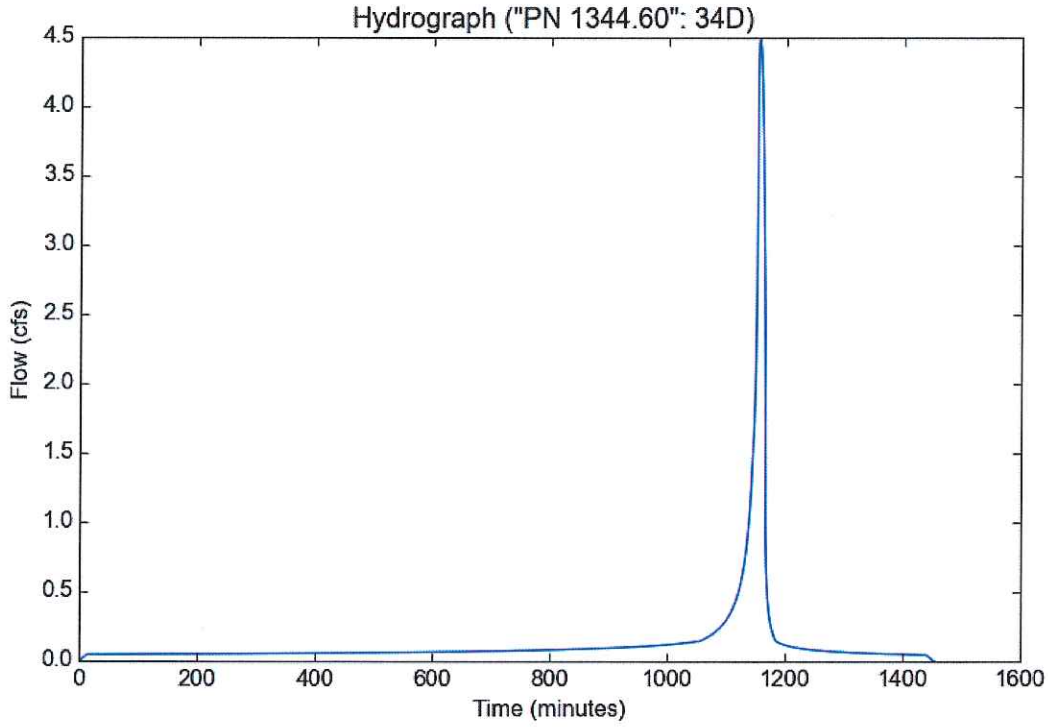
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	34D
Area (ac)	6.32
Flow Path Length (ft)	1212.0
Flow Path Slope (vft/hft)	0.2145
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.0674
Undeveloped Runoff Coefficient (Cu)	0.6622
Developed Runoff Coefficient (Cd)	0.667
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	4.4994
Burned Peak Flow Rate (cfs)	5.11
24-Hr Clear Runoff Volume (ac-ft)	0.2808
24-Hr Clear Runoff Volume (cu-ft)	12232.1889



Peak Flow Hydrologic Analysis

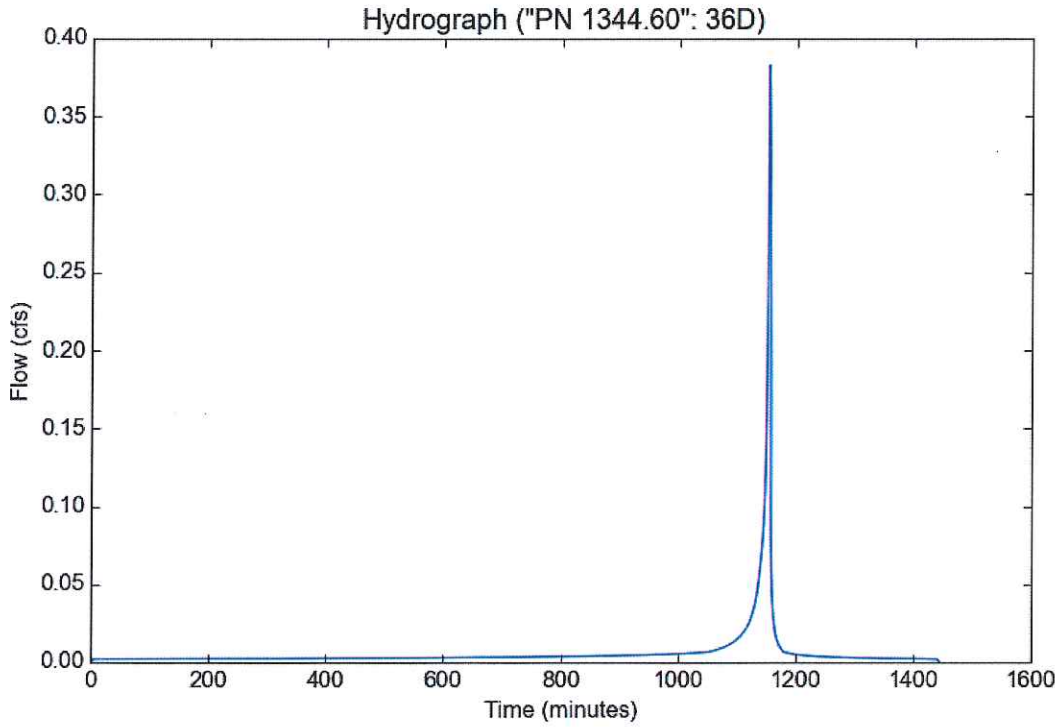
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	36D
Area (ac)	0.29
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1786
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.7317
Undeveloped Runoff Coefficient (Cu)	0.76
Developed Runoff Coefficient (Cd)	0.7628
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.3831
Burned Peak Flow Rate (cfs)	0.4187
24-Hr Clear Runoff Volume (ac-ft)	0.013
24-Hr Clear Runoff Volume (cu-ft)	565.4074



Peak Flow Hydrologic Analysis

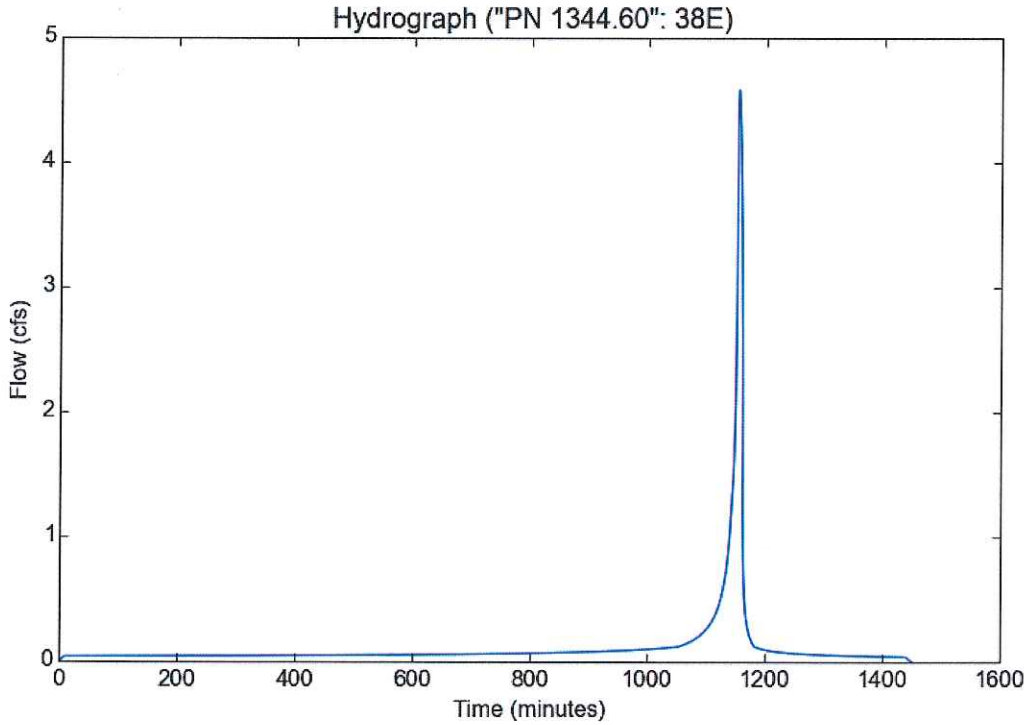
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	38E
Area (ac)	5.25
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.3953
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.2502
Undeveloped Runoff Coefficient (Cu)	0.6943
Developed Runoff Coefficient (Cd)	0.6984
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	4.5844
Burned Peak Flow Rate (cfs)	5.1401
24-Hr Clear Runoff Volume (ac-ft)	0.234
24-Hr Clear Runoff Volume (cu-ft)	10192.4281



Peak Flow Hydrologic Analysis

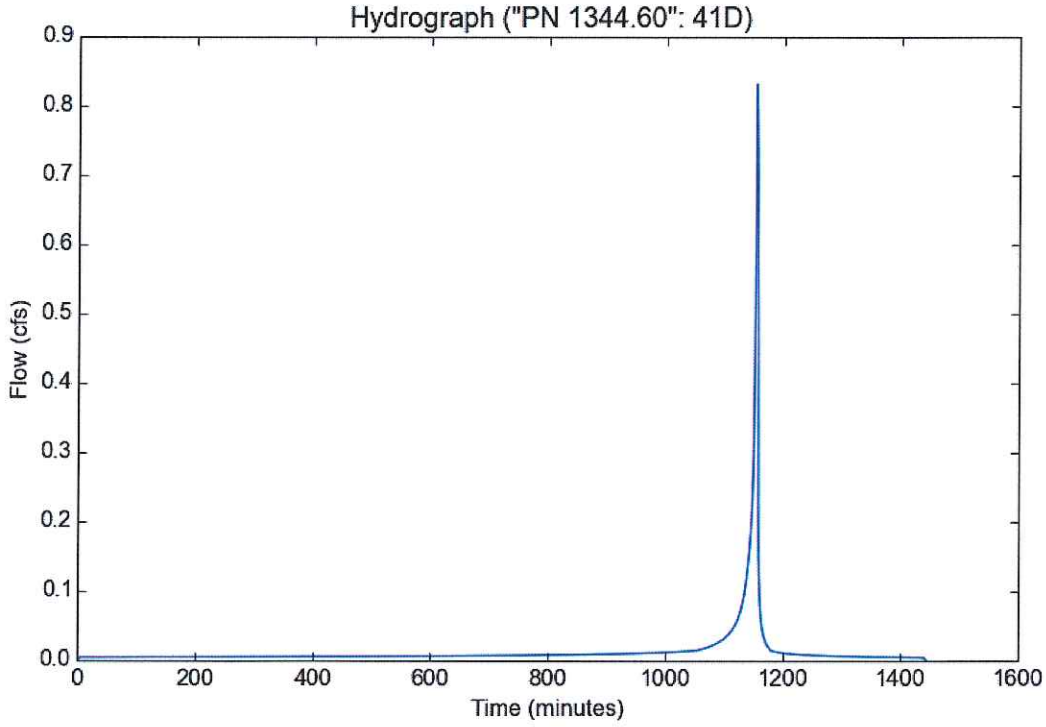
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	41D
Area (ac)	0.63
Flow Path Length (ft)	372.0
Flow Path Slope (vft/hft)	0.5726
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.7317
Undeveloped Runoff Coefficient (Cu)	0.76
Developed Runoff Coefficient (Cd)	0.7628
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.8322
Burned Peak Flow Rate (cfs)	0.9095
24-Hr Clear Runoff Volume (ac-ft)	0.0282
24-Hr Clear Runoff Volume (cu-ft)	1228.2988



Peak Flow Hydrologic Analysis

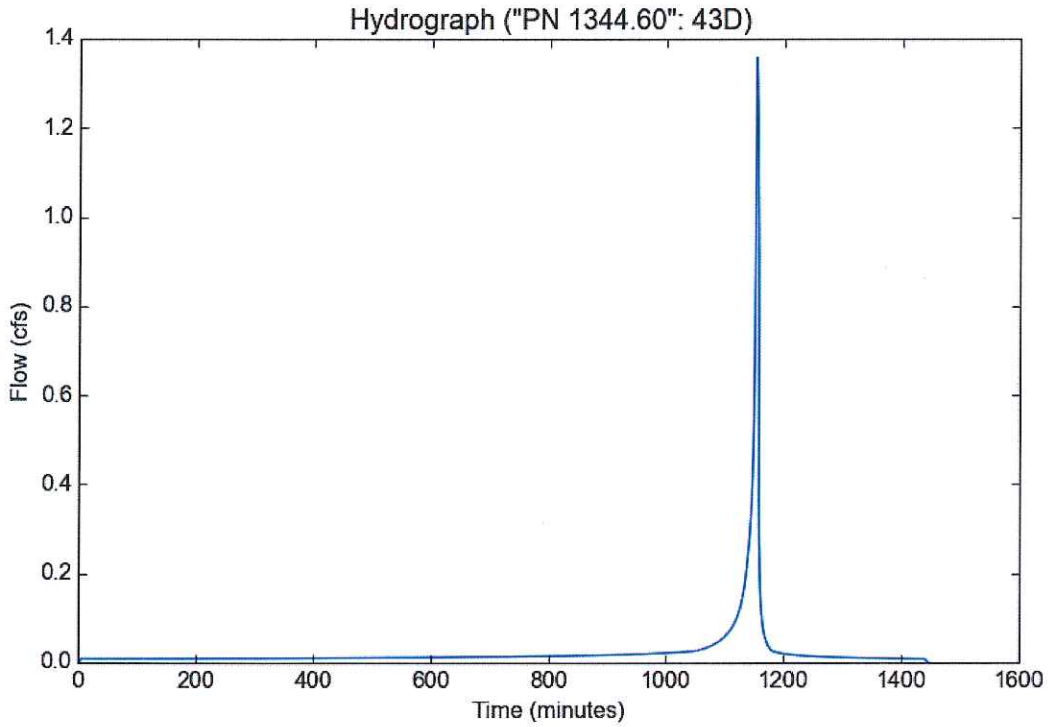
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	43D
Area (ac)	1.14
Flow Path Length (ft)	433.0
Flow Path Slope (vft/hft)	0.4965
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.5895
Undeveloped Runoff Coefficient (Cu)	0.7466
Developed Runoff Coefficient (Cd)	0.7497
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.3584
Burned Peak Flow Rate (cfs)	1.4918
24-Hr Clear Runoff Volume (ac-ft)	0.051
24-Hr Clear Runoff Volume (cu-ft)	2221.8646



Peak Flow Hydrologic Analysis

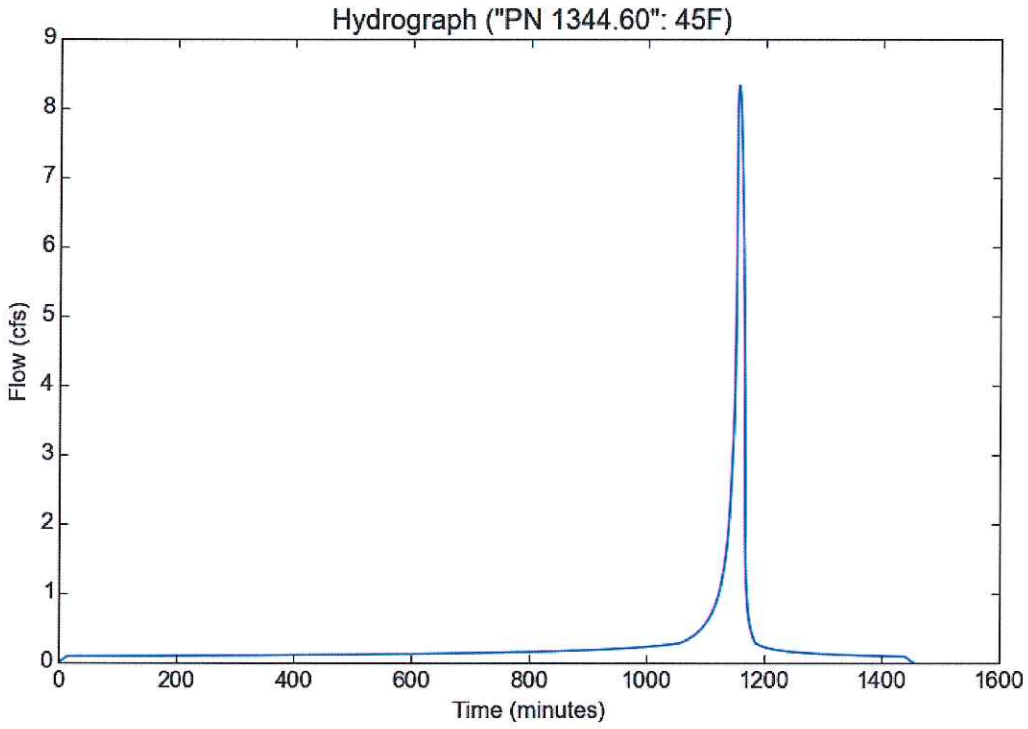
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	45F
Area (ac)	12.2
Flow Path Length (ft)	1323.0
Flow Path Slope (vft/hft)	0.2494
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.0333
Undeveloped Runoff Coefficient (Cu)	0.6563
Developed Runoff Coefficient (Cd)	0.6611
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	8.3347
Burned Peak Flow Rate (cfs)	9.4878
24-Hr Clear Runoff Volume (ac-ft)	0.5415
24-Hr Clear Runoff Volume (cu-ft)	23587.2969



Peak Flow Hydrologic Analysis

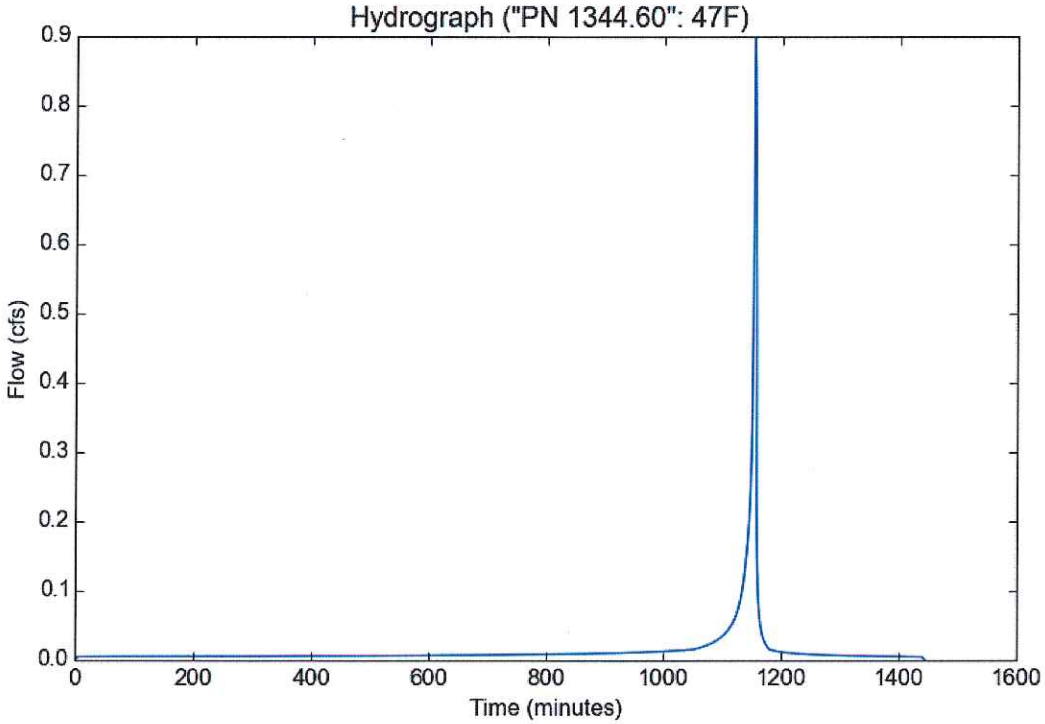
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	47F
Area (ac)	0.68
Flow Path Length (ft)	340.0
Flow Path Slope (vft/hft)	0.6471
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.7317
Undeveloped Runoff Coefficient (Cu)	0.76
Developed Runoff Coefficient (Cd)	0.7628
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.8982
Burned Peak Flow Rate (cfs)	0.9817
24-Hr Clear Runoff Volume (ac-ft)	0.0304
24-Hr Clear Runoff Volume (cu-ft)	1325.7828



Peak Flow Hydrologic Analysis

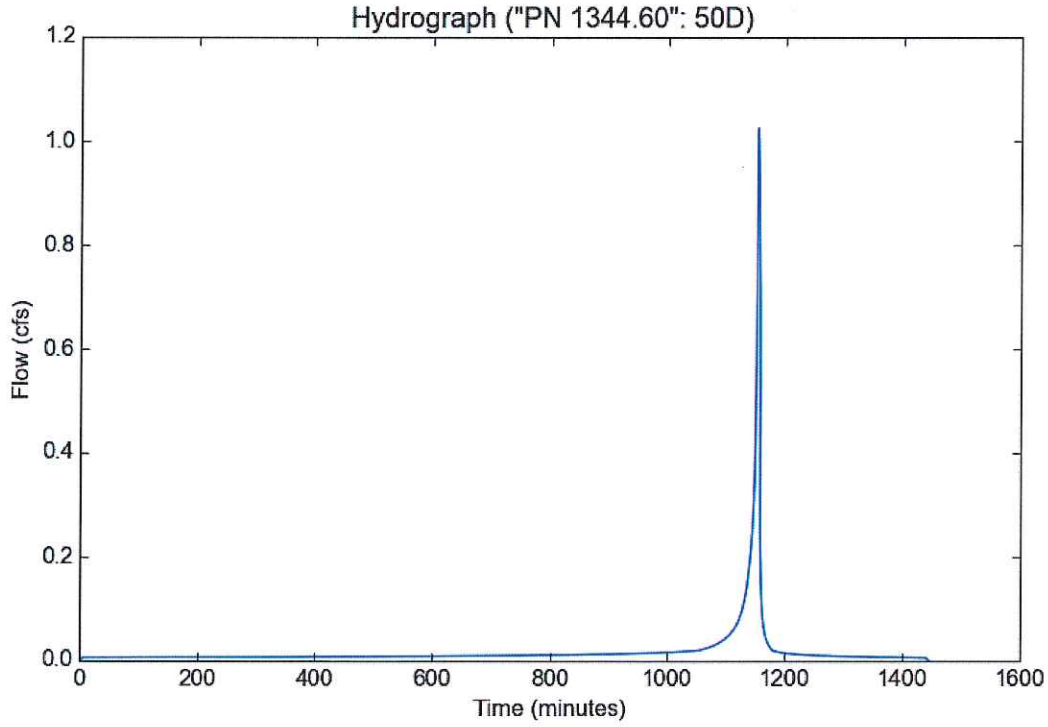
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	50D
Area (ac)	0.86
Flow Path Length (ft)	246.0
Flow Path Slope (vft/hft)	0.0488
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.5895
Undeveloped Runoff Coefficient (Cu)	0.7466
Developed Runoff Coefficient (Cd)	0.7497
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.0248
Burned Peak Flow Rate (cfs)	1.1254
24-Hr Clear Runoff Volume (ac-ft)	0.0385
24-Hr Clear Runoff Volume (cu-ft)	1676.1434



Peak Flow Hydrologic Analysis

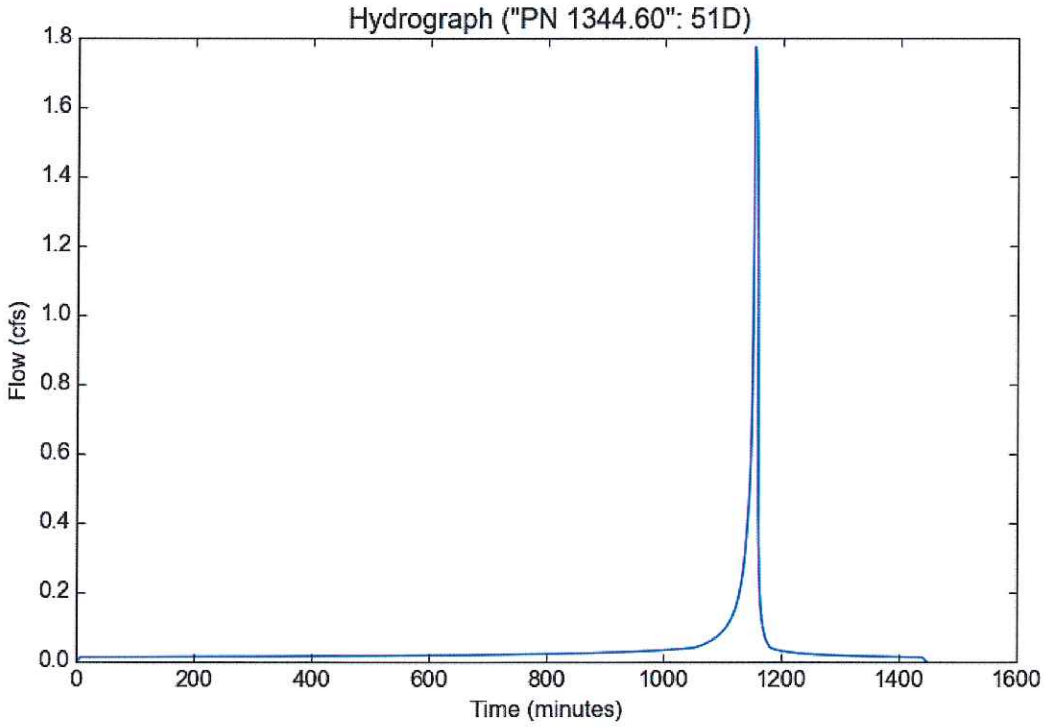
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	51D
Area (ac)	1.77
Flow Path Length (ft)	675.0
Flow Path Slope (vft/hft)	0.4296
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3885
Undeveloped Runoff Coefficient (Cu)	0.7186
Developed Runoff Coefficient (Cd)	0.7222
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	1.7749
Burned Peak Flow Rate (cfs)	1.9706
24-Hr Clear Runoff Volume (ac-ft)	0.079
24-Hr Clear Runoff Volume (cu-ft)	3442.6188



Peak Flow Hydrologic Analysis

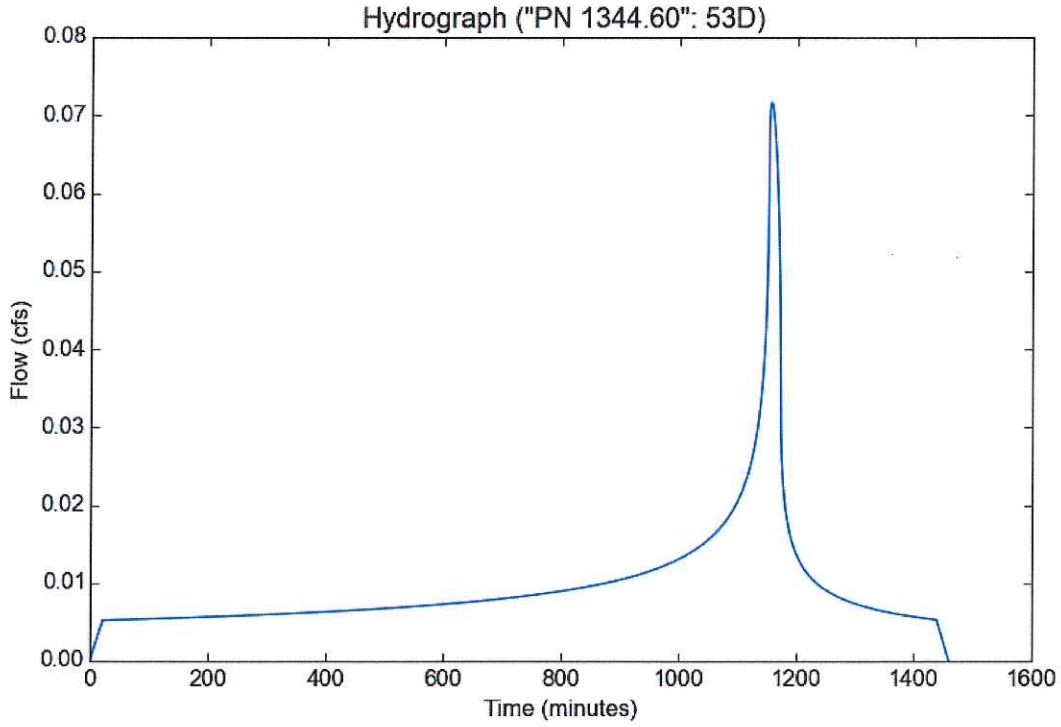
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	53D
Area (ac)	0.7
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.0583
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.8822
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.116
Time of Concentration (min)	21.0
Clear Peak Flow Rate (cfs)	0.0716
Burned Peak Flow Rate (cfs)	0.214
24-Hr Clear Runoff Volume (ac-ft)	0.0195
24-Hr Clear Runoff Volume (cu-ft)	848.4635



Peak Flow Hydrologic Analysis

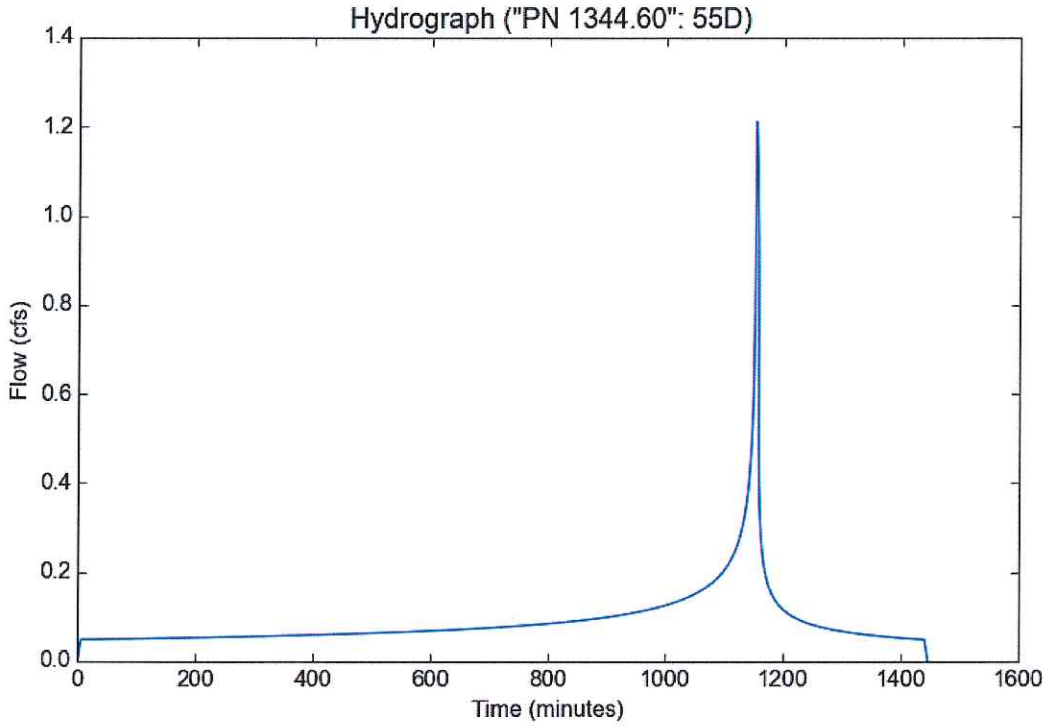
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	55D
Area (ac)	0.93
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.0105
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.9
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.5895
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.2122
Burned Peak Flow Rate (cfs)	1.2904
24-Hr Clear Runoff Volume (ac-ft)	0.1829
24-Hr Clear Runoff Volume (cu-ft)	7968.411



Peak Flow Hydrologic Analysis

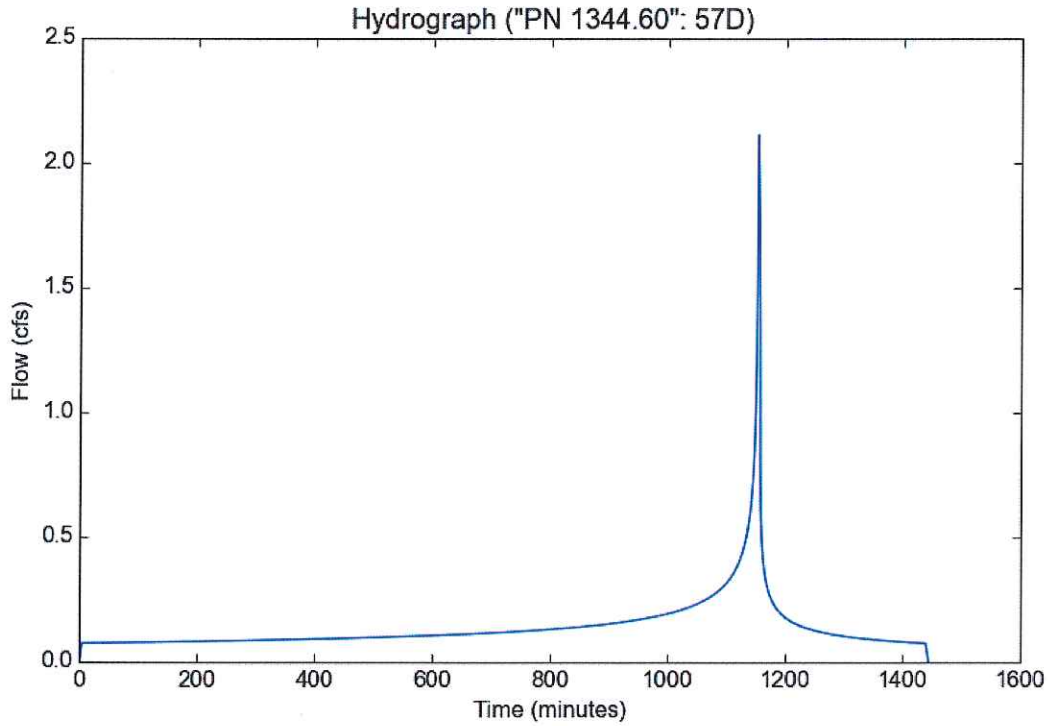
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	57D
Area (ac)	2.15
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.1615
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.56
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.7317
Undeveloped Runoff Coefficient (Cu)	0.1455
Developed Runoff Coefficient (Cd)	0.568
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.1149
Burned Peak Flow Rate (cfs)	2.5953
24-Hr Clear Runoff Volume (ac-ft)	0.2828
24-Hr Clear Runoff Volume (cu-ft)	12317.1512



Peak Flow Hydrologic Analysis

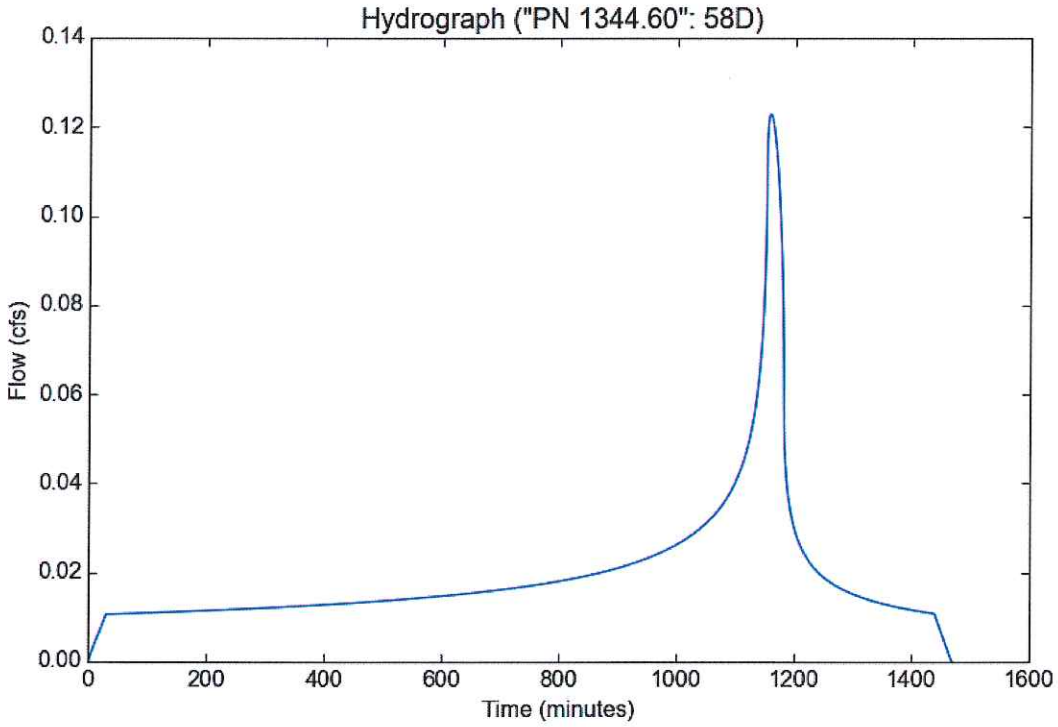
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	58D
Area (ac)	1.42
Flow Path Length (ft)	737.0
Flow Path Slope (vft/hft)	0.441
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.746
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.116
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.1229
Burned Peak Flow Rate (cfs)	0.358
24-Hr Clear Runoff Volume (ac-ft)	0.0395
24-Hr Clear Runoff Volume (cu-ft)	1721.179



Peak Flow Hydrologic Analysis

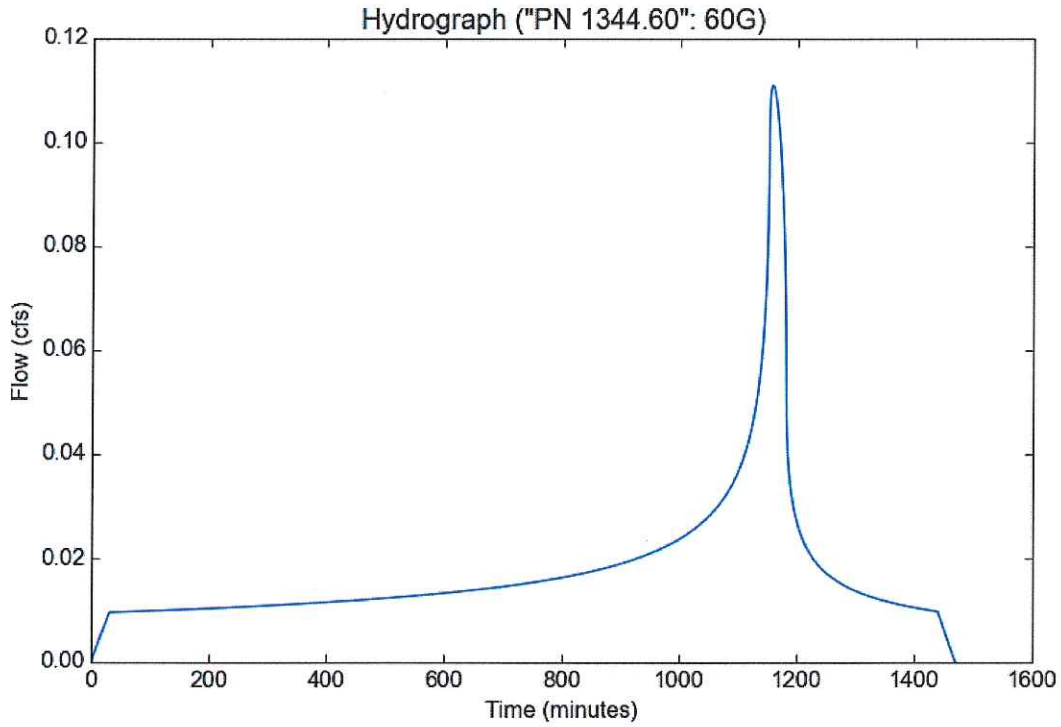
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	60G
Area (ac)	1.2
Flow Path Length (ft)	753.0
Flow Path Slope (vft/hft)	0.2377
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.03
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	0.746
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.124
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.111
Burned Peak Flow Rate (cfs)	0.3079
24-Hr Clear Runoff Volume (ac-ft)	0.0357
24-Hr Clear Runoff Volume (cu-ft)	1554.8291



Peak Flow Hydrologic Analysis

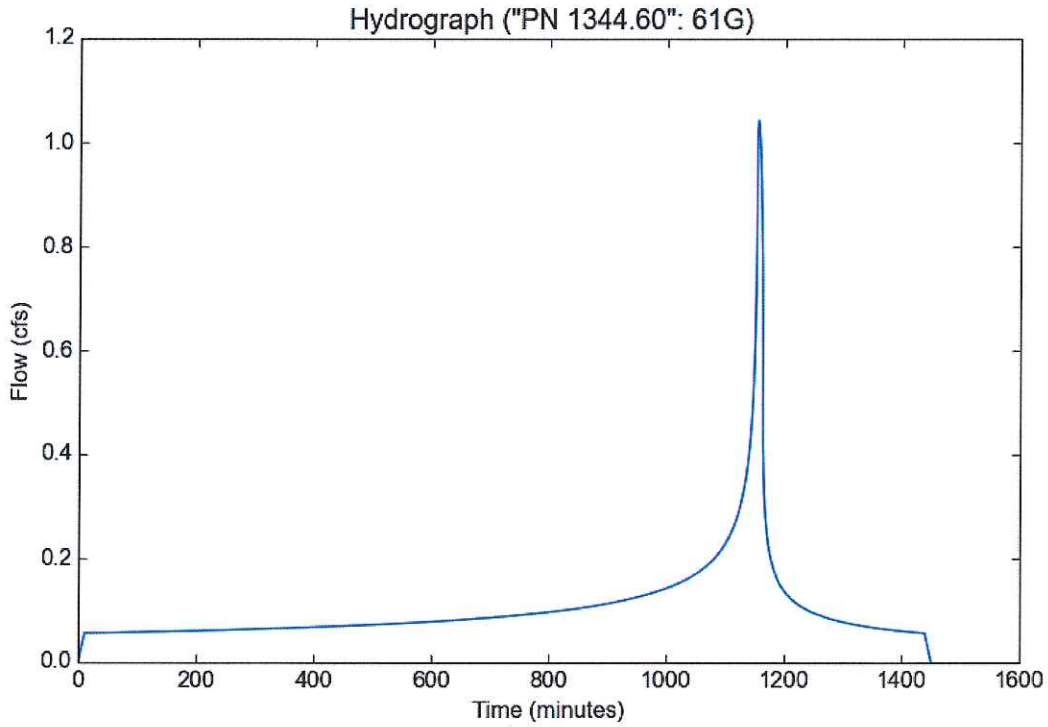
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	61G
Area (ac)	1.13
Flow Path Length (ft)	415.0
Flow Path Slope (vft/hft)	0.012
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.84
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.1955
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.772
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.0429
Burned Peak Flow Rate (cfs)	1.1286
24-Hr Clear Runoff Volume (ac-ft)	0.2093
24-Hr Clear Runoff Volume (cu-ft)	9115.3035



Peak Flow Hydrologic Analysis

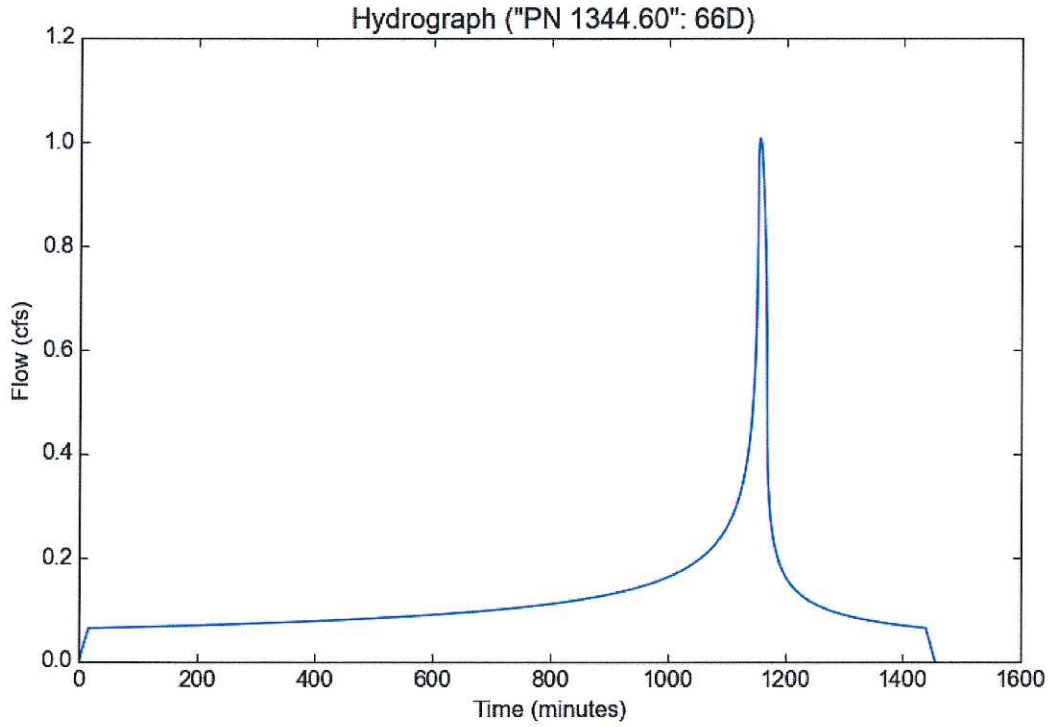
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	66D
Area (ac)	2.01
Flow Path Length (ft)	815.0
Flow Path Slope (vft/hft)	0.0736
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.5
Soil Type	35
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.0024
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.5
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	1.0074
Burned Peak Flow Rate (cfs)	1.2777
24-Hr Clear Runoff Volume (ac-ft)	0.2411
24-Hr Clear Runoff Volume (cu-ft)	10501.279



Peak Flow Hydrologic Analysis

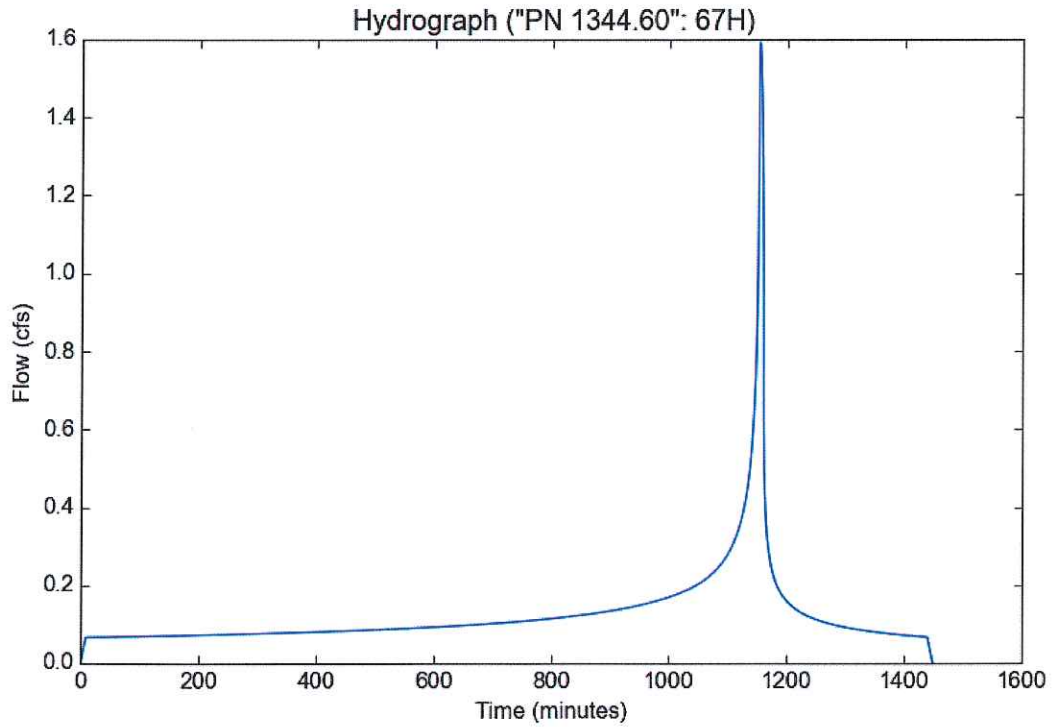
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	67H
Area (ac)	1.41
Flow Path Length (ft)	602.0
Flow Path Slope (vft/hft)	0.0831
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.79
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3137
Undeveloped Runoff Coefficient (Cu)	0.7055
Developed Runoff Coefficient (Cd)	0.8591
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.5914
Burned Peak Flow Rate (cfs)	1.6654
24-Hr Clear Runoff Volume (ac-ft)	0.2527
24-Hr Clear Runoff Volume (cu-ft)	11005.4885



Peak Flow Hydrologic Analysis

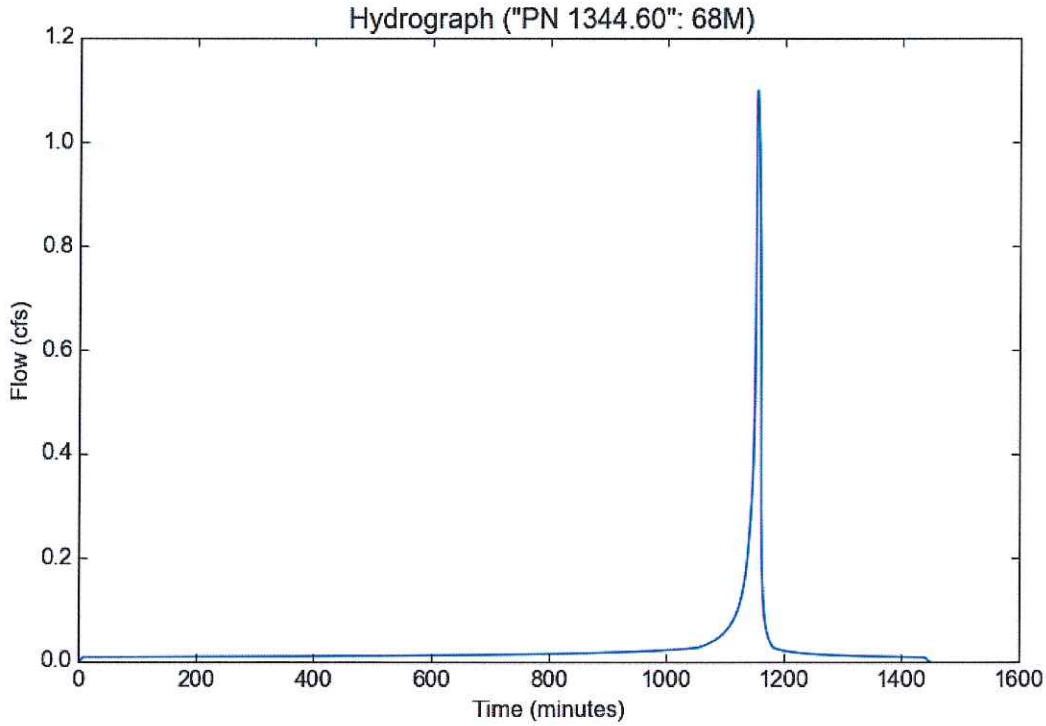
File location: Z:/RJR_Civil Engineering/LA County Hydrology Information/HydroCalc/PN 1344.60 2 yr - Report.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	"PN 1344.60"
Subarea ID	68M
Area (ac)	1.18
Flow Path Length (ft)	382.0
Flow Path Slope (vft/hft)	0.0314
50-yr Rainfall Depth (in)	7.5
Percent Impervious	0.02
Soil Type	34
Design Storm Frequency	2-yr
Fire Factor	0.83
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	2.9025
Peak Intensity (in/hr)	1.3137
Undeveloped Runoff Coefficient (Cu)	0.7055
Developed Runoff Coefficient (Cd)	0.7094
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.0996
Burned Peak Flow Rate (cfs)	1.2274
24-Hr Clear Runoff Volume (ac-ft)	0.0526
24-Hr Clear Runoff Volume (cu-ft)	2292.7982



APPENDIX D
Detention Basin Design Data

DEBRIS PRODUCTION

$$DP = DPR_{(A)} \times A$$

Where: *DP = Debris Production, in yd^3*

$DPR_{(A)}$ = Debris Production Rate based on the total drainage area, in yd^3/mi^2

A = Total Draianage Area including developments in mi^2

Au = Total Undeveloped Area, in mi^2

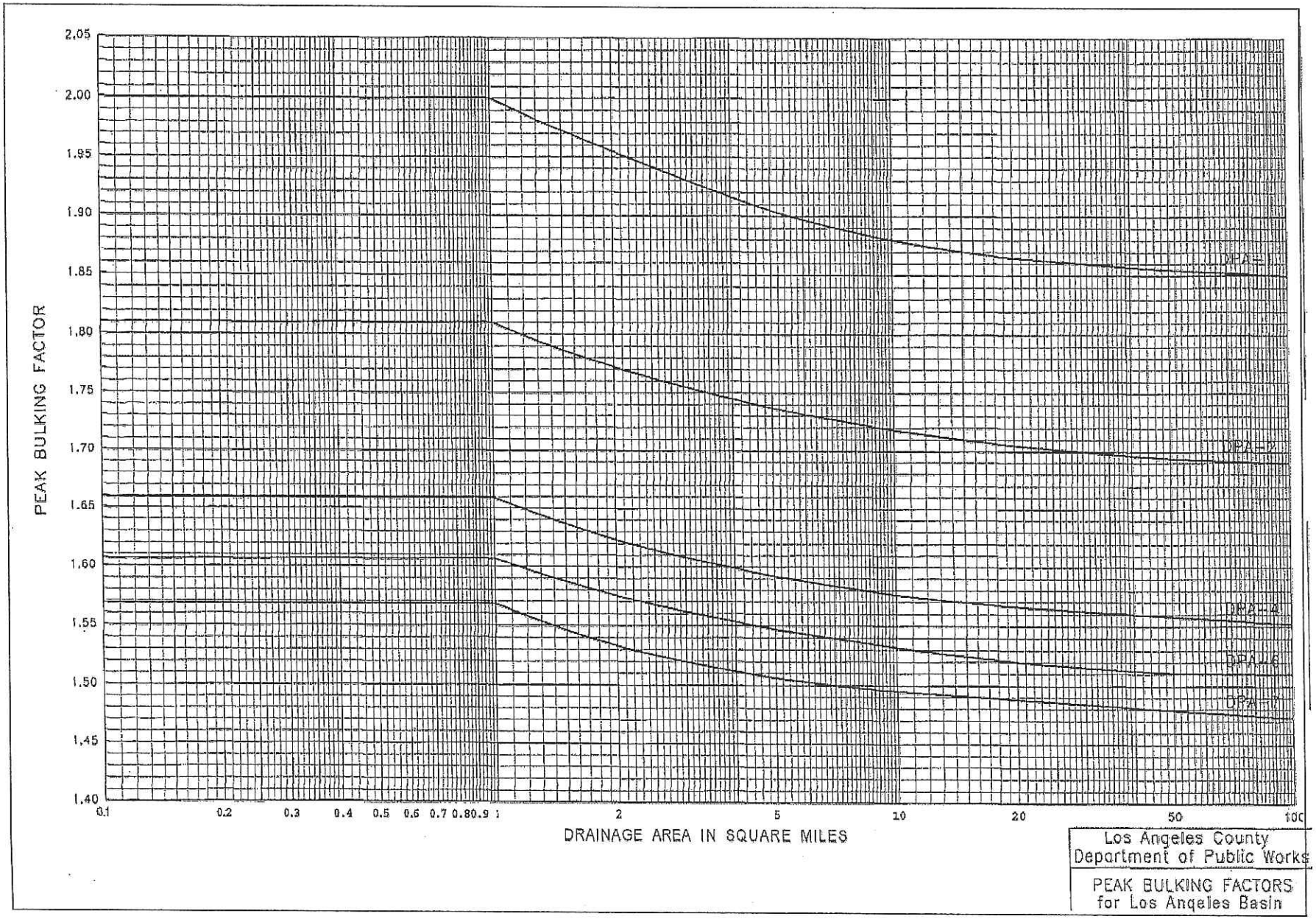
Ad = Total Undeveloped Area (existing only), in mi^2

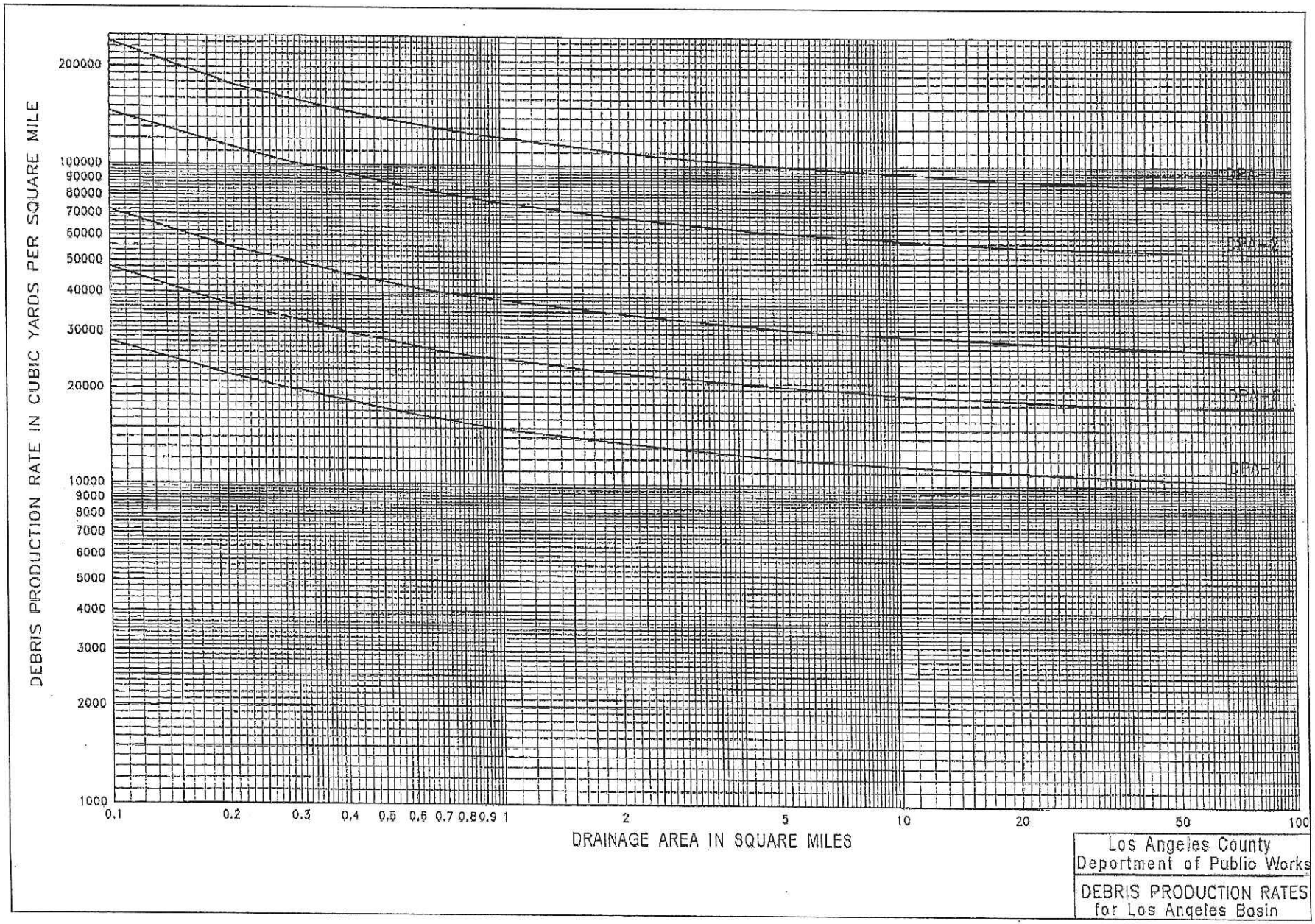
Where:

The subject watershed is located in DPA zone 6 and has a tributary area of 0.25 square miles.

The debris productin rate for the given watershed is 35,000 cubic yards per square mile.

The Design Debris Event (DDE) is 35,000 x 0.25 = **8,750 cubic yards**


PEAK BULKING FACTOR
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DPA=1
DPA=2
DPA=4
DPA=6
DPA=8
Los Angeles County
Department of Public Works
PEAK BULKING FACTORS
for Los Angeles Basin


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DFA-X
DFA-X
DFA-X
DFA-X
DFA-X
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Los Angeles Basin

5.0. Debris Basins

Two debris basins will be constructed as a part of the tract development.

5.1. Debris Basin 'A'

Basin Hydraulics: This basin is located immediately off-site at the northern end of the project. The basin will consist of providing a minimum of 9,360 cubic yards of debris storage capacity. Based on the Conceptual Drainage Reports and approvals, the basins were required to provide 41.4 cy per acre of tributary area. The present design will provide 10,776 cubic yards (which provides 47.7 c.y. per acre). Approximately 1042.8 cfs will flow to the basin based on B&E WSPG studies for a Q_{50} routed burned and bulk condition and the downstream storm drain system will be designed for Q_{50} burned runoff of 660 cfs.

The WSPG calculations indicate that the downstream system will adequately convey the runoff.

Basin Configuration: The basin configuration is illustrated on the grading plans. The bottom will consist of engineered compacted fill, and will slope at one (1) percent to the stand pipe. All side slopes are 3:1 (horizontal to vertical).

Secondary Outlet Provisions: The basin has been designed with an emergency inlet located at Elevation 790, 5 feet below the top of the basin. In addition, should both structures clog or fail, runoff would build up and flow out the direction of the emergency access road at Elevation 794, approximately 3.5 to 4.5 feet below the .finished floor of the adjacent pads towards Las Virgenes Road.

5.2. Debris Basin 'B'

Basin Hydraulics: This basin is located immediately off-site along the southeastern property line of the project. The basin will provide a minimum of 1,242 cubic yards of debris storage capacity. Based on the Conceptual Drainage Reports and approvals, the basins were required to provide 41.4 cy per acre of tributary area. The present design will provide 1,527 cubic yards (which provides 50.9 c.y per acre). The capacity analysis is included in Appendix F. Approximately 115 cfs will flow to the basin based on B&E WSPG studies for a Q_{50} routed burned and bulk condition and the downstream storm drain system will be designed for Q_{50} burned runoff of 73 cfs.

Basin Configuration: The basin configuration is illustrated on the grading plans. The bottom will consist of engineered compacted fill, and will slope at one (1) percent to the stand pipe. Side slopes range from 3:1 (horizontal to vertical) to 2:1 because of space constraints.

Secondary Outlet Provisions: The basin has been designed with an emergency inlet located at Elevation 815, 5 feet below the top of the basin. In addition, should both structures clog or fail, runoff would build up and flow out the direction of the emergency access/easement road. at Elevation 820. Pad 22 is located at Elevation 823.5, however, Pad 23 and the pads to the north are located at 819 and lower. Therefore, RJR has recommended a privacy/debris wall be constructed along the northern and southern edge of the easement. Therefore, if the basin clogs or the private drain becomes inoperable, runoff would be conveyed to the street and the walls will protect the pads..

APPENDIX E

Low Impact Development (LID) Calculations

PRELIMINARY LOW IMPACT DEVELOPMENT CALCULATIONS

Drainage Area	=	15.94 Acres
Flow Path Slope	=	5%
Flow Path Length	=	1550'
Soil Type	=	34 & 35
Imperviousness	=	0.67%

Site Imperviousness

Average Residence with Driveway

2,600 sq. ft. of impervious area per lot (measured)
67 single family lots x 2,600 sf per lot = 174,200 sq. ft. **(4.0 acres)**

Multi-Family Housing with Driveway

3,300 sq. ft. of impervious area building (measured)
*2 units per building
2 Multi-Family Buildings x 3,300 sf per building = 6,600 sq. ft. **(0.15 acres)**

Streets with sidewalks

3.72 acres (measured)

Common Area Hardscaping

0.15 acres (measured)

Commercial Lot

Total lot size = 2.91 acres (measured)
Assuming 90% of the lot will be impervious
2.91 x 0.90 = **(2.62 acres)**

Total Site Imperviousness

4 + .15+3.72+.15+2.62 = **10.64**
10% of the calculated impervious area was added to make up for variances in hardscape design between residences, etc.

10.64 + 10% = **11.70 acres**

Impervious Area/Total Site Developed Area = Site Imperviousness
10.64 / 15.94 = **approximately 0.67%**

Peak Flow Hydrologic Analysis

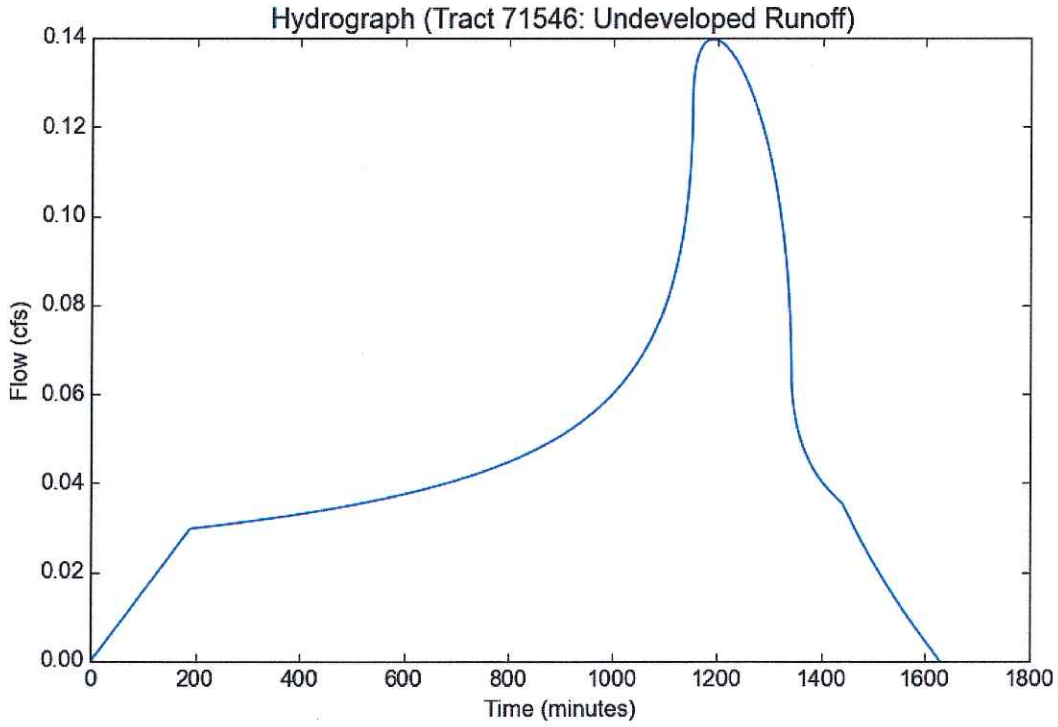
File location: Z:/Active Projects_Tracts/1344_New Home Company _Tr. 71546_Canyon Oaks/Hydrology/October 2014_Site Plan Option 6/tc_calculator_
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	Tract 71546
Subarea ID	Undeveloped Runoff
Area (ac)	15.94
Flow Path Length (ft)	1550.0
Flow Path Slope (vft/hft)	0.05
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.01
Soil Type	34
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.0812
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.108
Time of Concentration (min)	189.0
Clear Peak Flow Rate (cfs)	0.1397
Burned Peak Flow Rate (cfs)	0.1397
24-Hr Clear Runoff Volume (ac-ft)	0.1068
24-Hr Clear Runoff Volume (cu-ft)	4650.4671



Peak Flow Hydrologic Analysis

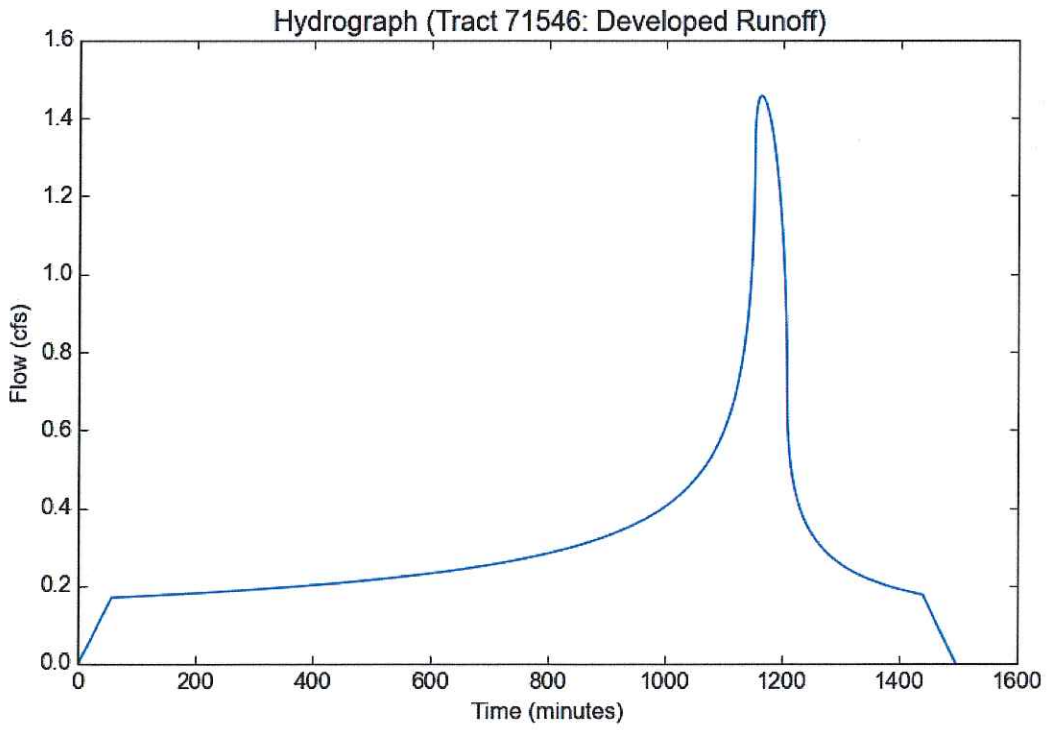
File location: Z:/Active Projects_Tracts/1344_New Home Company _Tr. 71546_Canyon Oaks/Hydrology/October 2014_Site Plan Option 6/tc_calculator_
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	Tract 71546
Subarea ID	Developed Runoff
Area (ac)	15.94
Flow Path Length (ft)	1550.0
Flow Path Slope (vft/hft)	0.05
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.67
Soil Type	34
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.1438
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.636
Time of Concentration (min)	56.0
Clear Peak Flow Rate (cfs)	1.4574
Burned Peak Flow Rate (cfs)	1.4574
24-Hr Clear Runoff Volume (ac-ft)	0.6284
24-Hr Clear Runoff Volume (cu-ft)	27373.2819



RJR ENGINEERING GROUP

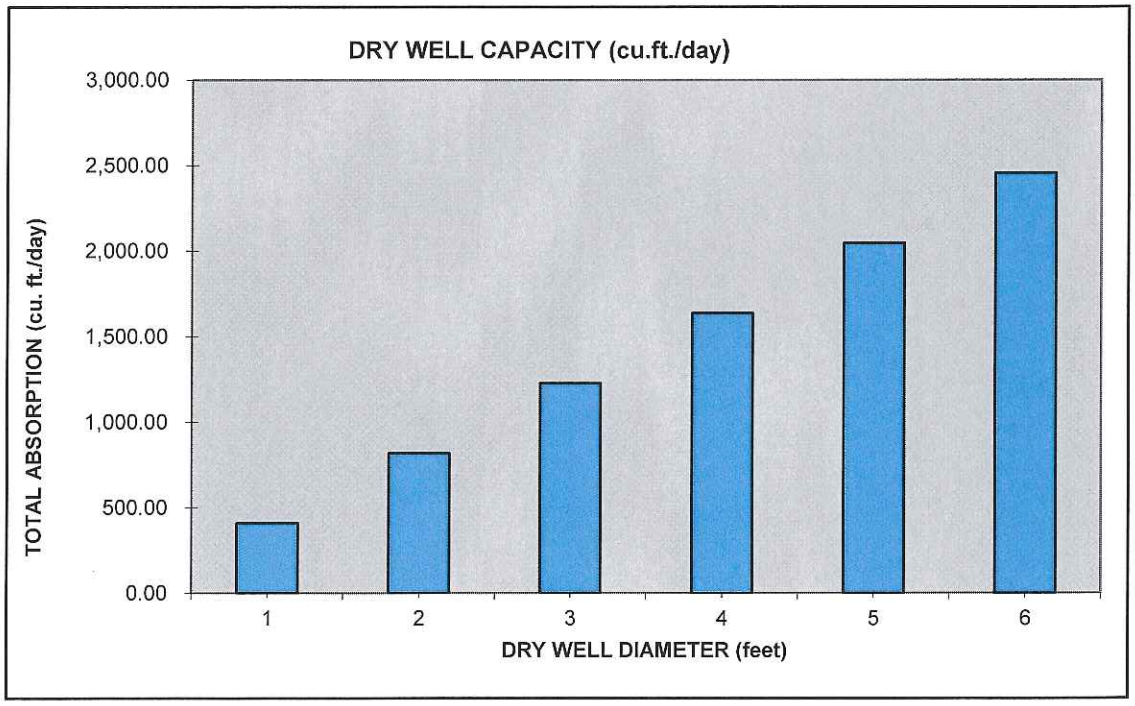
DRY WELL INFILTRATION CALCULATIONS

Dry Well Diameter	3.0	feet
Total Well Depth	35.0	feet
Estimated Backfill Depth	0.0	feet
Estimated Cap Thickness	5.0	feet
Effective Absorption Rate (converted from falling hear permeability rates)	32.5	gal./day

Well Effective Depth	***30.0***	feet
Dry Well Absorbtion Area	***282.6***	sq. ft.
Effective Absorption Rate (cu.ft./day)	***4.34***	c.f./day

TABLE 1 - ABSORBTION-RATE SUMMARY

EFFECTIVE DIAMETER	ABSORPTION AREA PER FOOT OF DEPTH	TOTAL ABSORPTION PER FOOT	TOTAL ABSORPTION PER WELL (c.f./day)
1	3.14	13.64	409.26
2	6.28	27.28	818.53
3	9.42	40.93	1227.79
4	12.56	54.57	1637.05
5	15.70	68.21	2046.32
6	18.84	81.85	2455.58



SYSTEM CAPACITY DESIGN

L.A. County Low Impact Design Method
L.A. County LID Design Storm: 3/4 inch storm over 24 hours

Developed Site Data:

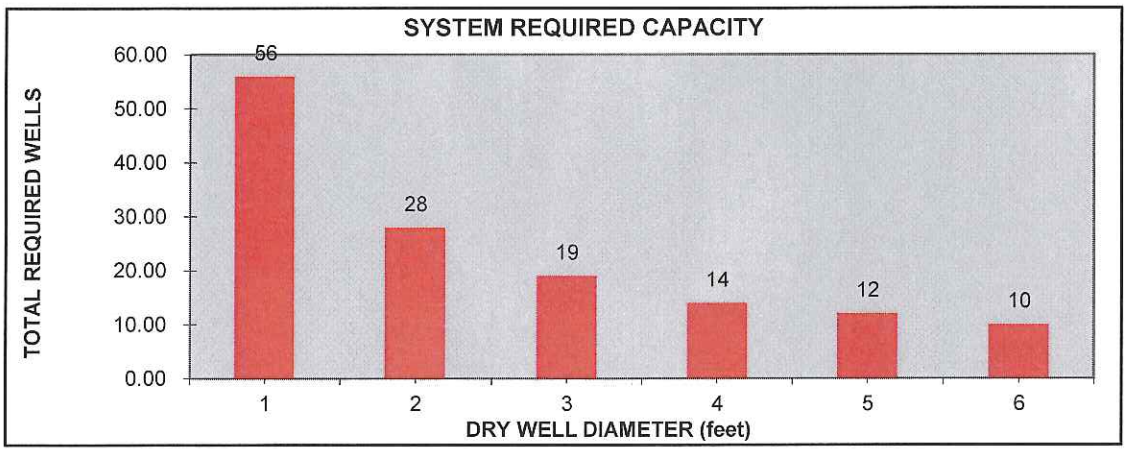
Drainage Area (mitigated areas only)	15.9 acres
Flow Path Slope	5.0 %
Flow Path Length	1,550.00 feet
Soil Type	35 & 34 feet
Imperviousness	67 %

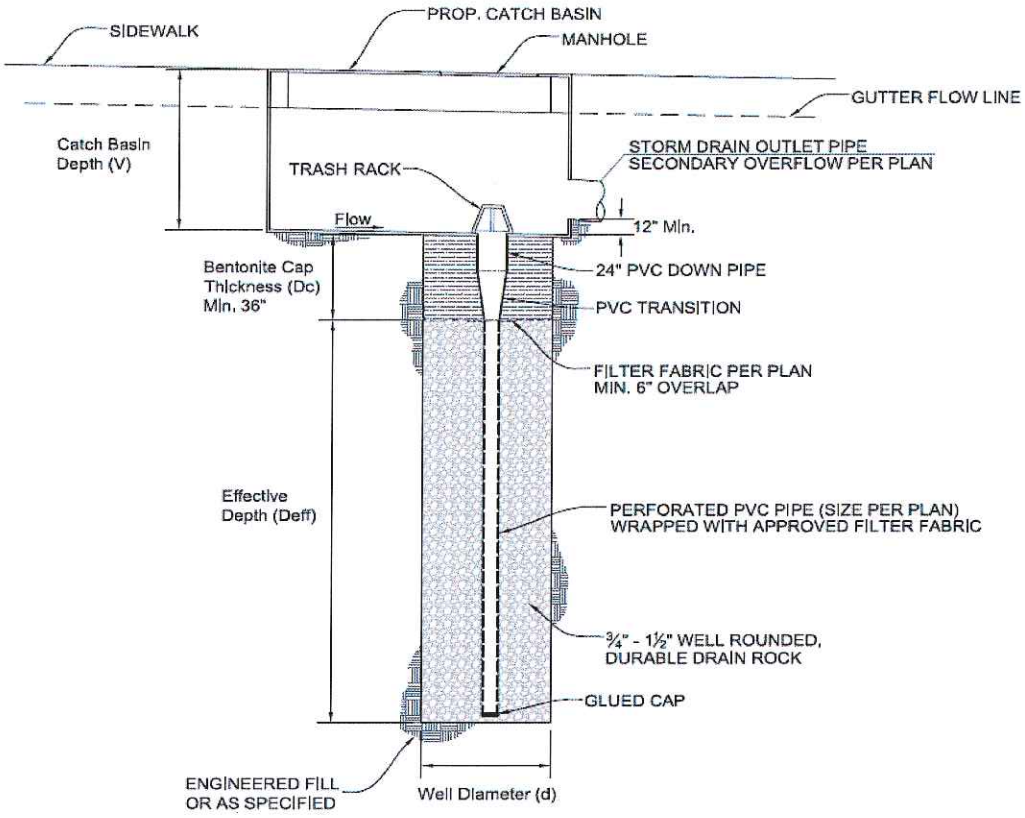
Design Runoff Volumes (From LID Calculator)

Undeveloped Runoff Volume	4,650.47 cu.ft.
Developed Runoff Volume	27373.28 cu.ft.
Excess Volume (ΔV)	*22,722.81* cu.ft.
Water Quality Treatment Flow Volume	**22,722.81** cu.ft.
Water Quality Treatment Flow Rate	**2.07** c.f.s.
Dry Well Design Diameter	*3.0* ft
Dry Well Design Capacity / Well	*1227.8* cu.ft.
Total Number of Required Wells	**19**
Total Proposed Treatment Volume	**23328.0** cu.ft.

TABLE 2 - SYSTEM CAPACITY SUMMARY

EFFECTIVE DIAMETER	TOTAL ABSORPTION PER WELL	TOTAL TREATMENT VOLUME REQUIRED	TOTAL REQUIRED WELLS
1	409.26	22722.81	56
2	818.53	22722.81	28
3	1227.79	22722.81	19
4	1637.05	22722.81	14
5	2046.32	22722.81	12
6	2455.58	22722.81	10

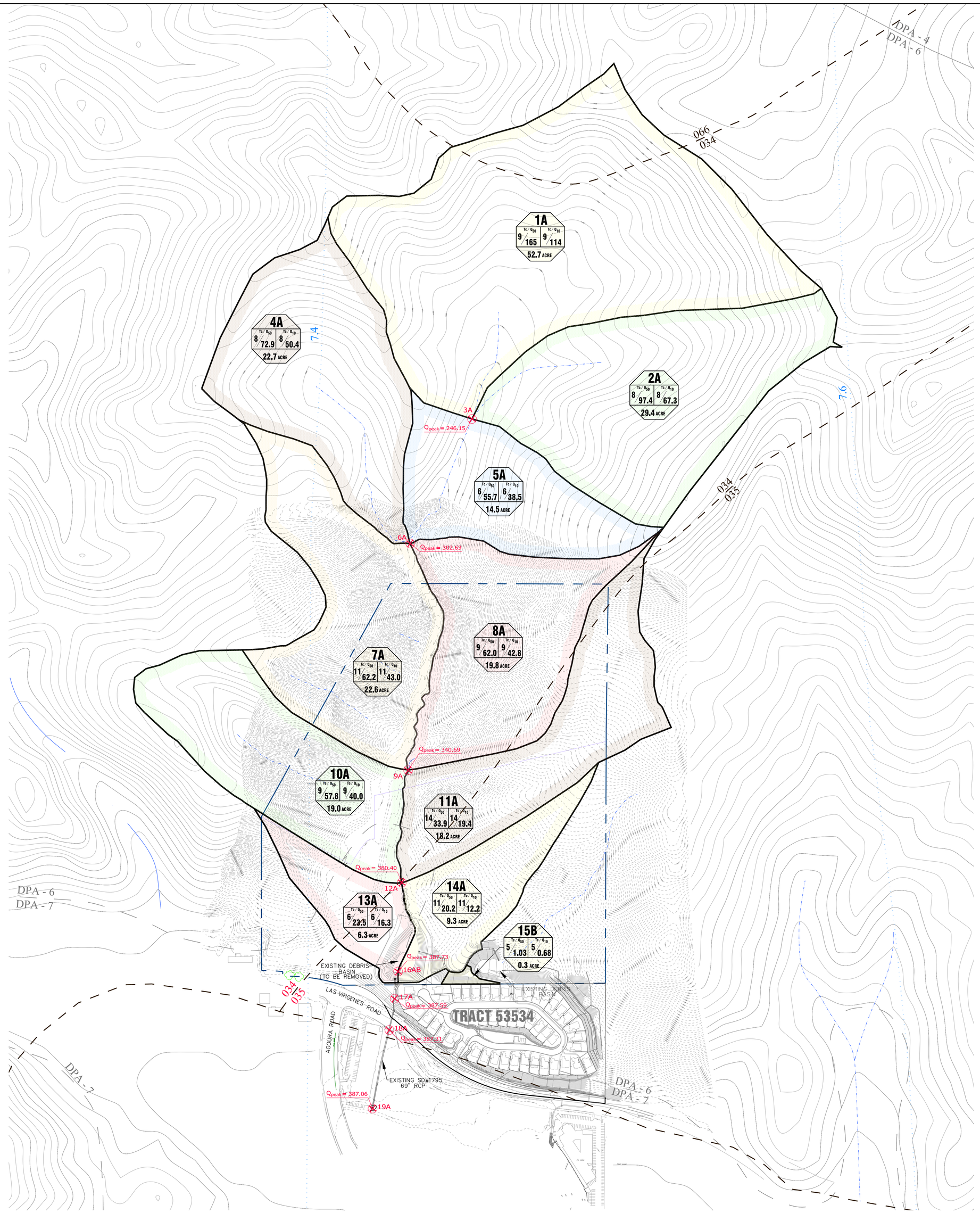




DRY WELL DETAIL AT STREET CATCH BASIN

NTS

APPENDIX F
Hydrology Maps



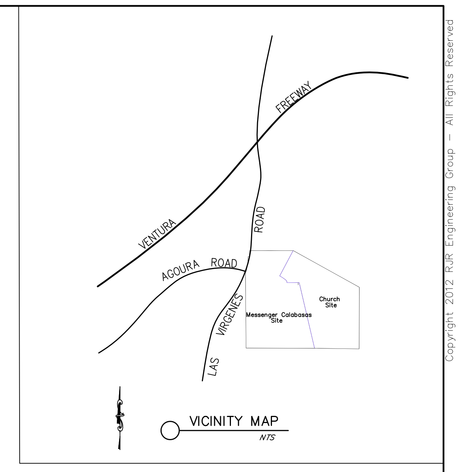
GRAPHIC SCALE

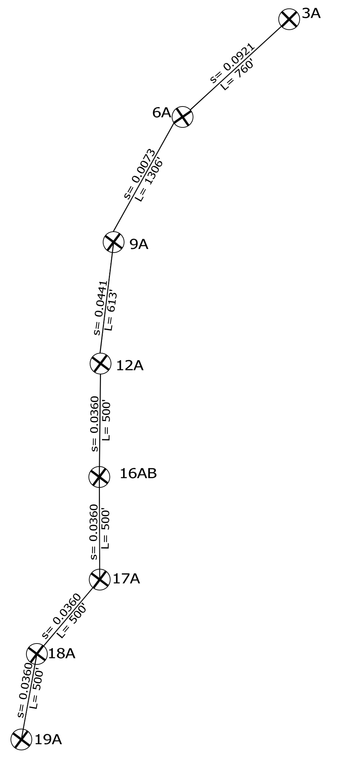
0 1" 2"
0 100 200 400

1" = 200'
C.I. = 5'

HYDROLOGY INFORMATION

SOIL NUMBER: 034, 035 & 066
RAINFALL: 7.4 - 7.55
DPA: 6 & 7
FIRE FACTOR: 0.83 (<15% IMP)
LOCATION: CALABASAS QUAD
REFERENCE: 2006 L.A.C.P.W. HYDROLOGY MANUAL





ROUTING SCHEMATIC

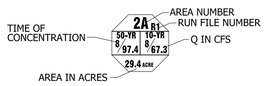
TABLE 1: HYDROLOGY DATA

AREA/NODE NUMBER	AREA (Acres)	INTENSITY (in./hr)	T_c	C_u	C_d	C_{ba}	K	IMPERV. (%)	BURN FACTOR	RATIONAL METHOD PEAK 'Q' $_{50}$ (50 yr) (cfs)	MODIFIED RATIONAL METHOD PEAK 'Q' $_{10}$ (50 yr) (cfs)	MODIFIED RATIONAL METHOD ROUTED 'Q' $_{10}$ (50 yr) (cfs)
1A	52.7	3.39	9	0.86	0.86	0.91	0.60	2.00	0.83	161.87	165.00	165.00
2A	29.4	3.61	8	0.86	0.86	0.91	0.59	2.00	0.83	96.21	97.35	253.38
3A	-	-	-	-	-	-	-	-	-	-	-	246.15
4A	22.7	3.54	8	0.86	0.86	0.91	0.60	2.00	0.83	72.83	72.94	293.73
5A	14.5	4.11	6	0.88	0.88	0.92	0.59	2.00	0.83	54.86	55.74	304.03
6A	-	-	-	-	-	-	-	-	-	-	-	302.63
7A	22.6	3.07	11	0.84	0.84	0.89	0.60	2.00	0.83	61.89	62.22	326.02
8A	19.8	3.39	9	0.86	0.86	0.91	0.60	2.00	0.83	60.82	61.99	341.59
9A	-	-	-	-	-	-	-	-	-	-	-	340.69
10A	19.0	3.35	9	0.85	0.85	0.90	0.60	2.00	0.83	57.24	57.83	355.79
11A	18.2	2.74	14	0.47	0.48	0.64	0.61	2.00	0.83	32.28	33.87	381.50
12A	-	-	-	-	-	-	-	-	-	-	-	380.40
13A	6.3	4.08	6	0.88	0.88	0.92	0.59	2.00	0.83	23.66	23.51	383.94
14A	9.3	3.07	11	0.52	0.53	0.68	0.60	2.00	0.83	19.53	20.19	387.98
15B	0.3	4.44	5	0.61	0.62	0.75	0.58	2.00	0.83	1.00	1.03	1.03
16AB	-	-	-	-	-	-	-	-	-	-	0.97	387.73
17A	-	-	-	-	-	-	-	-	-	-	-	387.59
18A	-	-	-	-	-	-	-	-	-	-	-	387.31
19A	-	-	-	-	-	-	-	-	-	-	-	387.06

HYDROLOGY INFORMATION

SOIL NUMBER: 034, 035 & 066
RAINFALL: 7.4 - 7.55
DPA: 6 & 7
FIRE FACTOR: 0.83 (<15% IMP)
LOCATION: CALABASAS QUAD
REFERENCE: 2006 L.A.C.P.W. HYDROLOGY MANUAL

HYDROLOGY LEGEND



- PROPERTY BOUNDARY
- TRIBUTARY AREA BOUNDARY
- DEBRIS POTENTIAL AREA BOUNDARY
- SOIL CLASSIFICATION AREA
- INCHES OF RAINFALL
- 19A — ROUTING NODE (L.A.R.A.T.)
- OVERLAND FLOW DIRECTION
- STORM DRAIN PIPE
- SIDE INLET CATCH BASIN
- STORM DRAIN INLET

EXISTING HYDROLOGY MAP

TENTATIVE TRACT 71546
THE NEW HOME COMPANY - CANYON OAKS

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Prepared by:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6498 FAX
San Luis Obispo, CA
(805) 596-0216 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7366 (310) 456-9085
E-mail: rjr@rjreng.com

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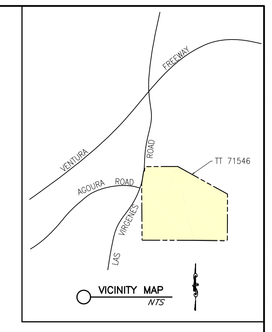

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TABLE 1: HYDROLOGY ROUTING DATA

Path A

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
1A	10.0	2020	.23270	32.13	17AB	15.2	348	.03590	204.34
2A	29.4	2042	.25470	113.56	18A	2.3	536	.03080	205.55
3A	.0	760	.09470	108.46	19A	.0	116	.02000	205.35
4A	22.7	1952	.21880	148.14	20A	.4	232	.05820	205.50
5A	14.5	1505	.36010	158.14	21A	.0	140	.02000	205.35
6A	.0	948	.06650	157.23	22A	1.4	360	.00830	206.20
7A	12.9	2054	.13880	172.83	23A	.0	190	.02000	205.87
8A	16.7	1321	.43150	178.26	24A	.0	305	.02300	205.86
9A*	.0	360	.02500	177.69	25A	.0	48	.04000	205.71
10A	1.3	300	.03000	178.34	33AC	9.1	360	.14400	220.34
11A	.0	92	.02720	178.13	71AD	40.1	461	.02820	263.53
12A	.0	22	.04540	178.06	72A	.0	10	.02000	252.17

*Node 9A represents the confluence at the proposed debris basin. At this point the bulkedportion of the flow rate is removed via the basin. All the nodes downstream of the basin represent a Q50 burned without the bulking factor.

Path B

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
13B	14.1	1899	.31070	45.30	16B	85	348	.02350	42.94
14B	.0	271	.02000	42.37	17AB	15.2	348	.3590	204.34
15B	1.1	335	.01190	43.22					

Path C

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
26C	4.8	1321	.17030	16.51	30C	.0	308	.02000	16.56
27C	1.4	380	.01840	15.81	31C	1.7	414	.02170	19.39
28C	.0	223	.08000	15.54	32C	.0	47	.02000	19.28
29C	1.2	326	.02760	16.61	33AC	9.1	360	.14400	220.34

Path D

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
34D	6.3	1212	.21450	23.51	53D	.7	240	.05000	76.78
35D	.0	51	.17060	20.80	54D	.0	105	.04200	76.06
36D	.3	224	.17860	21.30	55D	.9	190	.01050	76.65
37D	.0	84	.08000	20.95	56D	.0	280	.06960	76.58
40D6	5.3	115	.08000	37.31	57D	2.2	529	.07720	77.52
41D	.6	372	.57260	38.13	58D	1.4	737	.44100	78.13
42D	.0	133	.04000	37.69	59D	.0	78	.06500	77.53
43D	1.1	433	.49650	38.51	64EX3	2.3	113	.05000	81.29
44D	.0	73	.02740	38.33	65D	.0	24	.03000	81.18
49D8	12.9	245	.04880	77.51	66D	2.0	815	.07360	82.07
50D	.9	245	.04000	77.34	69DH	1.4	80	.02000	81.05
51D	1.8	675	.42960	77.64	70D	.0	270	.02000	80.99
52D	.0	240	.05830	76.93	71AD	40.1	461	.02820	263.53

ADDITIONAL ROUTING DATA ON SHEETS 2 AND 3

SEE SHEET 2

HYDROLOGY INFORMATION

SOIL NUMBER: 034, 035 & 066
RAINFALL: 7.4 - 7.55
DPA: 6 & 7
FIRE FACTOR: 0.83 (<15% IMP)
LOCATION: CALABASAS QUAD
REFERENCE: 2006 L.A.C.P.W. HYDROLOGY MANUAL

HYDROLOGY LEGEND

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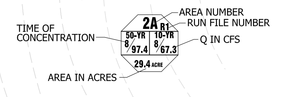

GRAPHIC SCALE
0 1" 2" 3"
0 40 80 160 240
1" = 80'

TENTATIVE TRACT MAP 71546
PROPOSED HYDROLOGY MAP - OFF SITE TRIBUTARY
THE NEW HOME COMPANY - CANYON OAKS
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: 1-10-15

Prepared by:
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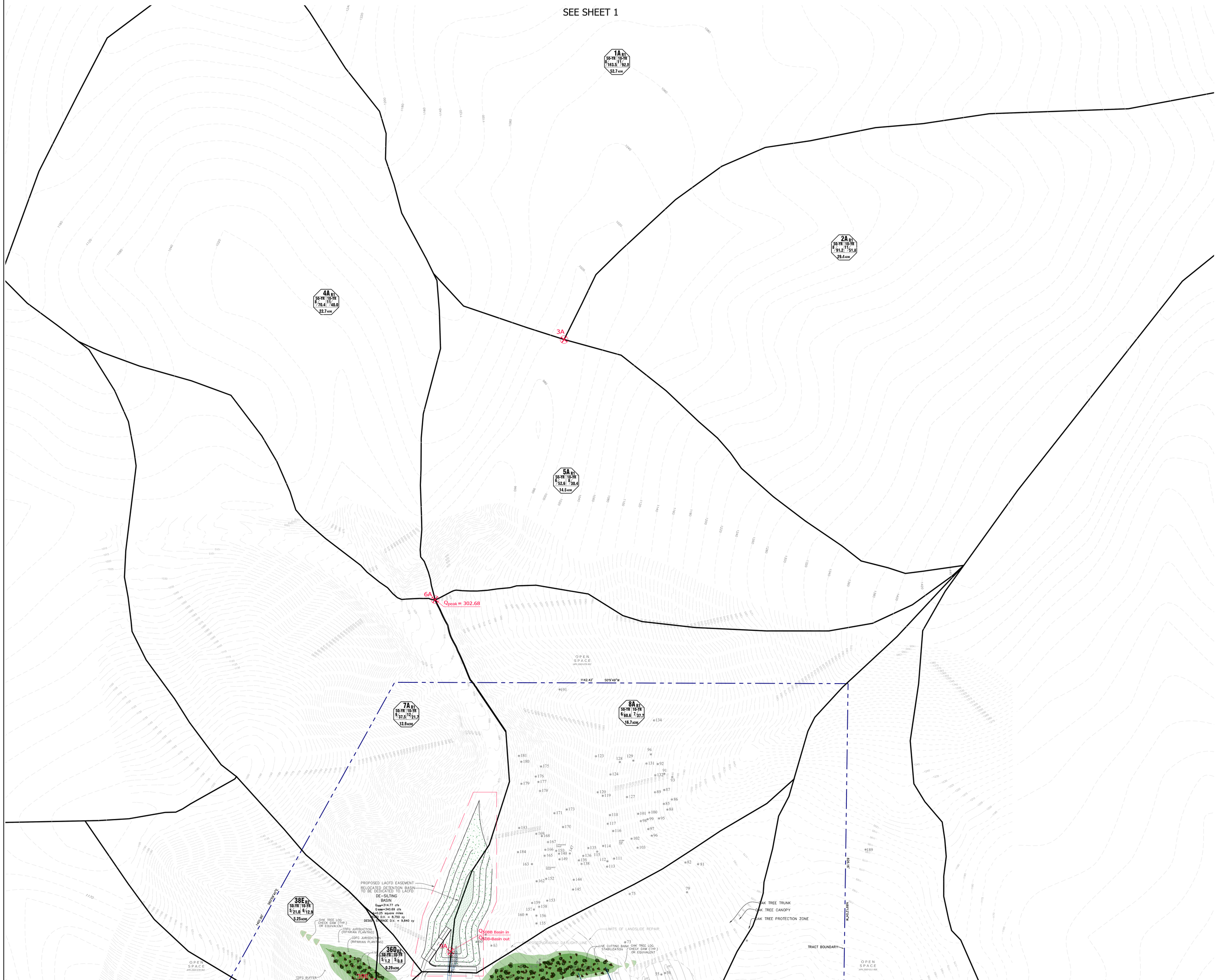
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
San Luis Obispo, CA
(805) 596-0215 (805) 596-0256 FAX
Sacramento, CA
(530) 888-7356 (310) 456-9085
E-mail: rjr@rjreng.com

SEE SHEET 1



SEE SHEET 2

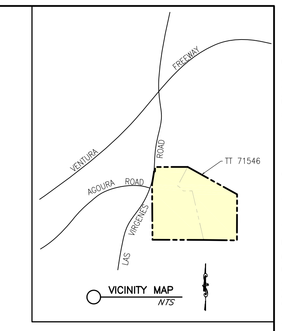


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TABLE 1: HYDROLOGY ROUTING DATA

Path A

Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
1A	10.0	2020	.23270	32.13	17AB	15.2	348	.03590	204.34
2A	29.4	2042	.25470	113.56	18A	2.3	536	.03080	205.55
3A	.0	761	.09470	108.46	19A	.0	116	.02000	205.35
4A	22.7	1952	.21880	148.14	20A	.4	232	.05820	205.50
5A	14.5	1505	.36010	158.14	21A	.0	140	.02000	205.35
6A	.0	948	.06650	157.23	22A	1.4	360	.00830	206.20
7A	12.9	2054	.13880	172.83	23A	.0	190	.02000	205.87
8A	16.7	1321	.43150	178.26	24A	.0	305	.02300	205.86
9A*	.0	360	.02500	177.69	25A	.0	48	.04000	205.71
10A	1.3	300	.03000	178.34	33AC	9.1	360	.14400	220.34
11A	.0	92	.02720	178.13	71AD	40.1	461	.02820	263.53
12A	.0	22	.04540	178.06	72A	.0	10	.02000	252.17

*Node 9A represents the confluence at the proposed debris basin. At this point the bulkedportion of the flow rate is removed via the basin. All the nodes downstream of the basin represent a Q50 burned without the bulking factor.

Path B

Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
13B	14.1	1899	.31070	45.30	16B	85	348	.02350	42.94
14B	.0	271	.03000	42.37	17AB	15.2	348	.3590	204.34
15B	1.1	335	.01190	43.22					

Path C

Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
26C	4.8	1321	.17030	16.51	30C	.0	308	.02000	16.56
27C	1.4	380	.01840	15.81	31C	1.7	414	.02170	19.39
28C	.0	223	.08000	15.54	32C	.0	47	.02000	19.28
29C	1.2	326	.02760	16.61	33AC	9.1	360	.14400	220.34

Path D

Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)	Sub Area	Sub-Area (Ac)	Proposed Flow Data: Conveyance Length (Ft)	Conveyance Slope	Flow Rate (Q50yr)
34D	6.3	1212	.21450	23.51	53D	.7	240	.05000	76.78
35D	.0	51	.17650	20.80	54D	.0	105	.04200	76.06
36D	.3	224	.17860	21.30	55D	.9	190	.01050	76.65
37D	.0	34	.08000	20.95	56D	.0	280	.06960	76.58
40D/E	5.3	115	.08000	37.31	57D	2.2	529	.07720	77.52
41D	.6	372	.57260	38.13	58D	1.4	737	.44100	78.13
42D	.0	133	.04000	37.69	59D	.0	78	.06500	77.53
43D	1.1	433	.49650	38.51	64D/J	2.3	113	.05000	81.29
44D	.0	73	.02740	38.33	65D	.0	24	.03000	81.18
49D/F	12.9	245	.04880	77.51	66D	2.0	815	.07360	82.07
50D	.9	245	.04000	77.34	69D/H	1.4	80	.02000	81.05
51D	1.8	675	.42960	77.64	70D	.0	270	.02000	80.99
52D	.0	240	.05830	76.93	71AD	40.1	461	.02820	263.53

ADDITIONAL ROUTING DATA ON SHEETS 2 AND 3

HYDROLOGY INFORMATION

SOIL NUMBER: 034, 035 & 066
RAINFALL: 7.4 - 7.55
DPA: 6 & 7
FIRE FACTOR: 0.83 (<15% IMP)
LOCATION: CALABASAS QUAD
REFERENCE: 2006 L.A.C.P.W. HYDROLOGY MANUAL

HYDROLOGY LEGEND

- PROPERTY BOUNDARY
- TRIBUTARY AREA BOUNDARY
- DEBRIS POTENTIAL AREA BOUNDARY
- SOIL CLASSIFICATION AREA
- INCHES OF RAINFALL
- 19A — ROUTING NODE (L.A.R.A.T.)
- OVERLAND FLOW DIRECTION
- STORM DRAIN PIPE
- SIDE INLET CATCH BASIN
- STORM DRAIN INLET
- TIME OF CONCENTRATION — 2A R1 (T5-TR T0-TR; Q 97.4 T 87.3; 29.4 ACRS) — AREA NUMBER / RUN FILE NUMBER / Q IN CFS / AREA IN ACRES

GRAPHIC SCALE
0 1" 2" 3"
0 40 80 160 240
1" = 80'

TENTATIVE TRACT MAP 71546
PROPOSED HYDROLOGY MAP - OFF SITE TRIBUTARY
THE NEW HOME COMPANY - CANYON OAKS
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: 1-10-15

Prepared by:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
San Luis Obispo
(805) 596-8328 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7356 (310) 456-9085
E-mail: rjr@rjreng.com

TABLE 1: HYDROLOGY ROUTING DATA

Path A

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
1A	10.0	2020	.23270	32.13	17AB	15.2	348	.03590	204.34
2A	29.4	2042	.25470	113.56	18A	2.3	536	.03080	205.55
3A	.0	760	.09470	108.46	19A	.0	116	.02000	205.35
4A	22.7	1952	.21880	148.14	20A	.4	232	.05820	205.50
5A	14.5	1505	.36010	158.14	21A	.0	140	.02000	205.35
6A	.0	948	.06650	157.23	22A	1.4	360	.00830	206.20
7A	12.9	2054	.13880	172.83	23A	.0	190	.02000	205.87
8A	16.7	1321	.43150	178.26	24A	.0	305	.02300	205.86
9A*	.0	360	.02500	177.69	25A	.0	48	.04000	205.71
10A	1.3	300	.03000	178.34	33AC	9.1	360	.14400	220.34
11A	.0	92	.02720	178.13	71AD	40.1	461	.02820	263.53
12A	.0	22	.04540	178.06	72A	.0	10	.02000	252.17

*Node 9A represents the confluence at the proposed debris basin. At this point the bulked portion of the flow rate is removed via the basin. All the nodes downstream of the basin represent a Q50 burned without the bulking factor.

Path B

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
13B	14.1	1899	.31070	45.30	16B	85	348	.02350	42.94
14B	.0	271	.02000	42.37	17AB	15.2	348	.3590	204.34
15B	1.1	335	.01190	43.22					

Path C

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
26C	4.8	1321	.17030	16.51	30C	.0	308	.02000	16.56
27C	1.4	380	.01840	15.81	31C	1.7	414	.02170	19.39
28C	.0	223	.03000	15.54	32C	.0	47	.02000	19.28
29C	1.2	326	.02760	16.61	33AC	9.1	360	.14400	220.34

Path D

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
34D	6.3	1212	.21450	23.51	53D	.7	240	.05000	76.78
35D	.0	51	.17650	20.80	54D	.0	105	.04200	76.06
36D	.3	224	.17860	21.30	55D	.9	190	.01050	76.65
37D	.0	34	.03000	20.95	56D	.0	280	.06960	76.58
40DE	5.3	115	.03000	37.31	57D	2.2	529	.07720	77.52
41D	.6	372	.57260	38.13	58D	1.4	737	.44100	78.13
42D	.0	133	.04000	37.69	59D	.0	78	.06500	77.53
43D	1.1	433	.49650	38.51	64DG	2.3	113	.05000	81.29
44D	.0	73	.02740	38.33	65D	.0	24	.03000	81.18
49DF	12.9	246	.04880	77.51	66D	2.0	815	.07360	82.07
50D	.9	246	.04000	77.34	69DH	1.4	80	.02000	81.05
51D	1.8	675	.42960	77.64	70D	.0	270	.02000	80.99
52D	.0	240	.05830	76.93	71AD	40.1	461	.02820	263.53

Path E

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
38E	5.3	860	.39530	21.98	40DE	5.3	115	.03000	37.31
39E	.0	74	.20280	20.09					

Path F

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
45F	12.2	1323	.24940	12.2	48F	.0	100	.04880	12.9
46F	.0	86	.08140	12.2	49DF	12.9	246	.04000	26.5
47F	.7	340	.64710	12.9					

Path G

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
60G	1.2	753	.23770	3.48	63G	.0	247	.02020	5.77
61G	1.1	415	.01200	6.34	64DG	2.3	113	.05000	81.29
62G	.0	33	.04290	5.77					

Path H

Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)	Sub Area	Sub-Area (Ac)	Conveyance Length (Ft.)	Conveyance Slope	Flow Rate ($Q50_{BB}$)
67H	1.4	602	.08310	5.56	69DH	1.4	80	.02000	81.05
68H	.0	76	.10530	4.96					

HYDROLOGY INFORMATION

SOIL NUMBER: 034, 035 & 066
RAINFALL: 7.4 - 7.55
DPA: 6 & 7
FIRE FACTOR: 0.83 (<15% IMP)
LOCATION: CALABASAS QUAD
REFERENCE: 2006 L.A.C.P.W. HYDROLOGY MANUAL

HYDROLOGY LEGEND

TIME OF CONCENTRATION — AREA NUMBER — RUN FILE NUMBER — Q IN CFS — AREA IN ACRES

PROPERTY BOUNDARY
TRIBUTARY AREA BOUNDARY
DEBRIS POTENTIAL AREA BOUNDARY
SOIL CLASSIFICATION AREA
INCHES OF RAINFALL
19A ROUTING NODE (L.A.R.A.T.)
OVERLAND FLOW DIRECTION
STORM DRAIN PIPE
SIDE INLET CATCH BASIN
STORM DRAIN INLET

TENTATIVE TRACT MAP 71546
PROPOSED HYDROLOGY MAP - ONSITE TRIBUTARY AREAS
THE NEW HOME COMPANY - CANYON OAKS

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: 11-19-12

SHEET 3 OF 3

Prepared by:
RJR ENGINEERING GROUP
Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
San Luis Obispo, CA
(805) 596-0216 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7356 (310) 456-8085
E-mail: rjr@rjreng.com

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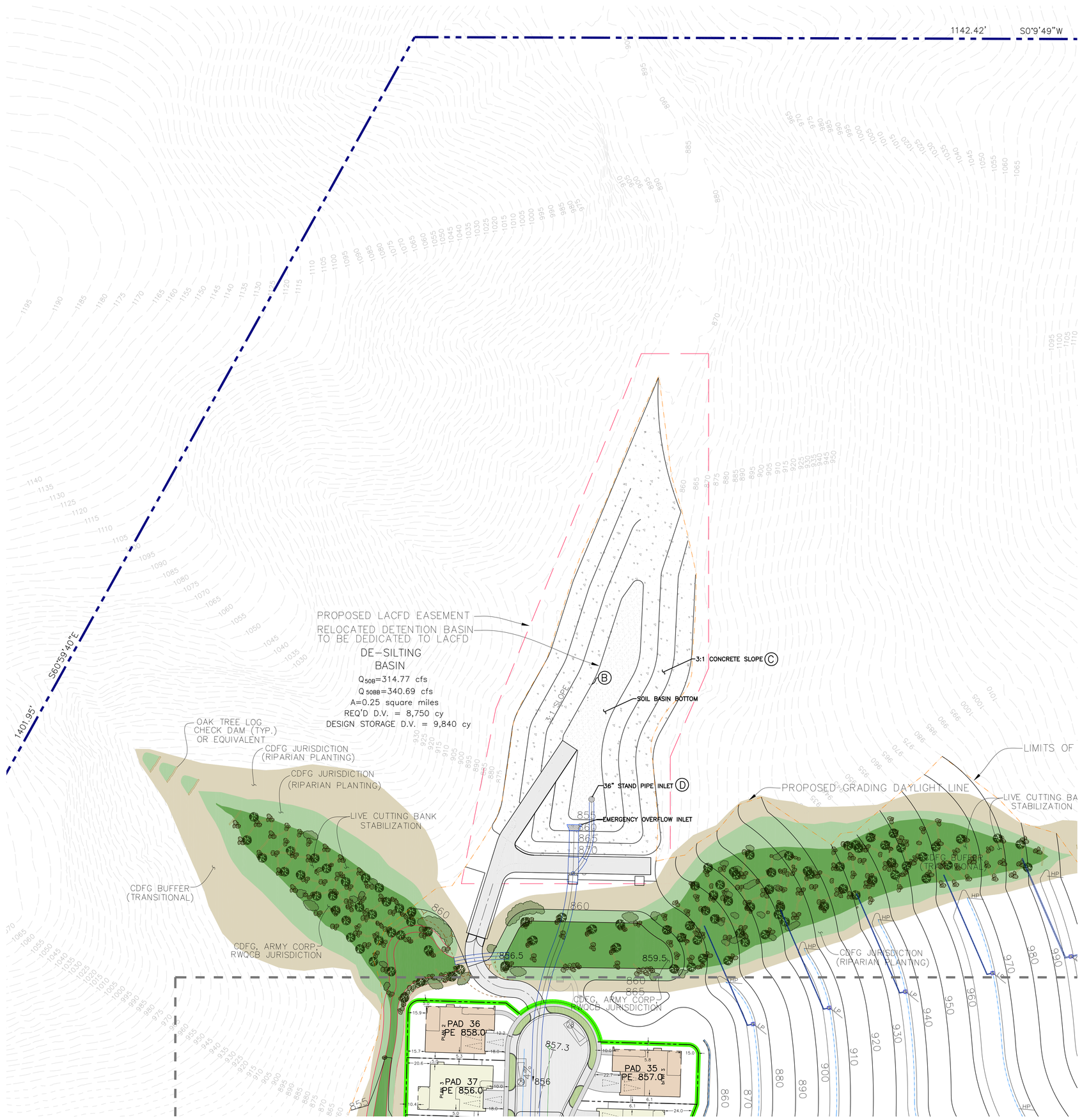


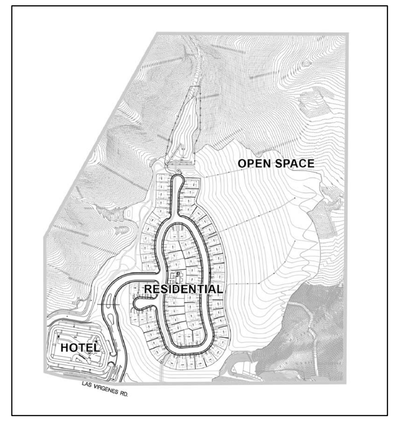
GRAPHIC SCALE

0 1" 2" 3"

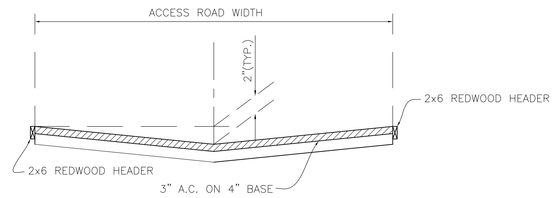
0 25 50 100 150

1" = 50'

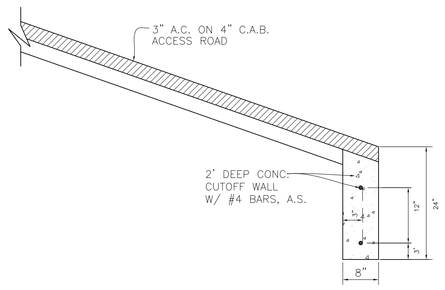
PRELIMINARY DEBRIS BASIN DATA	
UTILITY TYPE	QUANTITY
TRIBUTARY AREA	0.25 sq.mi.
Q50 B	314.77 cfs
Q50 B+b	340.67 cfs
REQUIRED STORAGE	8,750 c.y.
ACTUAL STORAGE	9,840 c.y.
BOTTOM AREA	2,986 sq.ft.
CONCRETE SIDING AREA	33,843 sq.ft.



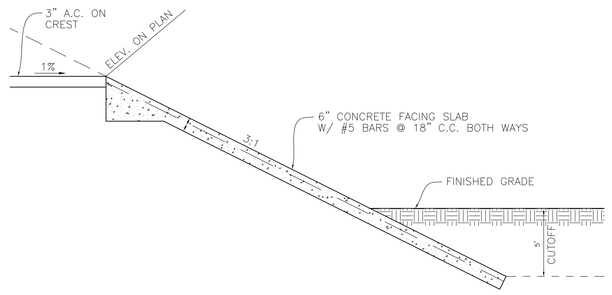
NTS



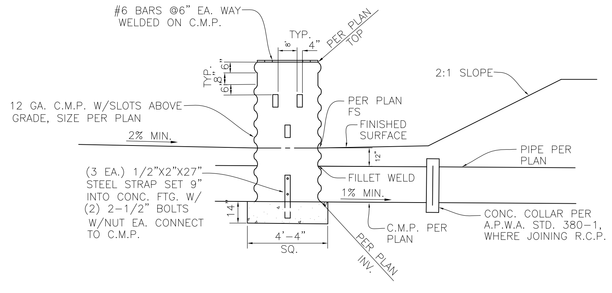
A ACCESS ROAD DETAIL
NOT TO SCALE



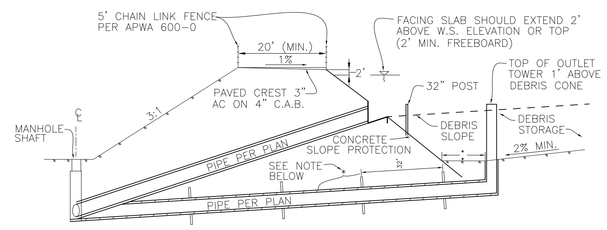
B ACCESS ROAD CUTOFF DETAIL
NOT TO SCALE



C CONCRETE SLOPE PROTECTION
NOT TO SCALE



D STAND PIPE DETAIL
NOT TO SCALE



NOTES:

FACING SLOPES MAY BE STEEPEND IF SOIL CONDITIONS ALLOW. (SOIL APPROVAL REQUIRED)

LENGTH OF ENCASEMENT– A MINIMUM OF 20' AND 6 TIMES THE DEPTH OF PONDED WATER MEASURED FROM THE INTERSECTION OF THE FACING SLAB WITH THE BOTTOM OF THE BASIN.

DEBRIS POST FOR INLET – 4" STEEL PIPE, CONCRETE FILLED, 32" HIGH, ENBEDED 36" IN 12" DIAMETER HOLES WITH CONCRETE.

* 2450-D PIPE (PIPE DIAMETER PER PLAN) ENCASED PER DESIGN GUIDELINE 2-D404 – DEBRIS BASIN MANUAL

* * 10' MINIMUM CLEARANCE NEEDED FOR BASIN MAINTENANCE.

E REQUIREMENTS AND DESIGN GUIDE FOR ELEVATED TYPE INLET DEBRIS BASIN
NOT TO SCALE

FOR CONCEPTUAL APPROVAL ONLY

DIGALERT

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1-800-422-4133
AT LEAST TWO DAYS BEFORE YOU DIG

UNDERGROUND SERVICE ALERT, (USA) OF SOUTHERN CALIFORNIA

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PUBLIC WORKS DEPARTMENT
100 Civic Center Way
CALABASAS, CA 91302
818.224.1600
FAX 818.225.7338
WWW.CITYOFCALABASAS.COM

PREPARED BY:
RJR ENGINEERING GROUP
Planning Civil Engineering Flood Control Hydrology
Geotechnical Engineering Water Quality Engineering
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
San Luis Obispo, CA
(805) 596-0216 (805) 546-0256 FAX
Tucson, AZ 85718
(520) 888-7556 (310) 494-9085
E-mail: rjr@rjreng.com

PREPARED FOR:
THE NEW HOME COMPANY
85 ENTERPRISE, SUITE 450
ALISO VIEJO, CA 92656

DEBRIS BASIN PLAN

TENT. TRACT 71546
PARCELS 2069-078-009 & 2069-078-011
4790 LAS VIRGENES ROAD
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DESIGNED BY:
CHECKED BY:
DRAWN BY:
SCALE:
SHEET NO.
17 of 26

Appendix F

Canyon Oaks Design Submittal

Robert Hidey **Architects**

C A N Y O N O A K S

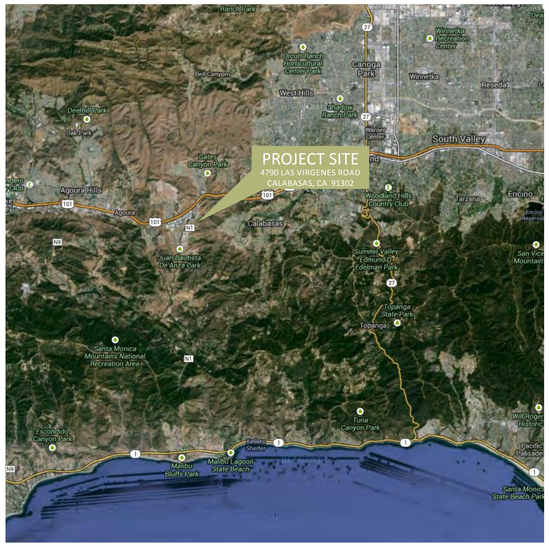
TRACT 71546
CALABASAS, CALIFORNIA

D E S I G N S U B M I T T A L

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

REGIONAL VICINITY MAP



LOCAL VICINITY MAP

PLAN TABULATION MATRIX

PRODUCT 1			
PLAN TYPE	LIVABLE SQ. FT.	F.A.R. SQ. FT.	NO. OF UNITS
Plan 1	2,730	3,497	15
Plan 2	2,859	3,624	27
Plan 3	3,027	3,850	25
TOTAL NO. OF UNITS			67

AFFORDABLE DUPLEX			
LEVEL	LIVABLE SQ. FT.	F.A.R. SQ. FT.	NO. OF UNITS
Plan 1-A	865	1,208	2
Plan 2-A	1,610	2,279	2
	2,475	3,487	4

CANYON OAKS CLUB		
COVERED SPACES	SQ. FOOTAGE	F.A.R. SQ. FT.
CLUBROOMS	800	800
RESTROOMS	291	291
BREEZEWAY	237	237
VESTIBULES 1 & 2	115	115
COVERED SHOWERS	55	55
POOL EQUIPMENT ROOM	188	188
STORAGE	30	30
ELECTRICAL	30	30
TOTAL S.F.	1,346	1,346

F.A.R. CALCULATION	
PRODUCT 1	246,553
AFFORDABLE	6,974
POOL BUILDING	1,346
HOTEL	66,516
TOTAL	**321,389**
NET SITE SF	3,233,023.00
F.A.R.	**0.10**

PARKING & BICYCLE MATRIX

USE	UNITS	CMC	CMC	TOTAL REQ.	TOTAL PROVIDED
HOTEL PARKING SPACES	120	1:1	1/EVERY 10	132	134
			SUBTOTAL PARKING		134
HOTEL BICYCLES			5% OF PARKING	6.6	7
SINGLE FAMILY HOMES*	67 HOMES				276
3-BEDROOM HOMES	0				
4-BEDROOM HOMES	67	3:4 BEDRM		201	
PRIVATE PARKING			2 SPACES IN EACH GARAGE		134
DRIVEWAY PARKING			1 SPACE IN EACH DRIVEWAY		67
ONSTREET/GUEST PARKING		1:3		23	69
			SUBTOTAL PARKING	224	270
AFFORDABLE HOMES*	4 UNITS				
1-BEDROOM HOMES	2	1.5:1	1 COVERED PER UNIT	3	4
	1 SPACE IN EACH GARAGE, 1 SPACE IN EACH DRIVEWAY				
2-BEDROOM HOMES	2	2:1	2 COVERED PER UNIT	4	8
	2 SPACES IN EACH GARAGE, 2 SPACES IN EACH DRIVEWAY (WIDER DRIVEWAYS)				
GUEST SPACES		1:3		2	2
			SUBTOTAL PARKING		9
CANYON OAKS CLUB					
ADA SPACE		1		1	1
			TOTAL RESIDENTIAL PARKING		284
			POOL HOUSE ADA SPACE		1
			TOTAL HOTEL PARKING		134
			TOTAL PROJECT PARKING		**419**

*APPLYING MF STANDARDS

*BICYCLE SPACES FOR ALL RESIDENTIAL UNITS ARE WITHIN THE PRIVATE GARAGES

PROJECT DIRECTORY

OWNER
THE NEW HOME COMPANY
85 ENTERPRISE, SUITE 450
ALISO VIEJO, CA 92656
29219 CANWOOD STREET, SUITE 107
AGOURA HILLS, CA 91301
TEL: 949-382-2809
CONTACT: RICK BIANCHI

ARCHITECT - RESIDENTIAL
ROBERT HIDEY ARCHITECTS
3337 MICHELSON DR. SUITE 170
IRVINE, CA 92612
TEL: 949-655-1550
CONTACT: EVERETT BENKE

LANDSCAPE ARCHITECT
VALLEY CREST DESIGN GROUP
24151 VENTURA BLVD.
CALABASAS, CA 91302
TEL: 714-557-5852
CONTACT: GREG RAY

CIVIL ENGINEER
RJR ENGINEERING, INC.
3500 CAMINO AVE., SUITE 200
OXNARD, CA 93030
TEL: 805-485-3935
CONTACT: ROB ANDERSON/RICK HAJAS

ARCHITECT - COMMERCIAL
DLR GROUP INC., OF CALIFORNIA
117 E. COLORADO BLVD. SUITE 500
PASADENA, CA 91105
TEL: 626-796-8230
CONTACT: BRIAN ARIAL/TODD CURLEY

LIGHTING CONSULTANT
KAPLAN GEHRING McCARROLL ARCHITECTURAL LIGHTING
270 CORAL CIRCLE
EL SEGUNDO, CA 90245
TEL: 310-552-2191 EXT. 125
CONTACT: PATRICK McCOLLOUGH

SOILS ENGINEER
RJR ENGINEERING, INC.
3500 CAMINO AVENUE, SUITE 200
OXNARD, CA 93030
TEL: 805-485-3935
CONTACT: ROB ANDERSON

VISIONSCAPES
VISIONSCAPE IMAGERY
26060 ACERO
MISSION VIEJO, CA 92691
TEL: 949-727-3591
CONTACT: JOE FONT

PROJECT SCOPE & STATISTICS

DESCRIPTION:
THE PROPOSED PROJECT CONSISTS OF 67 SINGLE-FAMILY RESIDENTIAL RESIDENCES, 4 AFFORDABLE HOUSING UNITS WITHIN 2 DUPLEXES, A CLUBHOUSE WITH RESORT-STYLE AMENITIES AND A 4-STORY 120-ROOM HOTEL.

PROJECT ZONING:
PROPOSED COMMERCIAL ZONING: CR-DP-SC
PROPOSED RESIDENTIAL ZONING: RM20-DP-SC
OPEN SPACE ZONING: OS-DR

PROJECT ADDRESS:
4790 LAS VIRGENES ROAD, CALABASAS, CA 91302

LEGAL DESCRIPTION & APN:
THE SITE CONSISTS OF TWO, IRREGULAR-SHAPED PARCELS, IDENTIFIED AS ASSESSOR'S PARCEL NUMBERS 2069-078-009 & 2069-078-011. THE COMBINED ACREAGE FOR THE TWO PROJECT PARCELS IS 77.22 ACRES. THE PROJECT AREA IS LOCATED ON THE USGS 7.5 MINUTE CALABASAS QUADRANGLE MAP, WITHIN SECTION 22 IN TOWNSHIP 1N, RANGE 17W AND PORTIONS OF SECTIONS 29 AND 30.

BUILDING & SITE AREAS:

SITE SIZE:	3,363,703.2 S.F. (GROSS AREA) 77.22 ACRES (GROSS AREA) 74.22 ACRES (NET AREA)
Project Density:	< 1 DU/AC
F.A.R.	0.10
STORIES:	RESIDENTIAL: 2 STORIES
	AFFORDABLE DUPLEX: 1-2 STORIES
	CANYON OAKS CLUB: 1 STORY
	HOTEL: 4 STORIES
CONSTRUCTION TYPE:	TYPE V, WOOD FRAME
FIRE PROTECTION:	FULLY SPRINKLERED

A.D.A. ACCESSIBILITY NOTE
ENTIRE PROJECT SHALL BE A.D.A. COMPLIANT AS REQUIRED AND SHALL CONFORM TO C.B.C. CHAPTER 11.

HOTEL PARKING
5 ACCESSIBLE SPACES PROVIDED
1 ACCESSIBLE VAN SPACE PROVIDED

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PROJECT NOTES

	DESCRIPTION
1	THE PROJECT IS REQUIRED TO COMPLY WITH SWIMMING POOL FENCING REQUIREMENTS PER SECTION 17.12.165(H) (4) OF THE CMC.
2	THE FUTURE HOA'S CC&RS SHALL CLARIFY WHAT ACCESSORY STRUCTURES MAY OR MAY NOT BE CONSTRUCTED IN YARD AREAS.
3	THE DEVELOPER IS REQUIRED TO PAY ALL IMPACT FEES, INCLUDING BUT NOT LIMITED TO SCHOOL FEES, PRIOR TO ISSUANCE OF BUILDING PERMITS.
4	PRIOR TO FINAL MAP APPROVAL, DEVELOPER WILL BE REQUIRED TO COMPLY WITH THE PROVISIONS OF SECTION 17.20.150(B)(28)(A, B, AND C) OF THE CMC RELATED TO MAINTENANCE OF MANUFACTURED SLOPES.
5	PROJECT IS REQUIRED TO COMPLY WITH SOLID WASTE RECYCLABLE MATERIAL REQUIREMENTS PROVIDED IN SECTION 17.20.200 OF THE CMC.
6	PER SECTION 17.20.220 OF THE CMC, THE DEVELOPER IS RESPONSIBLE FOR UNDERGROUNDING ALL EXISTING AND PROPOSED ONSITE UTILITY FACILITIES INTENDED TO SERVE NEW STRUCTURES.
7	PROJECT IS REQUIRED TO COMPLY WITH ALL WATER CONSERVATION PERFORMANCE STANDARDS PROVIDED IN SECTION 17.20.230 OF THE CMC.
8	PER SECTION 17.22.030(B) (2) (B) OF THE CMC, RENTAL OR SALE OF FOUR AFFORDABLE UNITS WILL BE LIMITED TO HOUSEHOLDS OF VERY LOW INCOME.
9	PER SECTION 17.22.040(E), THE DEVELOPER IS REQUIRED TO PAY THE COMMERCIAL AFFORDABLE HOUSING IMPACT FEE PRIOR TO BUILDING PERMIT ISSUANCE.
10	PER SECTION 17.24.020 OF THE CMC, THE DEVELOPER WILL HAVE TO EITHER PAY A PUBLIC ART ACQUISITION FEE OR INSTALL ART AS PART OF THE COMMERCIAL PROJECT.
11	PER SECTION 17.26.030 (C) OF THE CMC, A LANDSCAPE DOCUMENTATION PACKAGE SHALL BE PREPARED AND SUBMITTED CONCURRENT WITH A BUILDING PERMIT APPLICATION, AFTER APPROVAL OF PLANNING ENTITLEMENTS.
12	IRRIGATION SYSTEMS WILL HAVE TO COMPLY WITH STANDARDS IN SECTION 17.26.050 OF THE CMC.
13	PROVISIONS IN SECTION 17.26.050 (E) (2) OF THE CMC (MAINTENANCE OF COMMON OPEN SPACE AREAS) WILL APPLY TO THE PROPOSED NEW RESIDENTIAL SUBDIVISIONS.
14	COMPLY WITH ACCESS GRADE REQUIREMENTS PROVIDED IN SECTION 17.28.080 (D) OF THE CMC.
15	THE RESIDENTIAL AND COMMERCIAL COMPONENTS OF THE PROJECT ARE REQUIRED TO INCORPORATE INTO THEIR DESIGN THE SPECIFIC TRIP AND TRAVEL DEMAND REDUCTION MEASUREMENTS PROVIDED IN SECTION 17.28.110 (C) (1) AND (2) OF THE CMC. WORK WITH THE TRAFFIC/TRANSPORTATION DIVISION OF THE PUBLIC WORKS DEPARTMENT TO DETERMINE WHICH OF THE MEASURES ARE NECESSARY.
16	ALL SIGNS FOR THE PROPOSED DEVELOPMENT WILL HAVE TO COMPLY WITH SECTION 17.30 OF THE CMC. SIGN PERMITS SHALL BE OBTAINED FROM THE PLANNING DIVISION PRIOR TO INSTALLATION OF ANY SIGNS.
17	PER SECTION 17.34.010 (B) OF THE CMC, THE HOTEL STRUCTURE IS REQUIRED TO ACHIEVE THE EQUIVALENT OF A SILVER LEED RATING.
18	PER SECTION 17.34.020 (C)(6) OF THE CMC, ALL STREETS WITHIN A PROPOSED SUBDIVISION SHALL BE NAMED AND NAMES SHALL BE APPROVED BY THE REVIEW AUTHORITY.
19	COMPLY WITH MAINTENANCE REQUIREMENTS FOR PRIVATE ROADS AND OWNERSHIP OF THE STREET RIGHT-OF-WAYS WITHIN THE SUBDIVISION PER SECTION 17.46.020 (D) (1) OF THE CMC.
20	COMPLY WITH DRAINAGE AND WATERCOURSE REQUIREMENTS FOR A NEW SUBDIVISION PROVIDED IN SECTION 17.46.030 OF THE CMC.
21	DEVELOPER SHALL COMPLY WITH SURVEY MONUMENT REQUIREMENTS PROVIDED IN SECTION 17.46.080 OF THE CMC PRIOR TO FINAL MAP SUBMITTAL.
22	PUBLIC UTILITIES SHALL BE INSTALLED AS PART OF THE IMPROVEMENTS WITHIN THE SUBDIVISION PER SECTION 17.46.090 OF THE CMC.
23	PER SECTION 17.50.030 OF THE CMC, THE DEVELOPER IS REQUIRED TO PAY THE PARKLAND DEDICATION (QUIMBY) FEE TO THE CITY PRIOR TO RECORDATION OF THE FINAL MAP. STAFF ENCOURAGES YOU TO REVIEW THIS SECTION OF THE CODE TO UNDERSTAND HOW THE FEE IS CALCULATED.
24	COMPLY WITH RIGHT-OF-WAY DEDICATION REQUIREMENTS PER SECTION 17.50.040 OF THE CMC.
25	POLICY X11-39 OF THE GENERAL PLAN REQUIRES NEW RESIDENTIAL AND COMMERCIAL DEVELOPMENT TO INCLUDE INFRASTRUCTURE COMPONENTS NECESSARY TO SUPPORT MODERN COMMUNICATION TECHNOLOGIES.

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2694 Bishop Drive, Suite 250, San Ramon, CA 94583 Telephone 925.824.0440

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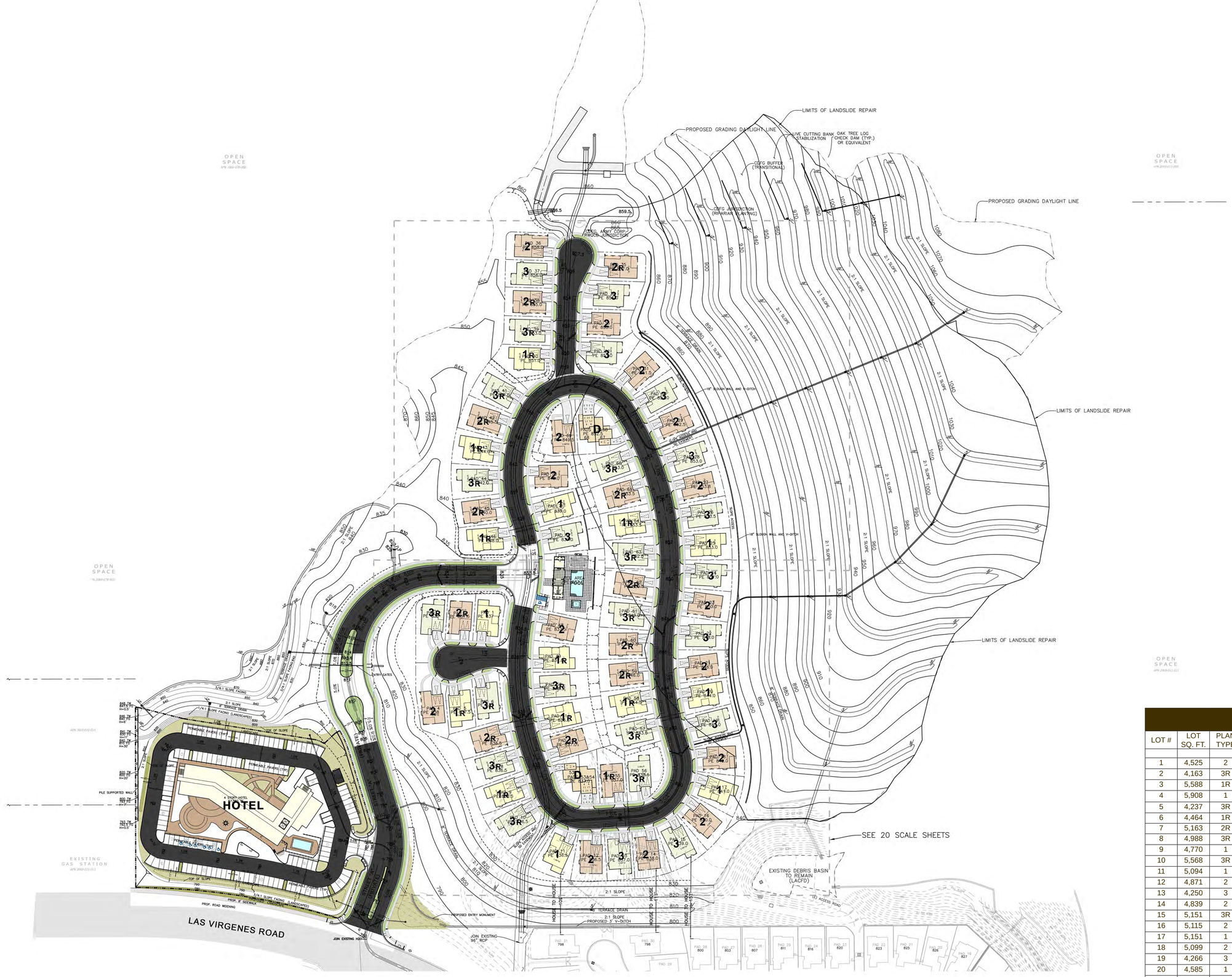

PRODUCT COUNT

PLAN 1	6
PLAN 1R	10
PLAN 1 TOTAL	16
PLAN 2	16
PLAN 2R	9
PLAN 2 TOTAL	25
PLAN 3	11
PLAN 3R	15
PLAN 3 TOTAL	26
AFFORDABLE - DUPLEX	2
AFFORDABLE - DUPLEX TOTAL	4

PRODUCT MIX

LOT #	LOT SQ. FT.	PLAN TYPE	LOT #	LOT SQ. FT.	PLAN TYPE	LOT #	LOT SQ. FT.	PLAN TYPE
1	4,525	2	25	4,640	1	49	6,048	2R
2	4,163	3R	26	4,639	3	50	6,173	3R
3	5,588	1R	27	4,651	2	51	6,001	1R
4	5,908	1	28	4,658	3	52	5,601	3R
5	4,237	3R	29	4,616	2	53	3,016	D
6	4,464	1R	30	4,685	3	54	3,210	D
7	5,163	2R	31	5,249	2	55	5,029	2R
8	4,988	3R	32	5,805	2	56	6,549	3R
9	4,770	1	33	4,620	3	57	4,648	3R
10	5,568	3R	34	5,219	2	58	4,950	1R
11	5,094	1	35	4,686	3	59	4,932	2R
12	4,871	2	36	4,471	2	60	4,934	2R
13	4,250	3	37	4,276	3	61	4,891	3R
14	4,839	2	38	4,434	2R	62	4,954	2R
15	5,151	3R	39	4,445	3R	63	4,963	3R
16	5,115	2	40	5,972	1R	64	4,902	1R
17	5,151	1	41	5,636	2	65	5,030	2R
18	5,099	2	42	4,782	3R	66	5,036	3R
19	4,266	3	43	4,906	1R	67	2,969	D
20	4,585	1	44	4,935	3R	68	3,453	D
21	4,693	2	45	4,446	2R	69	6,249	2
22	4,788	3	46	5,125	1R	70	6,759	1R
23	4,550	2	47	6,224	2	71	5,598	3
24	4,639	3	48	5,909	1R			

N

0 30' 60' 120'

SCALE: 1"=60'

ARCHITECTURAL SITE PLAN

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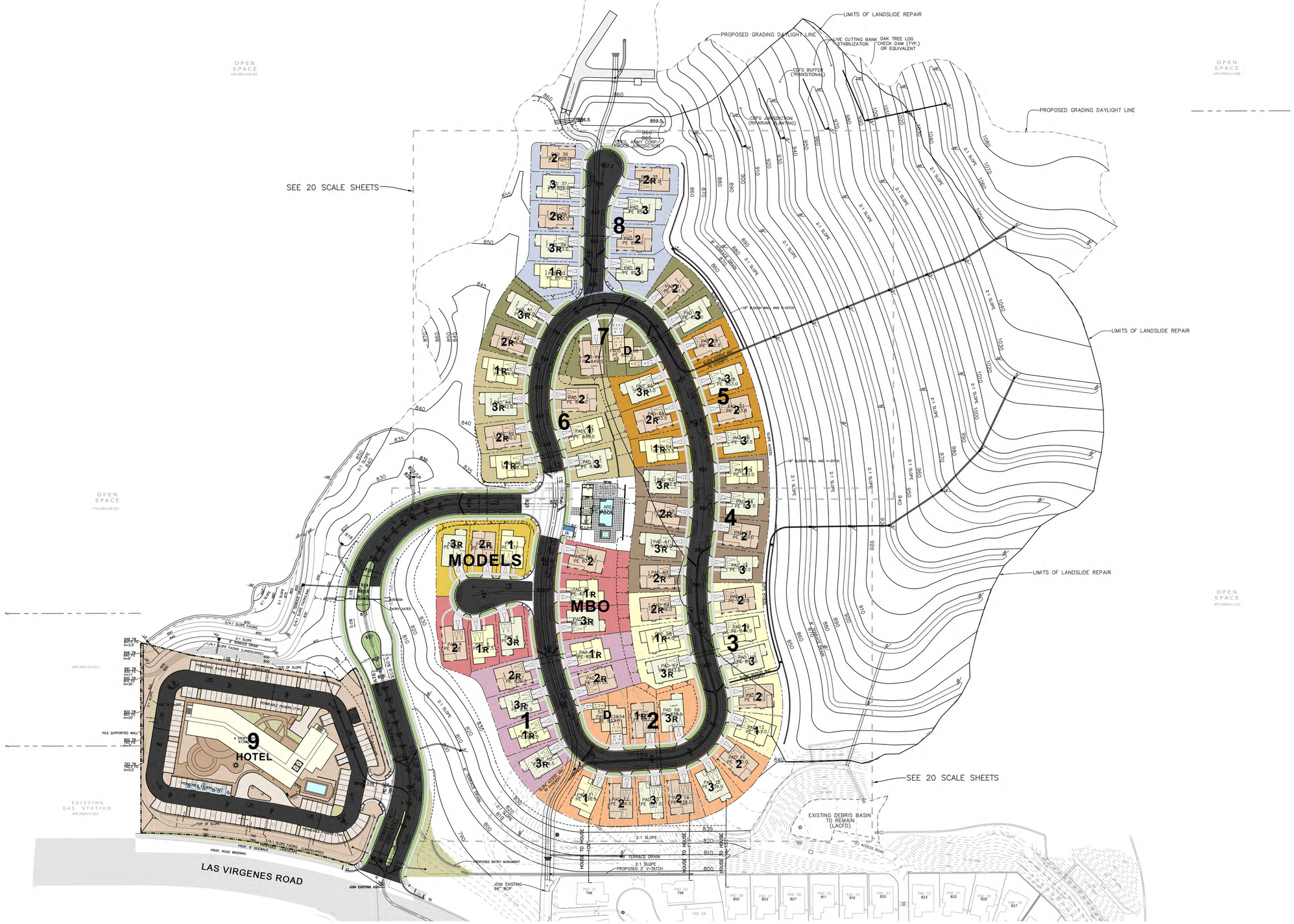
TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015



PHASING PLAN LEGEND

MODELS
MBO
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
PHASE 6
PHASE 7
PHASE 8
PHASE 9

MBO = MODELS BUILD-OUT

N

0 30' 60' 120'

SCALE: 1"=60'

SITE PLAN PHASING EXHIBIT

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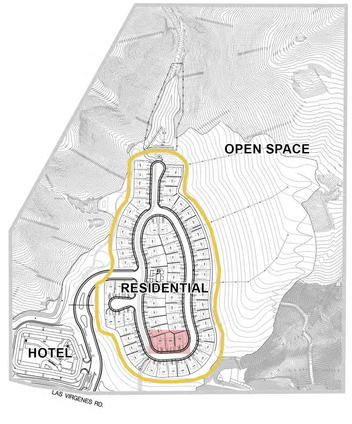
AFFORDABLE DUPLEX

PLAN 2A

PLAN 3B



0 1' 2' 4' 8'

SCALE: 1/4"=1'-0"

CONCEPTUAL STREETSCENE

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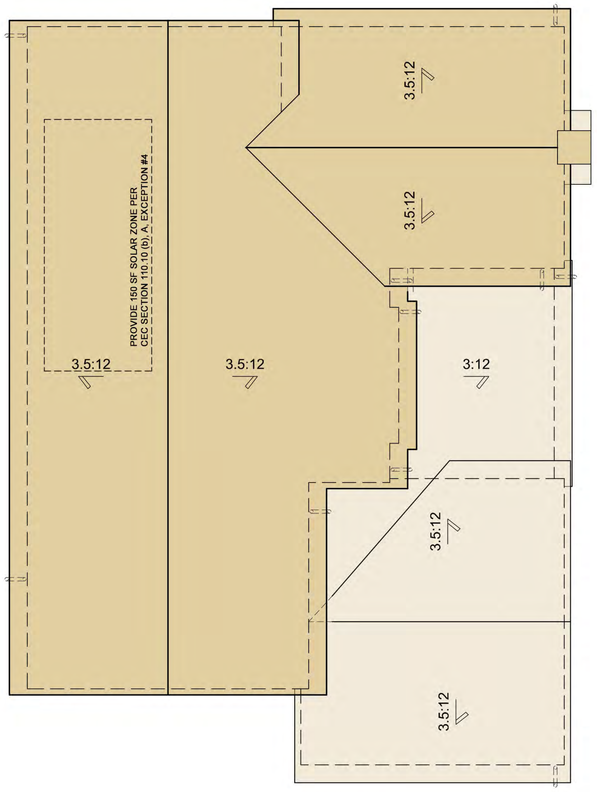
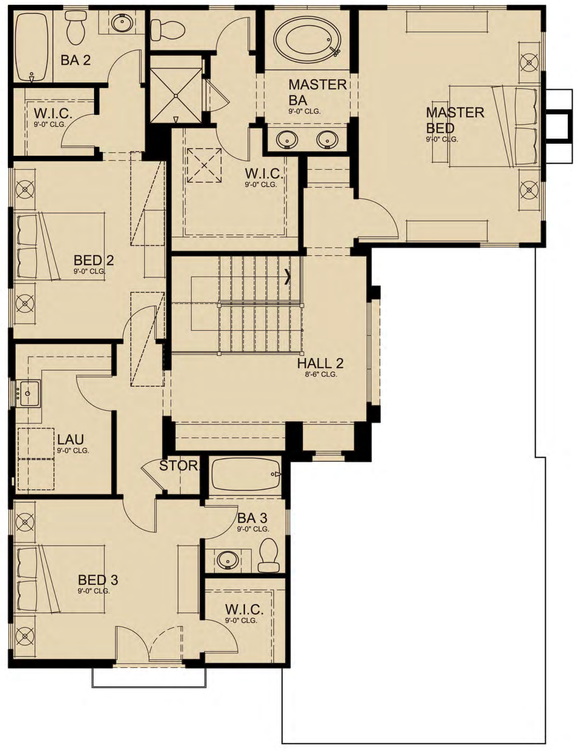
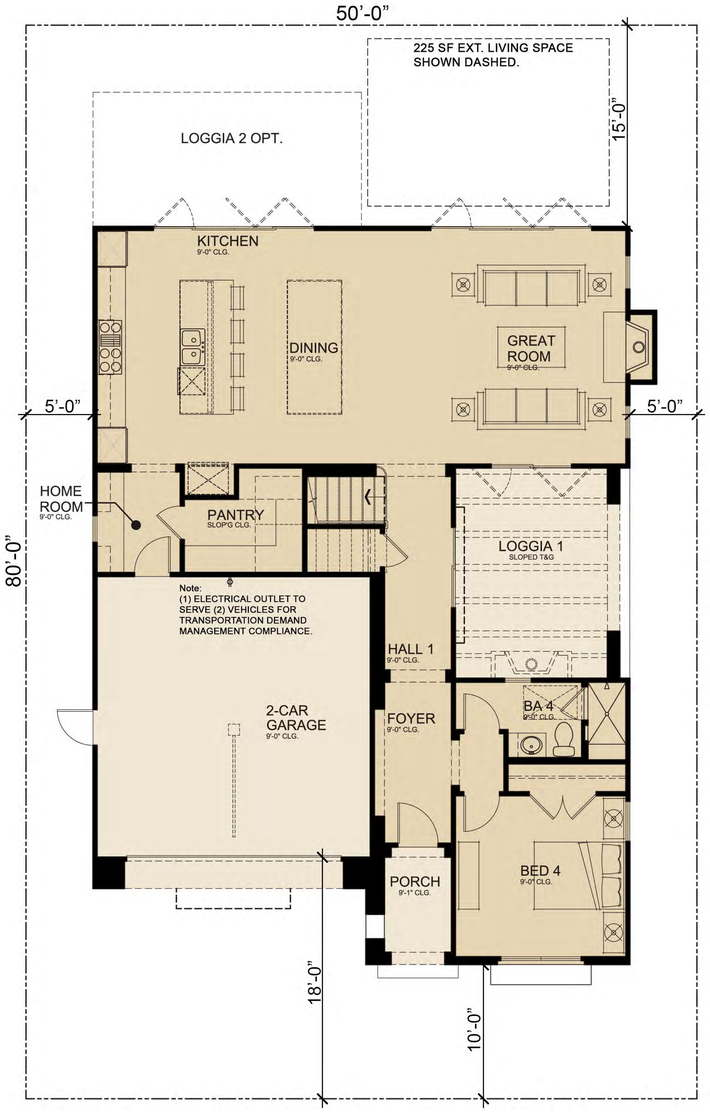


ROOF



SECOND FLOOR
1,397 SF



FIRST FLOOR
1,333 SF

PLAN 1
2,730 SF
2-CAR GARAGE
4 BED
4 BATH
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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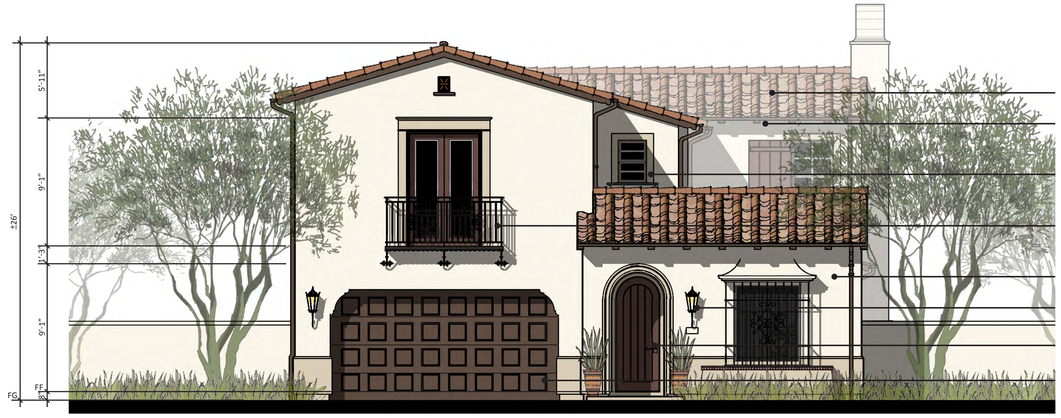
LEFT ELEVATION



FRONT ELEVATION

RIGHT ELEVATION

REAR ELEVATION

SPANISH COLONIAL
ELEVATIONS
PLAN 1A
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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LEFT ELEVATION

FRONT ELEVATION

RIGHT ELEVATION

REAR ELEVATION

MONTEREY
ELEVATIONS
PLAN 1B
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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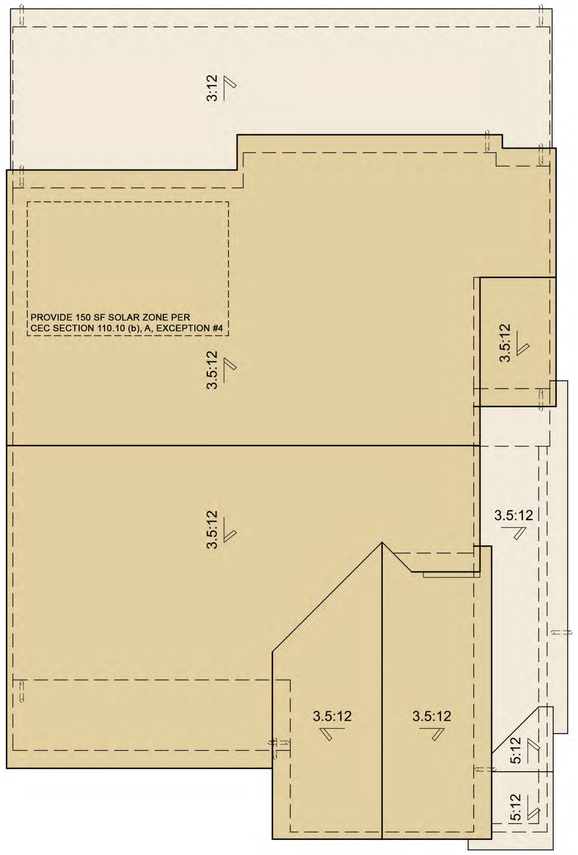
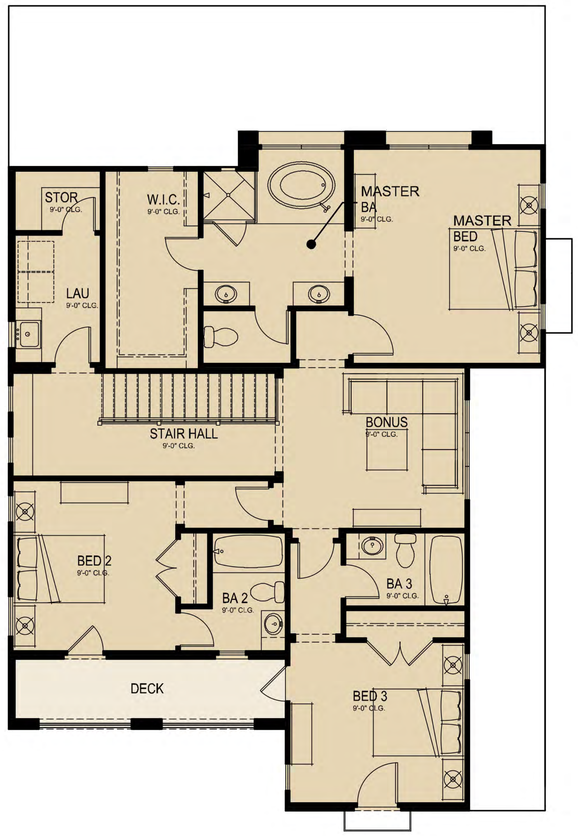
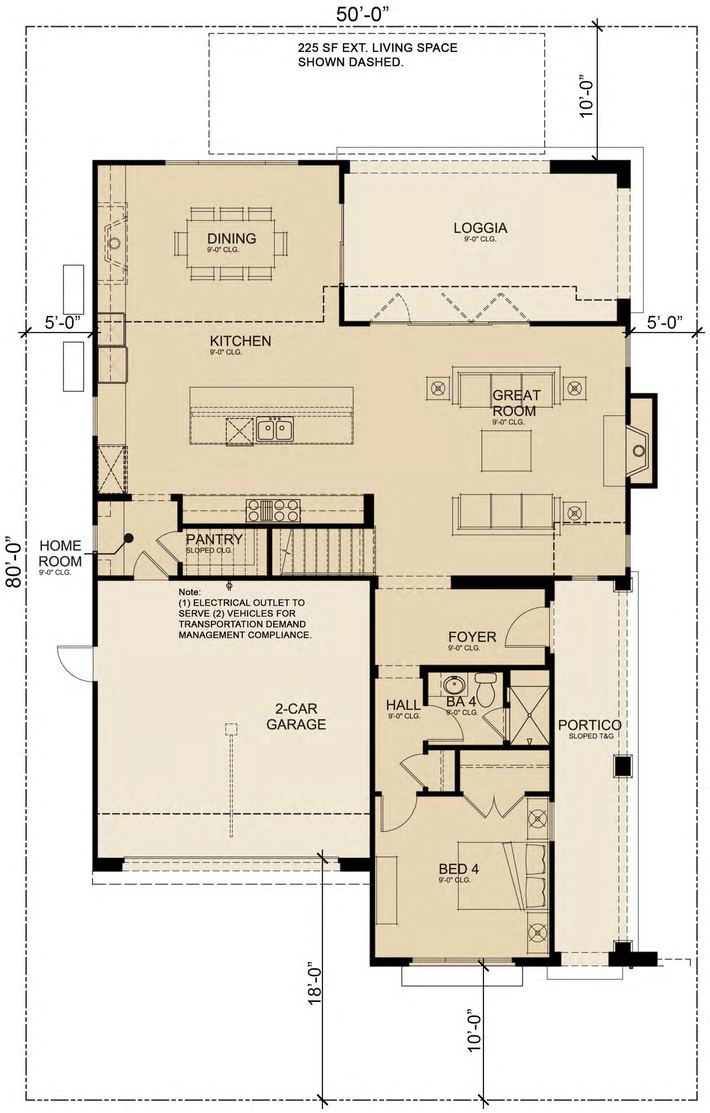


ROOF



SECOND FLOOR
1,476 SF



FIRST FLOOR
1,383 SF

PLAN 2
2,859 SF
2-CAR GARAGE
4 BED
4 BATH
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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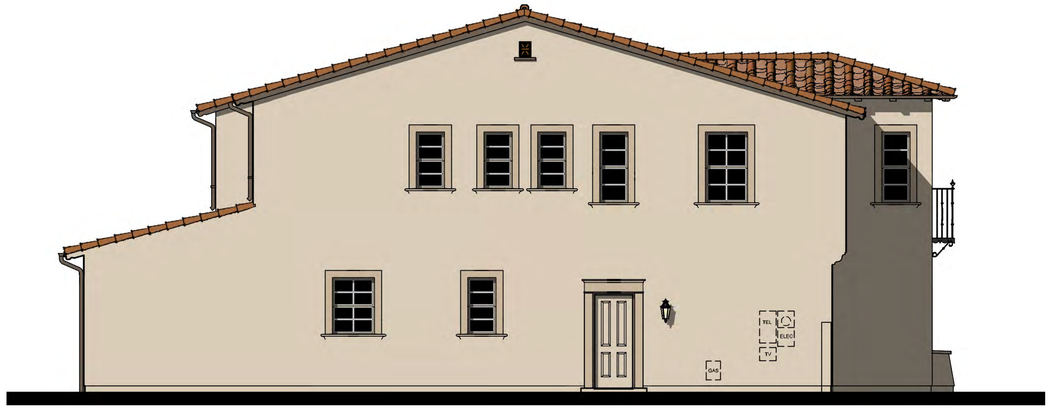

LEFT ELEVATION

FRONT ELEVATION

RIGHT ELEVATION

REAR ELEVATION

SPANISH COLONIAL
ELEVATIONS
PLAN 2A
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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THE NEW HOME COMPANY

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TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

LEFT ELEVATION

FRONT ELEVATION

RIGHT ELEVATION

REAR ELEVATION

SANTA BARBARA
ELEVATIONS
PLAN 2C
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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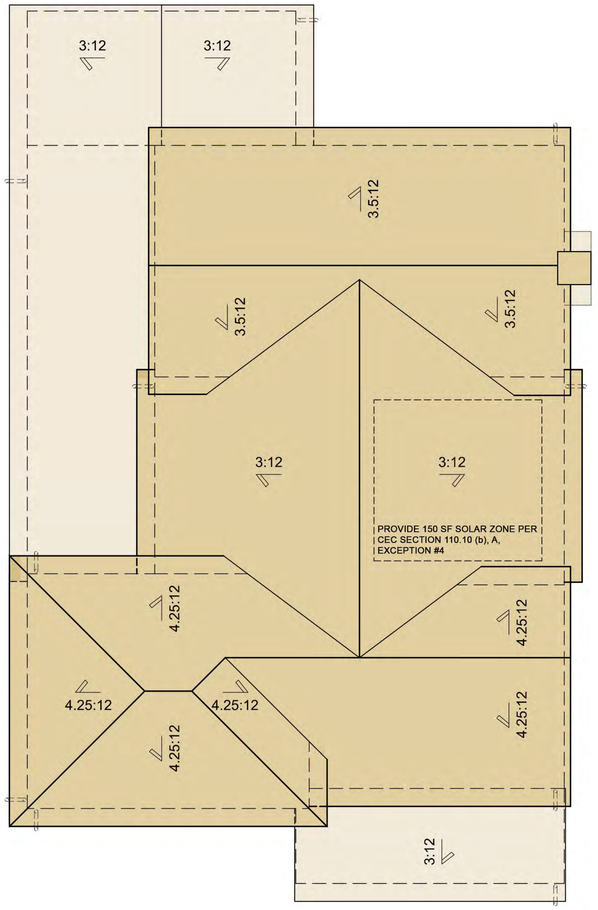
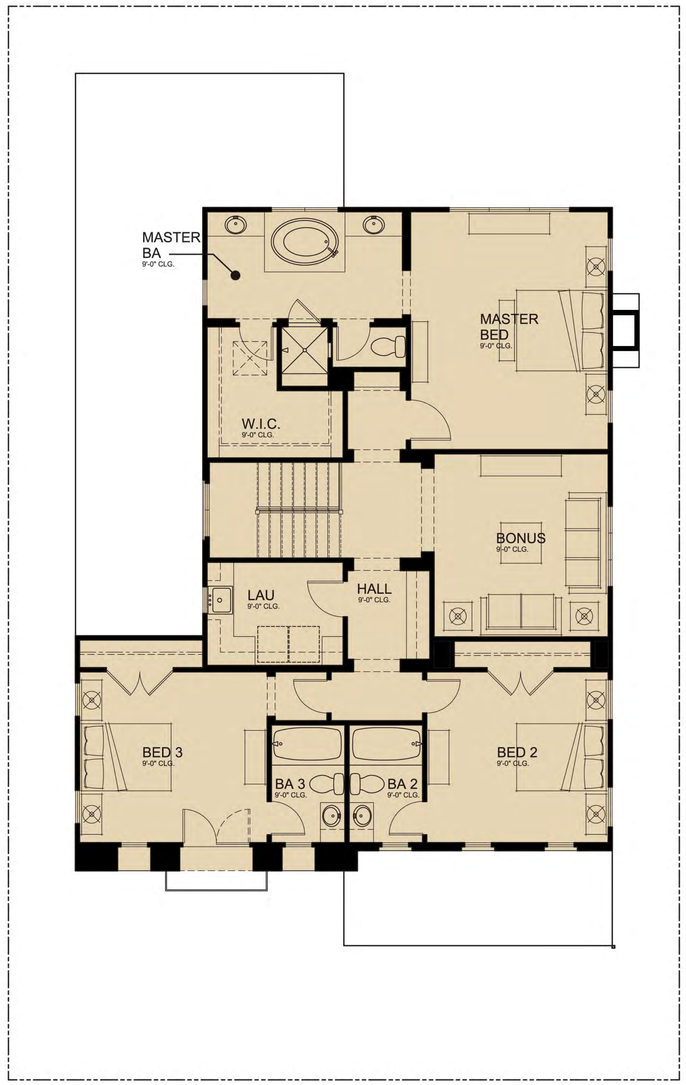
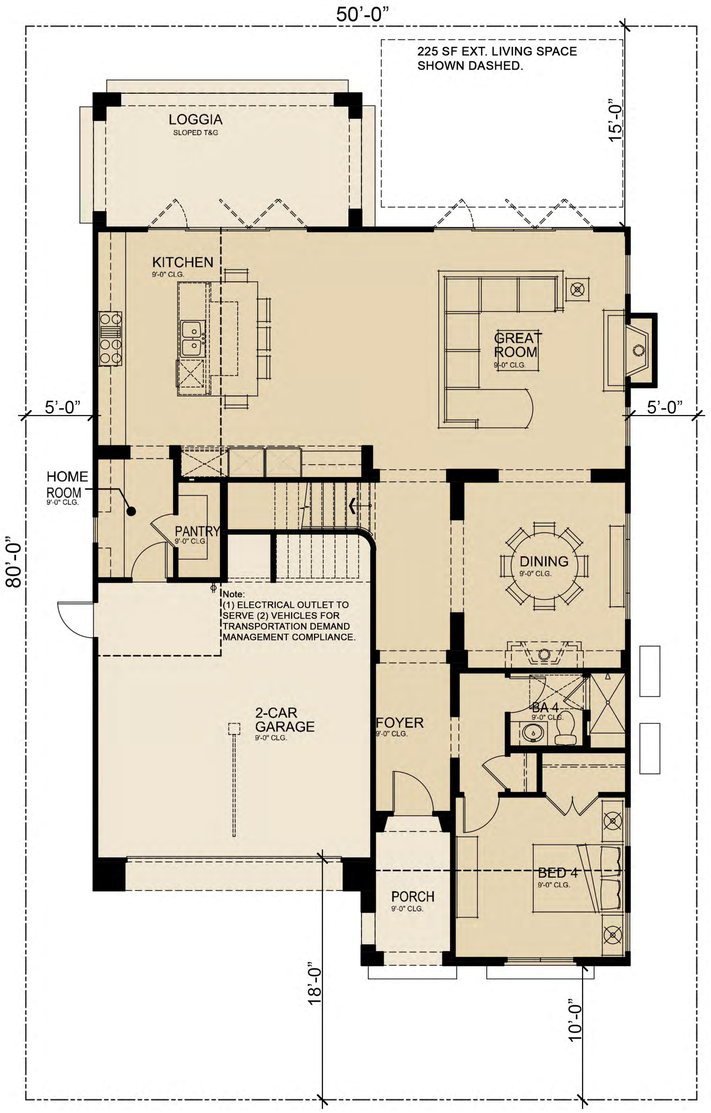


ROOF



SECOND FLOOR
1,527 SF



FIRST FLOOR
1,500 SF

PLAN 3
3,027 SF
2-CAR GARAGE
4 BED
4 BATH
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

Robert Hidey **Architects**

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THE NEW HOME COMPANY

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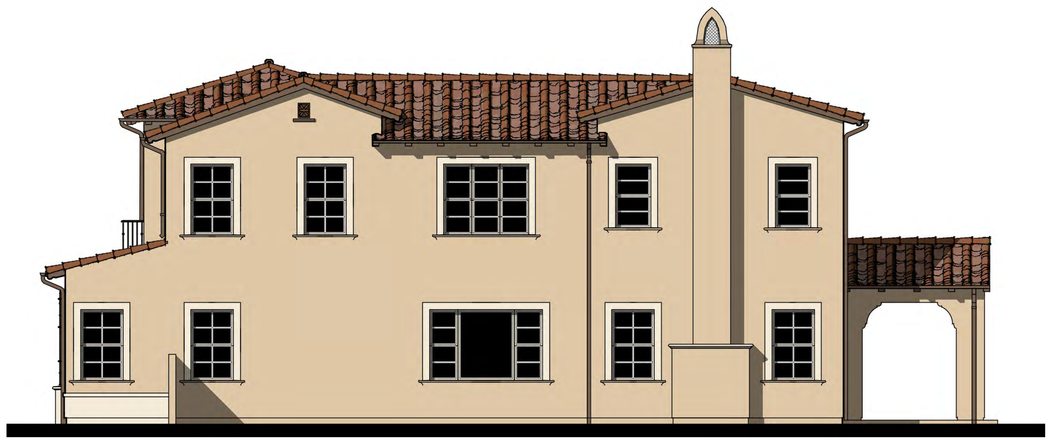
TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

LEFT ELEVATION

FRONT ELEVATION



RIGHT ELEVATION

REAR ELEVATION

SPANISH COLONIAL
ELEVATIONS
PLAN 3A
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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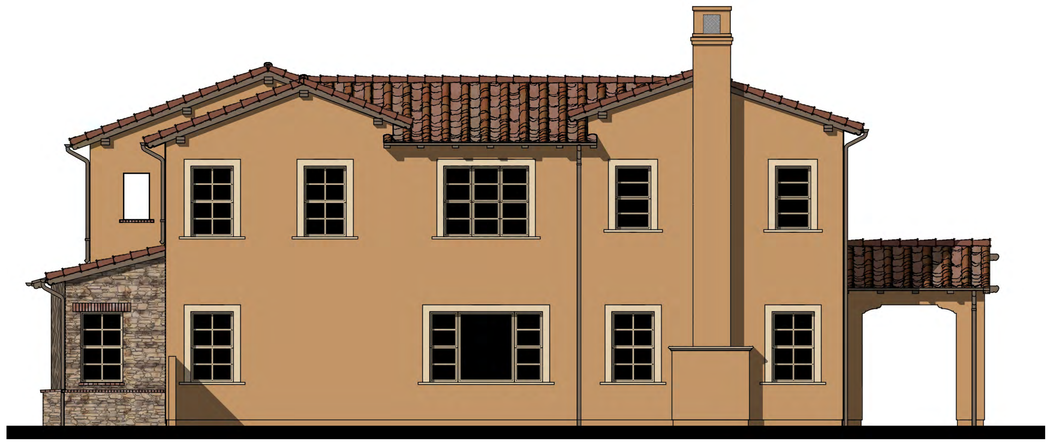
LEFT ELEVATION

FRONT ELEVATION



RIGHT ELEVATION

REAR ELEVATION

MONTEREY
ELEVATIONS
PLAN 3B
SINGLE FAMILY

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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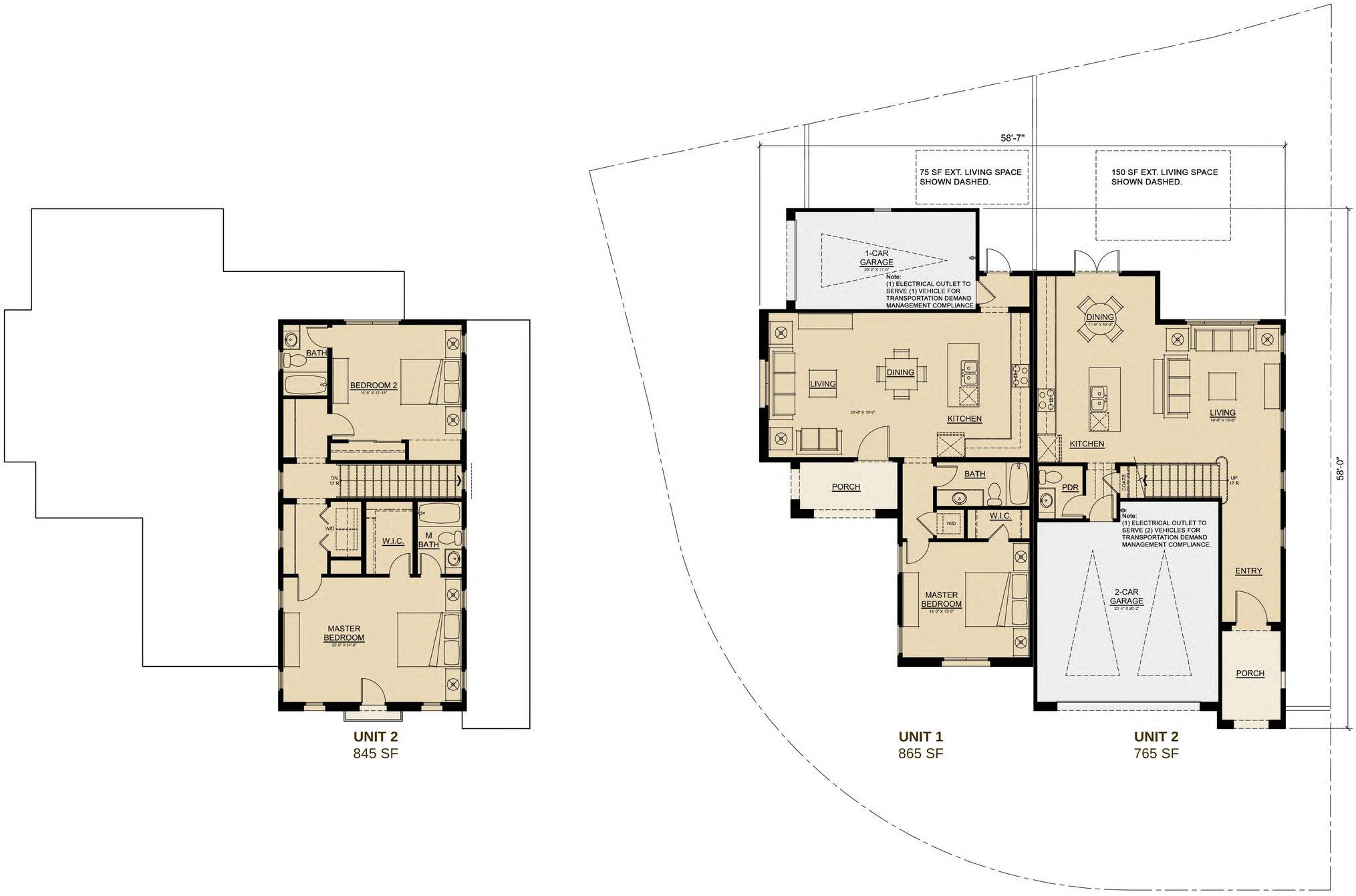

UNIT 1	UNIT 2
865 SF	1,610 SF
1-CAR GARAGE	2-CAR GARAGE
1 BED	2 BED
1 BATH	2.5 BATH

FLOOR PLAN
AFFORDABLE DUPLEX

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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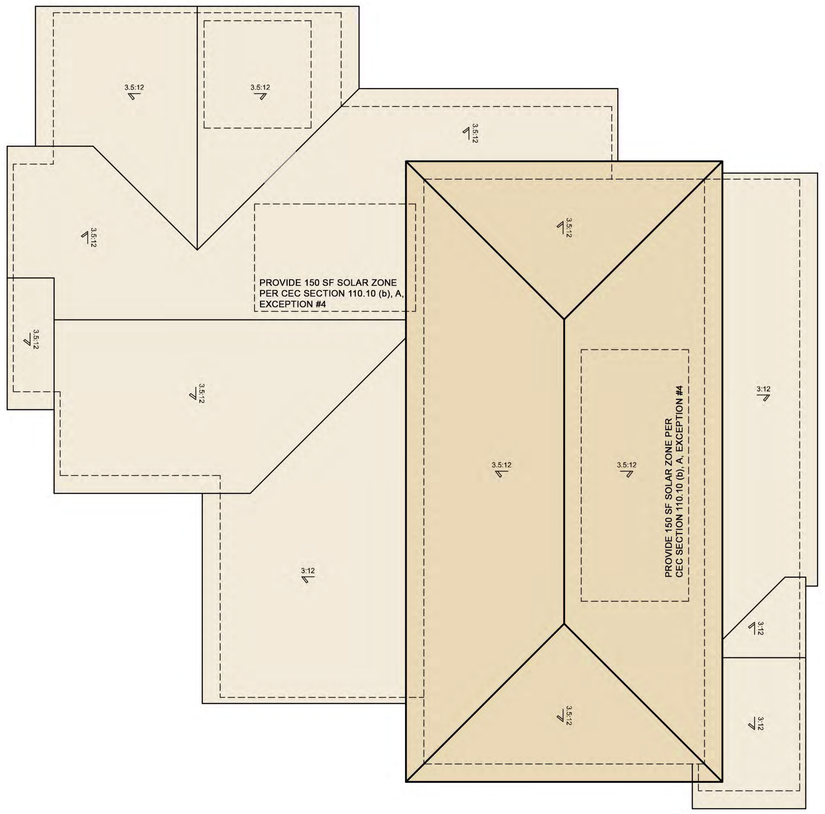

ROOF PLAN
AFFORDABLE DUPLEX

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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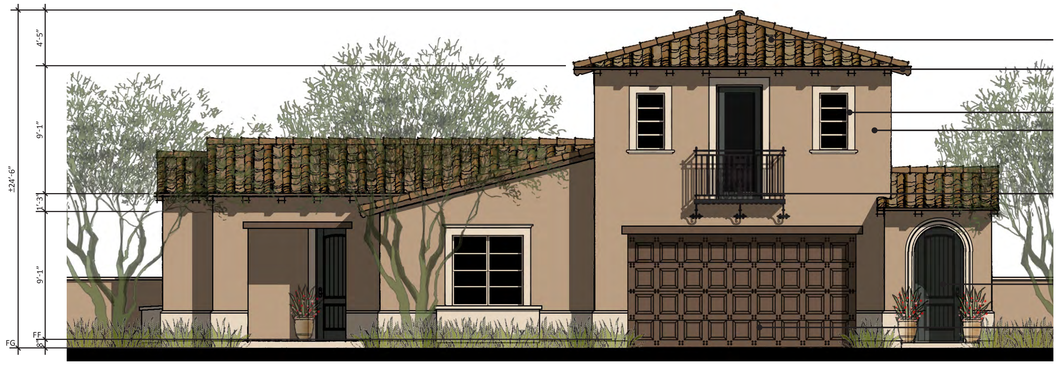
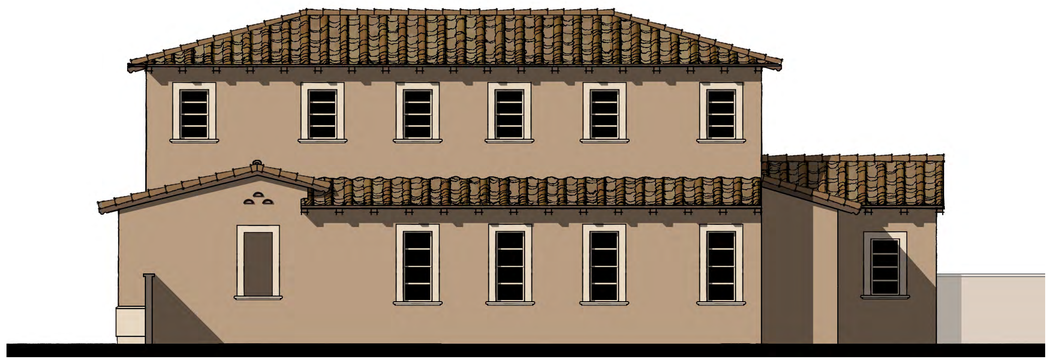
LEFT ELEVATION



FRONT ELEVATION



RIGHT ELEVATION

REAR ELEVATION

ELEVATIONS
AFFORDABLE DUPLEX

0 1' 2' 4' 8'
SCALE: 1/4"=1'-0"

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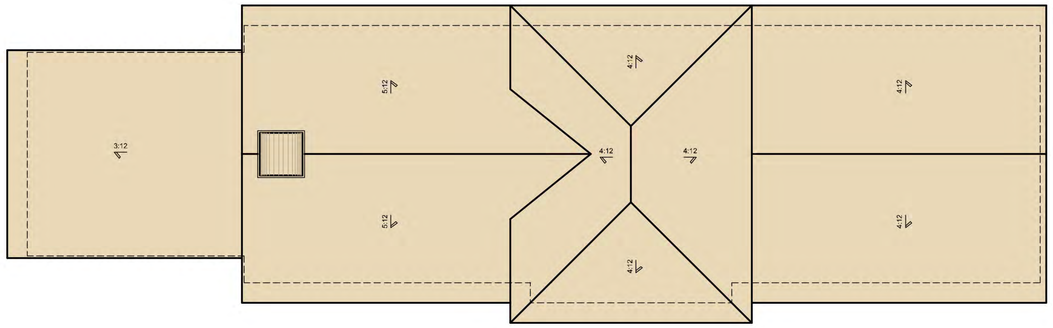
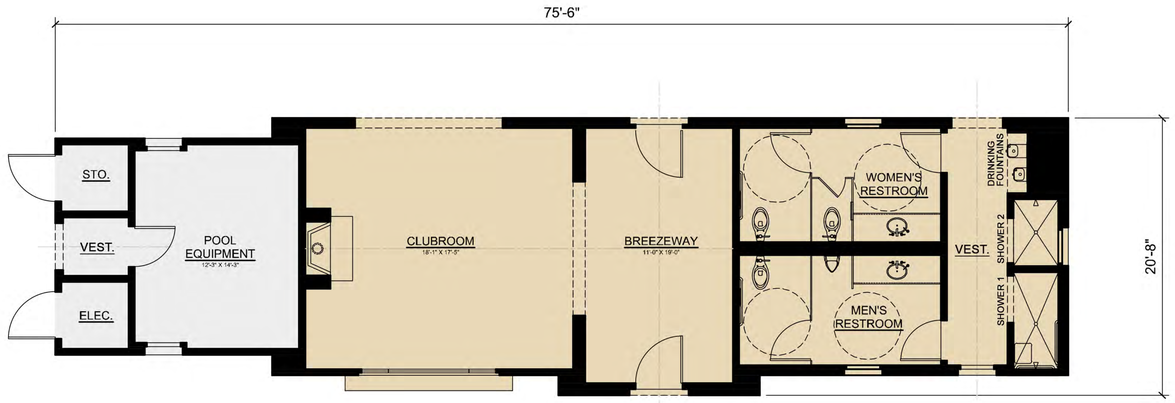
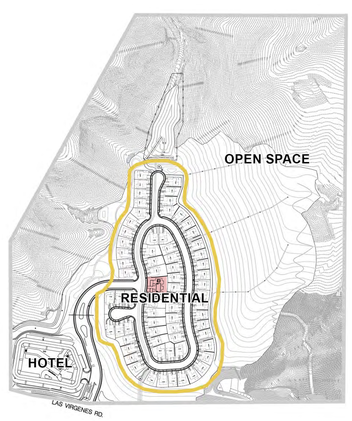


ROOF PLAN



FLOOR PLAN



CLUB

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DECORATIVE CHIMNEY SHROUD - FRAZEE 487 “SWISS COFFEE”

S-TILE ROOF - BCCS 7954 “CAMELOT”

DECORATIVE GABLE VENT

STUCCO - FRAZEE 487 “SWISS COFFEE”

DECORATIVE LIGHT FIXTURE

WROUGHT IRON - FRAZEE CL3237 “BLACKTOP”

ENTRY PEDIMENT - FRAZEE CL2902 “OLD WASHER”

FRONT ELEVATION

RIGHT ELEVATION

DECORATIVE CHIMNEY SHROUD - FRAZEE 487 “SWISS COFFEE”

S-TILE ROOF - BCCS 7954 “CAMELOT”

DECORATIVE GABLE VENT

STUCCO - FRAZEE 487 “SWISS COFFEE”

FASCIA/OUTLOOKERS - FRAZEE CL2867 “WHISKER”

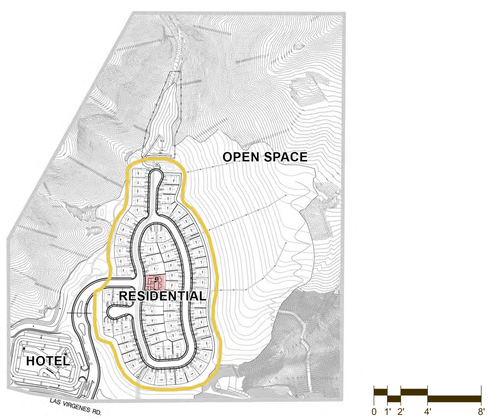
DECORATIVE LIGHT FIXTURE

ENTRY PEDIMENT - FRAZEE CL2902 “OLD WASHER”

WROUGHT IRON - FRAZEE CL3237 “BLACKTOP”

REAR ELEVATION

LEFT ELEVATION



CLUB

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PROJECT NUMBER: 13001 03/18/2015

NEW 64,162 SF
4-STORY HOTEL

POOL

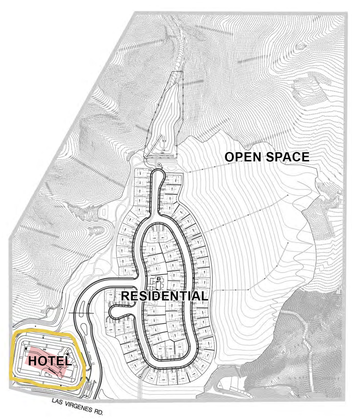
GENERATOR

BICYCLE RACK
(7 BIKES)

12X24 TRASH/
RECYCLING
ENCLOSURE;
6' H.

STREET "A"
(PRIVATE)

STREET "A"
(PRIVATE)



0 4' 8' 16' 32'
SCALE: 1/16"=1'-0"

DLR Group
Robert Hidey **Architects**

SITE PLAN
HOTEL

C A N Y O N O A K S

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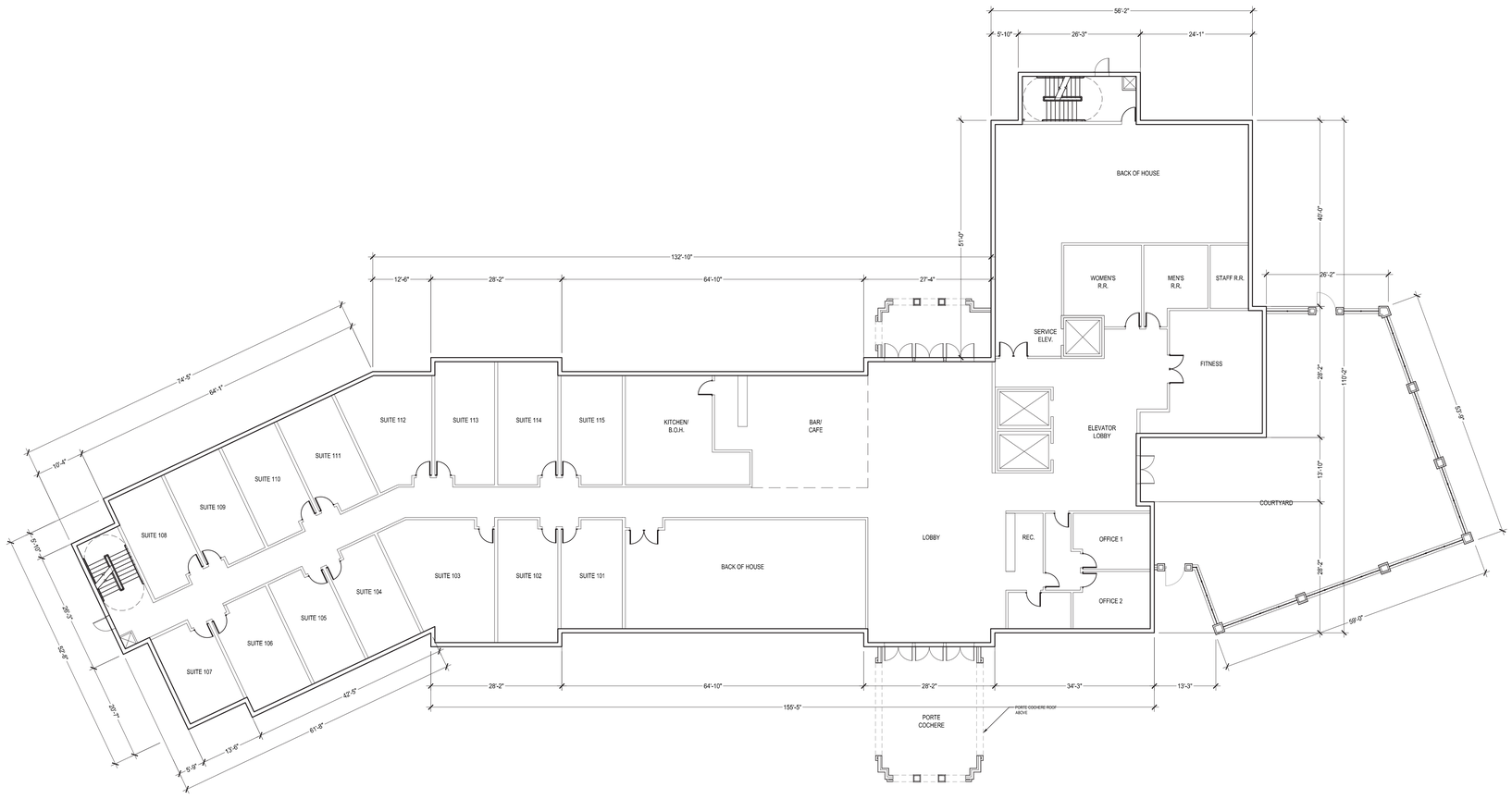
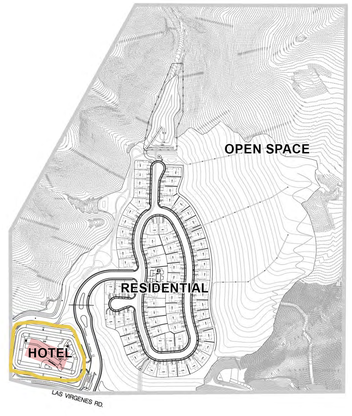
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015





0 4' 8' 16' 24'

SCALE: 3/32 "=1'-0"

DLR Group

Robert Hidey **Architects**

FIRST FLOOR PLAN

HOTEL

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CALABASAS, CALIFORNIA

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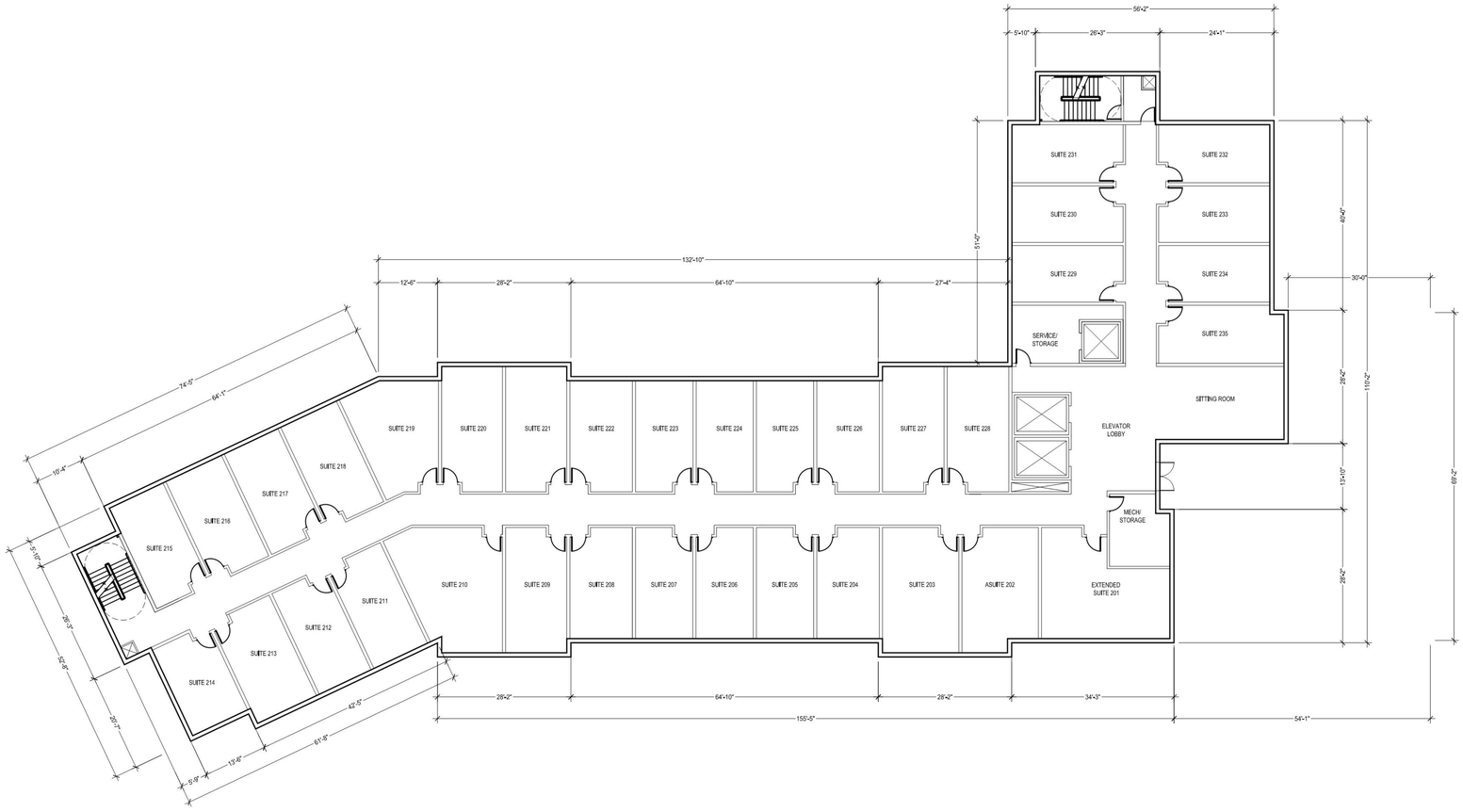

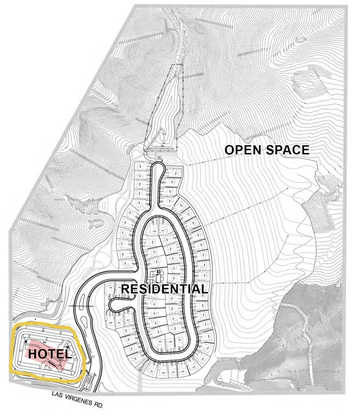

0 4' 8' 16' 24'

SCALE: 3/32 "=1'-0"

TYPICAL FLOOR PLAN/LEVELS 2-4

HOTEL

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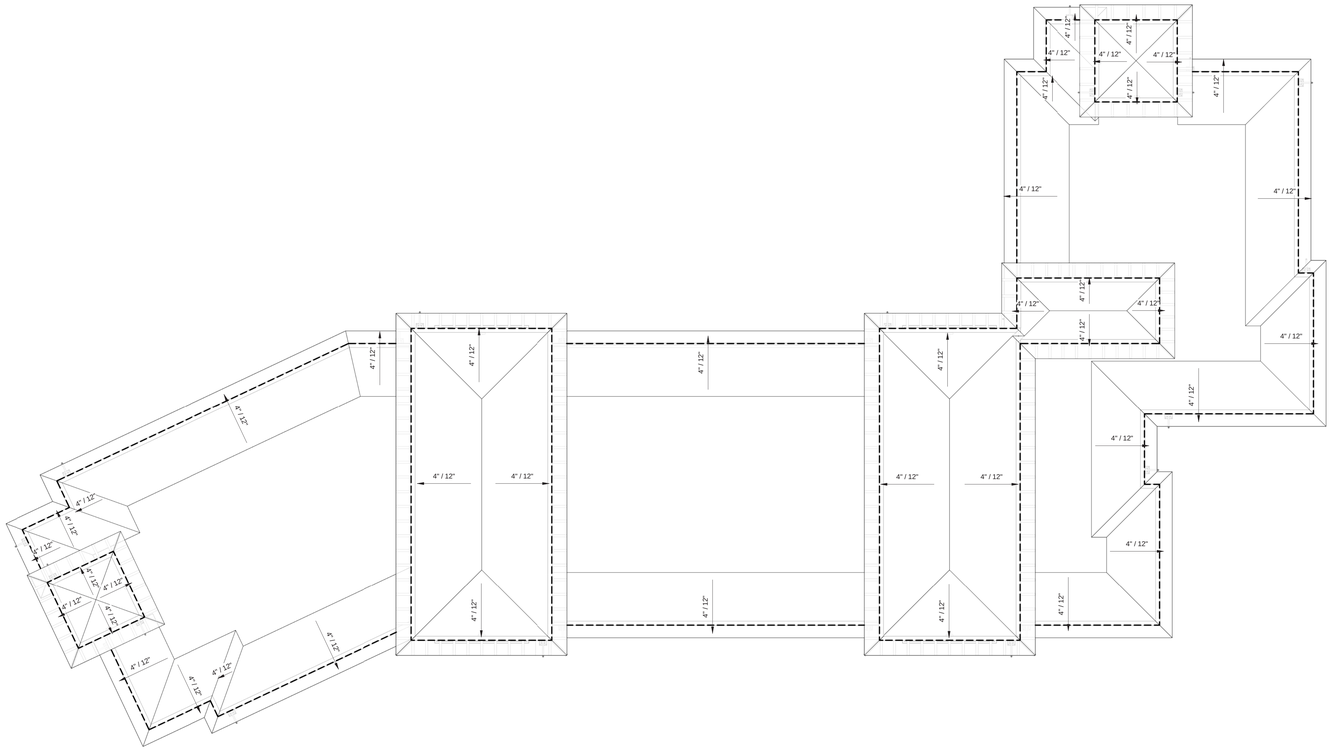

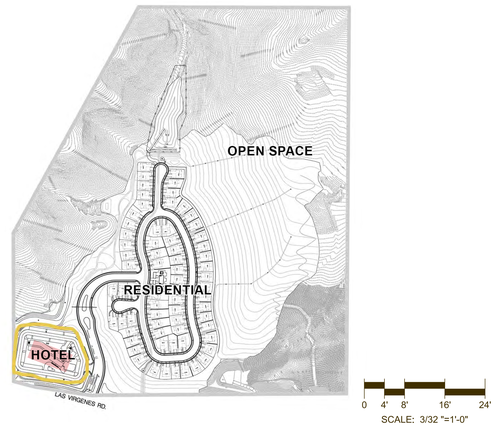

SCALE: 3/32 "=1'-0"

ROOF PLAN
HOTEL

C A N Y O N O A K S

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PROJECT NUMBER: 13001 06/18/2015

A-21

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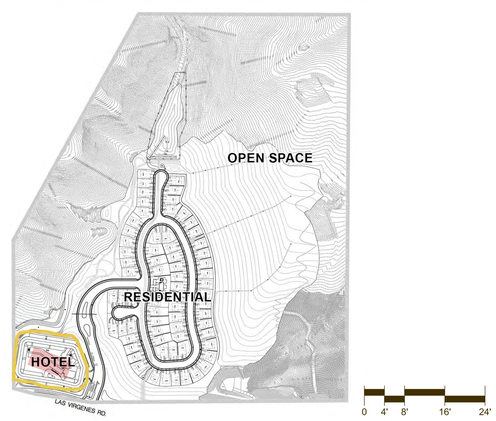
CONCEPTUAL WEST ELEVATION

CONCEPTUAL EAST ELEVATION



SCALE: 3/32 "=1'-0"

CONCEPTUAL ELEVATIONS
HOTEL

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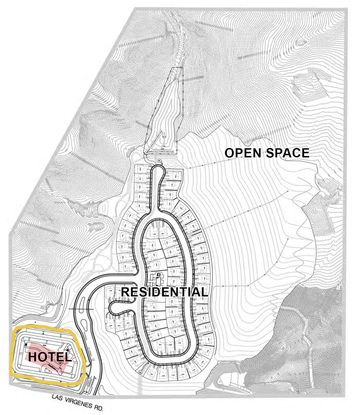
CONCEPTUAL NORTH ELEVATION

CONCEPTUAL SOUTH ELEVATION



CONCEPTUAL ELEVATIONS
HOTEL

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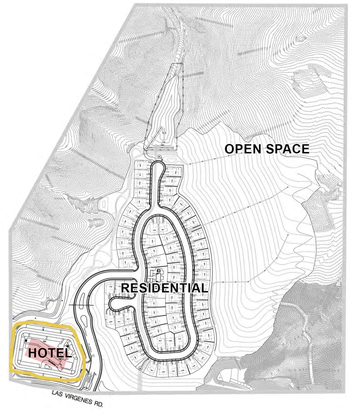

VIEW LOOKING EAST (WEST FACADE)
HOTEL

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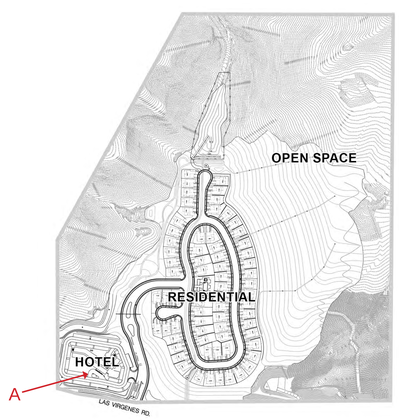

VIEW ‘A’
LOOKING EAST FROM INTERSECTION OF LAS VIRGENES AND AGOURA ROAD

C A N Y O N O A K S

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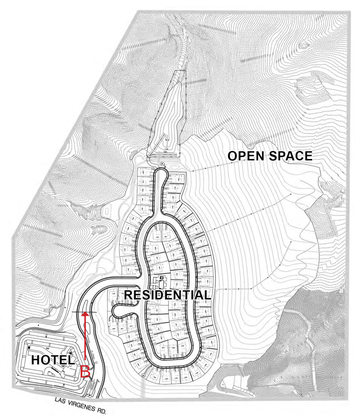

VIEW ‘B’
PROJECT ENTRY GATES

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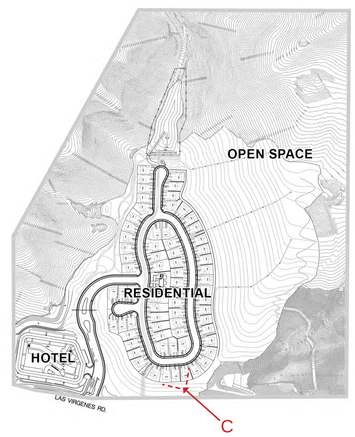

VIEW ‘C’
LOOKING EAST FROM COLONY PROJECT

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1
EXISTING

1
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

VisionScape IMAGERY
A Visualization Firm

Robert Hidey **Architects**

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2
EXISTING

2
PROPOSED

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PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

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3
EXISTING

3
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

VisionScape IMAGERY
A Visualization Firm

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PROJECT NUMBER: 13001 03/18/2015

4
EXISTING

4
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

VisionScape IMAGERY
A Visualization Firm

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5
EXISTING

5
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

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A Visualization Firm

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6
EXISTING

6
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

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7
EXISTING

7
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT INSTALLATION

VisionScape IMAGERY
A Visualization Firm

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PROJECT NUMBER: 13001 03/18/2015

1
EXISTING

1
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

VisionScape IMAGERY
A Visualization Firm

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2
EXISTING

2
PROPOSED

VisionScape IMAGERY
A Visualization Firm

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

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TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

3
EXISTING

3
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

VisionScape IMAGERY
A Visualization Firm

Robert Hidey **Architects**

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4
EXISTING

4
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

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5
EXISTING

5
PROPOSED

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PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

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6
EXISTING

6
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

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7
EXISTING

7
PROPOSED

PROPOSED PROJECT WITH LANDSCAPE AT 10 YEARS

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CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

LEGAL DESCRIPTION:

PARCEL 1 – PORTION THEREOF:

THOSE PORTIONS OF THE NORTHWEST ¼ OF SECTION 29 AND THE NORTHEAST ¼ OF SECTION 30, TOWNSHIP 1 NORTH, RANGE 17 WEST SAND BERNARDINO MERIDIAN, IN THE CITY OF CALABASAS, COUNTY OF OF LOS ANGELES, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE SOUTHERLY LINE OF SAID NORTHWEST ¼ SAID POINT BEING DISTANT THERON NORTH 89° 06' 02" WEST 532.00 FEET FROM TEH SOUTHEASTERLY CORNER OF THE SOUTHWEST ¼ OF THE NORTHWEST ¼ OF SAID SECTION 29, THENCE NORTH 0° 09' 49" EAST 1142.42 FEET; THENCE NORTH 60° 59' 40" WEST 1401.95 FEET, THENCE SOUTH 27° 44' 50" WEST 532.52 FEET TO THE BEGINNING OF NON–TANGENT CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 690 FEET, A RADIAL LINE OF SAID CURVE THROUGH A CENTRAL ANGLE OF 11° 12' 35" A DISTANCE 135 FEET TO THE BEGINNING OF A COMPOUND CURVE CONCAVE WESTERLY AND HAVING A RADIUS OF 55 FEET, THENCE SOUTHERLY ALONG SAID LAST MENTIONED CURVE THROUGH A CENTRAL ANGLE OF 57° 48' 50" A DISTANCE OF 55.50 FEET; THENCE NORTH 89° 42' 22" EAST 227.44 FEET; THENCE SOUTH 13° 20' 23" EAST 1250.61 FEET TO THE SOUTHERLY LINE OF SAID NORTHEAST ¼ THENCE ALONG SAID LAST MENTIONED SOUTHERLY LINE NORTH 89° 59' 58" EAST 60.86 FEET TO TEH SOUTHWESTERLY CORNER OF SAID NORTHWEST ¼; THENCE ALONG THE SOUTHERLY LINE OF SAID NORTHWEST ¼, SOUTH 89° 06' 02" EAST 761.34 FEET TO THE POINT OF BEGINNING.

BEING A PORTION OF PARCEL 3 OF MAP NO. 23345, IN THE CITY OF CALABASAS, AS PER MAP FILED IN BOOK 253 PAGES 61 TO 68 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT ALL OIL, GAS, ASPHALT AND OTHER HYDROCARBON SUBSTANCES WHICH WERE EXCEPTED IN THE DEED FROM ALBERTSON COMPANY, A CORPORATION, IN BOOK 21522 PAGE 215, OFFICIAL RECORDS.

THE LAND REFERRED TO HEREIN IS SITUATED IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 2:

PARCEL 4 OF MAP NO. 23345, IN THE CITY OF CALABASAS, AS PER MAP FILED IN BOOK 253 PAGES 61 TO 68 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT ALL OIL, GAS, ASPHALT AND OTHER HYDROCARBON SUBSTANCES WHICH WERE EXCEPTED IN THE DEED FROM ALBERTSON COMPANY, A CORPORATION, IN BOOK 21522 PAGE 215, OFFICIAL RECORDS.

APN 2069–078–011 & 2069–078–009.

EXISTING EASEMENT LEGEND

EASEMENTS PER PRELIMINARY TITLE REPORT NO. NCS–61534–SA1, DATED NOVEMBER 24, 2003 PREPARED BY FIRST AMERICAN TITLE COMPANY.

AN EASEMENT FOR THE EXCLUSIVE PERPETUAL RIGHT TO CONSTRUCT, INSTALL, USE, MAINTAIN, ALTER, ADD TO, REPAIR, REPLACE, REMOVE, INCREASE THE SIZE AND NUMBER OF CONDUIT AND CABLE AND OTHERWISE OPERATE:

(A) COMMUNITY ANTENNAE TELEVISION SYSTEM INCLUDING CONDUIT, CABLE, EQUIPMENT AND RELATED SYSTEM;

(B) CLOSED CIRCUIT, PAY AND SUBSCRIPTION TELEVISION SYSTEMS INCLUDING ALL CONDUIT, CABLE, EQUIPMENT AND RELATED SYSTEMS;

(C) ANY AND ALL SYSTEMS FOR TRANSMITTING, RECEIVING, DISTRIBUTING, CONDUCTING AND DISBURSING TELEVISION SIGNALS INCLUDING THE CARRIER, VIDEO, SOUND AND SYNCHRONIZING PORTIONS THEREOF AND ANY OTHER ELECTROMAGNETIC OR OTHER TYPES OF SIGNALS OR IMPULSES NOW OR HEREAFTER USED FOR THE PRODUCTION AND REPRODUCTION OF VISUAL IMAGES AND AUDIBLE SOUNDS AND ALL SYSTEMS AND EQUIPMENT ANCILLARY OR RELATED THERETO; TOGETHER WITH;

(2.) AN EXCLUSIVE PERPETUAL EASEMENT AND RIGHT OF WAY FOR SUCH CONSTRUCTION, USE, MAINTENANCE, ALTERATION, ADDITION, REPAIR, REPLACEMENT, REMOVAL INCREASES IN SIZE AND NUMBER OF CONDUIT AND CABLE, SERVICE, AND OTHER OPERATIONS WITH RESPECT TO SUCH SYSTEMS, TOGETHER WITH:

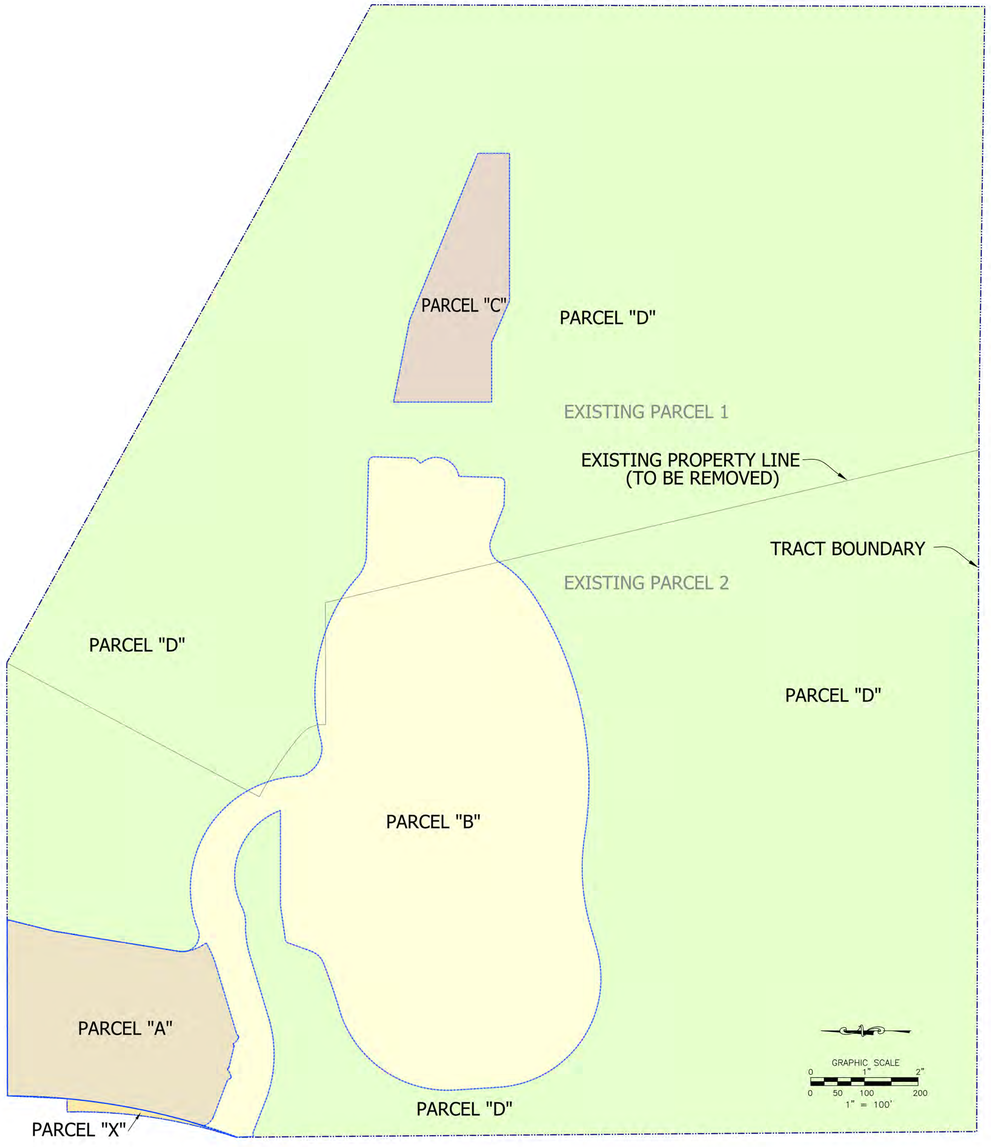
(3.) THE PERPETUAL EASEMENT AND RIGHT OF WAY FOR SUCH CONSTRUCTION, USE, MAINTENANCE, ALTERATION, ADDITION, REPAIR REPLACEMENT, REMOVAL INCREASES IN SIZE AND NUMBER OF CONDUIT AND CABLE, SERVICE, AND OTHER OPERATIONS (INCLUDING THE RIGHT TO PLACE AND MAINTAIN ANY AND ALL I IMPROVEMENTS, APPARATUS, PIPES, WIRES, CABLES, CONDUITS, CONTROL BOXES, AND OTHER INSTRUMENTALITIES AS GRANTEE SHALL DESIRE TO DO THE EXERCISE OF THE EXCLUSIVE RIGHTS HEREIN GRANTED), WITHOUT CHARE, ALL OPEN DITCHES, TRENCHES, OR EXCAVATIONS IN WHICH UTILITY SYSTEMS WILL BE PLACED, AND THE RIGHT TO THIRTY (30) DAYS WRITTEN NOTICE OF THE DATE SUCH DITCHES, TRENCHES, OR EXCAVATIONS WILL BE OPEN AND THE LOCATION AND EXTENT THEREOF AND INCIDENTAL PURPOSES IN THE DOCUMENT RECORDED FEBRUARY 23,1968 AS INSTRUMENT NO. 3920 IN BOOK D–3921 PAGE 435 OF OFFICIAL RECORDS.

GENERAL NOTES:

1. AREA: TOTAL SITE: 77.22 ACRES
2. EXISTING LAND USE: VACANT WITH 3 ACRE EASEMENT TO LA COUNTY FOR FLOOD CONTROL PURPOSES.
3. ZONE: RESIDENTIAL –MULTI FAMILY (20), PLANNED DEVELOPMENT, AND OPEN SPACE.
4. ASSESSOR'S PARCEL NUMBERS: 2069–078–009 & 2069–078–011
5. PROPOSED LAND USE:

PARCEL A:	2.91 ACRES – HOTEL SITE
PARCEL B:	13.03 ACRES – RESIDENTIAL DEVELOPMENT
PARCEL C:	1.46 ACRES – EASEMENT FOR FLOOD CONTROL PURPOSES
PARCEL D:	59.74 ACRES – OPEN SPACE, SLOPES, MITIGATION AREA
PARCEL X:	0.08 ACRES – PUBLIC STREET DEDICATION
SITE TOTAL:	77.22 ACRES

6. PROPOSED DEVELOPMENT: 71 DU (67 SF, 4 MF)
   4 STORY HOTEL–120 ROOMS (67,580 SF)
7. WATER PURVEYOR: LAS VIRGENES MUNICIPAL WATER DISTRICT.
8. SEWER DISPOSAL: LAS VIRGENES MUNICIPAL WATER DISTRICT.
9. STORM DRAIN: LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
10. CABLE: CHARTER COMMUNICATIONS
11. ELECTRICITY: SOUTHERN CALIFORNIA EDISON
12. GAS: SOUTHERN CALIFORNIA GAS
13. DRAINAGE, FLOOD CONTROL AND SEWER EASEMENTS TO BE DEDICATED ON THE FINAL MAP TO THE SATISFACTION OF THE CITY OF CALABASAS AND LAS VIRGENES MUNICIPAL WATER DISTRICT.
14. PRIVATE STREETS, SLOPES, DRAINAGE DEVICES, AND COMMON AREAS SHALL BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
15. DEVELOPER RESERVES THE RIGHT TO RECORD MULTIPLE PHASED UNITS OF THE MAP PER SMA, ARTICLE 4, SEC. 66456.1.
16. ALL PROPOSED IMPROVEMENTS, GRADES, AND INFRASTRUCTURES ARE PRELIMINARY AND SUBJECT TO CHANGE IN FINAL DESIGN.
17. ALL GRADING VOLUMES, WALL LOCATION AND HEIGHTS, AND PAD ELEVATIONS ARE SUBJECT TO MINOR CHANGES WITH THE PREPARATION OF IMPROVEMENT PLANS.
18. ALL NPDES AND SUSMP REQUIREMENTS TO B FULFILLED IN ACCORDANCE WITH ALL STATE AND REGULATIONS.
19. GEOLOGIC FEASIBILITY AND ALL GEOLOGIC HAZARDS ARE IN ACCORDANCE WITH THE GEOLOGIC & GEOTECHNICAL REPORTS PREPARED BY RJR ENGINEERING.
20. LAS VIRGENES ROAD FRONTAGE TO BE IMPROVED AND DEDICATED ACCORDANCE TO THE CITY OF CALABASAS
21. ALL SEWERS WILL COMPLY WITH LA COUNTY AND LVMWD REQUIREMENTS, AND WILL BE CONNECTED TO AT LAS VIRGENES ROAD.
22. ALL WATER AND REC WATER WILL COMPLY WITH LVMWD REQUIREMENTS, AND WILL BE CONNECTED TO AT LAS VIRGENES ROAD.
23. ALL STORM DRAINS WILL COMPLY WITH L.A. COUNTY REQUIREMENTS, AND WILL BE CONNECTED TO AT LAS VIRGENES ROAD.
24. THE DEVELOPER WILL UNDERGROUND ALL EXISTING AND PROPOSED ONSITE UTILITY FACILITIES INTENDED TO SERVE NEW STRUCTURES IN ACCORDANCE WITH SECTION 17.20.220 OF THE CMC.
25. ALL PROPOSED DRIVEWAYS WILL COMPLY WITH ACCESS GRADE REQUIREMENTS IN ACCORDANCE WITH SECTION 17.28.080 (D) OF THE CMC.
26. ALL SIGNS FOR THE PROPOSED DEVELOPMENT WILL HAVE TO COMPLY WITH SECTION 17.30 OF THE CMC. SIGN PERMITS SHALL BE OBTAINED FROM PLANNING DIVISION PRIOR TO INSTALLATION OF ANY SIGNS.
27. ALL STREETS WITHIN THE PROPOSED SUBDIVISION SHALL BE NAMED IN ACCORDANCE WITH SECTION 17.46.020 (C) OF THE CMC. NAMES SHALL BE APPROVED BY THE REVIEW AUTHORITY.
28. ALL PRIVATE STREETS WITHIN THE PROPOSED SUBDIVISION SHALL BE MAINTAINED IN ACCORDANCE WITH SECTION 17.46.020 (D) (1) OF THE CMC.
29. THE PROPOSED PROJECT DRAINAGE SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH SECTION 17.46.030 OF THE CMC.

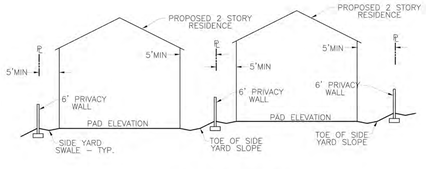


GENERAL NOTES (CONTINUED):

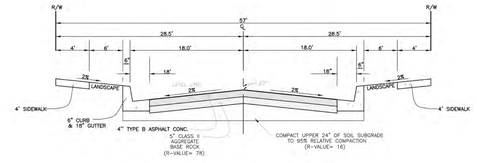
28. ALL PRIVATE STREETS WITHIN THE PROPOSED SUBDIVISION SHALL BE MAINTAINED IN ACCORDANCE WITH SECTION 17.46.020 (D) (1) OF THE CMC.
29. THE PROPOSED PROJECT DRAINAGE SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH SECTION 17.46.030 OF THE CMC.
30. ALL PROJECT SURVEY MONUMENTS SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 17.46.080 OF THE CMC PRIOR TO FINAL MAP SUBMITTAL.
31. ALL PUBLIC UTILITIES PART OF THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 17.46.090 OF THE CMC.
32. ALL RIGHT–OF–WAY DEDICATIONS PART OF THIS PROJECT SHALL COMPLY WITH AND BE PREPARED IN ACCORDANCE WITH SECTION 17.50.050 OF THE CMC.
33. THE DUAL ACCESS DRIVEWAY FOR THE TWO DUPLEXES SHALL BE APPROVED BY THE CITY ENGINEER IN ACCORDANCE WITH SECTION 17.28.080A OF THE CMC.
34. ALL DRIVEWAYS, COMMERCIAL AND RESIDENTIAL, SHALL COMPLY WITH THE ACCESS GRADE REQUIREMENTS IN ACCORDANCE WITH SECTION 17.28.80D OF THE CMC.

TYPICAL HOUSE PLOTTING AND SETBACKS
NTS

MINIMUM SETBACKS
10' FRONT SETBACK FROM SIDEWALK
18' GARAGE SETBACK FROM SIDEWALK
5' SIDE YARD SETBACK PROPERLY LINE
5' REAR YARD SETBACK PROPERLY LINE

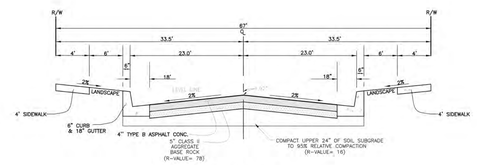


TYPICAL SINGLE FAMILY SIDE YARD SETBACK SECTION
NTS



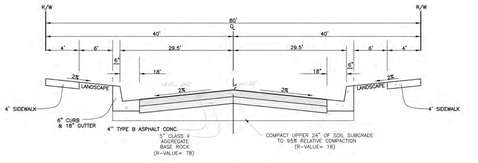
A TYPICAL 36' IN–TRACT PRIVATE STREETS
NTS

*ALL PRIVATE STREETS AND MEDIANS SHALL BE MAINTAINED BY THE ESTABLISHED HOA.



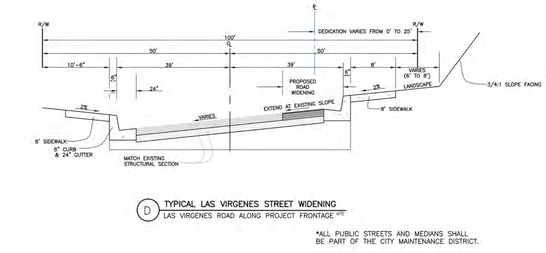
B TYPICAL PUBLIC STREET (ENTRANCE)
RESIDENTIAL ENTRANCE
NTS

*ALL PUBLIC STREETS AND MEDIANS SHALL BE PART OF THE CITY MAINTENANCE DISTRICT.



C TYPICAL PUBLIC STREET (ENTRANCE)
LAS VIRGENES ROAD TO HOTEL DRIVEWAY
NTS

*ALL PUBLIC STREETS AND MEDIANS SHALL BE PART OF THE CITY MAINTENANCE DISTRICT.



D TYPICAL LAS VIRGENES STREET WIDENING
LAS VIRGENES ROAD ALONG PROJECT FRONTAGE
NTS

*ALL PUBLIC STREETS AND MEDIANS SHALL BE PART OF THE CITY MAINTENANCE DISTRICT.

EARTHWORK SUMMARY:

NON–REMEDIAL EARTHWORK QUANTITIES

OVERALL ROUGH GRADE QUANTITIES	
CUT	613,183 CY
FILL	569,544 CY
NET	43,639 CY

*NO EXPORT WILL BE REQUIRED - THE SITE WILL BALANCE BASED ON SOIL SHRINKAGE CALCULATIONS.

RJR ENGINEERING

Robert Hidey **Architects**

PROJECT DETAILS

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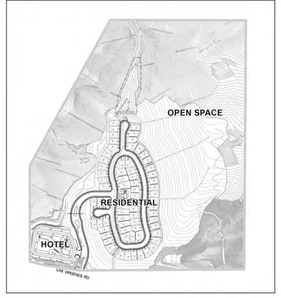

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TRACT 71546

TRACT 53534

OPEN SPACE

NORTHERN TRACT BOUNDARY

SOUTHERN TRACT BOUNDARY

WESTERN TRACT BOUNDARY

EASTERN TRACT BOUNDARY

OAK TREE TRUNK
OAK TREE CANOPY
OAK TREE PROTECTION ZONE

EXISTING GAS STATION

EXISTING COMMERCIAL/RETAIL

JOIN EXISTING SIDEWALK

EXISTING SIDEWALK

LAS VIRGENES ROAD

AGOURA ROAD

RIGHT-OF-WAY

EX. RECLAIMED WATER LINE

GRAPHIC SCALE
0 40 80 160 240
0 1" 2" 3"
1" = 80'

EXISTING SURVEY

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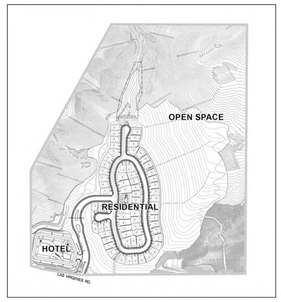

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EXISTING SURVEY WITH AERIAL PHOTO

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TENTATIVE SITE PLAN WITH AERIAL PHOTO

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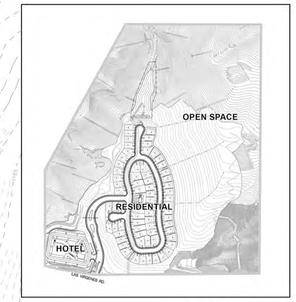

NTS

LEGEND

- TRACT BOUNDARY
- UNIT BOUNDARY
- STORM DRAIN EASEMENT
- EXISTING WATER LINE
- EXISTING SEWER LINE
- PROPOSED WATER LINE
- PROPOSED RECLAIMED WATER LINE
- PROPOSED SEWER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED LANE STRIPPING
- PROPOSED TOP AND TOE OF SLOPE
- PROPOSED DRY UTILITY TRENCH
- PROPOSED LANE STRIPPING
- PROPOSED 3/4:1 SLOPE FACING
- PROPOSED TERRACE DRAIN FLOW LINE
- PROPOSED PRIVACY WALL
- PROPOSED COMBO WALL BLOCK/WROGHT IRON
- PROPOSED RETAINING WALL

NOTE:
AFFORDABLE UNITS ARE LOCATED ON PADS 53, 54, 67, 68.

GRAPHIC SCALE
0 1" 2" 3"
0 30 60 120 180
1" = 60'

TENTATIVE SITE PLAN

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LEGEND

- TRACT BOUNDARY
- UNIT BOUNDARY
- STORM DRAIN EASEMENT
- EXISTING WATER LINE
- EXISTING SEWER LINE
- PROPOSED WATER LINE
- PROPOSED RECLAIMED WATER LINE
- PROPOSED SEWER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED LANE STRIPPING
- PROPOSED TOP AND TOE OF SLOPE
- PROPOSED DRY UTILITY TRENCH
- PROPOSED LANE STRIPPING
- PROPOSED 3/4:1 SLOPE FACING
- PROPOSED TERRACE DRAIN FLOW LINE
- PROPOSED PRIVACY WALL
- PROPOSED COMBO WALL BLOCK/WROGHT IRON
- PROPOSED RETAINING WALL

NOTE:
AFFORDABLE UNITS ARE LOCATED ON PADS 53, 54, 67, 68.

GRAPHIC SCALE
1" = 20'

TENTATIVE SITE PLAN

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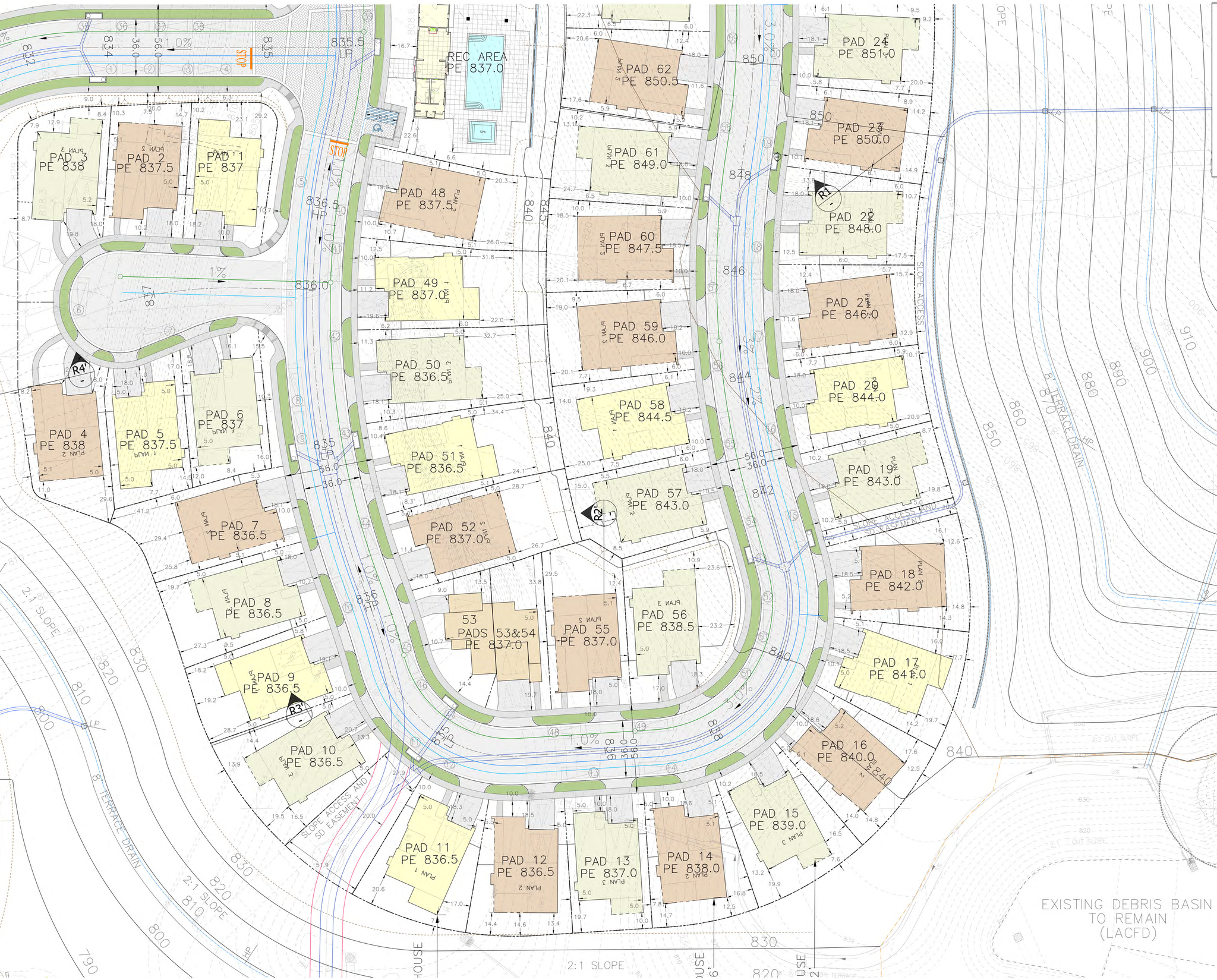

LEGEND

- TRACT BOUNDARY
- UNIT BOUNDARY
- STORM DRAIN EASEMENT
- EXISTING WATER LINE
- EXISTING SEWER LINE
- PROPOSED WATER LINE
- PROPOSED RECLAIMED WATER LINE
- PROPOSED SEWER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED LANE STRIPPING
- PROPOSED TOP AND TOE OF SLOPE
- PROPOSED DRY UTILITY TRENCH
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- PROPOSED RETAINING WALL

NOTE:
AFFORDABLE UNITS ARE LOCATED ON PADS 53, 54, 67, 68.

RJR ENGINEERING

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TENTATIVE SITE PLAN

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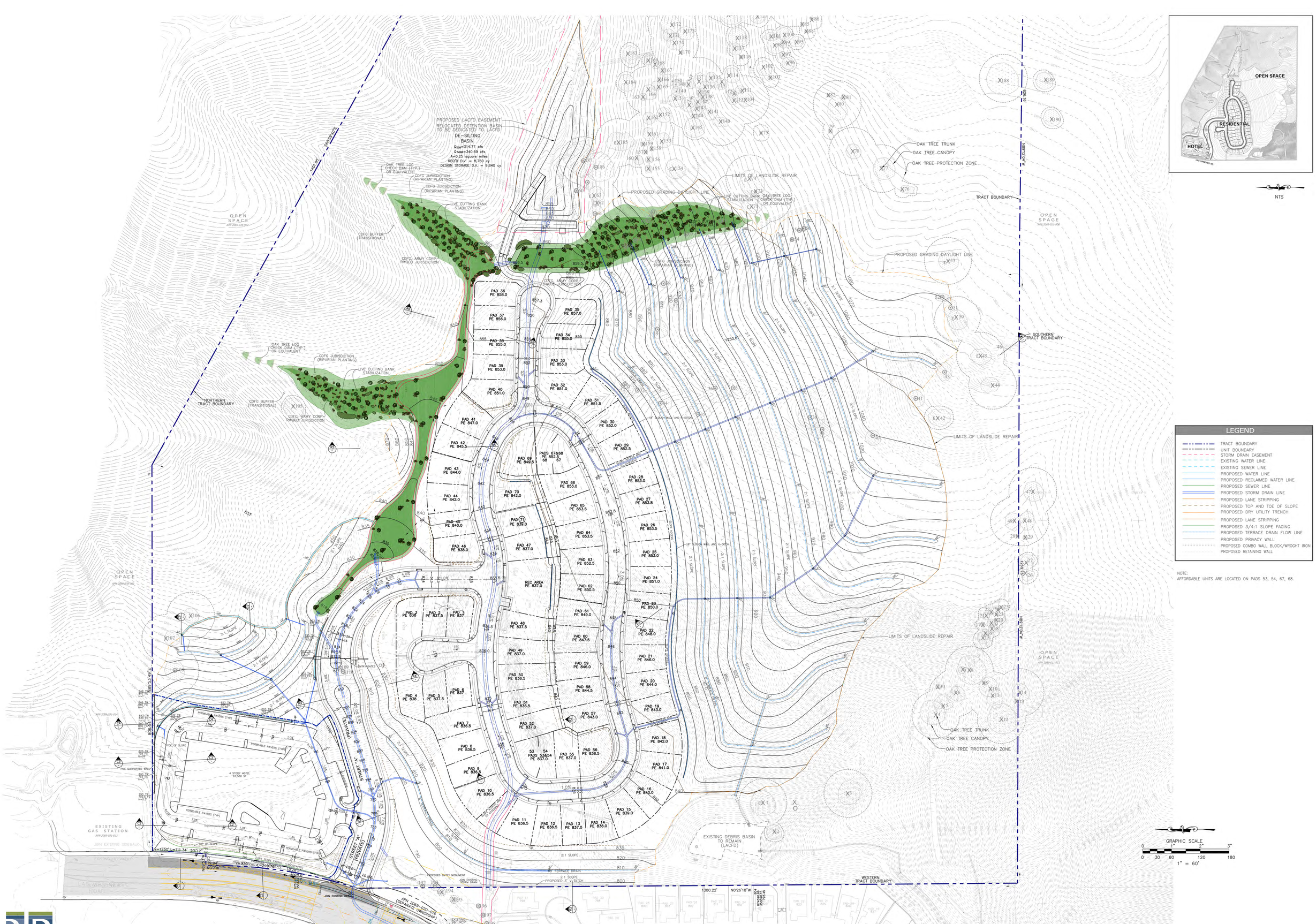

TENTATIVE SITE PLAN

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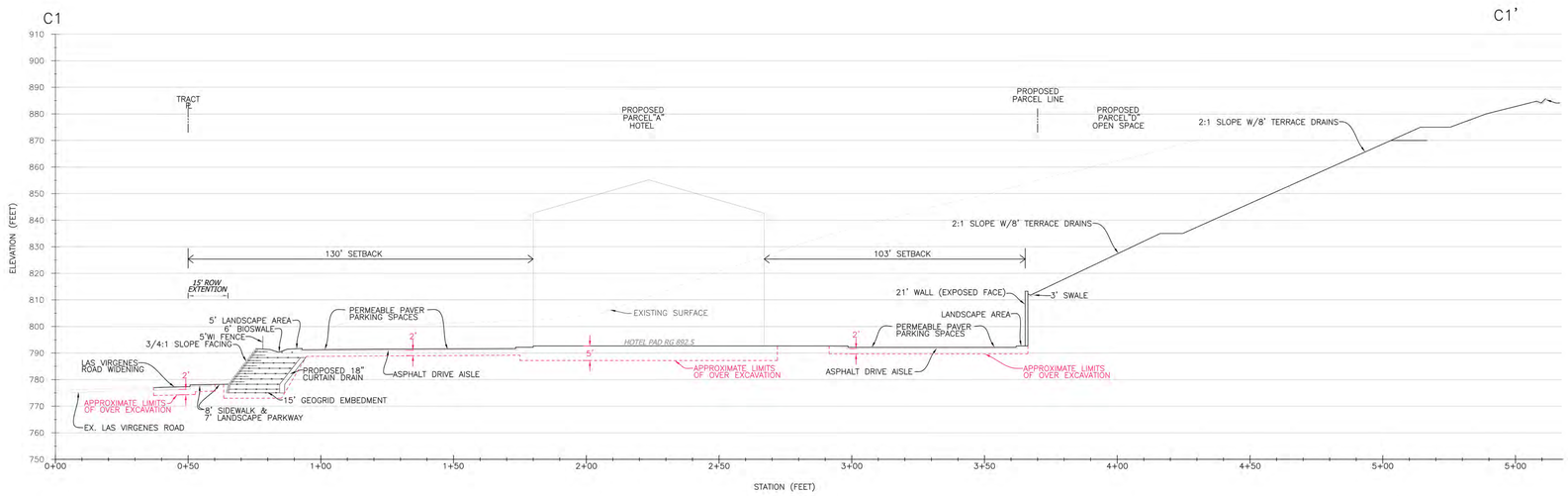
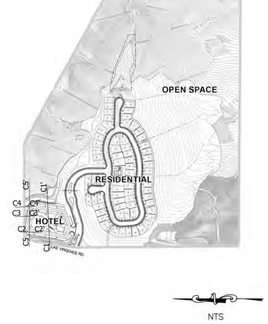
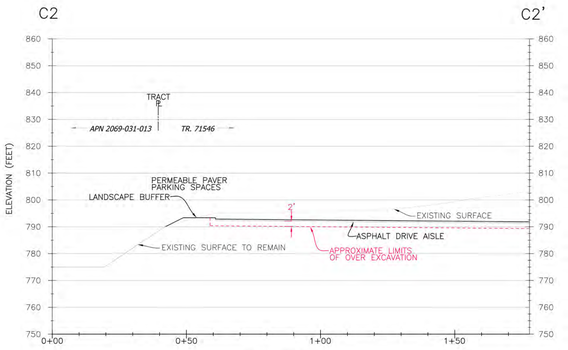


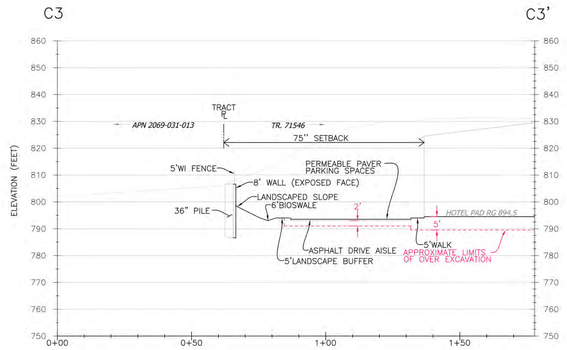


NTS

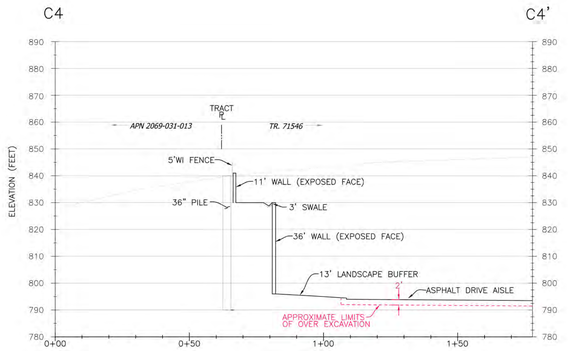
SECTION C1–C1'
SCALE: 1" = 20'



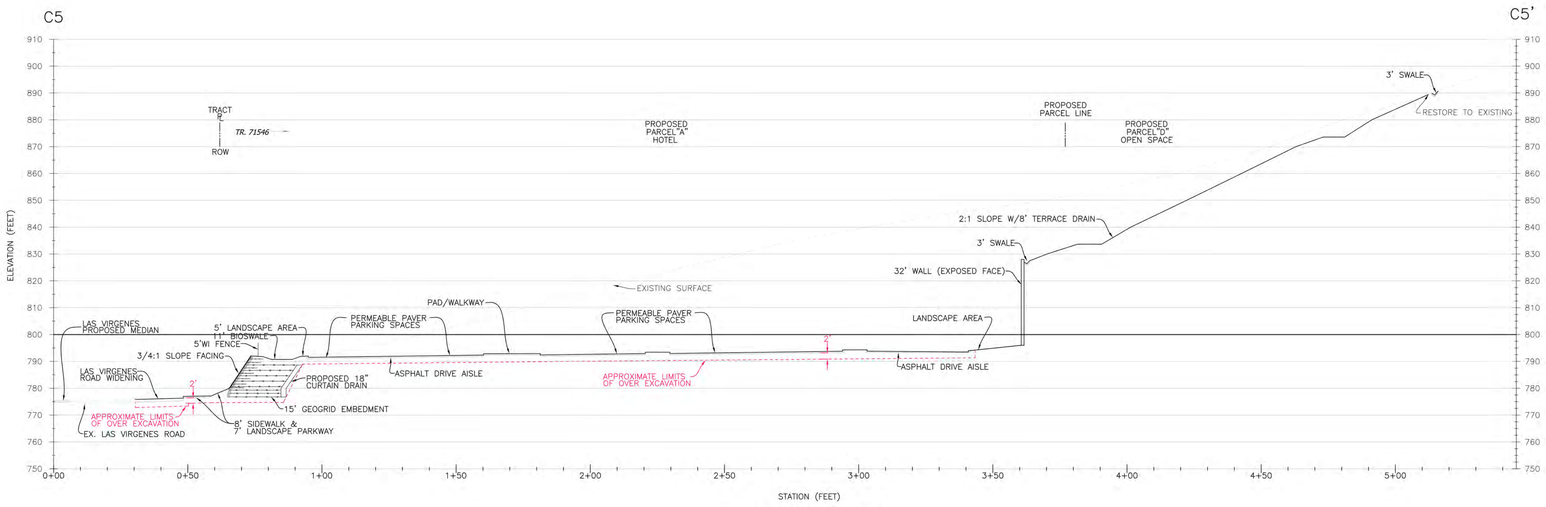
SECTION C2–C2'
SCALE: 1" = 20'



SECTION C3–C3'
SCALE: 1" = 20'



SECTION C4–C4'
SCALE: 1" = 20'



SECTION C5–C5'
SCALE: 1" = 20'

CROSS-SECTIONS

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

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3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
4301 Hacienda Drive, Suite 560, Pleasanton, CA 94588 Telephone 925.924.0440
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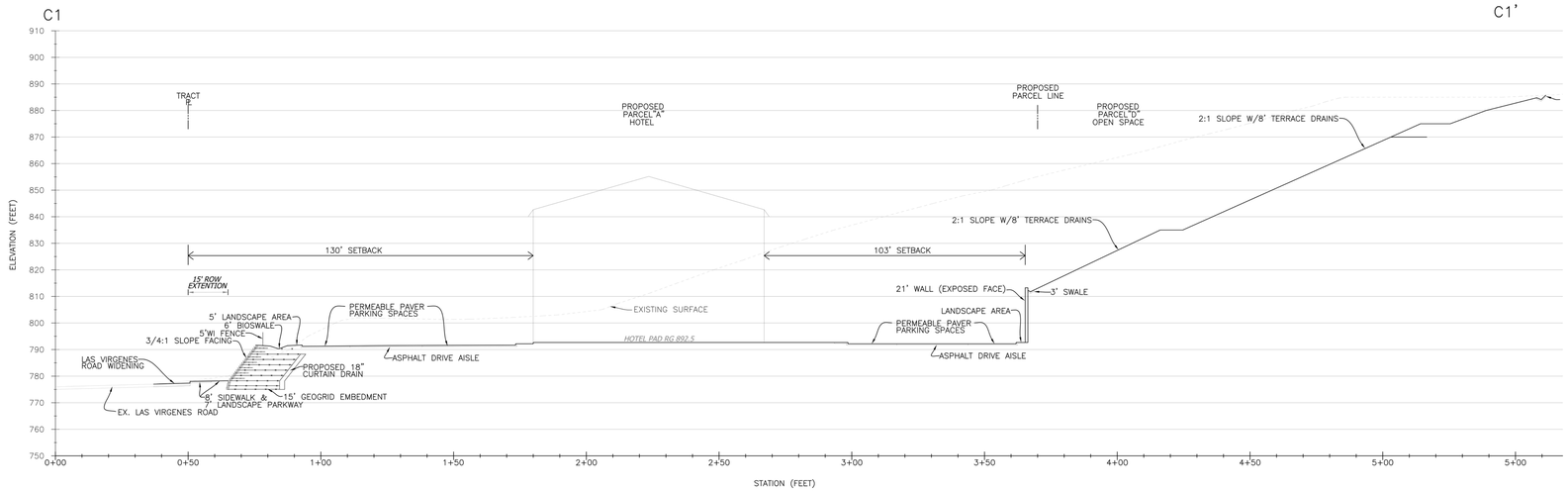
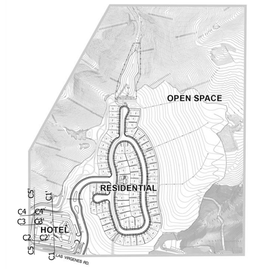
THE NEW HOME COMPANY

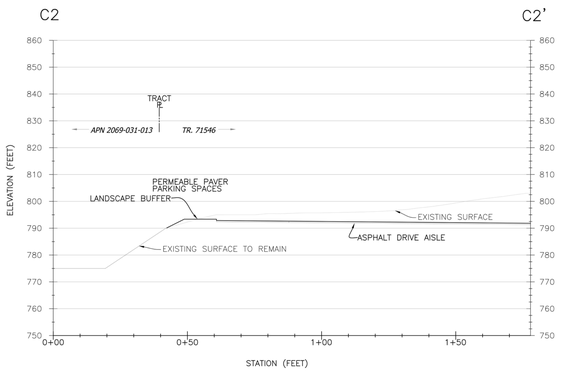
PROJECT NUMBER: 13001 03/18/2015



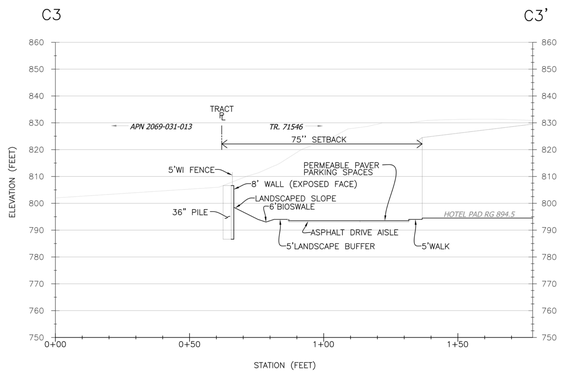
SECTION C1–C1'
SCALE: 1" = 20'



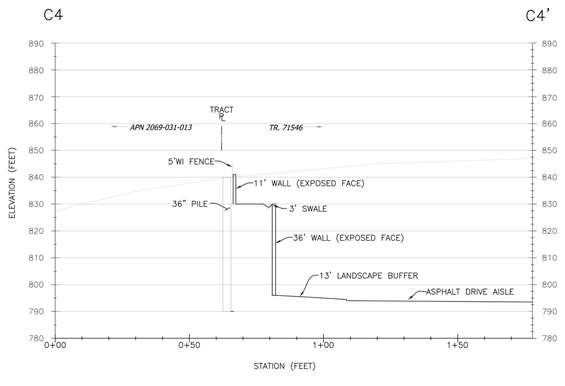
NTS



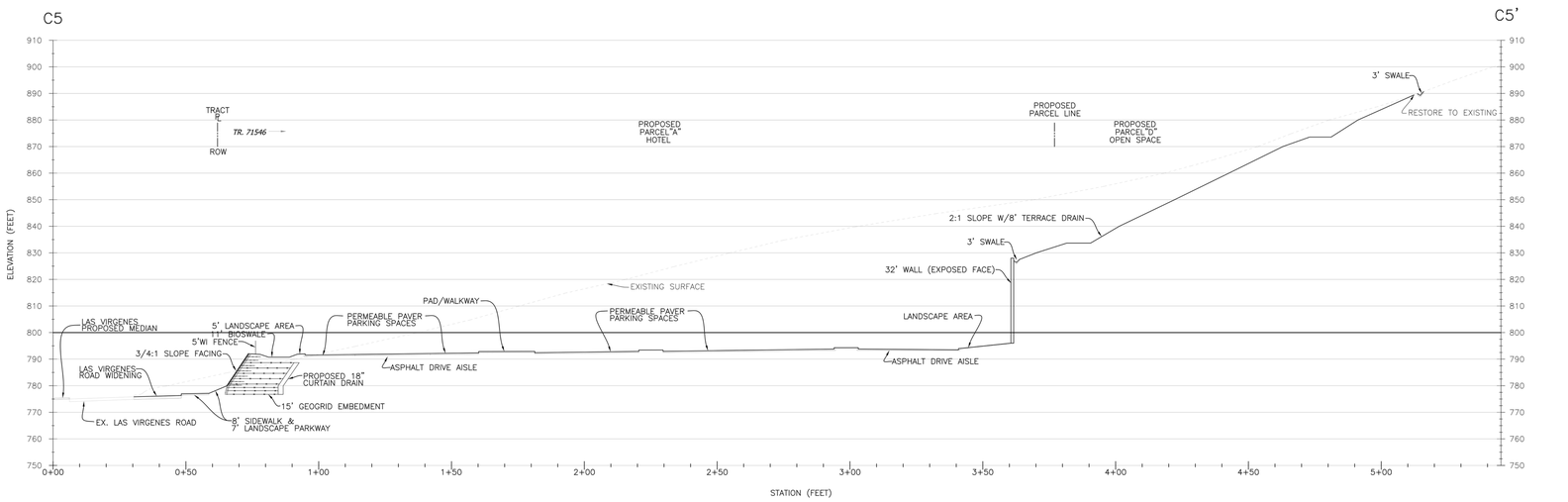
SECTION C2–C2'
SCALE: 1" = 20'



SECTION C3–C3'
SCALE: 1" = 20'



SECTION C4–C4'
SCALE: 1" = 20'



SECTION C5–C5'
SCALE: 1" = 20'

CROSS-SECTIONS

Robert Hidey **Architects**

C A N Y O N O A K S

THE NEW HOME COMPANY

TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
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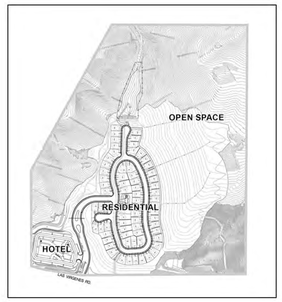

NTS

Street 'A'				
NUMBER	LENGTH	RADIUS	LINE DIRECTION	DELTA
L1	103.58'	-	S68° 59' 17.31"E	-
C2	129.61'	200.0'	-	37°07'53.04"
L3	225.30'	-	N73° 16' 12.04"E	-
C1	316.67'	170.0'	-	106°43'47.72"
L2	160.22'	-	S0° 00' 00.00"E	-

Street 'B'				
NUMBER	LENGTH	RADIUS	LINE DIRECTION	DELTA
C19	46.60'	263.6'	-	10°07'33.92"
C3	106.08'	263.6'	-	23°03'08.29"
C4	140.72'	230.0'	-	35°03'33.10"
C5	58.24'	230.0'	-	14°30'32.61"
C6	204.91'	100.0'	-	117°24'16.68"
C7	74.67'	523.9'	-	8°09'57.80"
C8	66.72'	523.9'	-	7°17'49.46"
C9	102.11'	523.9'	-	11°10'01.51"
C10	138.89'	523.9'	-	15°11'22.63"
C11	227.99'	500.0'	-	26°07'31.26"
C12	37.34'	767.3'	-	2°47'17.02"
C13	157.95'	90.0'	-	100°33'06.77"
L4	86.17'	-	N3° 39' 30.87"W	-
C14	109.61'	80.0'	-	78°30'03.31"
C15	48.13'	501.3'	-	5°30'02.53"
C16	298.29'	500.0'	-	34°10'51.45"

Street 'C'				
NUMBER	LENGTH	RADIUS	LINE DIRECTION	DELTA
L5	147.44'	-	S88° 20' 47.59"E	-
C17	90.45'	289.8'	-	17°52'51.96"

Street 'D'				
NUMBER	LENGTH	RADIUS	LINE DIRECTION	DELTA
L6	44.31'	-	N1° 38' 43.47"E	-
C18	77.32'	284.4'	-	15°34'41.89"

FIRE FLOW REQUIREMENTS

HOTEL
(3,500 GPM @ 20PSI RESIDUAL FOR 4 HRS. OVER AND ABOVE MAX. DAILY DOMESTIC DEMAND)

CONSTRUCTION TYPE:	TYPE VB
FIRE FLOW (BASED ON TOTAL FLOOR AREA):	7,000 GPM
REDUCTIONS (FIRE SPRINLERS - 50% MAX):	3,500 GPM
TOTAL FIRE FLOW REQUIRED:	**3,500 GPM**

SINGLE FAMILY HOMES
(1,250 GPM @ 20PSI RESIDUAL FOR 3 HRS. OVER AND ABOVE MAX. DAILY DOMESTIC DEMAND)

TOTAL FIRE FLOW REQUIRED:	**1,250 GPM**

CLUBHOUSE
(4,000 GPM @ 20PSI RESIDUAL FOR 2 HRS. OVER AND ABOVE MAX. DAILY DOMESTIC DEMAND)

CONSTRUCTION TYPE:	TYPE VB
FIRE FLOW (BASED ON TOTAL FLOOR AREA):	4,000 GPM
REDUCTIONS (FIRE SPRINLERS 13 OR 13R - 50% MAX):	2,000 GPM
TOTAL FIRE FLOW REQUIRED:	**2,000 GPM**

FIRE DEPARTMENT NOTES:
ALL PROPOSED GATES SHALL BE EQUIPPED WITH FIRE DEPARTMENT APPROVED LOCKING DEVICES.

ALL ACCESS ROADWAYS LESS THAN 36' IN WIDTH SHALL BE LABELED "NO PARKING FIRE LANE" IN ACCORDANCE WITH APPENDIX D, SECTION D103.6 OF THE COUNTY OF LOS ANGELES FIRE CODE.

ALL REQUIRED FIRE HYDRANTS SHALL BE INSTALLED, TESTED AND ACCEPTED OR BONDED FOR PRIOR TO FINAL MAP APPROVAL. ALL REQUIRED FIRE HYDRANTS SHALL BE INSTALLED, TESTED AND ACCEPTED PRIOR TO CONSTRUCTION.

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CIRCULATION EXHIBIT

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TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

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3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
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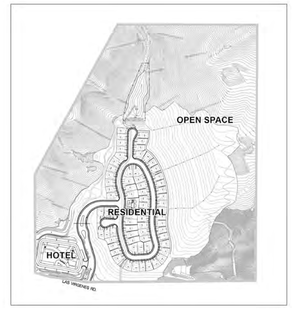
INTERNAL INTERSECTIONS AND DRIVEWAYS



NTS

SIGHT DISTANCE SUMMARY TABLE (INTRACT DRIVER AT VARIOUS LOCATIONS)			
LINE OF SIGHT	LENGTH OF LEG (FT)	DESIGNED / POSTED MPH	SIGHT DISTANCE REQUIRED
DRIVER'S VIEW Ⓐ TO CAR A1	104'	20	**
DRIVER'S VIEW Ⓐ TO CAR A2	119'	20	**
DRIVER'S VIEW Ⓑ TO CAR B1	137'	20	**
DRIVER'S VIEW Ⓑ TO CAR B2	434'	20	**
DRIVER'S VIEW Ⓒ TO CAR C1	102.5'	20	**
DRIVER'S VIEW Ⓒ TO CAR C2	382'	20	**
DRIVER'S VIEW Ⓓ TO CAR D1	150'	20	125' PER (201.1)
DRIVER'S VIEW Ⓓ TO CAR D2	312'	20	125' PER (201.1)
DRIVER'S VIEW Ⓔ TO CAR E1	223'	20	125' PER (201.1)
DRIVER'S VIEW Ⓔ TO CAR E2	252'	20	125' PER (201.1)
DRIVER'S VIEW Ⓕ TO CAR F1	296'	20	125' PER (201.1)
DRIVER'S VIEW Ⓕ TO CAR F2	258'	20	125' PER (201.1)
DRIVER'S VIEW Ⓖ TO CAR G1	148'	20	*
DRIVER'S VIEW Ⓖ TO CAR G2	164'	20	*
DRIVER'S VIEW Ⓗ TO CAR H1	185'	20	*
DRIVER'S VIEW Ⓗ TO CAR H2	94.5'	20	*
DRIVER'S VIEW Ⓘ TO CAR I1	136'	20	*
DRIVER'S VIEW Ⓘ TO CAR I2	132'	20	*
DRIVER'S VIEW Ⓙ TO CAR J1	124'	20	*
DRIVER'S VIEW Ⓙ TO CAR J2	164'	20	*

*DRIVEWAY SIGHT DISTANCES – ONLY MOST CRITICAL LOCATIONS LISTED
**CONTROLLED INTERSECTION – SSD DOES NOT APPLY – AMPLE SIGHT DISTANCE NOTED FOR CONTROLLED INTERSECTION

LEGEND

- CORNER SIGHT DISTANCE
- STOPPING SIGHT DISTANCE
- BEGINNING POINT FOR LINE OF SIGHT
- PROPOSED ROAD SIGN
- PROPOSED LIGHTS
- PROPOSED ROAD STRIPING
- EXISTING ROAD STRIPING

LINE OF SIGHT DESIGN CRITERIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL, MAY, 2012

STOPPING SIGHT DISTANCE** TABLE 201.1	
DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE (FT)
20	125
25	150
30	200
35	250
40	300
45	360
50	430
55	500
60	580
65	660
70	750
75	840
80	930

CORNER SIGHT DISTANCE*** TABLE 405.1A	
DESIGN SPEED (MPH)	LENGTH OF LEG (FT)
25	275
30	330
35	385
40	440
45	495
50	550
55	605
60	660
65	715
70	770

NOTE: PER CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL, LATEST EDITION, SECTION 405.1 (2)A & (2)C, WHEN THE COST TO OBTAIN 7 1/2 SECONDS OF CORNER SIGHT DISTANCE MAY BE EXCESSIVE. UNSIGNALIZED PUBLIC ROAD INTERSECTION USE CORNER SIGHT DISTANCE VALUES GIVEN IN TABLE 405.1A.

* PRIVATE ROAD INTERSECTIONS MINIMUM SIGHT DISTANCE SHALL BE EQUAL TO THE STOPPING SIGHT DISTANCE AS GIVEN IN TABLE 201.1

THE MINIMUM STOPPING SIGHT DISTANCE FOR MOTORISTS IS MEASURED FROM THE DRIVER'S EYES, WHICH ARE ASSUMED TO BE 3½ FEET ABOVE THE PAVEMENT SURFACE, TO AN OBJECT ½–FOOT HIGH ON THE ROAD.

** THE STOPPING SIGHT DISTANCES IN TABLE 201.1 SHOULD BE INCREASED BY 20 PERCENT ON SUSTAINED DOWNGRADES STEEPER THAN 3 PERCENT AND LONGER THAN ONE MILE.

*** URBAN DRIVEWAYS (REFER TO INDEX 205.3) CORNER SIGHT DISTANCE REQUIREMENTS AS DESCRIBED ABOVE ARE NOT APPLIED TO URBAN DRIVEWAYS.

GRAPHIC SCALE
0 1" 2" 3"
0 25 50 100 150
1" = 50'

Robert Hidey **Architects**
3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
4301 Hacienda Drive, Suite 560, Pleasanton, CA 94588 Telephone 925.924.0440
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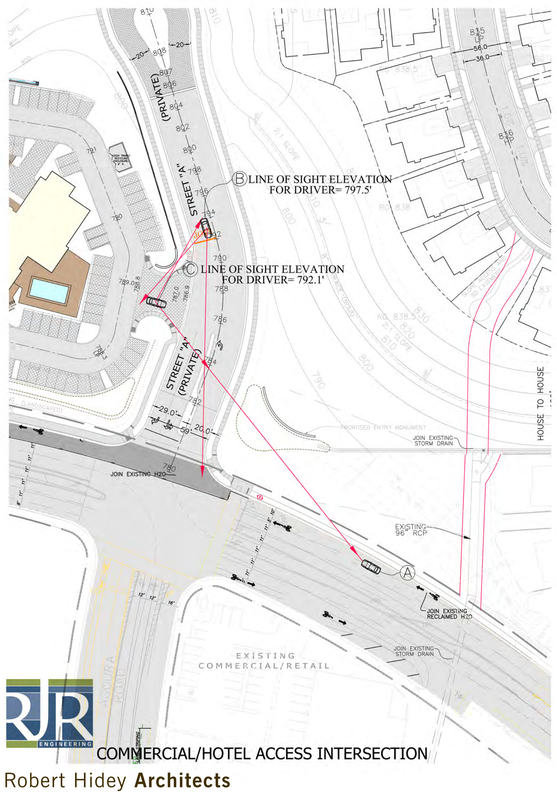
LINE OF SITE EXHIBIT IN-TRACT

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

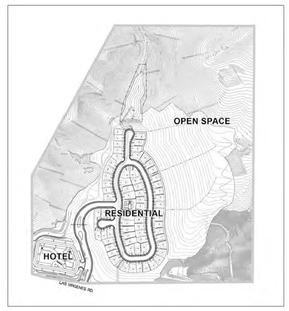
THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015



COMMERCIAL/HOTEL ACCESS INTERSECTION

AGOURA ROAD/LAS VIRGENES ROAD INTERSECTION



NTS

LEGEND

- CORNER SIGHT DISTANCE
- STOPPING SIGHT DISTANCE
- BEGINNING POINT FOR LINE OF SIGHT
- PROPOSED ROAD SIGN
- PROPOSED LIGHTS
- PROPOSED ROAD STRIPING
- EXISTING ROAD STRIPING

LINE OF SIGHT DESIGN CRITERIA

CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL, MAY, 2012

STOPPING SIGHT DISTANCE* TABLE 201.1	
DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE (FT)
20	125
25	150
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45	360
50	430
55	500
60	580
65	660
70	750
75	840
80	930

CORNER SIGHT DISTANCE* TABLE 405.1A	
DESIGN SPEED (MPH)	LENGTH OF LEG (FT)
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35	385
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70	770

*NOTE: PER CALIFORNIA DEPARTMENT OF TRANSPORTATION, HIGHWAY DESIGN MANUAL, LATEST EDITION, SECTION 405.1 (2)A & (2)C, WHEN THE COST TO OBTAIN 7 1/2 SECONDS OF CORNER SIGHT DISTANCE MAY BE EXCESSIVE, UNSIGNALIZED PUBLIC ROAD INTERSECTION USE CORNER SIGHT DISTANCE VALUES GIVEN IN TABLE 405.1A.

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THE STOPPING SIGHT DISTANCES IN TABLE 201.1 SHOULD BE INCREASED BY 20 PERCENT ON SUSTAINED DOWNGRADES STEEPER THAN 3 PERCENT AND LONGER THAN ONE MILE.

URBAN DRIVEWAYS (REFER TO INDEX 205.3) CORNER SIGHT DISTANCE REQUIREMENTS AS DESCRIBED ABOVE ARE NOT APPLIED TO URBAN DRIVEWAYS.

SIGHT DISTANCE SUMMARY TABLE (DRIVER AT ENTRANCE LOOKING SOUTH)			
LINE OF SIGHT	LENGTH OF LEG (FT)	DESIGNED / POSTED MPH	SIGHT DISTANCE REQUIRED
DRIVER'S VIEW Ⓒ TO CAR Ⓐ	822'	50	430' PER (201.1)
DRIVER'S VIEW Ⓒ TO CAR Ⓑ	900'	50	430' PER (201.1)

SIGHT DISTANCE SUMMARY TABLE (DRIVER AT ENTRANCE LOOKING SOUTH)			
LINE OF SIGHT	LENGTH OF LEG (FT)	DESIGNED / POSTED MPH	SIGHT DISTANCE REQUIRED*
DRIVER'S VIEW Ⓑ TO CAR Ⓒ	95'	25	–
DRIVER'S VIEW Ⓑ TO CAR Ⓐ	232'	25	–
DRIVER'S VIEW Ⓒ TO CAR Ⓑ	90'	25	–
DRIVER'S VIEW Ⓒ TO CAR Ⓐ	309'	25	–

*SITE DISTANCES MITIGATED WITH THE USE OF STOP SIGNS FOR THE SUBJECT INTERSECTION

GRAPHIC SCALE

0 1" 2" 3"

0 25 50 100 150

1" = 50'

LINE OF SITE EXHIBIT LAS VIRGENES

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

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Robert Hidey **Architects**

3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
4301 Hacienda Drive, Suite 560, Pleasanton, CA 94588 Telephone 925.551.6440
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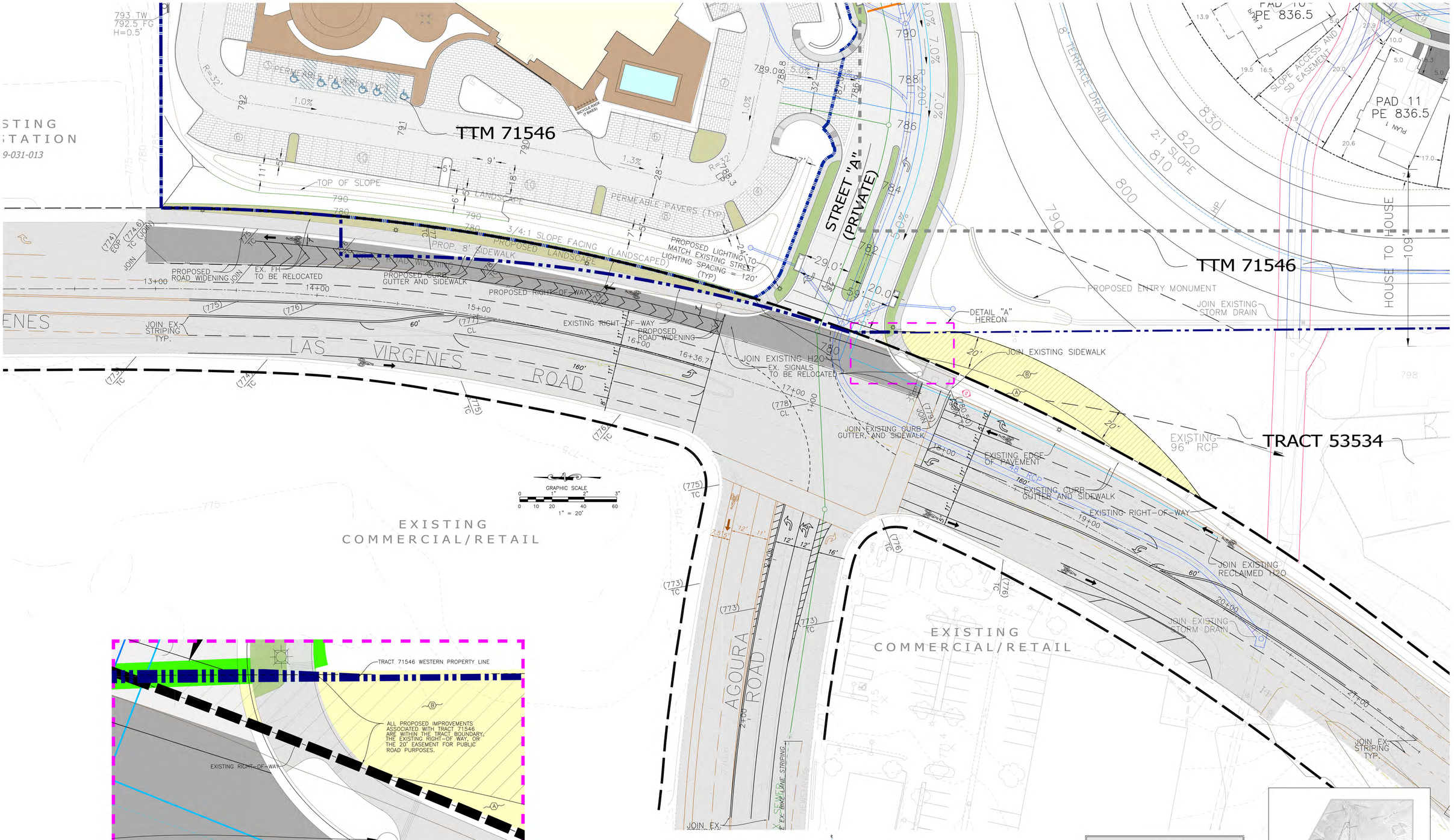
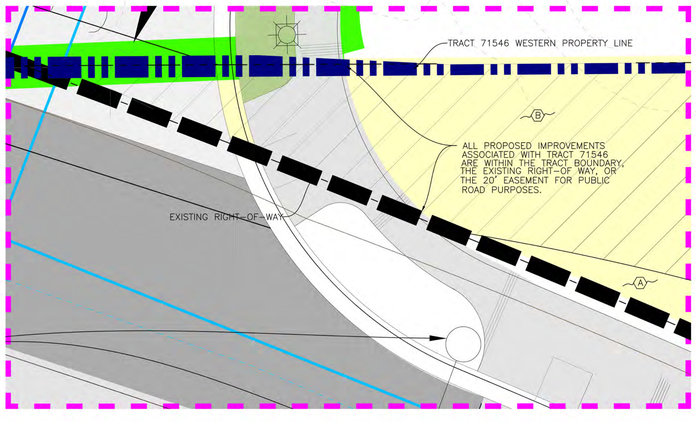




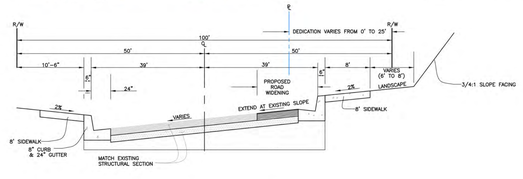
DETAIL "A"

GRAPHIC SCALE
1" = 5'

LEGEND

(A) PRIVATE PARCEL UNDER SEPARATE OWNERSHIP APN 2069-020-016 TRACT 10885 26635 AGOURA RD. CALABASAS, CA. 91302

(B) A 20' EASEMENT FOR PUBLIC ROAD AND HIGHWAY PURPOSES, TO THE COUNTY OF LAS ANGELES, RECORDED MARCH 12, 1931 AS INSTRUMENT NO. 1398 IN BOOK 10678, PAGE 172 OF OFFICIAL RECORDS.

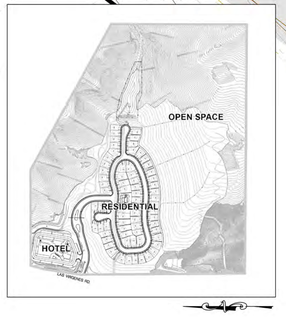


(D) TYPICAL LAS VIRGENES STREET WIDENING
LAS VIRGENES ROAD ALONG PROJECT FRONTAGE [1][2]

*ALL PUBLIC STREETS AND MEDIANS SHALL BE PART OF THE CITY MAINTENANCE DISTRICT.

LEGEND

- EXISTING LANE STRIPING TO BE REMOVED
- EXISTING LANE STRIPING TO REMAIN
- PROPOSED LANE IMPROVEMENTS & STRIPING



NTS

LAS VIRGENES FRONTAGE AND INTERSECTION EXHIBIT

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CALABASAS, CALIFORNIA

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3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
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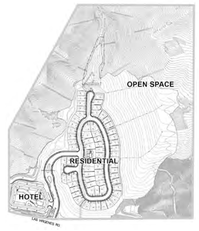

NTS

PRELIMINARY UTILITY QUANTITIES	
UTILITY TYPE	QUANTITY
STORM DRAIN	5,185 L.F.
WATER	7,300 L.F.
RECLAIMED WATER	1,800 L.F.
SEWER	4,060 L.F.
CATCH BASINS	26 UNITS

LEGEND

- PROPERTY BOUNDERY
- LAS VIRGENES RIGHT OF WAY
- EXISTING STORM DRAIN EASEMENT
- EXISTING WATER LINE
- EXISTING SEWER LINE
- W — PROPOSED WATER LINE
- RW — PROPOSED RECLAIMED WATER LINE
- S — PROPOSED SEWER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED LANE STRIPPING

GRAPHIC SCALE
0 1" 2" 3"
0 25 50 100 150
1" = 50'

SEE SHEET 14 – LAS VIRGENES FRONTAGE AND INTERSECTION EXHIBIT FOR DETAILS ASSOCIATED WITH IMPROVEMENTS WITHIN THE PUBLIC RIGHT OF WAY.

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Robert Hidey **Architects**

3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
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UTILITY EXHIBIT

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CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

OPEN SPACE
APN 2069-078-902

WALL 4-A

WALL 2-A

APN 2069-031-014

WALL 3-A
PILE SUPPORTED
RETAINING WALL

EXISTING
GAS STATION
APN 2069-031-013

WALL 1-A

EXISTING
COMMERCIAL/RETAIL

4 STORY HOTEL
67,580 SF

PERMEABLE PAVERS (TYP)

TOE OF SLOPE

TOP OF SLOPE

PILE SUPPORTED WALL

PROP. 8' SIDEWALK

PROP. ROAD WIDENING

3/4:1 SLOPE FACING (LANDSCAPED)

PROPOSED LANDSCAPE

STREET "A" (PRIVATE)

ENTRY GATES

PROPOSED ENTRY MONUMENT

JOIN EXISTING H2O

JOIN EXISTING STORM DRAIN

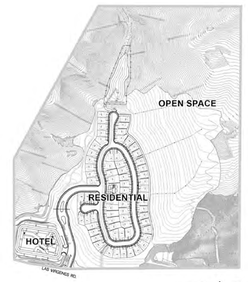
EXISTING 96" RCP

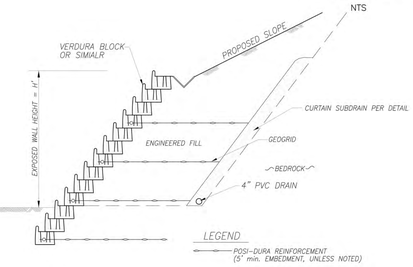
JOIN EXISTING RECLAIMED H2O

HOUSE TO HOUSE

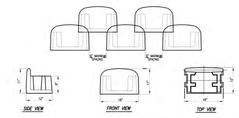
SLOPE ACCESS AND SD EASEMENT

8' TERRACE DRAIN





TYPICAL SLOPE FACING
N.T.S.



TYPICAL BLOCK SLOPE FACING
N.T.S.

ESTABLISHED SLOPE FACING

CONCEPTUAL PILE SUPPORTED WALL FINISH

PRELIMINARY SLOPE FACING QUANTITIES

WALL	INCLINATION	HEIGHT (max)	HEIGHT (min)	EXPOSED SLOPE FACING AREA (sq.ft.)
1-A	3/4:1	10'	5'	18,929
2-A	1/4:1 & 3/4:1	30'	5'	15,010
3-A	VERTICAL	30'	1'	N/A

LEGEND
SLOPE FACING
PILE SUPPORTED RETAINING WALL

GRAPHIC SCALE
0 1" 2" 3"
0 15 30 60 90
1" = 30'

RJR ENGINEERING

Robert Hidey **Architects**

WALL EXHIBIT
C A N Y O N O A K S
TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

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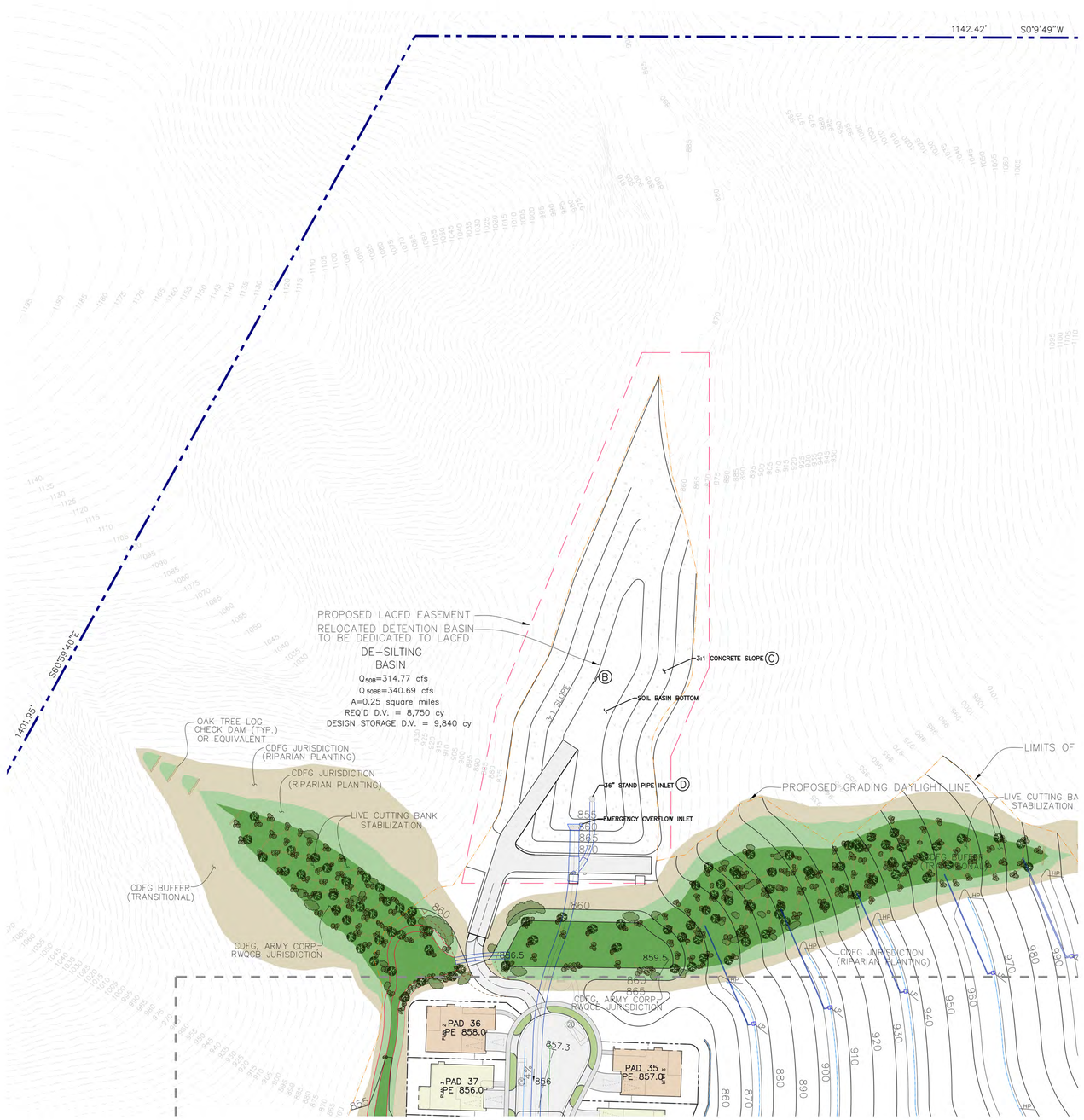
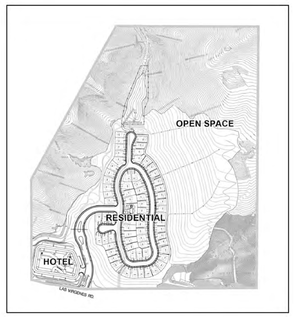


PRELIMINARY DEBRIS BASIN DATA	
UTILITY TYPE	QUANTITY
TRIBUTARY AREA	0.25 sq.mi.
Q50 B	314.77 cfs
Q50 B+b	340.67 cfs
REQUIRED STORAGE	8,750 c.y.
ACTUAL STORAGE	9,840 c.y.
BOTTOM AREA	2,986 sq.ft.
CONCRETE SIDING AREA	33,843 sq.ft.



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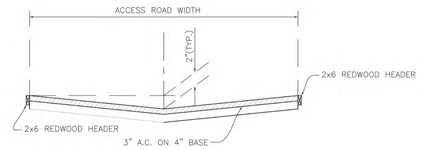
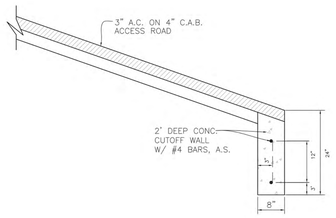
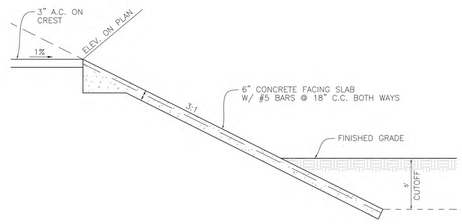


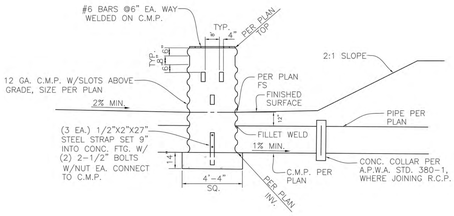
A ACCESS ROAD DETAIL
NOT TO SCALE



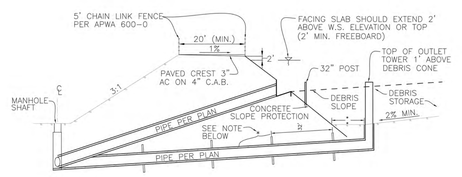
B ACCESS ROAD CUTOFF DETAIL
NOT TO SCALE



C CONCRETE SLOPE PROTECTION
NOT TO SCALE



D STAND PIPE DETAIL
NOT TO SCALE



NOTES:

FACING SLOPES MAY BE STEEPEND IF SOIL CONDITIONS ALLOW. (SOIL APPROVAL REQUIRED)

LENGTH OF ENCASEMENT– A MINIMUM OF 20' AND 6 TIMES THE DEPTH OF PONDED WATER MEASURED FROM THE INTERSECTION OF THE FACING SLAB WITH THE BOTTOM OF THE BASIN.

DEBRIS POST FOR INLET – 4" STEEL PIPE, CONCRETE FILLED, 32" HIGH, ENBEDED 36" IN 12" DIAMETER HOLES WITH CONCRETE.

* 2450-D PIPE (PIPE DIAMETER PER PLAN) ENCASED PER DESIGN GUIDELINE 2-D404 – DEBRIS BASIN MANUAL

* * 10' MINIMUM CLEARANCE NEEDED FOR BASIN MAINTENANCE.

E REQUIREMENTS AND DESIGN GUIDE FOR ELEVATED TYPE INLET DEBRIS BASIN
NOT TO SCALE

GRAPHIC SCALE
0 1" 2" 3"
0 25 50 100 150
1" = 50'

RJR ENGINEERING

Robert Hidey **Architects**

DEBRIS BASIN PLAN

C A N Y O N O A K S

THE NEW HOME COMPANY

TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

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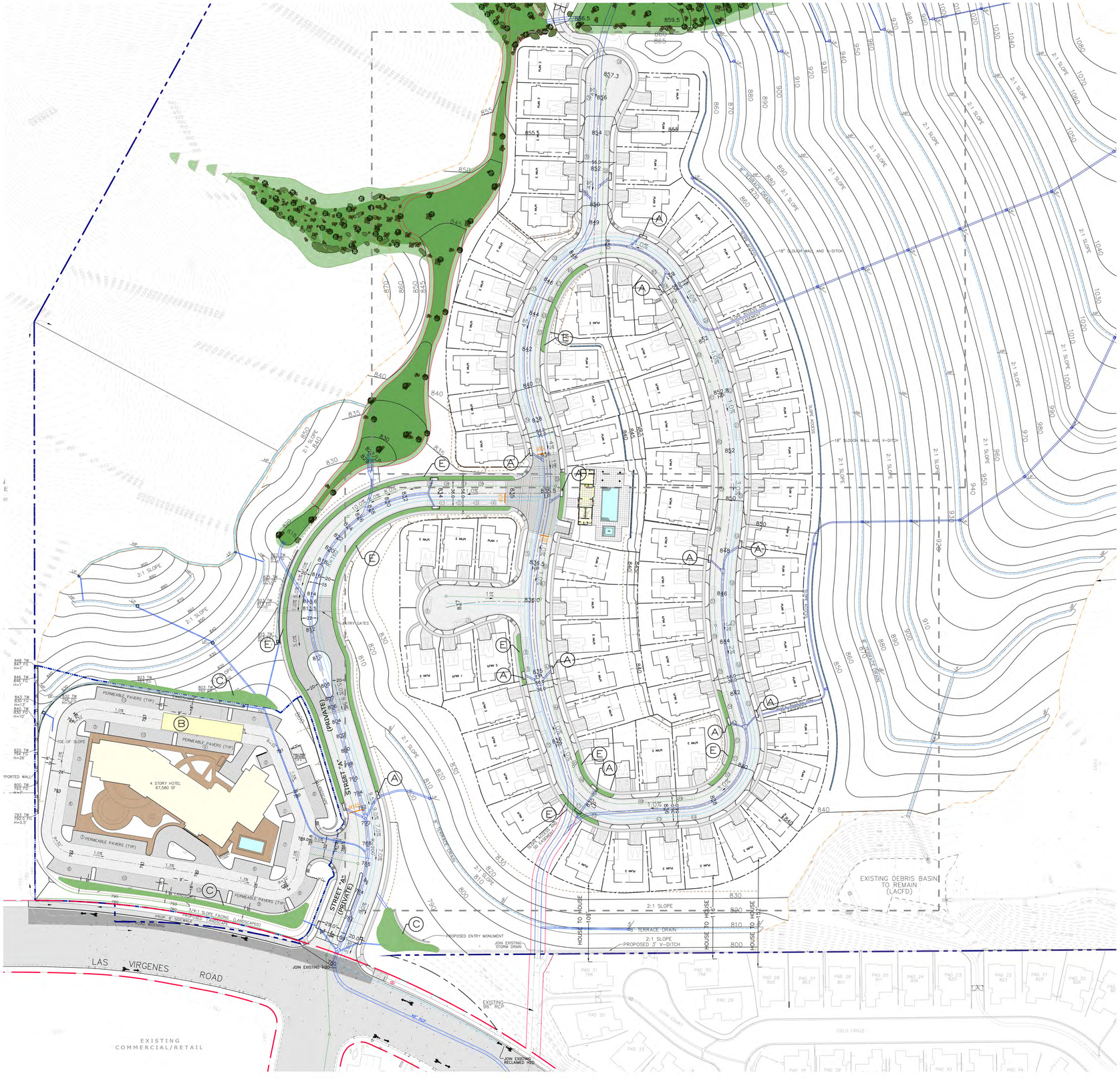

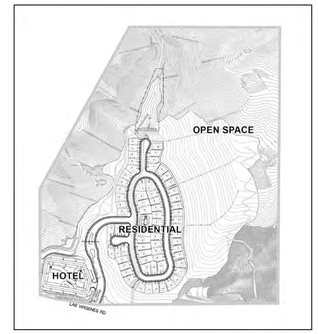

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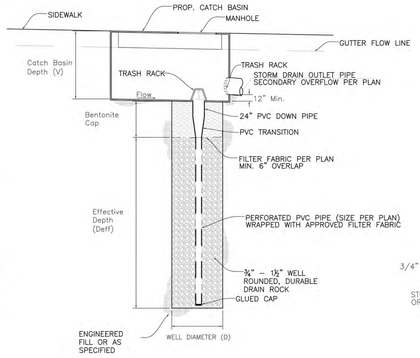
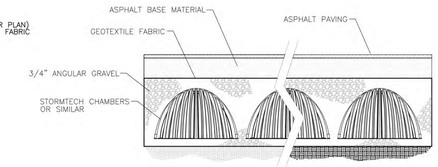
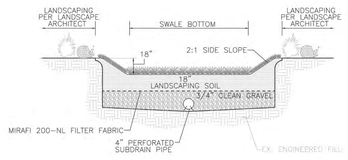


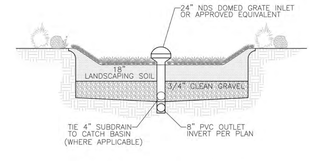
A DRY WELL DETAIL AT STREET CATCH BASIN
NTS



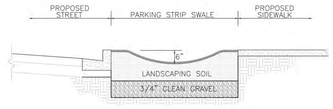
B UNDERGROUND RETENTION CHAMBERS
NTS



C BIO-FILTRATION PLANTER (WITH SUBDRAIN)
NTS



D BIO-FILTRATION PLANTER OVERFLOW
NTS



E TYPICAL PARKING STRIP SWALE
NTS

LEGEND

- PROPOSED PARKWAY BIOSWALE
- PROPOSED UNDERGROUND RETENTION/INFILTRATION

GRAPHIC SCALE
0 25 50 100 150
0 1" 2" 3"
1" = 50'

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PRELIMINARY LID EXHIBIT

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

RELOCATED DETENTION BASIN
TO BE DEDICATED TO LACFD
DE-SILTING
BASIN
Q_{50}=314.77 cfs
Q_{50B}=340.69 cfs
A=0.25 square miles
REQ'D D.V. = 8,750 cy
DESIGN STORAGE D.V. = 9,840 cy

OPEN SPACE
APN 2069-078-902

NORTHERN TRACT BOUNDARY

S80°59'40"E 1401.98'

S89°53'40"E 533'

OAK TREE LOG CHECK DAM (TYP.) OR EQUIVALENT

CDFG JURISDICTION (RIPARIAN PLANTING)

CDFG BUFFER (TRANSITIONAL)

CDFG, ARMY CORP., RWQCB JURISDICTION

LIVE CUTTING BANK STABILIZATION

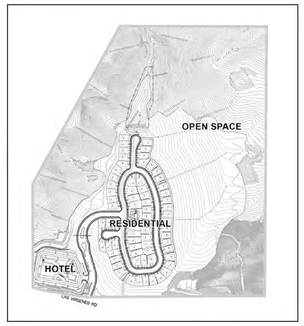
LIMITS OF LANDSLIDE REPAIR

PROPOSED GRADING DAYLIGHT LINE

2:1 SLOPE

ENTRY GATES

PERMEABLE PAVERS



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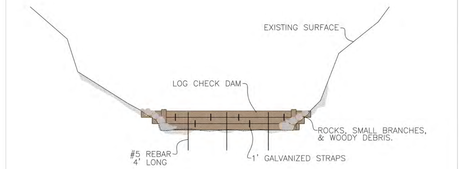
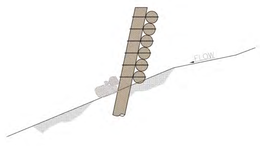


LOG CHECK DAM DETAIL (TYP.)
NTS

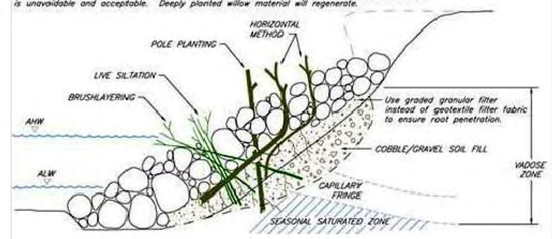
#5 REBAR SHALL BE EMBEDDED INTO SOIL A MINIMUM OF 2.5'.
IT MAY BE NECESSARY TO KEY IN LOGS TO STREAM WAY SIDEWALLS. A MINIMUM OF 1' KEYS



LOG CHECK DAM SECTION (TYP.)
NTS

GRAPHIC SCALE
0 1" 2" 3"
20 40 80 120
1" = 40'

NOTES:
1. Integrate brushlayering, pole planting and live siltation techniques during rock placement to ensure contact with native ground.
2. Plant deeply if possible. Place cuttings deeply into vadose zone, into the capillary fringe or 1.5 cm (6") into the seasonal saturated zone (water table).
3. Graded, granular filter is preferable to filter fabric to improve root penetration or slip poles through slits cut into fabric.
4. Place soil fill (cobbles, gravel, soil) around cuttings and 'water in' if possible.
5. Place riprap carefully, do not end dump. Some damage to brush layers and willow poles is unavoidable and acceptable. Deeply planted willow material will regenerate.



VEGETATED RIP-RAP
NTS

PRELIMINARY MITIGATION AREAS	
BUFFER ZONE	72,905.f. (1.67ac.)
TOTAL AREA*	164,822s.f. (3.78ac.)

*INCLUDES SEEP RESTORATION AND NORTHERN MITIGATION AREAS.

LEGEND
- CDFG TRANSITIONAL BUFFER
- CDFG JURISDICTION (RIPARIAN PLANTING)
- CDFG, ARMY CORP., RWQCB JURISDICTION

MITIGATION EXHIBIT

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

RJR ENGINEERING

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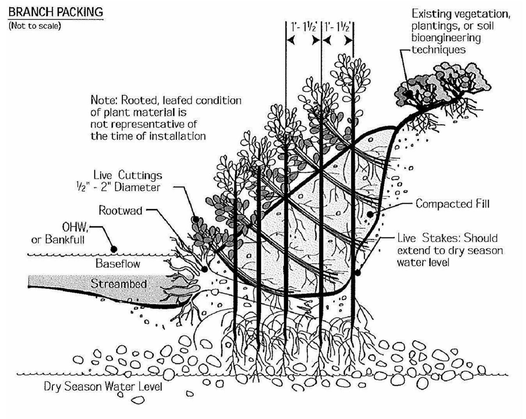
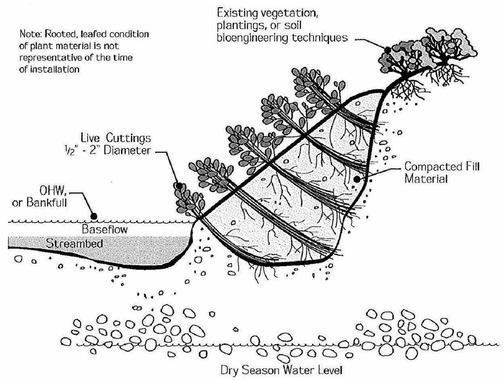


BRANCH PACKING (TYP.)
NTS

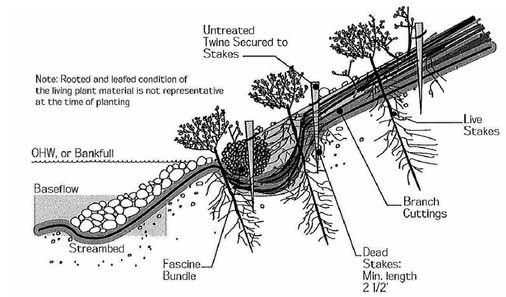
BRANCH PACKING IS USED TO REPAIR SMALL, LOCALIZED SLUMPS AND HOLES IN STREAMBANKS. IT CONSISTS OF ALTERNATING LAYERS OF LIVE BRANCHES AND COMPACTED BACKFILL. BRANCHES TRAP SEDIMENT THAT REFILLS THE LOCALIZED SLUMP OR HOLE, WHILE ROOTS SPREAD THROUGHOUT THE BACKFILL AND INTO SURROUNDING EARTH TO FORM A UNIFIED MASS.



BRUSH LAYERING (TYP.)
FILL METHOD
NTS

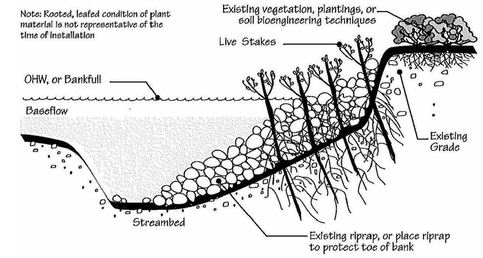
BRUSH LAYERING ARE HORIZONTAL BENCHES THAT FOLLOW THE CONTOUR OF EITHER AN EXISTING OR FILLED BANK SLOPE. BRANCHES SERVE AS TENSILE INCLUSIONS OR EARTH-REINFORCING UNITS TO PROVIDE SHALLOW STABILITY OF SLOPES.

THE CUTTINGS ARE ORIENTED MORE OR LESS PERPENDICULAR TO THE SLOPE FACE. THE PORTION OF THE BRUSH THAT PROTRUDES FROM THE SLOPE FACE ASSISTS IN RETARDING RUNOFF AND REDUCING SURFACE EROSION.



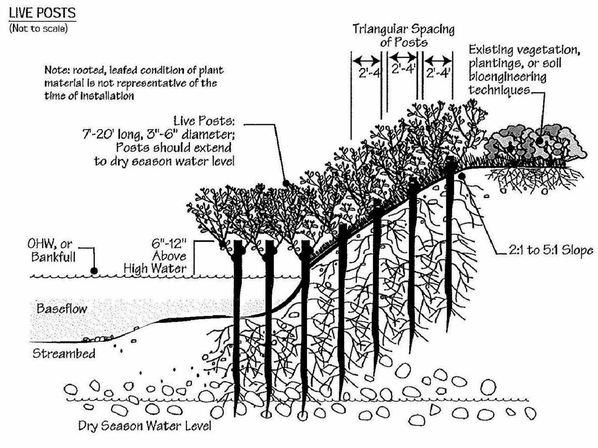
BRUSH MATTRESS (TYP.)
NTS

A BRUSH MATTRESS IS A LAYER OF DORMANT BRANCHES LAID ON AND SECURED TO A BANK SURFACE. IT OFFERS IMMEDIATE BANK COVERAGE. THIS TECHNIQUE IS ALSO EFFECTIVE ON LAKESHORES. TYPICALLY, IT IS COMBINED WITH A TOE STABILIZING TECHNIQUE SUCH AS ROCK, ROOT WADS, LIVE SILTATION, FASCINES, COCONUT FIBER LOGS, OR TREE REVETMENTS. IN THIS EXAMPLE A FASCINE WILL BE USED WITH A MATTRESS.



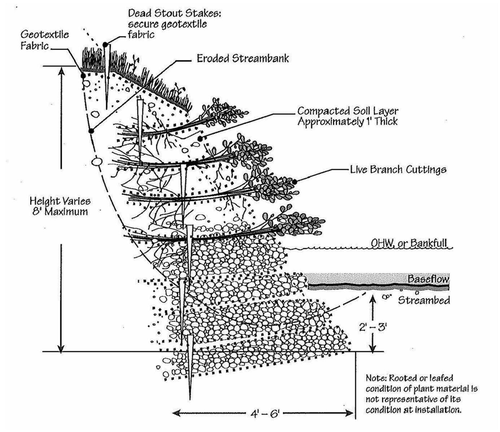
JOINT PLANTING (TYP.)
NTS

JOINT PLANTING DISGUISES RIP-RAP AND MAY PROVIDE HABITAT. THE PLANT ROOTS HELP HOLD SOIL TOGETHER UNDER THE ROCKS. IT INVOLVES TAMPING LIVE STAKES INTO JOINTS OR OPEN SPACES BETWEEN EXISTING ROCKS OR WHEN ROCK IS BEING PLACED ON THE SLOPE FACE.



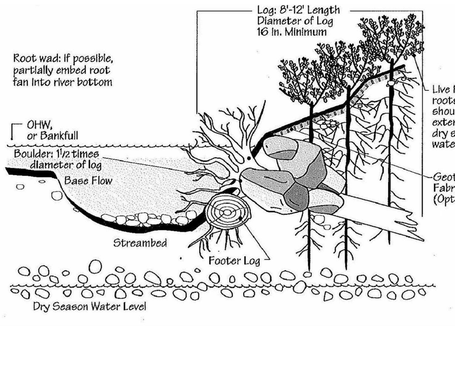
LIVE POSTS (TYP.)
NTS

LIVE POSTS FORM A PERMEABLE REVETMENT. THEY REDUCE STREAM VELOCITIES AND CAUSE SEDIMENT DEPOSITION IN THE TREATED AREA. THE ROOTS ARE MADE OF LARGE CUTTINGS INSTALLED IN STREAMBANKS IN SQUARE OR TRIANGULAR PATTERNS. UNSUCCESSFULLY ROOTED POSTS CAN ALSO PROVIDE SOME BENEFITS BY DEFLECTING HIGHER STREAM FLOWS AND TRAPPING SEDIMENT.



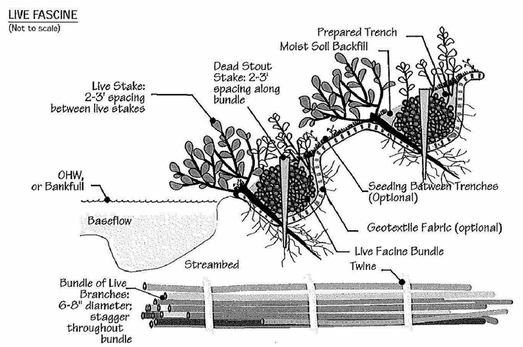
VEGETATED GEOGRID (TYP.)
NTS

VEGETATED GEOGRIDS ARE USED TO REBUILD A BANK. THEY ARE SIMILAR TO THE BRUSH LAYERING FILL TECHNIQUE EXCEPT THAT AN EROSION CONTROL FABRIC (GEOTEXTILE) IS WRAPPED AROUND EACH SOIL LIFT. LIVE BRANCH CUTTINGS ARE LAID BETWEEN LAYERS.



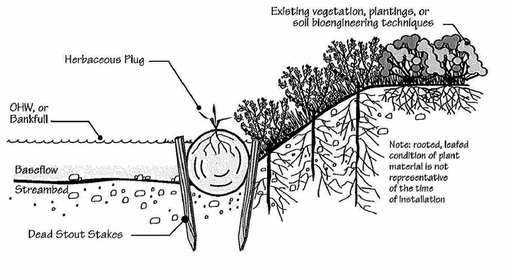
ROOT WAD WITH FOOTER (TYP.)
NTS

ROOT WADS ARMOR A BANK BY KEEPING THE CURRENT OFF THE BANK. THEY SHOULD BE USED IN COMBINATION WITH OTHER SOIL BIOENGINEERING TECHNIQUES TO STABILIZE A BANK. THESE REVETMENTS CAN PROVIDE EXCELLENT OVERHEAD COVER, RESTING AREAS AND SHELTERS FOR INSECTS AND FISH.



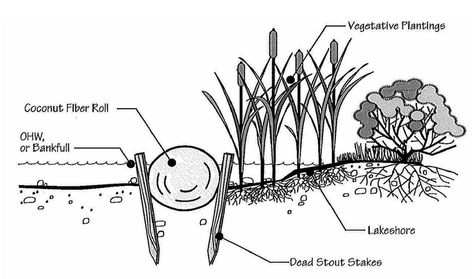
LIVE FASCINE (TYP.)
NTS

A LIVE FASCINE HELPS CONTROL SURFACE EROSION AND ROOTS FROM THE SPROUTED FASCINE HELP STABILIZE THE BANK. A FASCINE IS A LONG BUNDLE OF BRANCH CUTTINGS BOUND TOGETHER IN A CYLINDRICAL STRUCTURE. IT SHOULD BE PLACED IN A SHALLOW CONTOUR TRENCH ON A DRY SLOPE AND AT AN ANGLE ON A WET SLOPE TO REDUCE EROSION AND SHALLOW SLIDING.



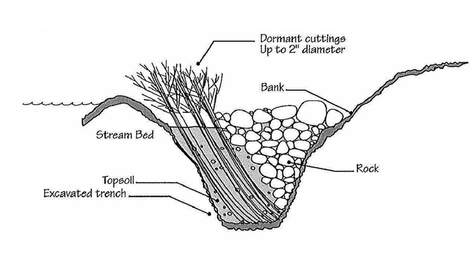
COCONUT FIBER ROLL (TYP.)
NTS

A COCONUT FIBER ROLL (COCONUT HUSK FIBERS WOVEN WITH TWINE) IS USED TO PROTECT A BANK'S TOE AND TO DEFINE AN EDGE. USE STAKES OR DUCKBILLS TO ANCHOR IT IN PLACE AT THE TOE OF THE SLOPE, GENERALLY AT THE ORDINARY HIGH-WATER MARK OR BANKFULL LEVEL.



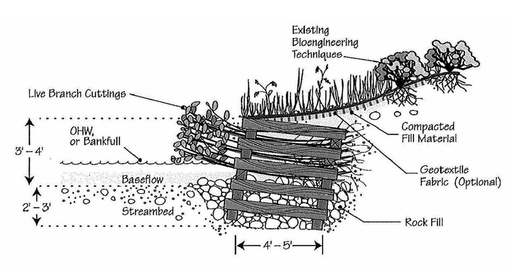
COCONUT FIBER ROLL (TYP.)
LAKE SHORE
NTS

A COCONUT FIBER ROLL (COCONUT HUSK FIBERS WOVEN WITH TWINE) CAN FUNCTION AS A BREAKWATER ALONG A CALM SHALLOW LAKESHORE. IN ADDITION TO REDUCING WAVE ENERGY, THIS PRODUCT CAN HELP CONTAIN SUBSTRATE AND ENCOURAGE DEVELOPMENT OF WETLAND COMMUNITIES.



LIVE SILTATION (TYP.)
NTS

LIVE SILTATION IS USED TO ARMOR AND REVEGETATE THE TOE OF A BANK. DEAD AND LIVE BRANCH CUTTINGS ARE USED TO PROVIDE IMMEDIATE AND LANG-TERM STABILITY, COVER AND FISH HABITAT. IT CAN BE USED ON STREAMS AND LAKESHORES TO COMBAT WIND AND WAVE EROSION. PLANT LIVE SILTATION PERPENDICULAR TO THE WIND AND WAVES.



LIVE CRIBWALL (TYP.)
NTS

A LIVE CRIBWALL IS USED TO REBUILD A BANK IN A NEARLY VERTICAL SETTING. IT CONSISTS OF A BOXLIKE INTERLOCKING ARRANGEMENT OF UNTREATED LOG/TIMBER. THE STRUCTURE IS FILLED WITH ROCK AND SOIL. LAYERS OF LIVE BRANCH CUTTINGS ROOT INSIDE THE CRIB STRUCTURE.

RJR ENGINEERING

Robert Hidey **Architects**

MITIGATION DETAILS

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TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

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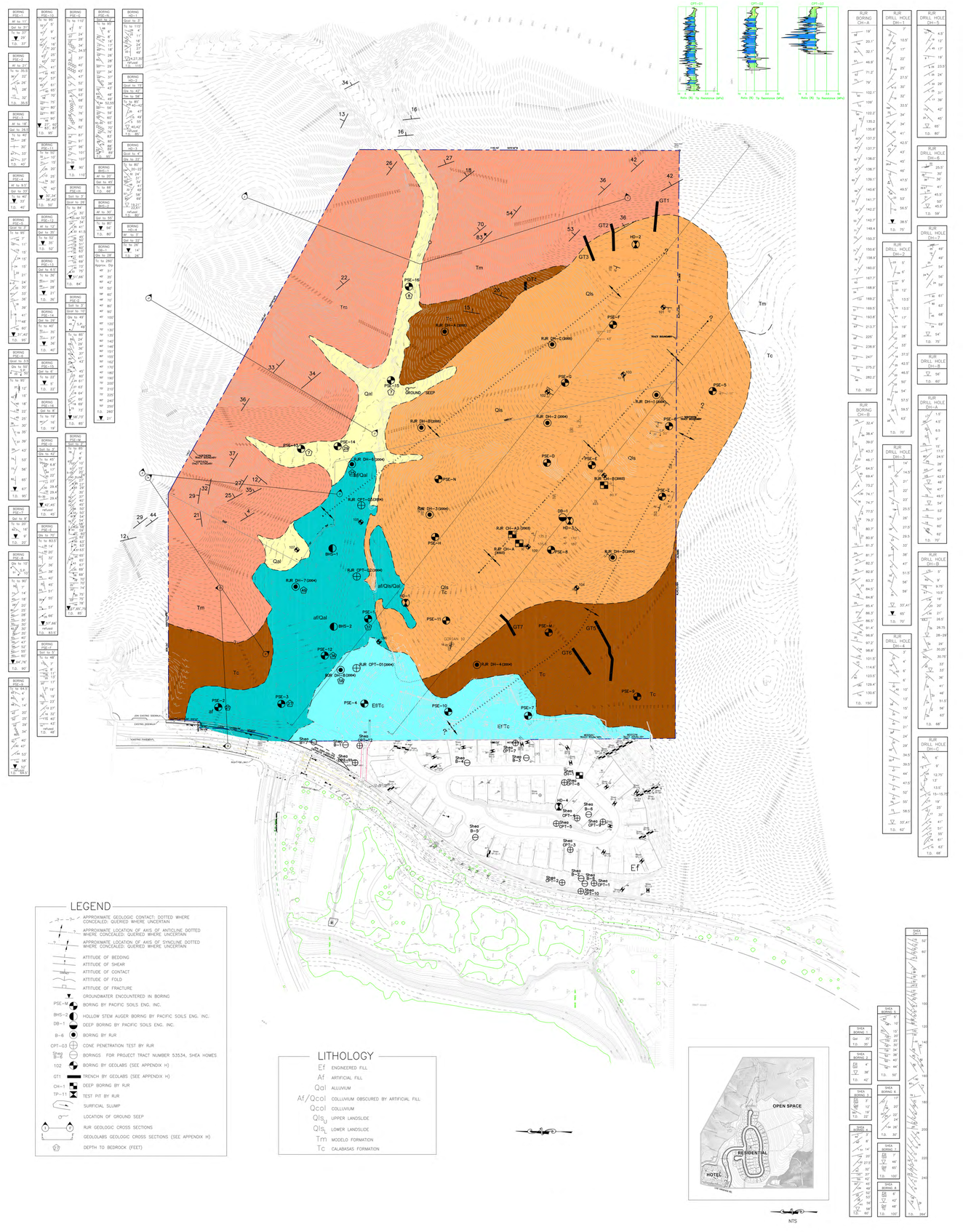

LEGEND

- APPROXIMATE GEOLOGIC CONTACT; DOTTED WHERE CONCEALED; QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF ANTICLINE DOTTED WHERE CONCEALED; QUERIED WHERE UNCERTAIN
- APPROXIMATE LOCATION OF AXIS OF SYNCLINE DOTTED WHERE CONCEALED; QUERIED WHERE UNCERTAIN
- ATTITUDE OF BEDDING
- ATTITUDE OF SHEAR
- ATTITUDE OF CONTACT
- ATTITUDE OF FOLD
- ATTITUDE OF FRACTURE
- GROUNDWATER ENCOUNTERED IN BORING
- PSE-# BORING BY PACIFIC SOILS ENG. INC.
- BHS-# HOLLOW STEM AUGER BORING BY PACIFIC SOILS ENG. INC.
- DB-# DEEP BORING BY PACIFIC SOILS ENG. INC.
- B-# BORING BY RJR
- CPT-03 CONE PENETRATION TEST BY RJR
- Shea B-# BORINGS FOR PROJECT TRACT NUMBER 53534, SHEA HOMES
- 102 BORING BY GEOLABS (SEE APPENDIX H)
- GT1 TRENCH BY GEOLABS (SEE APPENDIX H)
- CH-1 DEEP BORING BY RJR
- TP-1 TEST PIT BY RJR
- SURFICIAL SLUMP
- LOCATION OF GROUND SEEP
- RJR GEOLOGIC CROSS SECTIONS
- GEOLOLABS GEOLOGIC CROSS SECTIONS (SEE APPENDIX H)
- DEPTH TO BEDROCK (FEET)

LITHOLOGY

Ef	ENGINEERED FILL
Af	ARTIFICIAL FILL
Qal	ALLUVIUM
Af/Qcol	COLLUVIUM OBSCURED BY ARTIFICIAL FILL
Qcol	COLLUVIUM
Qls_U	UPPER LANDSLIDE
Qls_L	LOWER LANDSLIDE
Tm	MODELO FORMATION
Tc	CALABASAS FORMATION

NTS

GEOLOGIC EXPLORATION MAP

C A N Y O N O A K S

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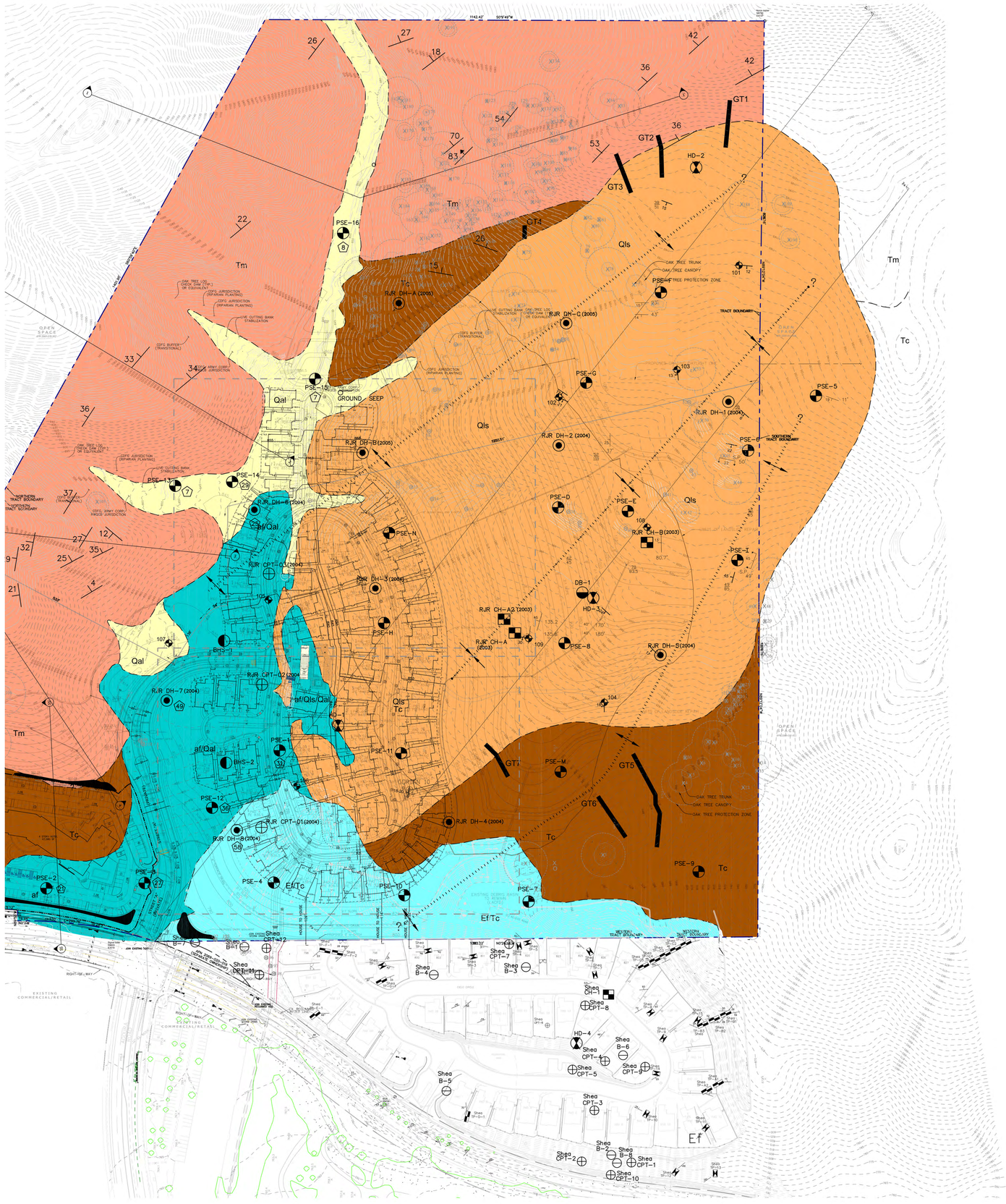

GEOLOGIC EXPLORATION MAP

C A N Y O N O A K S

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CALABASAS, CALIFORNIA

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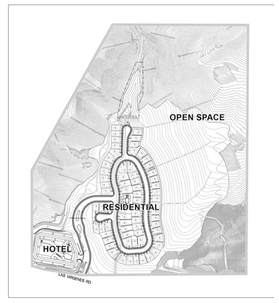
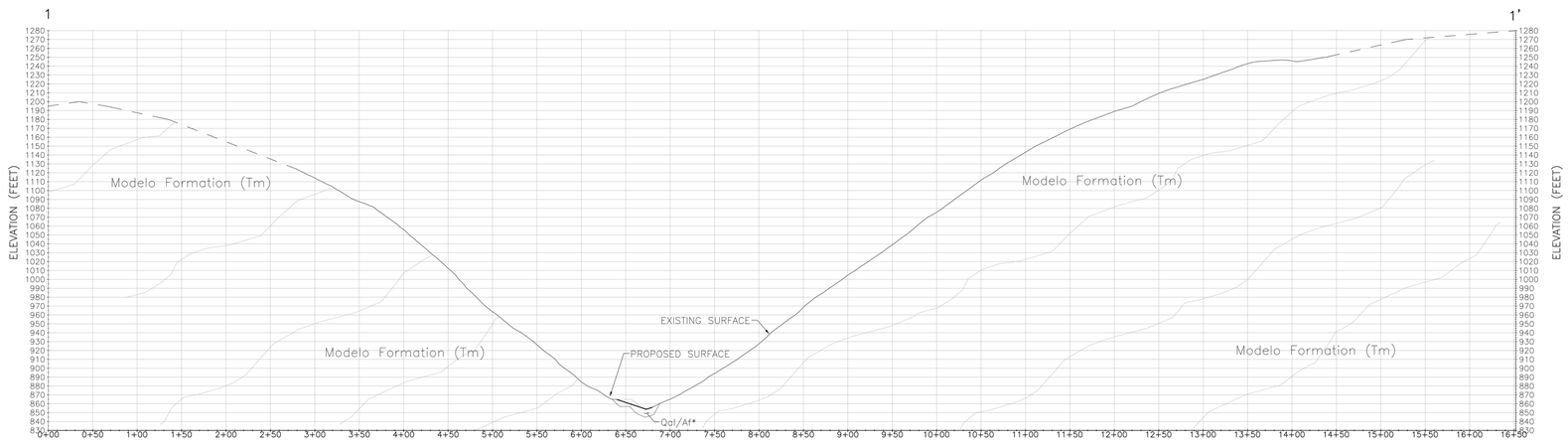
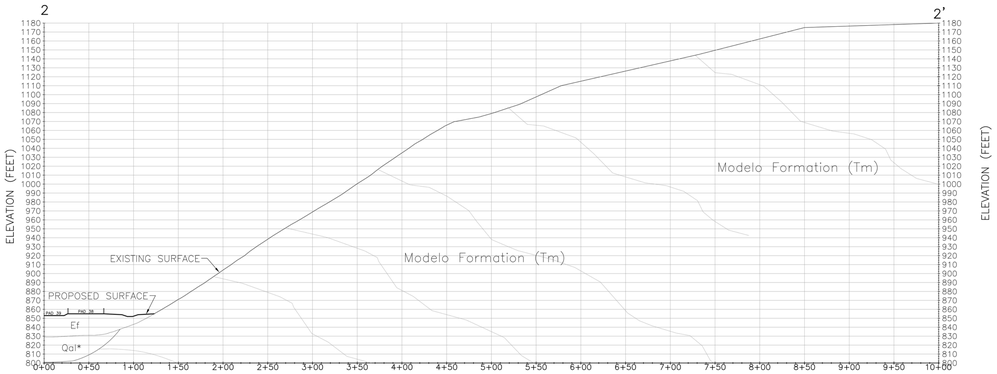


NTS

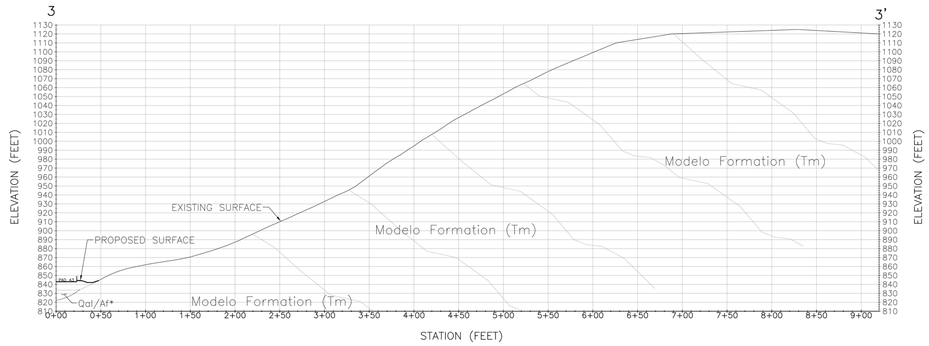


SECTION 1–1'



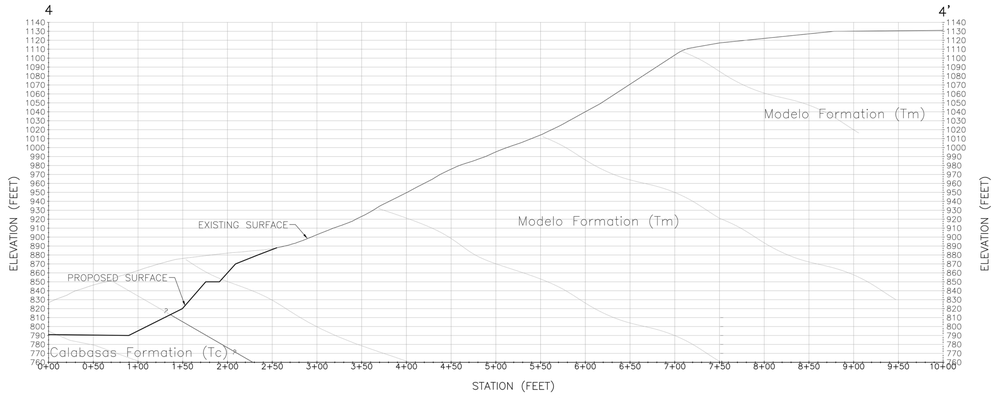
*Qal to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 2–2'



*Qal/Af to be removed and replaced with engineered fill as part of the rough grade process.

SECTION 3–3'



SECTION 4–4'

LEGEND

Af	Artificial Fill
Ef	Engineered Fill
Qal	Alluvium
Tc	Calabasas Formation
Tm	Modelo Formation
	Approximate Geologic Contact
?	Assumed Subsurface Geologic Contact
	Existing Surface
	Proposed Surface
	Existing Surface to be Graded/Improved

GEOLOGIC CROSS SECTIONS

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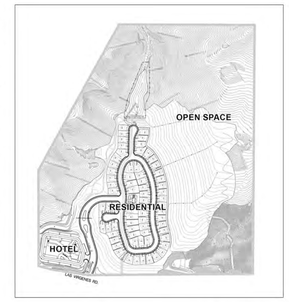

NTS

REMOVAL LIMITS

TRACT BOUNDARY

NORTHERN TRACT BOUNDARY

SOUTHERN TRACT BOUNDARY

WESTERN TRACT BOUNDARY

GRAPHIC SCALE
0 30 60 120 180
1" = 60'

LANDSLIDE MITIGATION PLAN

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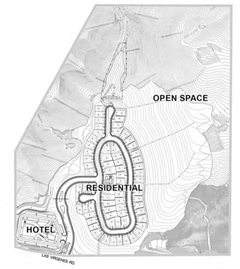

NTS

Remedial Earthwork Quantities	
Landslide Removal / Replacement to Rough Grade	
Cut	1,308,144 c.y.
Fill	988,430 c.y.
Net	319,714 c.y.
Alluvial Removal / Replacement to Rough Grade	
Cut	269,755 c.y.
Fill	251,755 c.y.
Net	18,000 c.y. **
Total Remedial Removal / Replacement	
Cut	1,577,899 c.y.
Fill	1,240,185 c.y.
Net	337,714 c.y. ***

*OVERALL ROUGH GRADE EARTHWORK NUMBERS REPRESENT ONLY THE GRADING FROM THE EXISTING TO THE PROPOSED WHERE NO LAND SLIDE OR ALLUVIAL REMOVALS ARE PRESENT AND WHERE LANDSLIDE OR ALLUVIAL REMOVALS ARE PRESENT THE NUMBERS REPRESENT GRADING FROM BOTTOMS OF REMEDIAL SURFACE TO THE PROPOSED. ANY AREA WHERE ADDITIONAL CUT IS REQUIRED IN EXCESS OF ALLUVIAL OR LANDSLIDE BOTTOM HAS ALSO BEEN REMOVED TO ENSURE NO EARTHWORK HAS BEEN COUNTED DOUBLE.

**VOLUME OF EARTHWORK REDUCED FOR AREAS OF DOUBLE CUT UNDER THE ALLUVIAL / LANDSLIDE REMOVAL BOTTOMS

***TOTAL VOLUME OF EARTHWORK CREDIT APPLIED TO THE REDUCTION OF CUT IN THE OVERALL ROUGH GRADE EARTHWORK QUANTITIES

GRAPHIC SCALE
0 1" 2" 3"
0 30 60 120 180
1" = 60'

REMEDIAL REMOVAL EARTHWORK MAP

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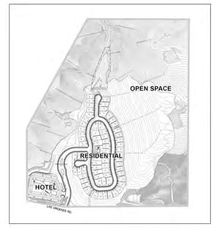
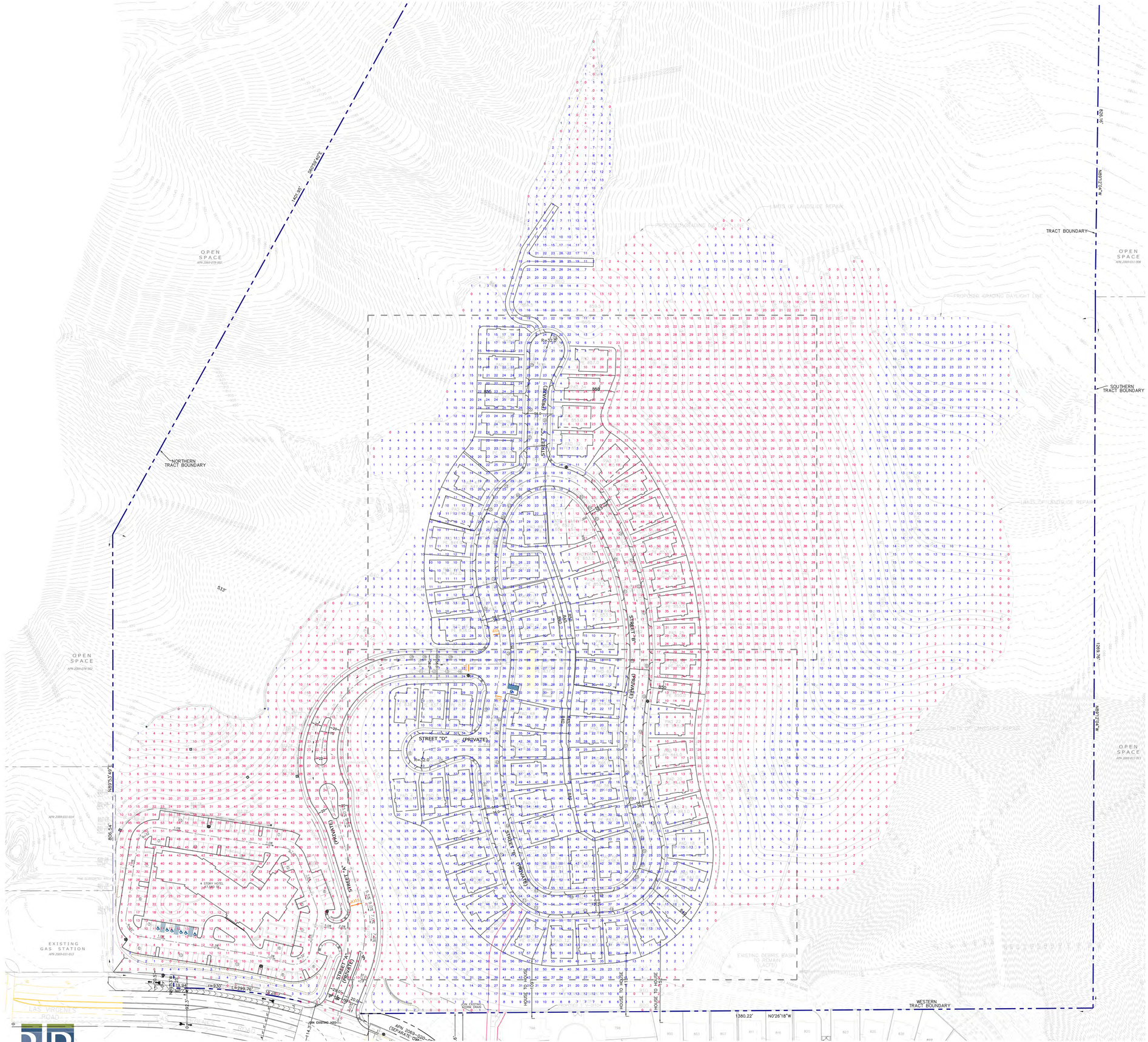


NTS



Non-Remedial Earthwork Quantities

Overall Rough Grade Earthwork Quantities*		
Cut	613,183	c.y.
Fill	569,544	c.y.
Net	43,639	c.y.

*OVERALL ROUGH GRADE EARTHWORK NUMBERS REPRESENT ONLY THE GRADING FROM THE EXISTING TO THE PROPOSED WHERE NO LAND SLIDE OR ALLUVIAL REMOVALS ARE PRESENT AND WHERE LANDSLIDE OR ALLUVIAL REMOVALS ARE PRESENT THE NUMBERS REPRESENT GRADING FROM BOTTOMS OF REMEDIAL SURFACE TO THE PROPOSED. ANY AREA WHERE ADDITIONAL CUT IS REQUIRED IN EXCESS OF ALLUVIAL OR LANDSLIDE BOTTOM HAS ALSO BEEN REMOVED TO ENSURE NO EARTHWORK HAS BEEN COUNTED DOUBLE.

GRAPHIC SCALE
1" 2" 3"
0 30 60 120 180
1" = 60'

RJR ENGINEERING

OVERALL EARTHWORK VOLUMES

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TRACT 71546
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PROJECT NUMBER: 13001 03/18/2015

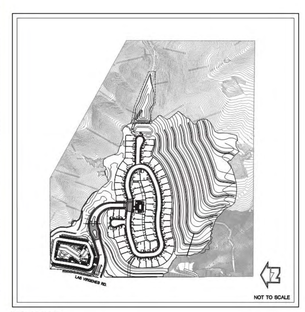
OVERALL SITE PLAN

Canyon Oaks is nestled in a native oaks woodland surrounded by open space grassland; the community's canyon and distant views are a strong site feature that defines this community's character. Central elements to the community theme include convenient access to dining and shopping, and a beautiful environment which accentuates this elegant community.

The entry landscape is set in a framework of oak trees with stone walls and monument sign. Street trees guide you to a grove of entry accent trees, early California entry portals with wood and iron vehicular gates.

The entry drive then passes through a grove of sycamore trees and canyon scenery punctuated with oak trees. As you continue into the community, the Canyon Oaks Club center greets the visitor at the main intersection with its handsome architecture, inviting pool area, canopy oaks and accent trees. Enhanced paving, convenient walk-able, tree-lined streets with parkways welcome you home.

The site design and layout is oriented to respect the existing sensitive habitat corridors and watershed systems. An integrated network of open spaces and habitat corridors will sustain sensitive plant and animal species, as well as enhance regional open space systems. Native plants promote soil health; needing fewer pesticides, fertilizer and herbicides. In addition, native plants provide reduced water use and promote a drought tolerant solution. The Canyon Oaks community design reflects local and regional history, as well as the character of historic Calabasas.



KEY MAP

0 15' 30' 60' 120'
SCALE: 1"=60'-0"

ValleyCrest DesignGroup LA- 1
Robert Hidey **Architects**

C A N Y O N O A K S

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CALABASAS, CALIFORNIA

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LA-1

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CONCEPTUAL LANDSCAPE AND PLANTING PLAN

Surrounding open spaces at entries are grouped with native accent trees. Primary Streets are lined with tree-planted parkways and walking paths that link the community. Evergreen screen trees soften the side yard while accent trees & enhanced paving punctuate the arrival intersection. Groundcover plants utilize flats or 1 gal, with shrubs in 1 to 5 gal, trees in 15 gal to 60" boxes, and specimen trees of 60" boxes or larger.

SHRUB PLANT LEGEND

COMMUNITY LANDSCAPE

Acacia spp.
Aeonium spp.
Agapanthus africanus
Agave spp.
Aloe spp.
Anigozanthos spp.
Artemesia spp
Asparagus densiflorus 'Myers'
Baccharis spp.
Bougainvillea
Buxus spp.
Ceanothus spp.
Cistus spp.
Coleonema
Cycas revoluta
Cyperus papyrus
Dietes iridioides
Distictus buccinatoria
Dracaena
Echium candicans
Festuca spp.
Gardenia spp.
Gelsemium sempervirens
Hebe 'Lake'
Helictotrichon sempervirens
Hemerocallis hybrids
Heteromeles arbutifolia
Hibiscus spp.
Kniphofia uvaria
Lavandula spp.
Leucophyllum frutescens
Ligustrum japonicum 'Texanum'
Limonium perezii
Liriope spp.
Lonicera japonica 'Halliana
Myoporum parvifolium
Myrius communis
Nandina domestica
Osteospermum fruticosum
Pennisetum spp.
Philodendron selloum
Phormium hybrids
Pittosporum spp.
Prunus spp.
Rhamnus californica
Rhaphiolepis indica
Rhus spp.
Rosa spp.
Rosmarinums officinalis
Salvia spp.
Senecio mandraliscae
Stachys byzantina
Strelitzia spp.

UPLAND LANDSCAPE

Juglans californica var. californica
Quercus agrifolia
Quercus lobata
Acmispon glaber
Artemisia californica
Baccharis pilularis var. consanguinea
Encelia californica
Eriogonum cinereum
Eriogonum fasciculatum var. foliolosum
Hazardia squarrosa
Leymus condensatus
Malacothamnus fasciculatus
Mimulus aurantiacus
Salvia apiana
Salvia mellifera
Sambucuc nigra ssp. caerulea
Asclepias fascicularis
Eschscholzia californica
Nassella pulchra
Pseudognaphalium californicum
Verbena lasiostachys
Amsinckia menziesii
Lupinus nanus
Lupinus succulentus
Phacelia cicutaria

RIPARIAN AND WETLAND LANDSCAPE

Juglans californica var. californica
Salix lasiolepis
Baccharis pilularis var. consanguinea
Baccharis salicifolia
Rhamnus californica
Rosa californica
Sambucus nigra ssp. caerulea
Ambrosia psilostachya
Artemisia douglasiana
Artemisia dracunculus
Rubus ursinus
Urtica dioica ssp. holosericea
Agrostis exarata
Distichlis spicata
Muhlenbergia rigens
Anemopsis californica
Artemisia douglasiana
Carex senta
Cyperus eragrostis
Juncus mexicanus
Juncus patens
Mimulus cardinalis
Mimulus guttatus
Typha domingensis

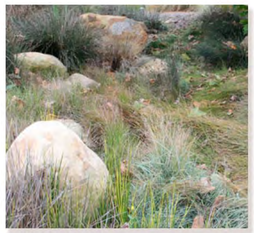
EXISTING OPEN SPACE LANDSCAPE

TREE LEGEND

SYMBOL	PLANT NAME
STREET TREES	
	• PODOCARPUS GRACILIOR • QUERCUS VIRGINIANA • ULMUS PARVIFOLIA • RHUS LANCEA • ARBUTUS UNEDO
LAS VIRGENES STREET TREE	
	• CEDRUS DEODARA
	• PLATANUS RACEMOSA
	• QUERCUS AGRIFOLIA
ACCENT TREES	
	• OLEA EUROPAEA • KOELREUTERIA PANICULATA
VERTICAL BACKDROP/SCREEN TREES	
	• PINUS ELDARICA • LOPHOSTEMON CONFERTUS • MELALEUCA LEUCADENDRA
OPEN SPACE TREES	
	• PLATANUS RACEMOSA
	• QUERCUS AGRIFOLIA
	• QUERCUS LOBATA
RIPARIAN TREES	
	• SALIX LASIOLEPIS • JUGLANS CALIFORNICA VAR. CALIFORNICA
ENTRY STREET TREES	
	• PLATANUS RACEMOSA
	• QUERCUS AGRIFOLIA
EXISTING TREES	
	• QUERCUS AGRIFOLIA • QUERCUS LOBATA

NOTE: IRRIGATION SYSTEMS WILL BE DESIGNED IN CONFORMANCE WITH SECTION 17.20.230 AND 17.26.050 WATER CONSERVATION PERFORMANCE STANDARDS OF THE CALABASAS LAND USE AND DE-

NOTE: ALL PLANTING WITHIN THE TRAFFIC SAFE-TY VISIBILITY AREA WILL COMPLY WITH SECTION 17.26.040(B)(2)(a)(i) OF THE CMC AND SHALL NOT EXCEED 42" HEIGHT


PLANTED BIOSWALE

NATURE PRESERVATION LANDSCAPE

PROPOSED OAK HILLSIDE

SPECIMEN OAKS

CALIFORNIA SYCAMORES

OAK STREET TREES

KEY MAP

0 15' 30' 60' 120'
SCALE: 1"=60'-0"

ValleyCrest DesignGroup
Robert Hidey **Architects**

LA- 2

C A N Y O N O A K S

THE NEW HOME COMPANY

TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

LA-2

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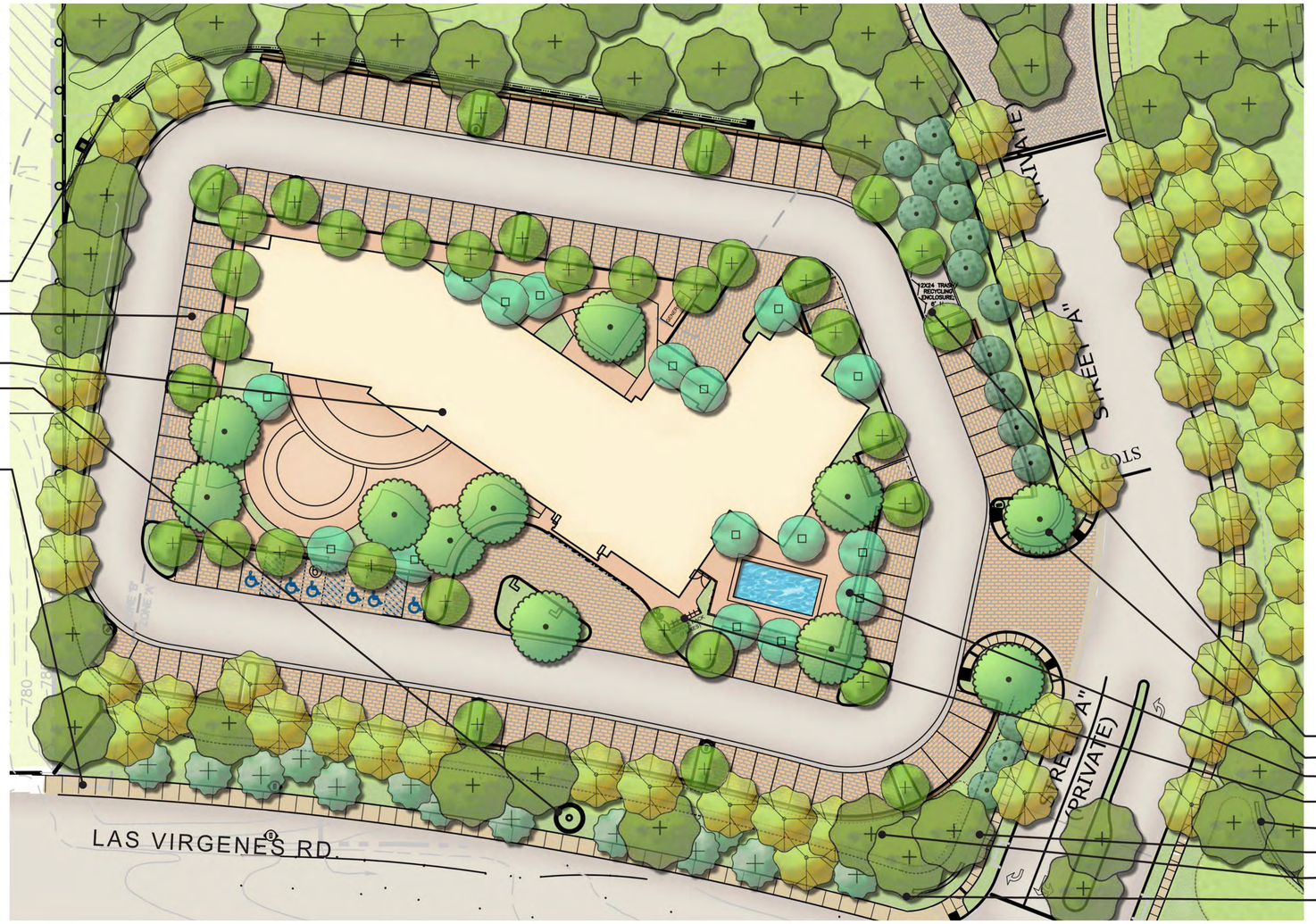
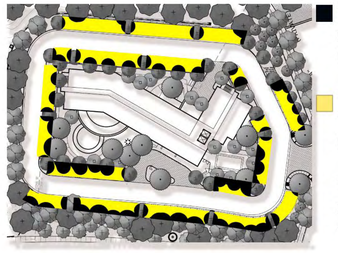
HOTEL ENLARGEMENT

The Hotel site is nestled into the hillside. The edge landscape consists of the Scenic Highway landscape along Las Virgenes Road/Malibu Canyon Road. The transition landscape between the open spaces would be native oaks and grasses, and bioswale landscape areas with deciduous canopy trees. Resort style landscape garden areas set around the hotel will be colorful, romantic and textural in style, reinforcing the rustic Monterrey/Santa Barbara landscape character into the hotel community.





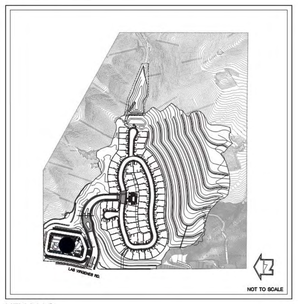
Parking lot shade study

ACTIVITY AREAS AND OUTDOOR PLAZAS PROVIDE A COMFORTABLE ATTRACTIVE ENVIRONMENT

Open vistas along with classic Monterrey architecture, provide a leisurely environment for hotel visitors.

Planted road-side bioswale systems enhance the sites natural characteristics; allowing for function and beauty.

NOTE: ALL PLANTING WITHIN THE TRAFFIC SAFETY VISIBILITY AREA WILL COMPLY WITH SECTION 17.26.040(B)(2)(a)(i) OF THE CMC AND SHALL NOT EXCEED 42" HEIGHT AS DETERMINED BY THE PUBLIC WORKS DEPARTMENT



KEY MAP

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ENTRY ENLARGEMENTS

Characterized by large specimen oak trees, the entry experience provides an elegant and naturalized approach into the Canyon Oaks Community. Entering the community from Las Virgenes Rd., homeowners and hotel visitors will be greeted by stone monument walls amongst the specimen oaks and sycamores. Continuing further, we reach the Santa Barbara style entry gates which provides a sophisticated portal to the community.

Accent plantings compliment detailed entry ways for a unique, welcoming experience.

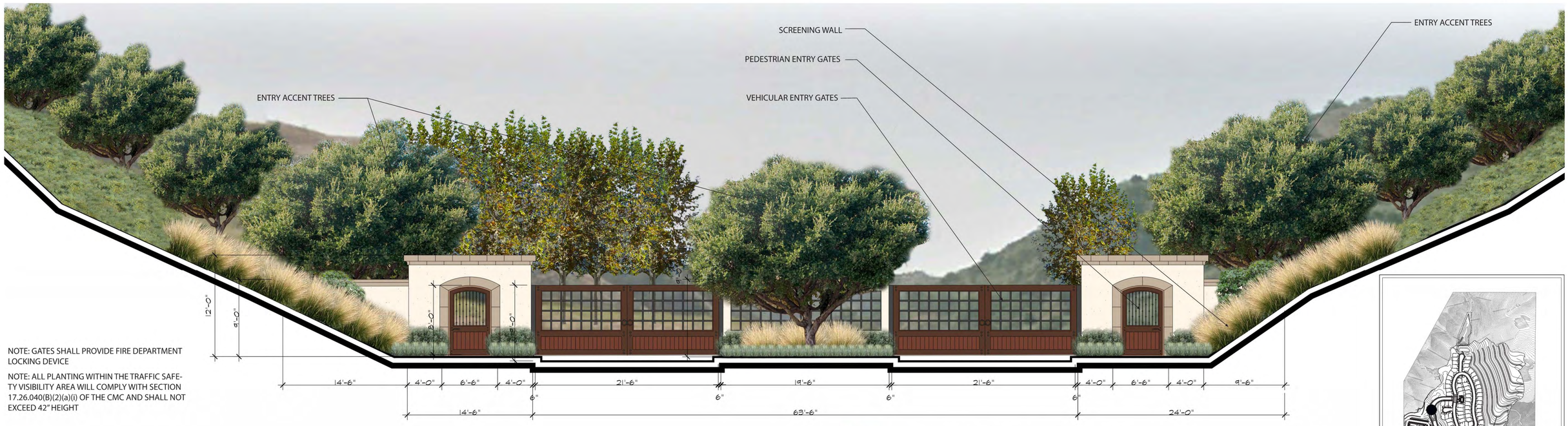
Wall monuments with community signage accent primary entryways, and inform site users of location and place.

MAIN ENTRY

SCALE: 1"=20'-0"

GATED ENTRY

SCALE: 1"=20'-0"

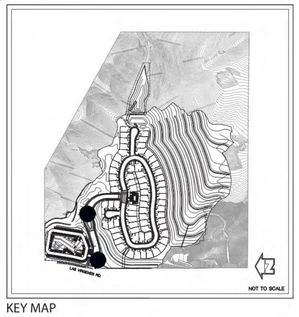


NOTE: GATES SHALL PROVIDE FIRE DEPARTMENT LOCKING DEVICE

NOTE: ALL PLANTING WITHIN THE TRAFFIC SAFETY VISIBILITY AREA WILL COMPLY WITH SECTION 17.26.040(B)(2)(a)(i) OF THE CMC AND SHALL NOT EXCEED 42" HEIGHT

SCALE: 1"=4'-0"

GATED ENTRY ELEVATION 'A'



KEY MAP

ValleyCrest DesignGroup
Robert Hidey **Architects**
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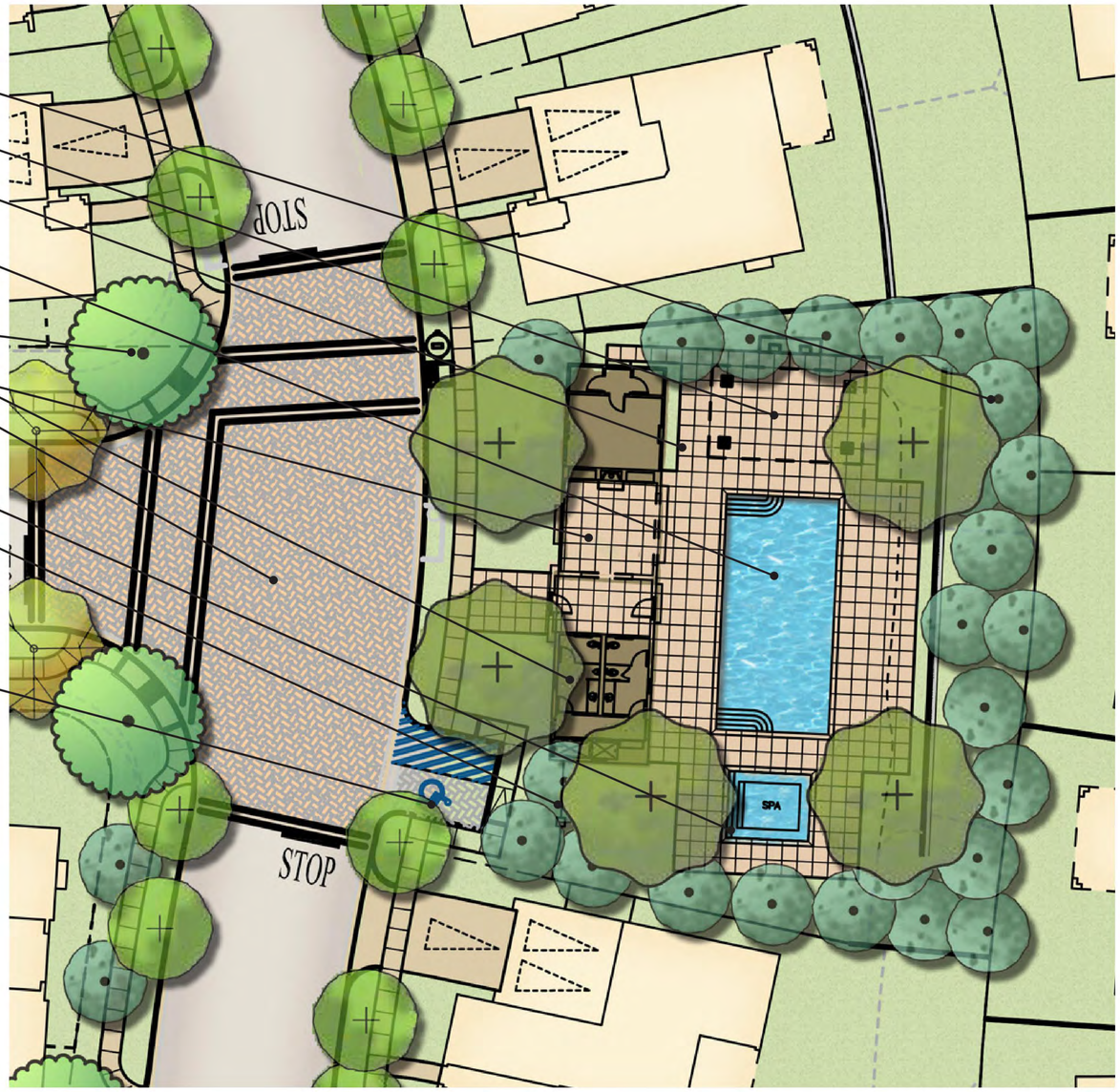
POOL AREA ENLARGEMENT

The Recreation Facility is set at the terminus of the entry drive. The landscape will feature accent trees creating an oak woodland theme. The romantic Monterrey/Santa Barbara architectural style, with smooth stucco walls will be carried through the colorful rustic garden environment. Shaded picnic area, lap pool and spa offer luxurious amenities for the community.

ATTRACTIVE ARCHITECTURE FRAMES POOL AREA ENTRY

COMFORTABLE LOUNGES AT THE POOL



SHADE TRELLIS WITH PICNIC AREA

RELAXING POOL AND SPA AMENITIES

INDOOR / OUTDOOR LOUNGE AREA WITH FIREPLACE

NOTE: ALL PLANTING WITHIN THE TRAFFIC SAFETY VISIBILITY AREA WILL COMPLY WITH SECTION 17.26.040(B)(2)(a)(i) OF THE CMC AND SHALL NOT EXCEED 42" HEIGHT

KEY MAP

0 5' 10' 20'
SCALE: 1"=20'-0"

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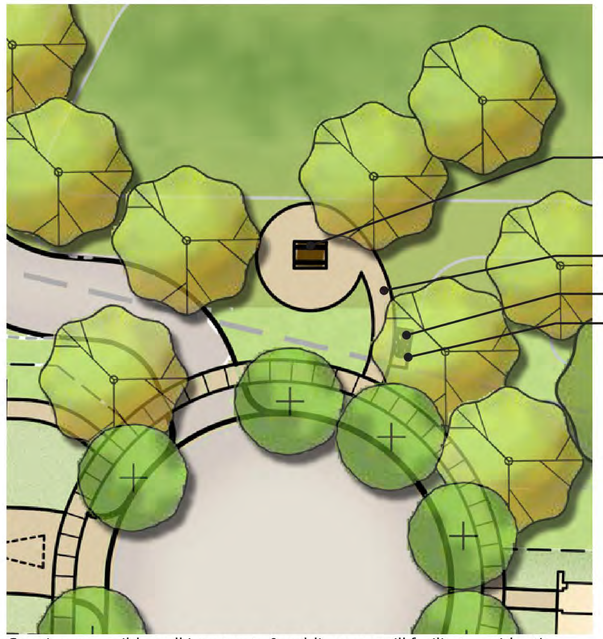
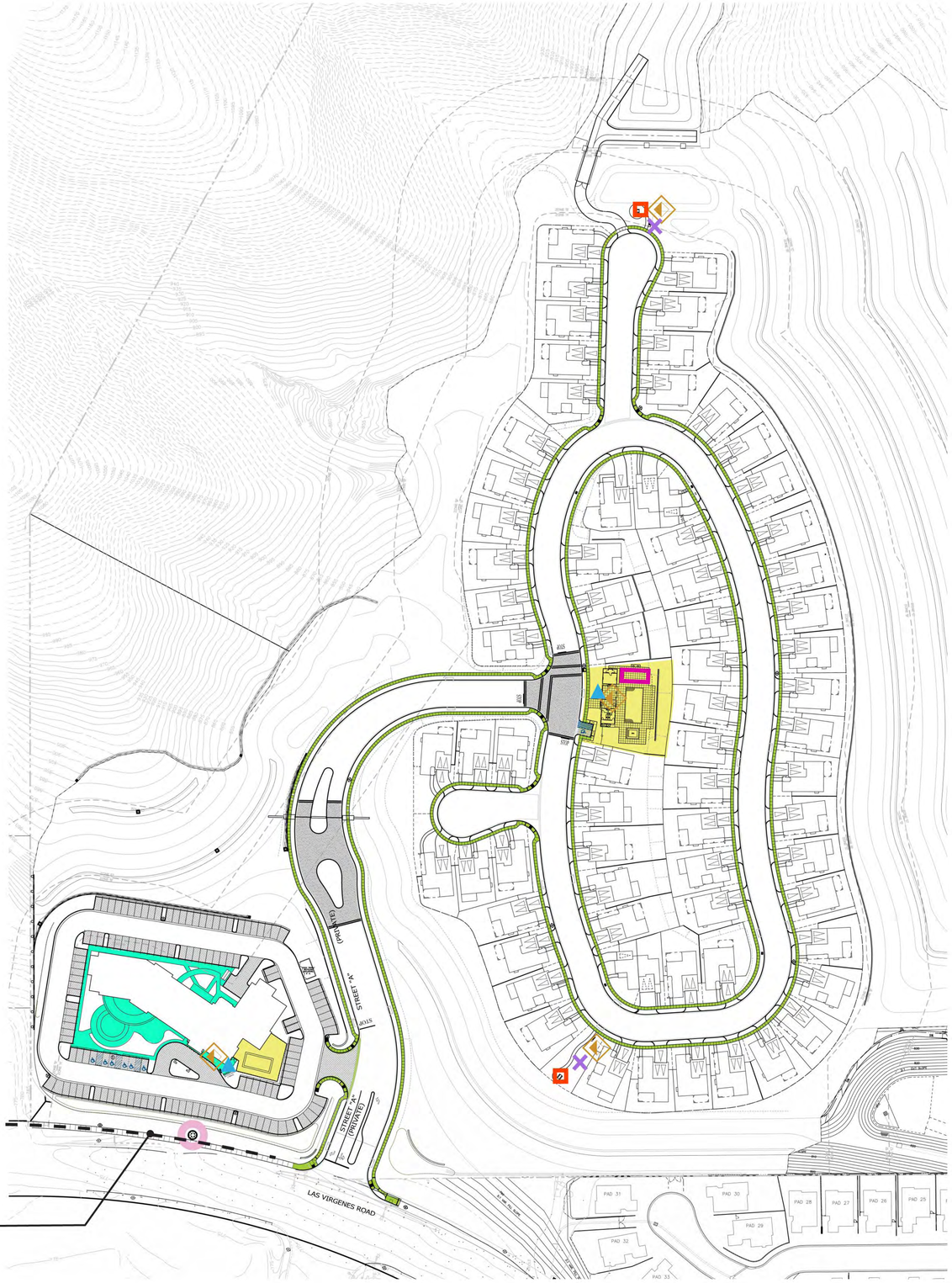
ONSITE AMENITIES DIAGRAM

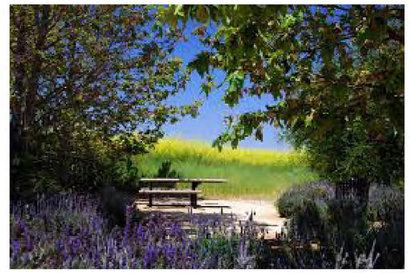
Pedestrian walking circulation within the community is encouraged through local walks. The enhanced shade trees the addition of picnic areas. Walkways will have use-appropriate lighting as permitted by code. Bicycle amenities are incorporated into the design in the community recreation center and adjacent hotel site. Community recreation at the pool area offers enjoyable passive and active uses.



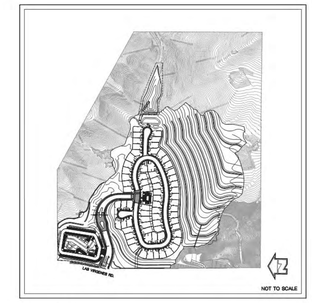
Creating accessible walking streets & public space will facilitate resident's access to their natural surroundings.

Picnic areas offer a convenient, comfortable place to share with family and friends.





Picnic areas shaded by adjacent canopy trees.



KEY MAP

0 15' 30' 60' 120'
SCALE: 1"=60'-0"

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CONCEPT STATEMENT:

THE PROJECT PROMOTES SITE WALKABILITY BY PROVIDING PEDESTRIAN WALKS THAT WILL CONNECT TO MILES OF EXISTING TRAILS IN THE SANTA MONICA MOUNTAINS.

CANYON OAKS IS DESIGNED TO INCORPORATE INNOVATIVE PLANNING TECNIQUES TO ENSURE THE PRESERVATION OF OPEN SPACE CORRIDORS AND RIDGELINES AS HABITAT LINKAGES; SUPPORTING PLANTS AND WILDLIFE.

LEGEND

- SITE BOUNDARY

PUBLIC TRAILS (MAINTAINED BY OTHERS) :

- BARK PARK TRAIL (EXISTING)
  RECREATIONAL TRAIL EASMENT TO BE DEDICATIED TO SMMC
- OLD 101 TRAIL (EXISTING)
- NEW MILLENNIUM TRAIL (EXISTING)
- CALABASAS HISTORIC TRAIL (EXISTING)
- GUN CLUB ROAD (EXISTING)
- LAS VIRGENES CREEK TRAIL (EXISTING)
- LAS VIRGENES TRAIL (EXTENSION)
  This propoped trail connects the Canyon Oaks Community to Las Virgenes Road, trail heads, local restaurants and stores within a few minutes walk.
- AGOURA ROAD WALKS (EXISTING)
- LAS VIRGENES VIEW PARK CONNECTOR

T CALABASAS DE ANZA TRAIL HEAD (EXISTING)

PRIVATE WALKS (HOA MAINTAINED):

- CANYON OAKS PEDESTRIAN WALKS
  Our proposed walks connect to the existing Calabasas trail system

TRAILHEAD · MONUMENT · PLAYGROUND
HIKING TRAIL · OVERLOOK · SHOPPING/DINNING
BIKING TRAIL · PARK AREA · SWIMMING POOL

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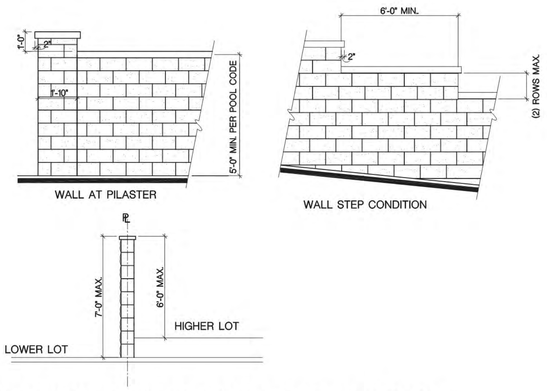
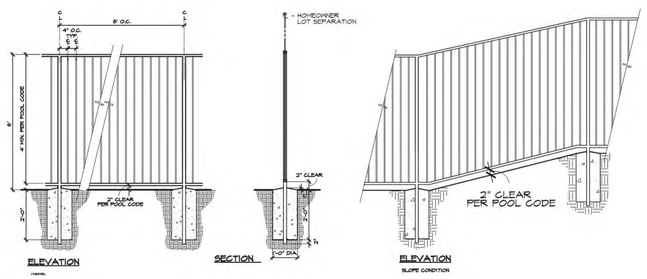
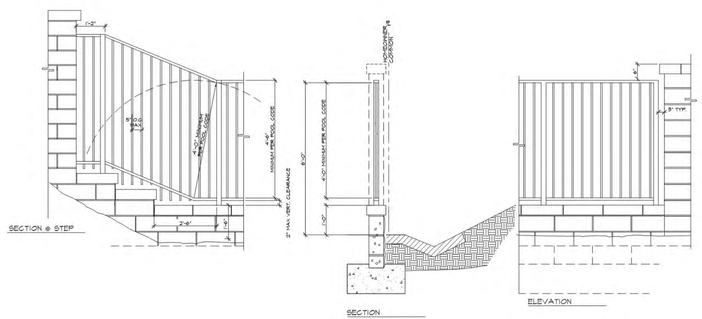
WALL AND FENCE PLAN



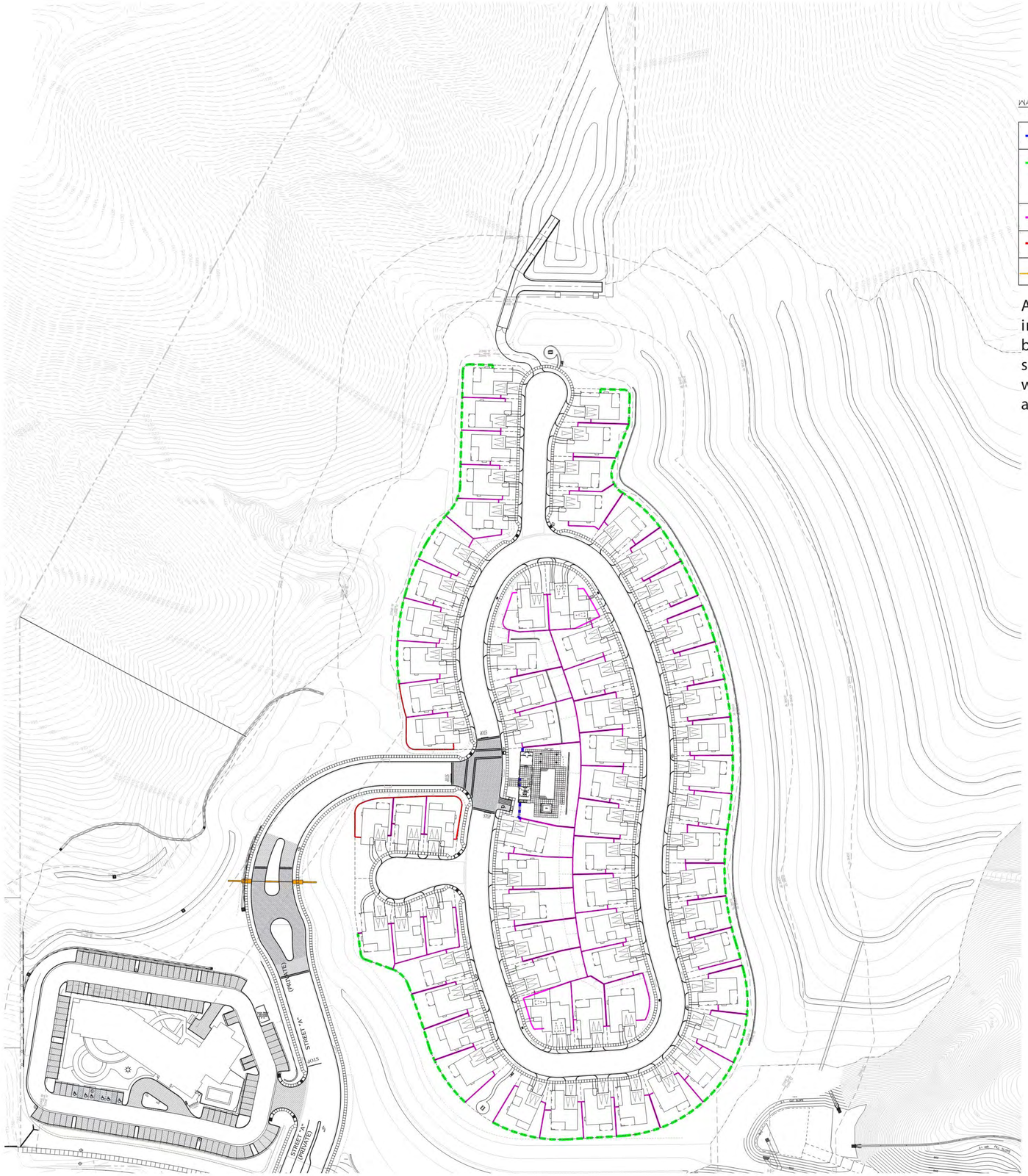
COMMUNITY CMU BLOCK WALL INTEGRAL COLOR



6' POOL FENCE PAINTED STEEL



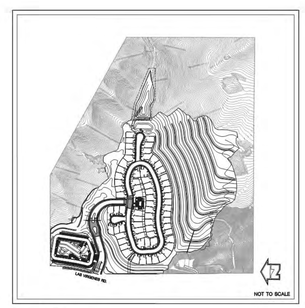
COMBO BLOCK WALL INTEGRAL COLOR - 5'W/ PAINTED STEEL



WALL TYPES

SYMBOL	FACILITY	
	POOL FENCE	6' POOL FENCE PAINTED STEEL (FENCING PER REQ. 17.12.165(H)(4) OF THE CMC.)
	COMBO WALL	COMBO WALL - 1' BLOCK INTEGRAL COLOR W/ 5' PAINTED STEEL CMU SPLIT FACE PUBLIC SIDE PRECISION BLOCK HOUSE SIDE, INTEGRAL COLOR
	PRIVATE LOT WALLS	CMU PRECISION BLOCK INTEGRAL COLOR
	COMMUNITY WALLS	CMU SPLIT FACE PUBLIC SIDE PRECISION BLOCK HOUSE SIDE, INTEGRAL COLOR
	ENTRY GATE	ENTRY GATE

All community & combo walls will be integral colored with a CMU precision block on the home owner side and CMU split face block on the public side of the wall facing. The pool gate will contain a self-latching mechanism for safety.



KEY MAP

0 15' 30' 60' 120'
SCALE: 1"=60'-0"

ValleyCrest DesignGroup LA- 8

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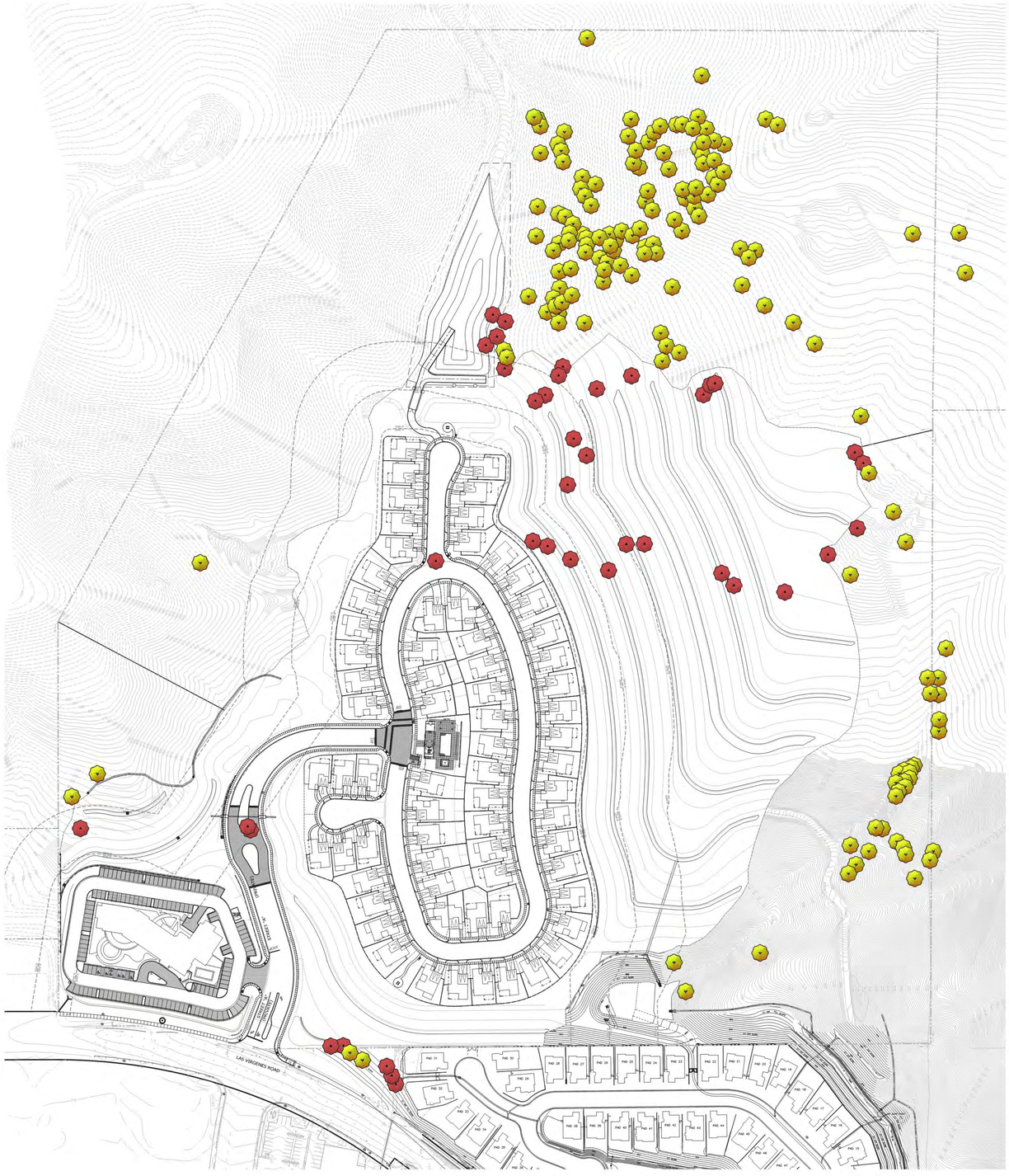
C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

OAK TREE MITIGATION PLAN



EXISTING OAK TREE LOCATIONS

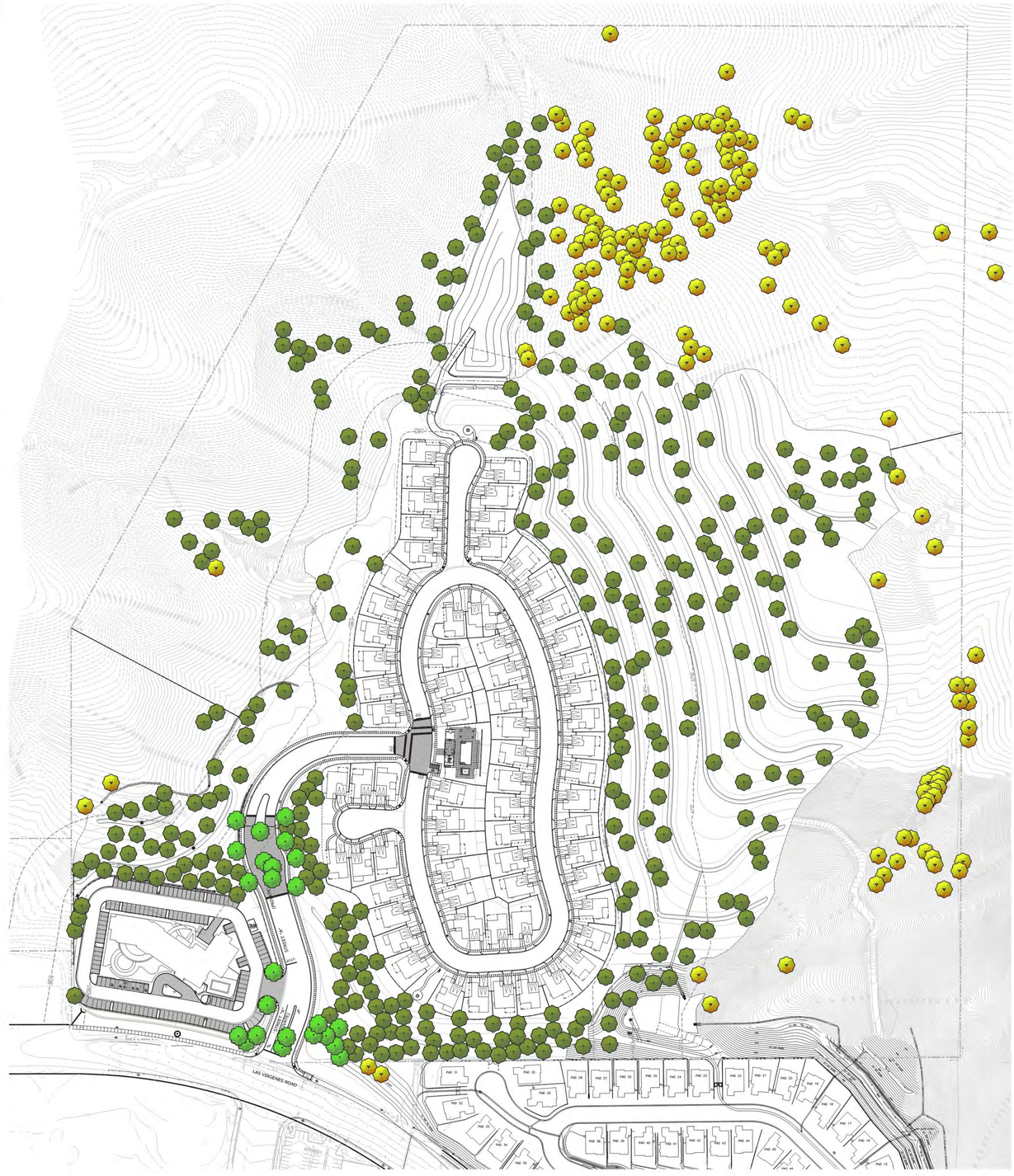
NOTE:
SEE OAK TREE REPORT FOR ADDITIONAL OAK TREE INFORMATION

EXISTING OAKS TO BE REMOVED - 39 TOTAL

EXISTING OAKS TO REMAIN

NOTE:

TREES PRESERVED - 145
ENCROACHMENTS DUE TO PROJECT DEVELOPMENT - 14
REMOVALS - 39



OAK TREE MITIGATION

PROPOSED OAKS FOR MITIGATION - 386

SPECIMEN OAK TREES FOR MITIGATION - 24 (60" BOX OR LARGER)

TOTAL OAK MITIGATION - 410

EXISTING OAKS TO REMAIN

0 22.5' 45' 90' 180'
SCALE: 1"=90'-0"

ValleyCrest DesignGroup
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LA- 9

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LA-9

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PERVIOUS SURFACE COVERAGE DIAGRAM

The design of the development site incorporates the site's natural features to capture irrigation runoff and the first 3/4 inch of runoff from a two-year storm event. Through incorporating bioswales, detention basins, and pervious paving, the design aims to increase on-site infiltration. As an added feature, portions of the non-permeable surfaces will divert rainwater run-off to bioswales and other permeable landscape areas, providing interesting and attractive landscape amenities.

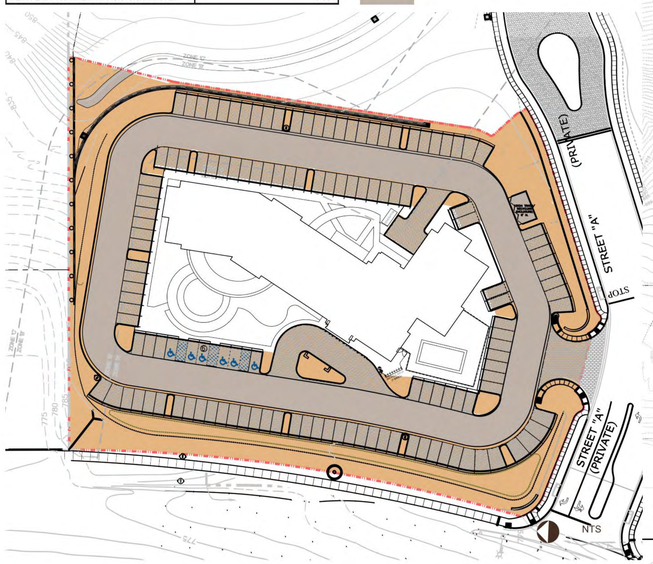
Permeable surfacing within parking areas allow for an environmentally sound design, while maintaining access and performance.

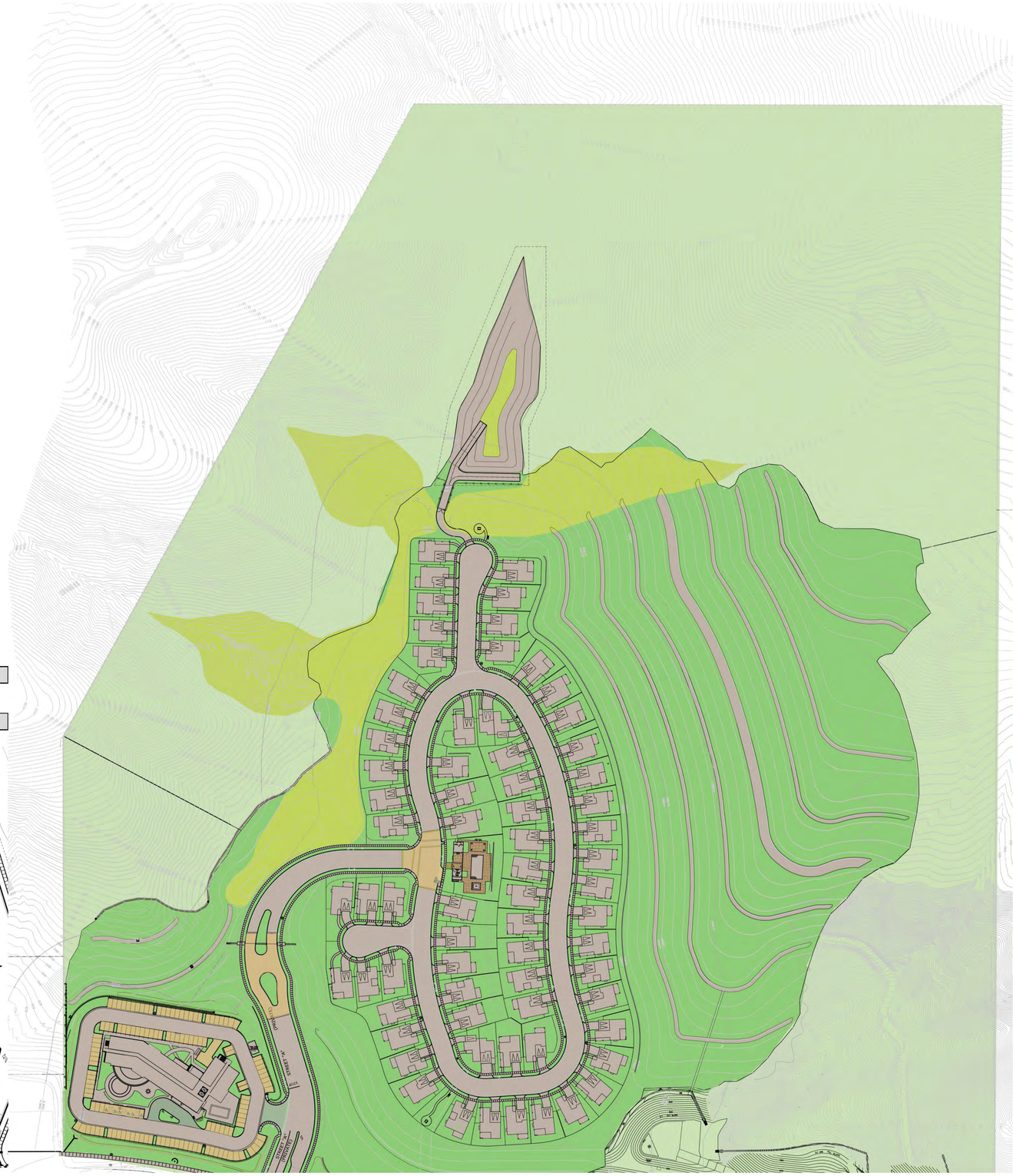
HOTEL PARKING AREA

HOTEL PARKING - PERCENT OF PERVIOUS SURFACE MIN. 30% Per Section 17.26.040	
TOTAL HOTEL PARKING AREA:	89,435sqft.
TOTAL NON-PERVIOUS:	28,895 sqft.
TOTAL PERVIOUS:	60,540 sqft.
PERCENT OF PERVIOUS SURFACE:	68%

PERVIOUS SURFACE

NON-PERVIOUS SURFACE

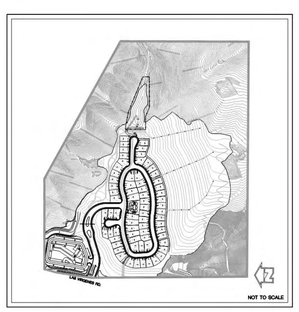




TOTAL SITE

Area Description	Areas (Acres)	% Coverage (Site)	% Pervious Area (Site)
Undisturbed Open Spa	+/- 36.32	47%	47%
Landscaping (Includes Native Revegetation, Trails, Picnic Areas, Front and Rear Yards, Parkways, Slopes)	+/- 11.43	15%	15%
Bioswale, Proposed Riparian Area, and Detention Basin.	+/- 4.70	6%	6%
Pervious Paving (Includes Hotel Parking and Pervious Paving)	+/- 1.62	2%	1%
Non Pervious (Includes Buildings, Roads, Concrete Walks, Asphalt Parking, Pools and Spas, Decking and Walls)	+/- 23.15 +/-	30%	0%
Total Site Area	77.22	100%	70%
Pervious Surface Residential/Multifamily Requirement			45%
Pervious Surface Proposed			70%
Pervious Surface Proposed Over and Above Requirement			25%

Note: Portions of the 30% non permeable surface run off will be diverted to Bio Swales increasing onsite infiltration.



KEY MAP

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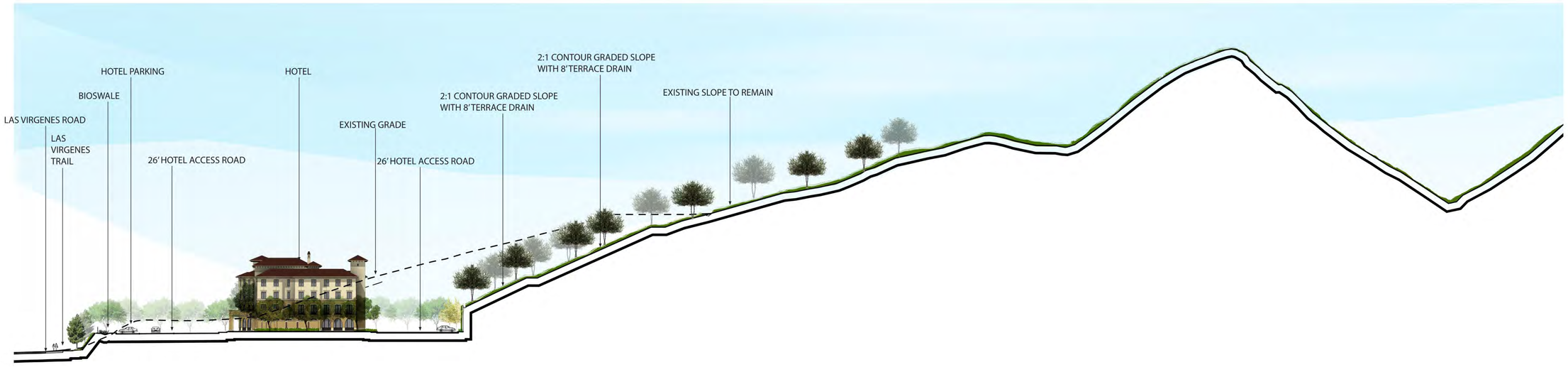
SITE SECTIONS

SECTION A-A

0 25' 50' 100'
SCALE: 1"=50'-0"



SECTION B-B

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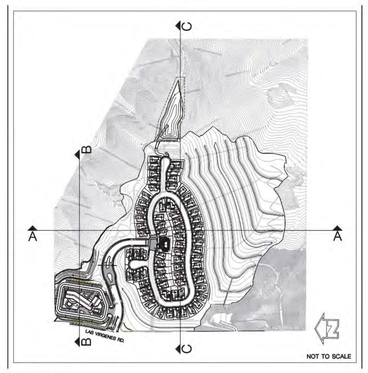

KEY MAP

ValleyCrest DesignGroup LA- 11

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C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

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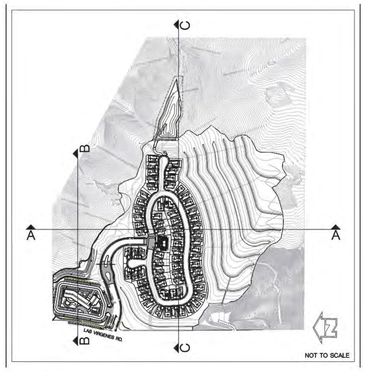
PROJECT NUMBER: 13001 03/18/2015

SITE SECTIONS

SECTION C-C

0 25' 50' 100'

SCALE: 1"=50'-0"



KEY MAP

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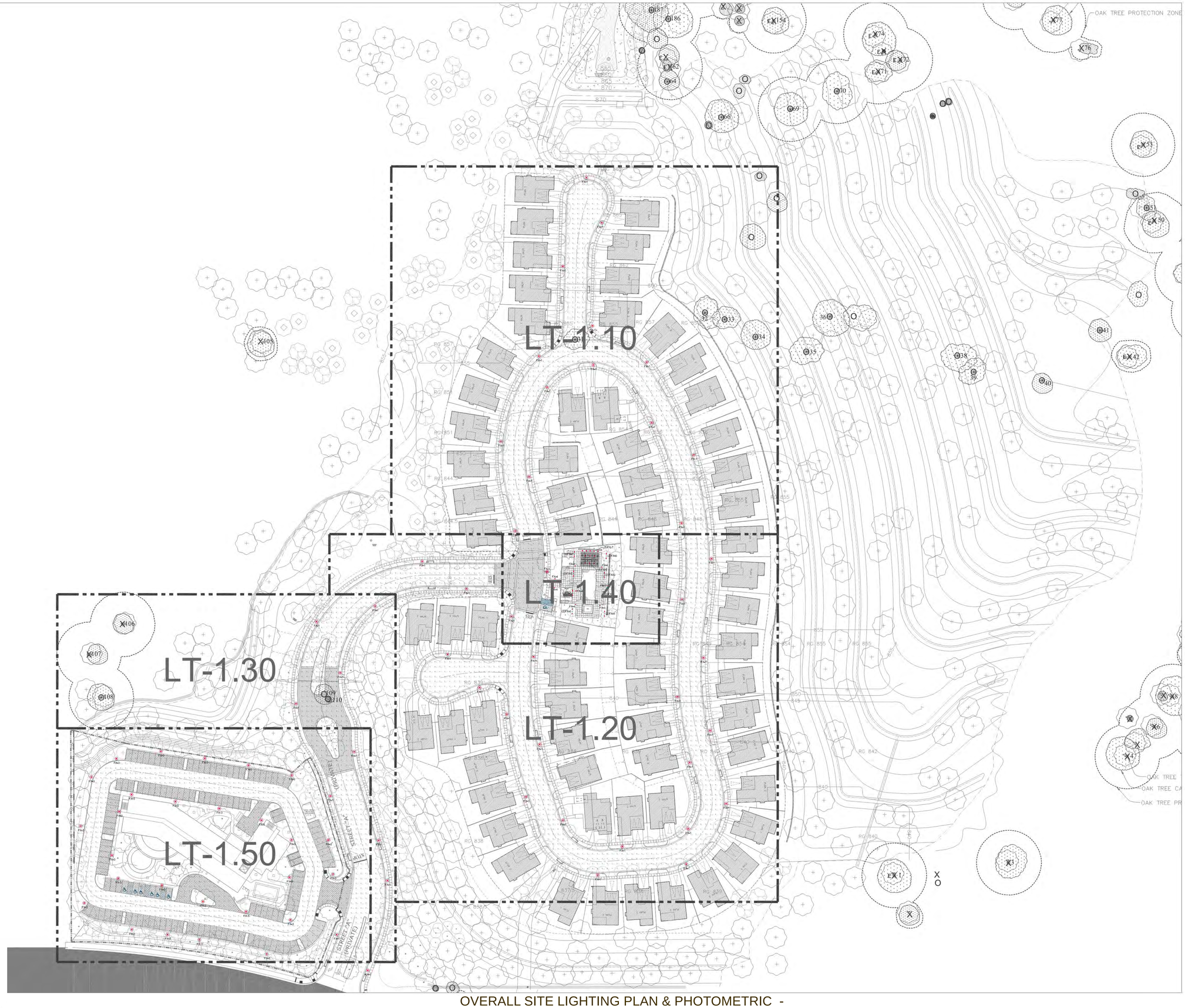

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OVERALL SITE LIGHTING PLAN & PHOTOMETRIC - ROADWAYS & SIDEWALKS

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

0 8' 16' 32' 64'
SCALE: 1/32" = 1'-0"

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LT-1.00

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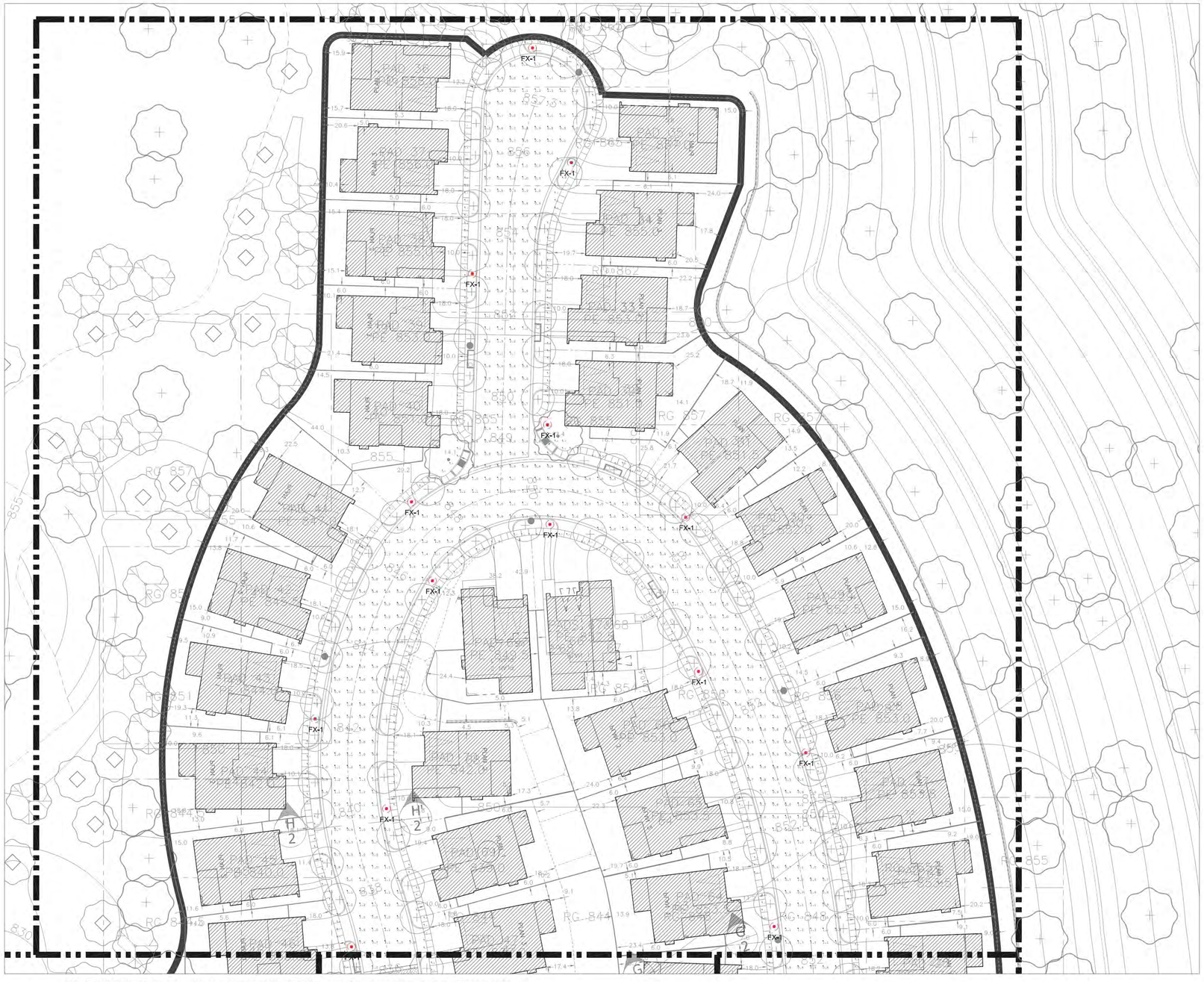

GENERAL NOTES:
- Calculations are based on Primary and Secondary fixtures and do not account for light contributions from building mounted fixtures.
- Fixtures are calculated with Light Loss Factors, but should be controlled as necessary.

See study below for illuminance calculations.

Fixture Types:
FX-1 Lumec - Post Light w/ Full Cutoff - LED
75w Single Headed Postlight
Typical spacing: 45ft
Typical mounting height: 15ft
Light Loss Factor: 0.85
Lumens: 3814

* Recommend dimming fixture to 75% to meet low level lighting requirements and still maintain required uniformity

Secondary Road Calculations:
Calabasas Lighting Standards: Chapter 17.27.030
Target Illuminance: Maximum Average 0.9fc
Uniformity (Max/ Min): 4:1

Maximum Average Illuminance
0.93fc
Uniformity (Max/ Min)
4:1

Interior Sidewalk Calculations:
Calabasas Lighting Standards: Chapter 17.27.30
Target Illuminance: Maximum Average 0.6fc

Average Illuminance
0.73fc

Uniformity (Max/ Min)
No Uniformity Required

NOTE:
Compliance with Calabasas Lighting Standards: Chapter 17.27.30 does not address Emergency Egress Lighting Requirement of 1fc Average and 40:1 Uniformity.

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SITE LIGHTING PLAN & PHOTOMETRIC - ROADWAYS & SIDEWALKS

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

0 4' 8' 16' 32'
SCALE: 1/16"=1'-0"

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LT-1.10

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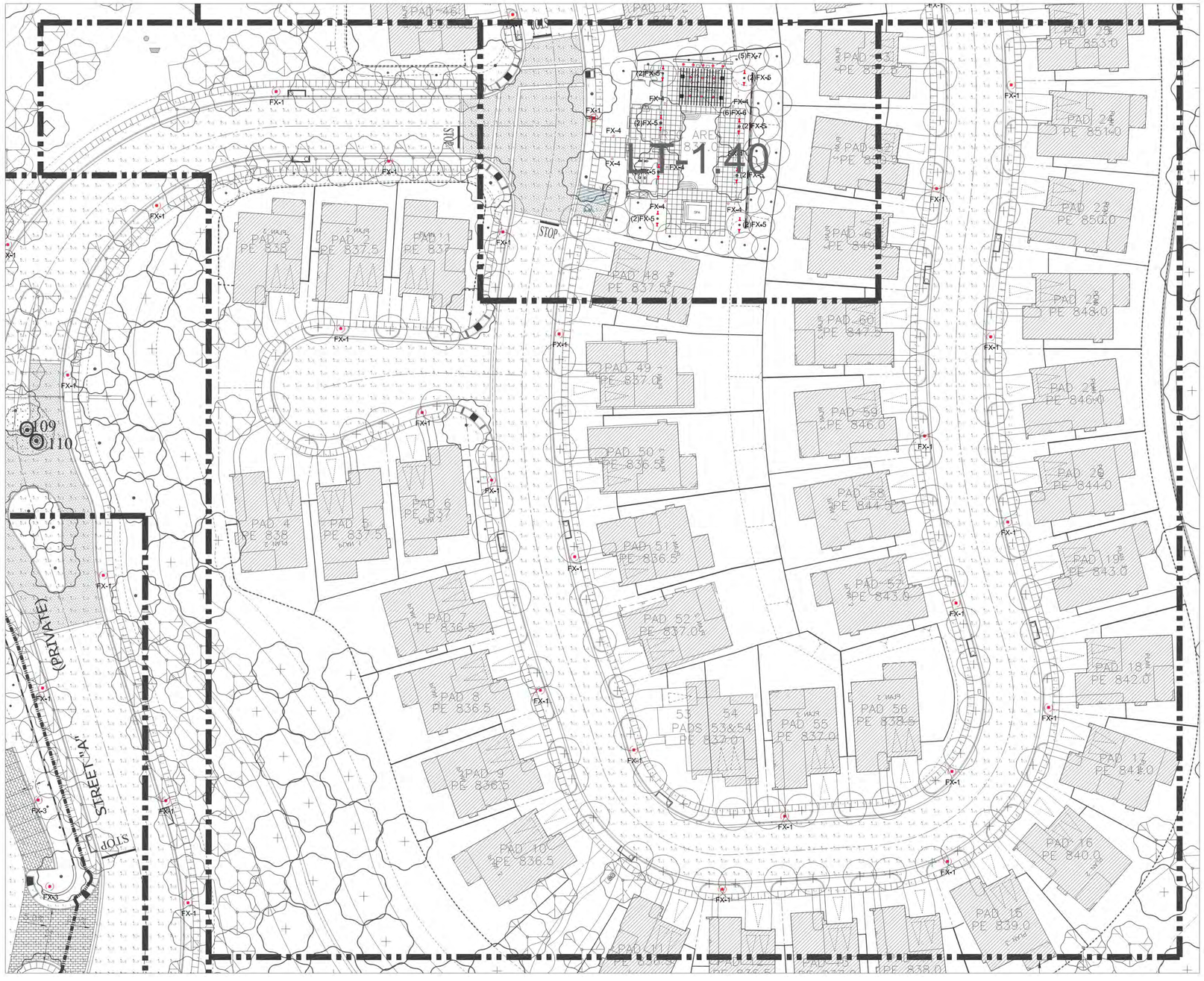

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Maximum Average Illuminance
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Uniformity (Max/ Min)
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Uniformity (Max/ Min)
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SITE LIGHTING PLAN & PHOTOMETRIC - ROADWAYS & SIDEWALKS

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

0 4' 8' 16' 32'
SCALE: 1/16"=1'-0"

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PROJECT NUMBER: 13001 03/18/2015

LT-1.20

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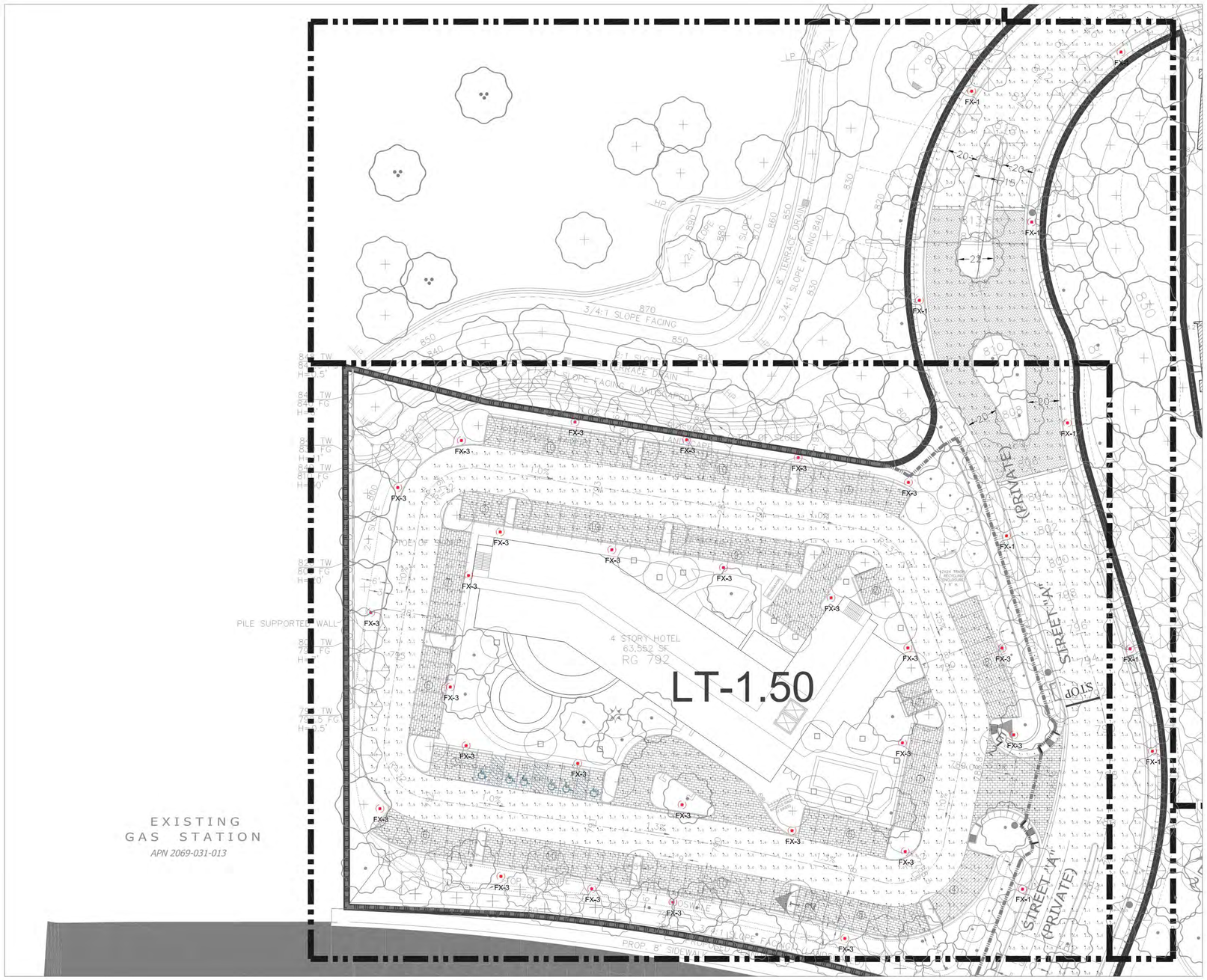

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Maximum Average Illuminance
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Uniformity (Max/ Min)
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Average Illuminance
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Uniformity (Max/ Min)
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SITE LIGHTING PLAN & PHOTOMETRIC - ROADWAYS & SIDEWALKS

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0 4' 8' 16' 32'
SCALE: 1/16"=1'-0"

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LT-1.30

3337 Michelson Drive, Suite 370, Irvine, CA 92612 Telephone 949.655.1550
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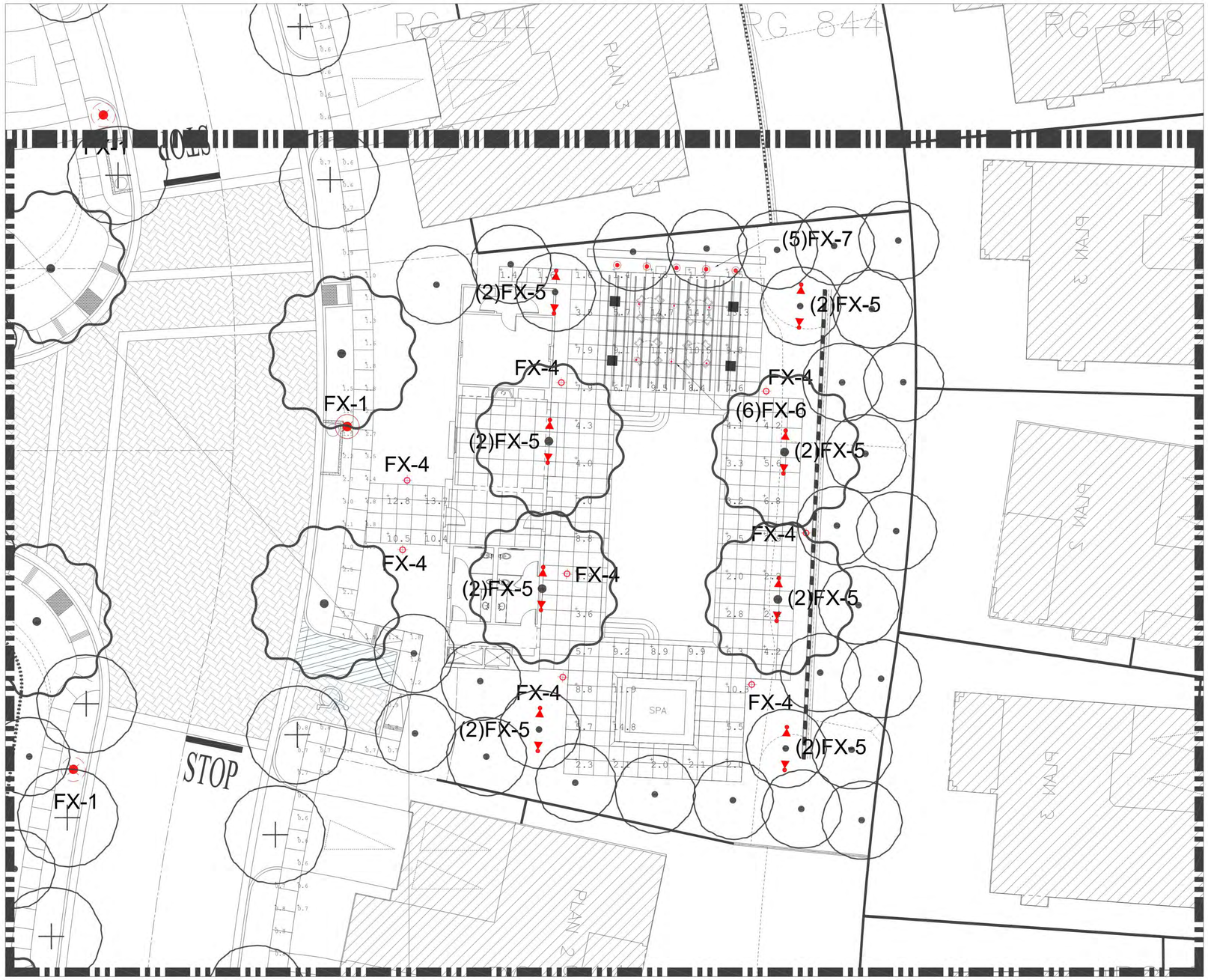

GENERAL NOTES:
- Calculations are based on Primary and Secondary fixtures and do not account for light contributions from building mounted fixtures.
- Fixtures are calculated with Light Loss Factors, but should be controlled as necessary.

See study below for illuminance calculations.

Fixture Types:
FX-1 Lumec - Post Light w/ Full Cutoff - LED
75w Single Headed Postlight
Typical spacing: 45ft
Typical mounting height: 15ft
Light Loss Factor: 0.85
Lumens: 3814

FX-2 Lumec - Post Light w/ Full Cutoff - LED
75w Single Headed Postlight
Typical spacing: 45ft
Typical mounting height: 12ft
Light Loss Factor: 0.85
Lumens: 3814

* Recommend dimming fixture to 75% to meet low level lighting requirements and still maintain required uniformity

Pool Deck Calculations:
Target Average Illuminance: 1fc

Average Illuminance
4.00fc / 0.4fc min

Interior Sidewalk Calculations:
Calabasas Lighting Standards: Chapter 17.27.30
Target Illuminance: Maximum Average 0.6fc

Average Illuminance
0.73fc

Uniformity (Max/ Min)
No Uniformity Required

NOTE:
Compliance with Calabasas Lighting Standards: Chapter 17.27.30 does not address Emergency Egress Lighting Requirement of 1fc Average and 40:1 Uniformity.

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270 CORAL CIRCLE
EL SEGUNDO, CA 90245
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FAX 310.552.2192
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RECREATIONAL AREA LIGHTING PLAN & PHOTOMETRIC

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

0 2' 4' 8' 12'
SCALE: 3/16 "=1'-0"

THE NEW HOME COMPANY

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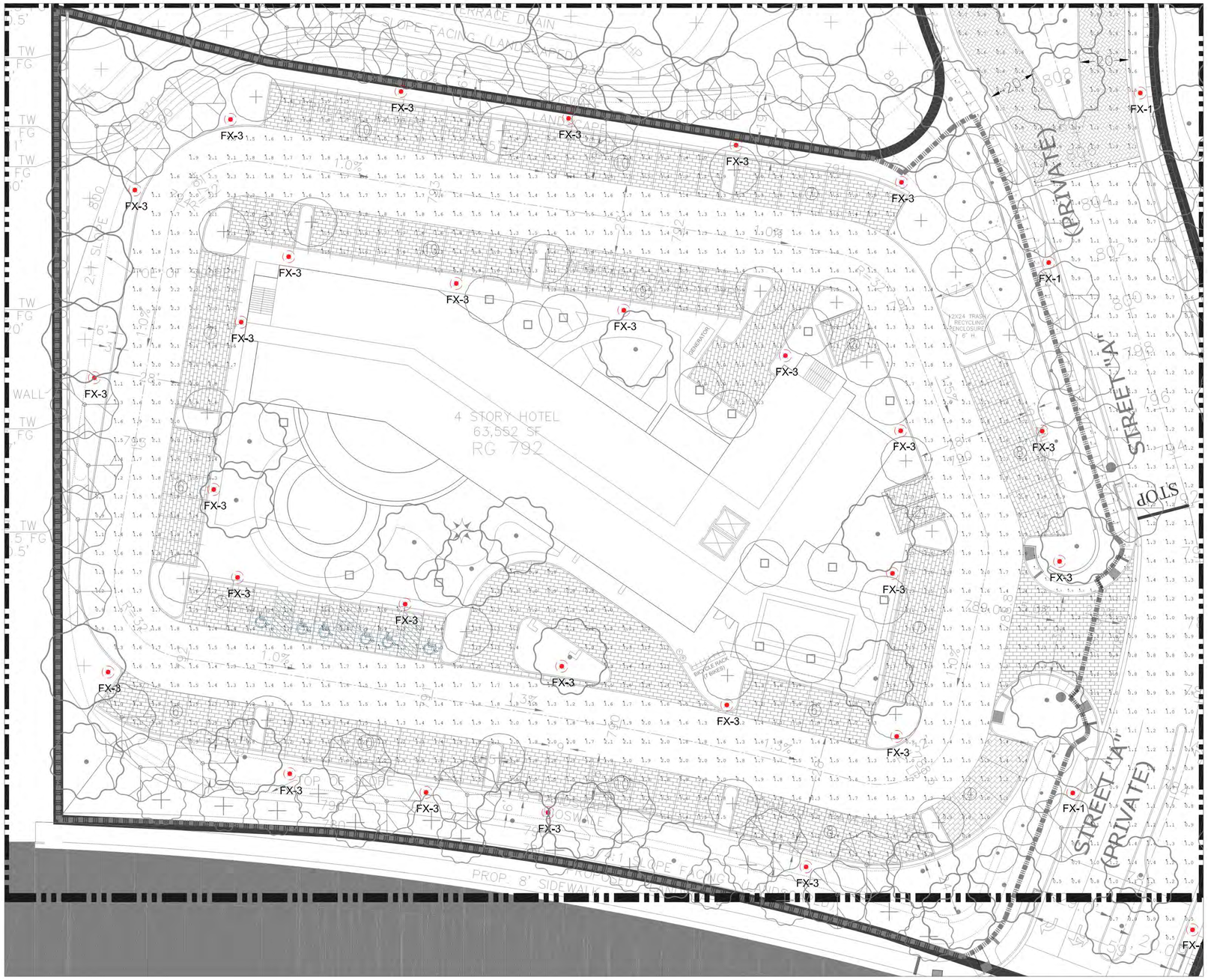
PROJECT NUMBER: 13001 03/18/2015



GENERAL NOTES:
- Calculations are based on Primary and Secondary fixtures and do not account for light contributions from building mounted fixtures.
- Fixtures are calculated with Light Loss Factors, but should be controlled as necessary.

See study below for illuminance calculations.

Fixture Types:
FX-1 Lumec - Post Light w/ Full Cutoff - LED
75w Single Headed Postlight
Typical spacing: 45ft
Typical mounting height: 15ft
Light Loss Factor: 0.85
Lumens: 3814

* Recommend dimming fixture to 75% to meet low level lighting requirements and still maintain required uniformity

Secondary Road Calculations:
Calabasas Lighting Standards: Chapter 17.27.030
Target Illuminance: Maximum Average 0.9fc
Uniformity (Max/ Min): 4:1

Maximum Average Illuminance
0.93fc
Uniformity (Max/ Min)
4:1

Interior Sidewalk Calculations:
Calabasas Lighting Standards: Chapter 17.27.30
Target Illuminance: Maximum Average 0.6fc

Average Illuminance
0.73fc

Uniformity (Max/ Min)
No Uniformity Required

NOTE:
Compliance with Calabasas Lighting Standards: Chapter 17.27.30 does not address Emergency Egress Lighting Requirement of 1fc Average and 40:1 Uniformity.

Parking lot Calculations:
Calabasas Lighting Standards: Chapter 17.27.030
Target Illuminance: Maximum Average 0.2fc
Uniformity (Max/ Min): 20:1

Maximum Average Illuminance
0.93fc
Uniformity (Max/ Min)
15:1

NOTE:
The project's close proximity to a protected preserve means special attention must be made to limit Light Trespass from affecting the surrounding area. To help ensure that area be protected, the FX-1 were placed as far away from the property line where possible. This meant that the FX-1 postlights were now required to illuminate, in some instances, distances in excess of 50ft to the edge of the parking lots.
Compliance with Calabasas Lighting Standards: Chapter 17.27.30 does not just request that the average lighting levels be 0.4fc average but that the Max/Min Uniformity be of a certain level for safe vehicular operation.
Given the physical characteristics of each Parking Lot and their close proximity to the Property Line, we request a variance of an additional 0.23fc average to maintain vehicular safety and protect the surrounding area from unwanted light trespass.

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HOTEL LIGHTING PLAN & PHOTOMETRIC

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

0 4' 8' 16' 24'
SCALE: 3/32 "=1'-0"

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LT-1.50

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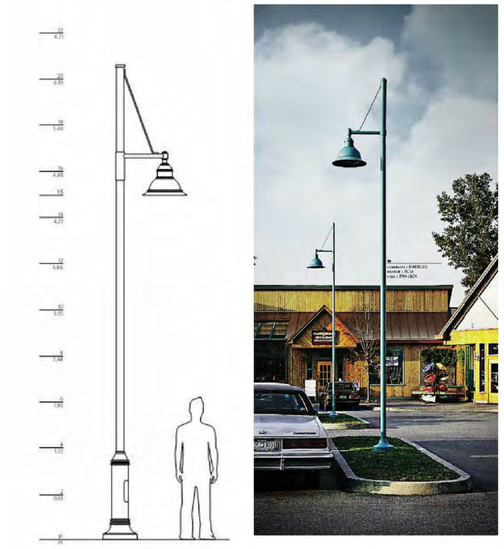
KGM KAPLAN GEHRING McCARROLL ARCHITECTURAL LIGHTING

LIGHTING FIXTURE SCHEDULE- CANYON OAKS

Contact: **PROJECT MANAGER | Patrick McCollough pmccollough@kgmlighting.com**
TEAM SUPPORT | Jhernandez@kgmlighting.com
Phone: (310) 552.2191
Fax: (310) 552.2192

TYPE	MANUFACTURER	MODEL NUMBER	LAMP	DESCRIPTION
2014-11-04 | LIGHTING PROGRESS - NOT FOR CONSTRUCTION				
EXTERIOR				
FX-1	LUMEC	DOMUS SMALL SERIES DOS-60W30LED-ES-277-HS(HOUSE SHIELD)-LE5F(Type V)-DBG-1A(MOUNTING ARM)-BK/TX(BLACK TEXTURED-VERIFY FINISH W/ DESIGN TEAM) + AM8F-15(15FT POLE) ***MANUFACTURER TO PROVIDE SHOP DRAWINGS WITH EACH COMPONENT IDENTIFIED PRIOR TO PROCUREMENT**	3000K WARM WHITE LED APPROX. 75W EACH ***FINAL WATTAGE AND BEAM DISTRIBUTION TO BE VERIFIED W/ PHOTOMETRICS**	15FT LED POSTLIGHT W/ FULL CUTOFF - STREET- **DIMMABLE**
FX-2	LUMEC	DOMUS SMALL SERIES DOS-60W30LED-ES-277-HS(HOUSE SHIELD)-LE5F(Type V)-DBG-1A(MOUNTING ARM)-BK/TX(BLACK TEXTURED-VERIFY FINISH W/ DESIGN TEAM) + AM8F-12(12FT POLE) ***MANUFACTURER TO PROVIDE SHOP DRAWINGS WITH EACH COMPONENT IDENTIFIED PRIOR TO PROCUREMENT**	3000K WARM WHITE LED APPROX. 75W EACH ***FINAL WATTAGE AND BEAM DISTRIBUTION TO BE VERIFIED W/ PHOTOMETRICS**	12FT FULL CUT OFF LED POSTLIGHT - RECREATION AREA- **DIMMABLE**
FX-3	LUMEC	DOMUS SMALL SERIES DOS-60W30LED-ES-277-HS(HOUSE SHIELD)-LE5F(Type V)-DBG-1A(MOUNTING ARM)-BK/TX(BLACK TEXTURED-VERIFY FINISH W/ DESIGN TEAM) + AM8F-15(15FT POLE) ***MANUFACTURER TO PROVIDE SHOP DRAWINGS WITH EACH COMPONENT IDENTIFIED PRIOR TO PROCUREMENT**	3000K WARM WHITE LED APPROX. 75W EACH ***FINAL WATTAGE AND BEAM DISTRIBUTION TO BE VERIFIED W/ PHOTOMETRICS**	15FT LED POSTLIGHT W/ FULL CUTOFF - HOTEL PARKING- **DIMMABLE**
FX-4	ARCHITECTURAL AREA LIGHTING	SPB-12LEDWW-BLK(BLACK) ARCHITECT TO VERIFY FINISH - ELECTRICAL ENGINEER TO VERIFY VOLTAGE-CONTRACTOR TO COORDINATE REMOTE TRANFORMER SIZE AND LOCATION SO THAT NO VOLTAGE DROP IS VISABLY NOTICEABLE	14.8 WATTS WARM WHITE, 3500K	30" BOLLARD

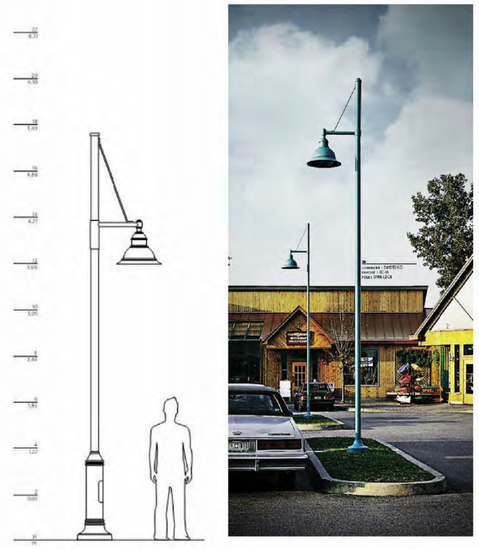
TYPE	MANUFACTURER	MODEL NUMBER	LAMP	DESCRIPTION
2014-11-04 | LIGHTING PROGRESS - NOT FOR CONSTRUCTION				
FX-5	VISION 3 LIGHTING	FL1A-SI(SILVER-VERIFY FINISH W/ ARCHITECT)-C2-K1-#MR16-36-B01-830-36-0-0-H1(HEX LOUVER)-CONTRACTOR TO COORDINATE MOUNTING DETAIL W/LANDSCAPE DESIGN + MO14B-SI(SILVER-VERIFY FINISH W/ ARCHITECT) + AC4-C4 -SI (SILVER-VERIFY FINISH W/ ARCHITECT)-C2	SORAA 9.5W, 3000K, 36 DEG LED #MR16-36-B01-830-36	STAKE MOUNTED UPLIGHT
FX-6	LUMIERE	CAMBRIA SERIES 203-CRS (CENTER REAR SWIVEL)-50MR16-12-BZ(BRONZE-VERIFY FINISH WITH ARCHITECT -LVR (HEX CELL LOUVER)-CONTRACTOR TO COORDINATE MOUNTING DETAIL PER ARCHITECTURAL DRAWINGS. **FIXTURE IS MOUNTED TO EXPOSED TRELLIS STRUCTURE ABOVE**	**LED REPLACEMENT LAMP 10W SORAA OUTDOOR LED MR16 41°, 2700K** CONTACT KRISTY BENNER AT KRISTY.BENNER@WBLIGHT.COM TO ORDER SORAA OUTDOOR LAMP	TRELLIS MOUNTED DOWNLIGHT - RECREATIONAL AREA **DIMMABLE**
FX-7	VISION 3 LIGHTING	IG4G-SI(SILVER-VERIFY FINISH W/ ARCHITECT)-STD -NR16-#MR16-36-B01-830-36-0-0-H1(HEX LOUVER)-CONTRACTOR TO COORDINATE MOUNTING DETAIL W/LANDSCAPE DESIGN	SORAA 9.5W, 3000K, 36 DEG LED #MR16-36-B01-830-36	INGRADE UPLIGHT AT ENTRY



CANYON OAKS | CALABASSAS, CA

KGM 15FT LED POSTLIGHT W/FULL CUTOFF STREET - DIMMABLE **FX-1**

270 CORAL CIRCLE | EL SEGUNDO, CALIFORNIA 90245 | TEL:310.552.2191 | FAX:310.552.2192



CANYON OAKS | CALABASSAS, CA

KGM 12FT FULL CUT OFF LED POSTLIGHT - RECREATION AREA - DIMMABLE **FX-2**

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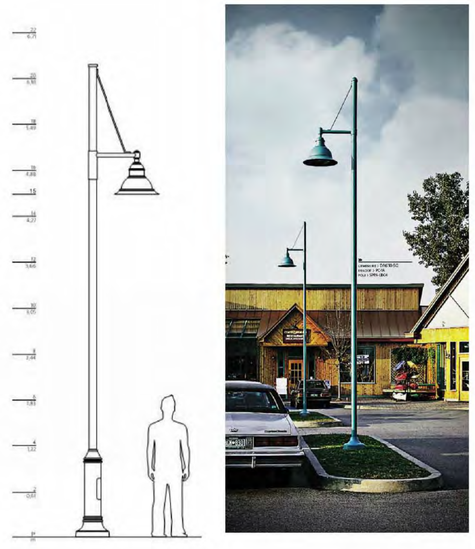

CANYON OAKS | CALABASSAS, CA

KGM 15FT LED POSTLIGHT W/ FULL CUTOFF - HOTEL PARKING - DIMMABLE **FX-3**

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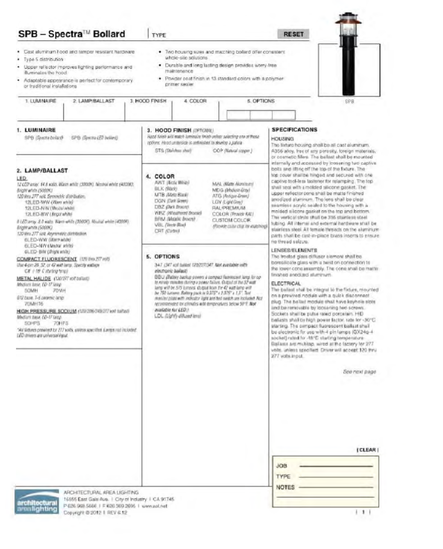

CANYON OAKS | CALABASSAS, CA

KGM 30" BOLLARD **FX-4**

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FIXTURE SCHEDULE & CUT-SHEETS

C A N Y O N O A K S

THE NEW HOME COMPANY

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TRACT 71546
CALABASAS, CALIFORNIA

PROJECT NUMBER: 13001 03/18/2015

LT-1.60

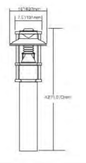
SPB – Spectra™ Bollard | TYPE

FINISH
Fixture finish shall consist of a five stage pretreatment regimen with a polymer primer sealer, over any off- and top coated with a thermoset super TGIC polyester powder coat finish. The finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance.

CERTIFICATION
Fixtures shall be listed with ETL for outdoor, wet location use, UL1598 and Canadian CSA Std. C22.2 no. 250.

WARRANTY
Spectra LED, including housing, LEDs and electrical components, is warranted for five years. Non-LED fixture is warranted for three years. Baked components carry the ballast manufacturer's limited warranty. Any unauthorized tailure, repair, replacement or modification of the Product(s) shall void this warranty. This warranty applies only to the use of the Product(s) as intended by AAL and does not cover any misapplication or misuse of said Product(s), or installation in hazardous or corrosive environments.

DIMENSIONS

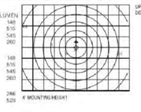


SPB WATTAGE: 80 LUMEN OUTPUT: 3753 EFFICACY: 70

B2 U4 G3

FORWARD LIGHT		LUMEN
FL	30°	7.6% 148
FM	60°	9.7% 515
FH	80°	9.7% 545
FVH	90°	4.6% 260
BACK LIGHT		
BL	30°	7.6% 148
BM	60°	9.7% 515
BH	80°	9.7% 545
BVH	90°	4.6% 260
UPLIGHT		
UL	100°	5.1% 286
UH	180°	9.4% 529

UPLIGHT 21.8%
DOWNLIGHT 78.2%

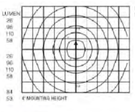


SPB 12LED BW WATTAGE: 14.8 LUMEN OUTPUT: 719 EFFICACY: 48.6

B0 U3 G1

FORWARD LIGHT		LUMEN
FL	30°	3.6% 26
FM	60°	13.4% 96
FH	80°	15.3% 110
FVH	90°	8.1% 58
BACK LIGHT		
BL	30°	3.6% 26
BM	60°	13.4% 96
BH	80°	15.3% 110
BVH	90°	8.1% 58
UPLIGHT		
UL	100°	11.7% 84
UH	180°	7.4% 53

UPLIGHT 19.1%
DOWNLIGHT 80.9%



E&E reserves the right to change product specifications without notice.

HDD Files can be found at www.aal.net

architectural area lighting
ARCHITECTURAL AREA LIGHTING
16555 East Gale Ave. | City of Industry | CA 91745
P 626.968.5866 | F 626.369.2695 | www.aal.net
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CANYON OAKS | CALABASAS, CA

30" BOLLARD

FX-4

KGM
270 CORAL CIRCLE | EL SEGUNDO, CALIFORNIA 90245 | TEL:310.552.2191 | FAX:310.552.2192

Job: Approval: Type:

VISION·3 LIGHTING

Rear Mount MR16 Flood **MODEL FL1**
12V, 50W Max., MR16 Halogen
12-24V, 10W or 12V, 12.5W LED

Specifications:

Body: Machined 6061-T6 aluminum, C36000 brass, or 304 stainless steel body with 18-8 stainless steel hardware.

Knuckle: Machined 6061-T6 aluminum, C36000 brass, or 304 stainless steel mounting knuckle with a 1/2" NPS-threaded male fitting allows a full range of mounting positions. Double-lube design (U.S. Patent #6,966,676) allows fixture to hold position during aiming and ensures a solid lock when tightened. Integral high temperature silicone O-ring prevents leaking between housing and knuckle. LED models have a molded silicone wire seal to prevent water entry at knuckle. Available Keyed-Alike Lock option (U.S. Patent #7,188,486 & #7,434,352) allows for full 360° horizontal aiming and locking.

Cap: Machined 6061-T6 aluminum, C36000 brass, or 304 stainless steel cap-lock is silver with one 18-8 stainless steel set screw and are sealed to the body with a high temperature silicone O-ring. Drive hole in C2 & C4 style caps allows for water drainage from top of lens. "Flush Lens" cap options reduce the collection of water and debris on the lens. All caps accept internal accessories, hold-in place by a stainless steel clip.

Finish: TGIC thermo-set polyester powder coat paint available in 14 standard colors. On aluminum model, finish is applied over a corrosion resistant, low-volatant chromium free, RoHS compliant coating. Aluminum model available in one sildkwood metal finish (Clear Anodized. Brass model available in three additional metal finishes: Natural, Polished, and Aged. Stainless steel model available in three additional metal finishes: Natural, Polished, and Brushed.

Socket: GY-6.35 porcelain socket with 600V, 250°C, PTFE coated 18 ga leads.

Lens: Tempered, clear lens, secured to cap with a high temperature, UV curing, silicone adhesive.

Lamps:
- 12 Volt bi-pin MR16 halogen up to 50 Watts (maximum allowable wattage depends on model and application. See **Certification** heading).
- 12-24 Volt AC/DC, 10W LED with Right-Low switch for 35W & 20W halogen equivalent outputs. Requires up to 11W at startup, which must be allowed for during system design.
- 12 Volt AC/DC, 12.5W LED with push button selection of 4 outputs (50W, 35W, 20W & 12W halogen equivalents). Requires up to 11W at startup, which must be allowed for during system design.

LED modules are field replaceable and feature replaceable lenses. an L70 of 60,000 hrs., dynamic transformer recognition, phase dimming (see Transformer and Dimmer Compatibility List), and patented LEDSense® thermal management.

Certification: CSA tested & certified to US and Canadian safety standards for the following applications:

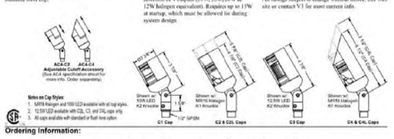
Wet location landscape use (UL1838):
FL1A - 50W Max. MR16 Halogen lamp.
FL1B - 35W Max. MR16 Halogen lamp.
FL1S - 20W Max. MR16 Halogen lamp.

Wet location wall mount use (UL1598):
FL1A - 50W Max. MR16 Halogen lamp.
FL1B - 35W Max. MR16 Halogen lamp.
FL1S - 20W Max. MR16 Halogen lamp.

Wet location ceiling mount use (UL1598):
FL1A - 20W Max. MR16 Halogen lamp.
FL1B - 20W Max. MR16 Halogen lamp.
FL1S - 20W Max. MR16 Halogen lamp.

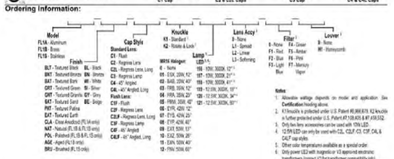
10W LED & 12.5 LED can be used in all models and applications.

All ratings subject to change without notice. See web site or contact V3 for most current info.



Notes on Cap Styles:
1. MR16 Halogen and 10V/12.5 available with all cap styles.
2. 12.5W LED available with C2L, C3, and C4L caps only.
3. All caps available with standard or flush lens option.

Ordering Information:



Example: **FL1B - AGE - C3 - K2 - 9 - 9 - F2 - H1**

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P.O. Box 607, Fowler, CA 93625 (559) 834-5749 (559) 834-4779 fax www.vision3lighting.com
revision 04/04/13

CANYON OAKS | CALABASAS, CA

STAKE MOUNTED UPLIGHT

FX-5

KGM
270 CORAL CIRCLE | EL SEGUNDO, CALIFORNIA 90245 | TEL:310.552.2191 | FAX:310.552.2192

LUMIÈRE®

DESCRIPTION

Cambria 203 is a small, low voltage dimmable LED and halogen MR16 luminaire. It is available with a fully adjustable side swivel stem (203), 203-FL), an adjustable center rear swivel (203-CRS) or a stationary rear flush mount (203-FM) with two swivel options: 45° tilt and pivot and 360° rotation. Center rear swivel model CRS provides 200° tilt and 360° rotation. Various lenses, louvers and color or dichroic filters can be combined - up to three at once - to create multiple lighting effects. The Luminaire exclusive Siphon Prevention System (S.P.S.) prevents water from siphoning into the fixture through its own lead wires.

Catalog #	Type
Project	
Comments	Date
Prepared by	

SPECIFICATION FEATURES

A ... Material
Housing, hood and mounting stem are precision-machined from corrosion-resistant billet stock 6061-T6 aluminum, C360 brass, C302 bronze, C110 copper or 303/304 stainless steel.

B ... Finish Painted
Fixtures constructed from 6061-T6 aluminum are double protected by an ROHS compliant chemical film undercoating and polyester powdercoat paint finish, exceeding salt spray requirements. A variety of standard colors are available.

C ... Brass, Bronze, Copper or Stainless Steel
Fixtures constructed from brass, bronze, copper or stainless steel are left unpainted to reveal the natural beauty of the material. Brass, bronze and copper will patina naturally over time.

D ... Hood
Hood is removable for easy relamping and adjusts up to three internal accessories at once (lenses, louvres, filters) to achieve multiple lighting effects. Model 203, 203-CRS & 203-FM: Weep holes prevent water and mineral stains from collecting on the lens, even in the straight-up position. Model 203-FL: The flush lens design reduces fixture lighting, minimizes debris collection and prevents water and mineral stains from collecting on the lens.

E ... Gasket
Housing and hood are sealed with a high temperature silicone o-ring gasket to prevent water intrusion and breakage due to thermal shock.

F ... Lens
Tempered glass lens, factory sealed with high temperature adhesive to prevent water intrusion and breakage due to thermal shock.

G ... Mounting Stem
Model 203 and 203-FL include fully adjustable side-mounted swivel stem, providing 240° tilt and 360° rotation for easy aiming. Center rear swivel (203-CRS) or stationary rear flush mount (203-FM) models are also available. All models include 1/2" NPS threaded male fitting. Stainless steel arm-locking mechanisms are standard (not available on 203-FM). Luminaire's exclusive Siphon Prevention System (S.P.S.) prevents water from siphoning into the fixture through its own lead wires.

H ... Hardware
Stainless steel hardware is standard to provide maximum corrosion resistance.

I ... Socket
Ceramic socket with 250° C Teflon® coated lead wires and GU5.3 bi-pin base.

J ... Electrical
Remote 12V transformer required (not included). NOTE: initial power draw on LED equipped fixtures is 15 watts. When sizing transformer use 15 watts per LED fixture. Nominal power draw after start up is 6 watts or 18 watts accordingly. Also, LEDs are more voltage sensitive than halogen. Voltages above 13.5 volts may cause premature LED failure. The LED modules are designed to tolerate dimmers 10 and 13 volts. Any less or more voltage can cause premature failures.

K ... Lamp
Halogen lamp not included. Available from Luminaire as an accessory, LED modules are included and are available in four color temperatures (2700, 3000, 4000 & 5000 Kelvin) and two distributions: spot, narrow, and flood. Both color temperature and distribution must be specified when ordering - see reverse side for details and catalog logic.

CAMBRIA
203
10W LED
6W LED
50W (max.) MR16
Halogen
Low Voltage
Accent/Flood
IP65

COOPER Lighting
Specifications and Dimensions subject to change without notice.
ADL332402
10.25.2013 8:40:28 PM

CANYON OAKS | CALABASAS, CA

TRELLIS MOUNTED DONWLIGHT - RECREATIONAL AREA - DIMMABLE

FX-6

KGM
270 CORAL CIRCLE | EL SEGUNDO, CALIFORNIA 90245 | TEL:310.552.2191 | FAX:310.552.2192

CAMBRIA 203

ORDERING INFORMATION

Sample Number: 203 FL 10WFS 12 MCP

Series	Source	Voltage	Accessories
203 = LED or MR16 Cambria Accent Fixture	10WFS = 10W Max. Halogen MR16, GU5.3 Base	12 = 10-13.5V	Filters
Construction	XLED12FS = 6W 220lm, 12 Degree Spot, GU5.3 Base	Finish	FTC = Amber Filter, 2 3/8" Dia.
— = Standard Side Swivel Stem, 1/2" NPS	XLED12FM = 6W 220lm, 41 Degree Narrow, GU5.3 Base	Painted	FTG = Green Filter, 2 3/8" Dia.
CRS = Center Rear Swivel Stem, 1/2" NPS	XLED12FF = 6W 220lm, 41 Degree Wide, GU5.3 Base	BC = Black	FTH = Dichroic CW Filter, 2 3/8" Dia.
FM = Rear Flush Mount, 1/2" NPS	XLED12FW = 6W 220lm, 41 Degree Flood, GU5.3 Base	SC = Bronze	FTW = Dichroic WW Filter, 2 3/8" Dia.
FL = Flush Lens, Side Swivel Stem, 1/2" NPS	XLED24FS = 6W 300lm, 10 Degree Spot, GU5.3 Base	CC = Clay Silver	Lens
	XLED24FM = 6W 300lm, 24 Degree Narrow, GU5.3 Base	VG = Verde	FLN = Flat Narrow Lens, 2 3/8" Dia.
	XLED24FF = 6W 300lm, 41 Degree Wide, GU5.3 Base	WT = White	FLW = Flat Wide Lens, 2 3/8" Dia.
	XLED24FW = 6W 300lm, 41 Degree Flood, GU5.3 Base	Gloss	FRN = Frosted Narrow Lens, 2 3/8" Dia.
	XLED512S = 10W 670lm, 12 Degree Spot, GU5.3 Base	MBK = Matte Black	FRW = Frosted Wide Lens, 2 3/8" Dia.
	XLED512M = 10W 670lm, 24 Degree Narrow, GU5.3 Base	MBR = Bronze	Optical Lenses
	XLED524S = 10W 670lm, 10 Degree Spot, GU5.3 Base	MCP = Copper	LNS = Spot Optical Lens, 2 3/8" Dia.
	XLED524M = 10W 670lm, 24 Degree Narrow, GU5.3 Base	MSN = Satin Nickel Finish	LNF = Flood Optical Lens, 2 3/8" Dia.
	XLED524F = 10W 670lm, 41 Degree Flood, GU5.3 Base	Louvers	Optical Lenses
	XLED2412S = 10W 2700K, 12 Degree Spot, GU5.3 Base	LBL = Lamp Concealing Louver, Black Finish, 2 3/8" Dia.	LNS = Spot Optical Lens, 2 3/8" Dia.
	XLED2412M = 10W 2700K, 24 Degree Narrow, GU5.3 Base	LBR = Lamp Concealing Louver, Bronze Finish, 2 3/8" Dia.	LNF = Flood Optical Lens, 2 3/8" Dia.
	XLED2412F = 10W 2700K, 41 Degree Flood, GU5.3 Base	Optical Lenses	Optical Spread Lens for Recessed, 2 3/8" Dia.
	XLED3012S = 10W 3000K, 12 Degree Spot, GU5.3 Base	LNS = Spot Optical Lens, 2 3/8" Dia.	
	XLED3012M = 10W 3000K, 24 Degree Narrow, GU5.3 Base	LNF = Flood Optical Lens, 2 3/8" Dia.	
	XLED3012F = 10W 3000K, 41 Degree Wide, GU5.3 Base	Lens Accessories	
	XLED4012S = 10W 4000K, 12 Degree Spot, GU5.3 Base	LBL = Lamp Concealing Louver, Black Finish, 2 3/8" Dia.	
	XLED4012M = 10W 4000K, 24 Degree Narrow, GU5.3 Base	LBR = Lamp Concealing Louver, Bronze Finish, 2 3/8" Dia.	
	XLED4012F = 10W 4000K, 41 Degree Wide, GU5.3 Base	Optical Lenses	
	XLED5012S = 10W 5700K, 12 Degree Spot, GU5.3 Base	LNS = Spot Optical Lens, 2 3/8" Dia.	
	XLED5012M = 10W 5700K, 24 Degree Narrow, GU5.3 Base	LNF = Flood Optical Lens, 2 3/8" Dia.	
	XLED5012F = 10W 5700K, 41 Degree Wide, GU5.3 Base		

CANYON OAKS | CALABASAS, CA

TRELLIS MOUNTED DONWLIGHT - RECREATIONAL AREA - DIMMABLE

FX-6

KGM
270 CORAL CIRCLE | EL SEGUNDO, CALIFORNIA 90245 | TEL:310.552.2191 | FAX:310.552.2192

PHOTOMETRIC DATA

Cambria 203 Lamp=50MR16/NSP (EXT) CBCP=11,000

Cone of Light

Distance to Illuminated Plane	Initial Node Footcandles	Beam Diameter
10.9'	45	4.0'
12.9'	160	5.0'
8.9'	158	2.5'
5.9'	1,000	1.5'
2.9'	4,000	0.8'
4.9'	2,658	2.5'

Lamp Wattage Multiplier: 20W x 0.50

Cambria 203 Lamp=50MR16/FL (FBW) CBCP=3200

Cone of Light

Distance to Illuminated Plane	Initial Node Footcandles	Beam Diameter
10.9'	53	19.5'
10.9'	29	4.5'
8.9'	45	5.2'
5.9'	81	4.2'
8.9'	29	2.5'
4.9'	146	1.5'

Cambria 203 Lamp=50MR16/SFL (EXN) CBCP=2000

Cone of Light

Distance to Illuminated Plane	Initial Node Footcandles	Beam Diameter
10.9'	9	13.5'
10.9'	11	11.5'
8.9'	27	8.5'
5.9'	48	7.5'
4.9'	100	3.5'
2.9'	651	1.5'

Lamp Wattage Multiplier: 35W x 0.57 20W x 0.30

Cambria 203 Lamp=50MR16/VWFL (FBW) CBCP=1280

Cone of Light

Distance to Illuminated Plane	Initial Node Footcandles	Beam Diameter
10.9'	6	17.5'
10.9'	11	11.5'
8.9'	17	9.2'
5.9'	28	7.5'
8.9'	17	4.5'
2.9'	258	3.5'

NOTES AND FORMULAS
- Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot.
- Footcandle values are below. Apply appropriate light loss factors where necessary.

LAMP INFORMATION

Lamp	Watts	Beam Spread	CBCP	°K	Life (hrs.)	Base	Note
XLED2712	6	12°	3300	2700	50000	GU5.3 bi-pin	1,2
XLED2724	6	24°	937	2700	50000	GU5.3 bi-pin	1,2
XLED2741	6	41°	472	2700	50000	GU5.3 bi-pin	1,2
XLED3012	6	12°	3084	3000	50000	GU5.3 bi-pin	1,2
XLED3024	6	24°	1019	3000	50000	GU5.3 bi-pin	1,2
XLED3041	6	41°	446	3000	50000	GU5.3 bi-pin	1,2
XLED4012	6	12°	4290	4000	50000	GU5.3 bi-pin	1,2
XLED4024	6	24°	1179	4000	50000	GU5.3 bi-pin	1,2
XLED4041	6	41°	774	4000	50000	GU5.3 bi-pin	1,2
XLED5712	6	12°	4146	5700	50000	GU5.3 bi-pin	1,2
XLED5724	6	24°	1275	5700	50000	GU5.3 bi-pin	1,2
XLED5741	6	41°	750	5700	50000	GU5.3 bi-pin	1,2
10LED2712	10	12°	3997	2700	50000	GU5.3 bi-pin	1,2
10LED2721	10	21°	1486	2700	50000	GU5.3 bi-pin	1,2
10LED2741	10	41°	705	2700	50000	GU5.3 bi-pin	1,2
10LED3012	10	12°	3913	3000	50000	GU5.3 bi-pin	1,2
10LED3021	10	21°	1521	3000	50000	GU5.3 bi-pin	1,2
10LED3041	10	41°	964	3000	50000	GU5.3 bi-pin	1,2
10LED4012	10	12°	5388	4000	50000	GU5.3 bi-pin	1,2
10LED4021	10	21°	1739	4000	50000	GU5.3 bi-pin	1,2
10LED4041	10	41°	1125	4000	50000	GU5.3 bi-pin	1,2
10LED5712	10	12°	67° 1	5700	50000	GU5.3 bi-pin	1,2
10LED5721	10	21°	1965	5700	50000	GU5.3 bi-pin	1,2
10LED5741	10	41°	1182	5700	50000	GU5.3 bi-pin	1,2
50MR16GNSP	50	10°	11,000	3050	4000	GU5.3 bi-pin	1,2
50MR16GSL	50	25°	3200	3050	4000	GU5.3 bi-pin	1,2
50MR16FL	50	46°	2080	3050	4000	GU5.3 bi-pin	1,2
50MR16VWFL	50	66°	1280	3050	4000	GU5.3 bi-pin	1,2

COOPER Lighting
Specifications and Dimensions subject to change without notice.
ADL332402

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TRELLIS MOUNTED DONWLIGHT - RECREATIONAL AREA - DIMMABLE

FX-6

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Job: Approval: Type:

VISION·3 LIGHTING

MR16 Remote Sealed Ingrade **MODEL IG4**
12 Volt, 42 Watt Max., MR16 Halogen
12-24 Volt AC/DC, 10 Watt, LED

Specifications:

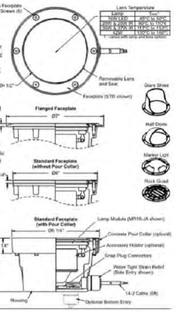
Housing: Cast C84400 bronze housing. Optional concrete pour collar available in matched and finish to match the faceplate.

Lens: Tempered, 5/16" thick, sloped lens allows for flush mounting. Optional Slip Reduction Lens increases wet/dry friction by over 50%. Molded, high temperature, silicone lens gasket compresses around lens between faceplate and housing for a water tight seal. Both lens and seal are removable for cleaning or replacement. Note: Lens temperatures can get hot enough, with some lamps, to cause injury when touched. See Lens Temperatures table at right and take proper precautions with your design.

Faceplate: Available in cast or machined C84400 bronze or machined 316 stainless steel. Attaches using six 18-8 stainless steel captive screws. Optional Glare Shield, Half Dome, Marker Light, and Rock Guard faceplates available in cast C84400 bronze and allow 360° of rotational alignment. Optional Flanged faceplate available, in machined brass or 316 stainless steel, for cast-drill applications.

Lamp Module & Aiming: Standard Aiming Lamp Module allows for 22° vertical and 360° horizontal aiming. Joystick Aiming Lamp Module allows for one tool "hot aiming" with 18° vertical and 360° horizontal adjustment without having to touch hot bezels or lamp. Optional accessory holder accepts up to two lens options.

Finish: Available in 14 standard TGIC thermo set polyester powder coat paint colors. Cast Bronze faceplates available in two additional finishes: Natural, Aged, and Polished. Machined Stainless faceplates available in three additional finishes: Natural, Aged, and Polished.



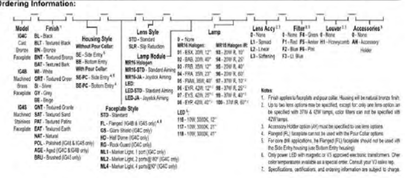
Lamp Module Limitations:
IG4 - 10W LED or 42W Max. MR16 Halogen lamp.

Halogen lamp. (Only one lens option can be used with 37W & 42W lamps. 42W lamps can not be used with a color filter) Note: IG4 is not rated for use in Canada with halogen lamp options.

Certification: IP68 rated to a depth of 3 ft. for 48 hours. Drive over durable for up to 5500 lb vehicles, at up to 10 mph ('HR' or 'HR-PC' housings and 'STD', 'ML1', 'ML2', or 'ML4' faceplates only. Other housing and faceplate options are not suitable for drive over applications). CSA tested & certified to US and Canadian safety standards for the following application(s):

Wet location landscape use (UL1838):
IG4 - 10W LED or 42W Max. MR16 Halogen lamp.

Ordering Information:



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INGRADE UPLIGHT AT ENTRY

FX-7

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Robert Hidey **Architects**

FIXTURE SCHEDULE & CUT-SHEETS

C A N Y O N O A K S

TRACT 71546
CALABASAS, CALIFORNIA

THE NEW HOME COMPANY

PROJECT NUMBER: 13001 03/18/2015

LT-1.61

3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
4301 Hacienda Drive, Suite 560, Pleasanton, CA 94588 Telephone 925.924.6440
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Appendix G

Sewer Area Study

Civil Engineering

Land Planning

Hydrology/Flood Control

Geotechnical Engineering

Geology/Seismic Hazards

Public Works Services

Storm Water Management

RJR ENGINEERING

3500 Camino Avenue, Suite 200
Oxnard, California 93030
p: 805.485.3935
f: 805.485.6496

Malibu p: 310.456.9085
San Luis Obispo p: 805.596.0216
Sacramento p: 530.888.7356

www.rjreng.com

SEWER AREA STUDY
TENTATIVE TRACT 71546
INTERSECTION OF AGOURA & LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

Prepared For:

The New Home Company
95 Enterprise, Suite 325
Aliso Viejo, CA. 92656

Attn: Rick Bianchi

Dated: January 5, 2015

Project: 1344.60

SEWER AREA STUDY
TRACT 71546
THE NEW HOME COMPANY
INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
CALABASAS, CALIFORNIA

1.0. INTRODUCTION

1.1. General Information

This Sewer Area Study was prepared for The New Home Company based on the Professional Services Agreement between The New Home Company, and RJR Engineering. This report presents results of the preliminary hydrologic engineering analysis conducted by RJR Engineering Group (RJR), for the landplaning and feasibility of Tract 71546 in Calabasas, California. The initial agreement and scope of work includes assessing existing hydrology and hydraulic conditions of the onsite and offsite tributary areas related to the subject site as well as the hydrologic and hydraulic conditions of the proposed site improvements.

1.2. Available Information

As part of the study RJR was provided certain plans and reports. Available record drawings including wastewater improvement plans were used to verify the existing facility sizes, slopes and locations. The proposed improvements were based off the tentative map designed by RJR Engineering. In order to provide conservative results, RJR has assumed relatively full sewer main lines and analyzed pipe hydraulics with conservative Manning's values. This report has been written specifically for these improvements and assumptions. Any changes in this data may result in new or additional recommendations and conclusions.

1.3. Purpose

RJR Engineering Group has conducted this sewer area analysis for The New Home Company property for the purposes of providing existing capacity data and proposed development impacts for the conveyance of wastewater flows through the existing sewer facilities located off site.

Currently, The New Home Company project is in the tentative tract map stage. Tentative site plans have been prepared including residential, commercial and recreational improvements. This study has incorporated the tentative design into the proposed calculations.

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2.0. WASTEWATER FACILITIES

2.1. Existing Facilities

The project site currently has no wastewater improvements within the property boundaries. Existing wastewater facilities are located within Las Virgenes Road located south of the proposed site adjacent to the neighboring Tract 53534. Flows within this line are conveyed south away from the proposed project site. An existing 8 inch vcp sewer line is also located within Agoura Road, approximately 300 feet west of the subject property line. A manhole currently exists at the terminus of the line.

2.2. Proposed Facilities

The proposed development (Tentative Site Plan) consists of 67 single family residential units; 2 multi-family residential building pads 53, 54, 67, and 68 (4 units); a three acre hotel lot (120 rooms); associated streets; improvements; and landscaping. The proposed site plan includes the design of a complete sewer system in accordance with County standards and will service all portions of the proposed development.

A proposed gravity flow sewer system is proposed to be connected to the existing 8" VCP located in Agoura Road at the existing manhole located approximately 300 feet west of the project entrance. The line will then extend straight to proposed Street 'A' and extend east within the limits of the proposed street up to the proposed intersection of streets 'A' and 'B'.

A sewer line will then extend east from the intersection, under Street 'B' to service all units along eastern half of the Street 'B' loop as well as the eastern most cul-de-sac. A separate line will run west under Street 'B' to service the western half of the Street 'B' loop.

Based on designs of similar size tracts, the proposed sewer pipes will range from 4 inch to 8 inch. Grades of the proposed sewer lines will vary throughout the site and will be adjusted in design so the velocity of flow is maintained between self-cleaning and non-scouring velocities. Upon completion of the preliminary layout and design of the sewer improvements a hydraulic analysis will be conducted to verify pipe sizes and velocities within the system. Appropriate adjustments will then be made to the preliminary design as needed.

It should also be noted that all private streets within the proposed development will include the appropriate easements for wastewater facilities.

Overall, the proposed sewer system within the Tract is feasible and final designs will meet or exceed the County wastewater requirements.

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3.0. SEWER AREA ANALYSIS

3.1 Methodology

This study was conducted in accordance with the Los Angeles County Department of Public Works standards. The service areas were determined based on land use and anticipated sewer discharge based on the L.A. County sewer zoning coefficients. The calculated wastewater production flows were then used for the hydraulic analysis of the existing sewer lines.

The proposed sewer production rates were then estimated based on the tentative tract map. The anticipated sewer discharge rates were based on the L.A. County sewer zoning coefficients. The calculated proposed wastewater production flow rates were then added to the existing flow rates for the purpose of the hydraulic analysis of the fully developed condition.

3.5.1 Existing Analysis

The existing sewer analysis demonstrates that the existing sewer facilities, downstream of the proposed project have sufficient capacity to carry additional wastewater from proposed development.

Existing Commercial Land Use

Zoning Coefficient	=	*0.015 cfs/acre*
Total Acreage	=	*9.3 acres*
Total Sewer Flow	=	*0.1395 cfs*

Existing Capacity

The existing sewer facility capacity was determined using the hydraulic program Hydraflow by Autodesk, Inc. The software calculates flow areas, velocity, wetted perimeter, top width, critical depth, hydraulic grade line and energy grade lines for various channel configurations. The software takes into account channel shape, n-values, discharge and depth.

Agoura Road

The following parameters were used for calculating the existing wastewater hydraulics:

Pipe Diameter	=	8 Inches
Pipe Slope	=	1% to 2.25% (varies based on existing conditions)
n-value	=	.017 (selected as a conservative value of VCP)
Calculated Q	=	**0.1395 cfs**

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Using the above parameters, the existing sewer facilities flow at approximately 0.17 feet in depth, approximately 25 percent full. The Hydraflow calculations have been provided in Appendix B for reference.

24 Inch Trunk Sewer Line

The following parameters were used for calculating the existing wastewater hydraulics:

Pipe Diameter	=	24" Inches
Pipe Slope	=	1% (selected as a conservative value)
n-value	=	.017 (selected as a conservative value of VCP)
Assumed Depth	=	1.50' (approximately 75% full)
		1.80' (approximately 90% full)

For the purposes of this study, the existing 24 inch trunk sewer line was run under two scenarios. The first assumed the trunk line to be 75 percent full to provide a conservative analysis of the sewer facilities. The second assumed the trunk line to be approximately 90% full to analyze a worst case scenario. The 24" line therefore was calculated to have a flow rate of approximately 15.78 cfs at 75 percent full and 18.44 cfs at approximately 90 percent full. The Hydraflow calculations have been provided in Appendix B for reference.

3.5.2 Proposed Analysis

The proposed sewer analysis demonstrates that the existing sewer facilities have sufficient capacity to carry the proposed wastewater from the developed site without impacting downstream facilities.

Proposed Commercial Land Use

Zoning Coefficient	=	*0.015 cfs/acre*
Total Acreage	=	*3 acres*
Total Sewer Flow	=	*0.045 cfs*

Proposed Single Family Land Use

Zoning Coefficient	=	*0.001cfs/unit*
Total Unit County	=	*67 Units*
Total Sewer Flow	=	*0.067 cfs*

The Los Angeles County Zoning coefficients list R-1 Residential land use as 0.004 cfs/acre for wastewater production. The average single family lot size for the proposed project is approximately 0.15 acre. For the purposes of this study a conservative value of 0.25 acre per lot was assumed, therefore the wastewater flow rate is estimated at 0.001 cfs/unit.

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Proposed Multi-Family Land Use

Zoning Coefficient	=	*0.004 cfs/building*
Total Unit County	=	*2 - (2 Units Each) Buildings*
Total Sewer Flow	=	*0.008 cfs*

The Los Angeles County Zoning coefficients list R-4 Residential land use as 0.016 cfs/acre for wastewater production. The average multi-family building size for the proposed project is approximately 0.25 acre. For the purposes of this study a wastewater production rate was estimated at 0.004 cfs/building.

Total Proposed Sewer Flow = ***0.120 cfs***

Agoura Road

The following parameters were used for calculating the proposed wastewater hydraulic scenario:

Pipe Diameter	=	8 Inches
Pipe Slope	=	1% to 2.25% (varies based on existing conditions)
n-value	=	.017 (selected as a conservative value of VCP)
Calculated Q	=	**0.2595 cfs** (existing + proposed)

Using the above parameters, the existing sewer facilities have capacity to convey the existing and proposed sewer flows with sufficient capacity for future improvement assuming that the existing sewer facilities are currently less than 90% of their existing capacities. The pipe would flow at approximately 0.20 feet in depth, approximately 30 percent full. The Hydraflow calculations have been provided in Appendix B for reference.

24 Inch Trunk Sewer Line

The following parameters were used for calculating the existing and proposed wastewater hydraulics:

Pipe Diameter	=	24" Inches
Pipe Slope	=	1% (selected as a conservative value)
n-value	=	.017 (selected as a conservative value of VCP)
Calculated Q	=	**16.04 cfs** (Trunk Line 75% full + ex. 8" + prop)
		18.70 cfs (Trunk Line 90% full + ex. 8" + prop)

Using the above parameters, the existing sewer facilities have capacity to convey the existing and proposed sewer flows for existing flows less than 90% full, otherwise they will exceed the maximum capacity of the existing trunk line. See Hydroflow runs in Appendix B.

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4.0. SUMMARY

Although no flow data for the 24 inch sewer trunk line is known at this time, it should be noted that the connection point into the trunk line is near the top of the system and is in place for the immediate area surrounding the proposed project. For the purposes of this study and to provide conservative estimates, the sewer trunk line was estimated to be between 75 percent and 90 percent full. However, it is likely that the trunk line does not run near the 75 percent full mark since the connection with the trunk line is near the top of the system. In addition, the proposed project is further upstream than any of the existing improvements. The distance will provide a time delay that will allow for the downstream flows to move further downstream allowing for more capacity for the proposed sewer flows.

Overall, the existing sewer facilities have sufficient capacity to convey the proposed wastewater production while providing sufficient clearances for additional future development assuming that the existing conditions don't exceed the 90% threshold. RJR recommends that an existing sewer capacity study be performed to verify existing flows during the design phase of this project. If, the existing sewer capacity is shown to approach 90% or above then the existing 8" sewer along Agoura Road will have to be replaced to accommodate the additional proposed flows.

5.0. LIMITATIONS

The above described site assessment and calculations are estimates based on the preliminary proposed site plan that was available at the time of this report. The above calculations can be used to aid the final site and wastewater system design for the proposed development.

It should be noted that this report has been prepared solely as a sewer area analysis for the proposed improvements outlined in the tentative tract map. Any changes in the site plan or reconfiguration of proposed site improvements will render this report void.

Our recommendations have been made in accordance with the custom and practices generally employed by the civil engineering profession. This is in lieu of all other warranties, or representations, either expressed or implied. Based on the available data, RJR has determined the site development is feasible with respect to the downstream facilities. However, additional findings in subsequent studies may modify or invalidate these findings. It should be noted that the sewer model is based on the tentative tract site improvements existing sewer plans and conservative assumptions. Any variations from these assumptions or preliminary designs will alter the hydraulic findings.

This hydraulics report was prepared for the exclusive use of The New Home Group., their agents, assignees and successors-in-interest. However all plans and reports remain the intellectual property of RJR Engineering. As such, this report is not transferable or assignable without the express written consent of RJR. This report is copyrighted and applicable laws apply, and the tendering of this report to the Client for submittal to the public

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APPENDIX A
SEWER AREA STUDY DATA

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

AREA STUDY

An area study must be made for all private contract sewer projects. See attached sample. The area study must include the following items:

1. Area being served -- In Acres
2. Determined Tributary area to main line being designed (incl. areas of future devel.)- In Acres
3. Existing and Land Use Zoning
4. Anticipated Sewer Discharge in cfs of total area based on zoning, and/or heavy water users
5. Existing or proposed utilities if in conflict
6. Existing and proposed sewers showing pipe size and grade leading up to the trunk line in order for you to evaluate the impact of your proposed development on the existing system
7. Direction of sewer flow
8. Contour lines
9. Scale not to be less than 1"=600'
10. North arrow pointing up or to the left

ZONING COEFFICIENTS

ZONE	COEFFICIENT (cfs/Acre)
Agriculture	0.001
Residential	
R-1	0.004
R-2	0.008
R-3	0.012
R-4	0.016 *
Commerical	
C-1 through C-4	0.015 *
Heavy Industrial	
M-1 through M-4	0.021 *

* Individual building, commercial or industrial plant capacities shall be the determining factor when they exceed the coefficients shown.

The coefficient to be used for any zoned areas not listed will be determined by the County based upon the intended development and use.

The County shall determine which of the coefficients or combination of coefficients shall be used for design as determined by the established or proposed zoning in the study area. Any modifications to these coefficients due to topography, development, or hazard areas, shall be approved by the Department of Public Works.

Manning's n Values

Reference tables for Manning's n values for Channels, Closed Conduits Flowing Partially Full; and Corrugated Metal Pipes.

n-value range

	Low	Average	High
7. Concrete:			
Culvert, straight and free of debris	0.010	0.011	0.013
Culvert with bends, connections, and some debris	0.011	0.013	0.014
Finished	0.011	0.012	0.014
Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
Unfinished, steel form	0.012	0.013	0.014
Unfinished, smooth wood form	0.012	0.014	0.016
Unfinished, rough wood form	0.015	0.017	0.020
8. Wood:			
Stave	0.010	0.012	0.014
Laminated, treated	0.015	0.017	0.020
9. Clay:			
Common drainage tile	0.011	0.013	0.017
Vitrified sewer	0.011	0.014	0.017
Vitrified sewer with manholes, inlet, etc.	0.013	0.015	0.017
Vitrified Subdrain with open joint	0.014	0.016	0.018
10. Brickwork:			
Glazed	0.011	0.013	0.015
Lined with cement mortar	0.012	0.015	0.017
Sanitary sewers coated with sewage slime with bends and connections	0.012	0.013	0.016
Paved invert, sewer, smooth bottom	0.016	0.019	0.020
Rubble masonry, cemented	0.018	0.025	0.030

Manning's n for Corrugated Metal Pipe (AISI, 1980).

Type of Pipe, Diameter and Corrugation Dimension	n
1. Annular 2.67 x 1/2 inch (all diameters)	0.024
2. Helical 1.50 x 1/4 inch	
8" diameter	0.012
10" diameter	0.014
3. Helical 2.67 x 1/2 inch	
12" diameter	0.011
18" diameter	0.014
24" diameter	0.016
36" diameter	0.019
48" diameter	0.020
60" diameter	0.021
4. Annular 3x1 inch (all diameters)	0.027
5. Helical 3x1 inch	
48" diameter	0.023
54" diameter	0.023
60" diameter	0.024
66" diameter	0.025
72" diameter	0.026
78" diameter and larger	0.027
6. Corrugations 6x2 inches	
60" diameter	0.033
72" diameter	0.032
120" diameter	0.030
180" diameter	0.028

APPENDIX B
HYDRAFLOW CALCULATIONS

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing Condition (8 Inch VCP Sewer) Junction w/ Trunk Line Sta. 0+00 to 0+94

Circular

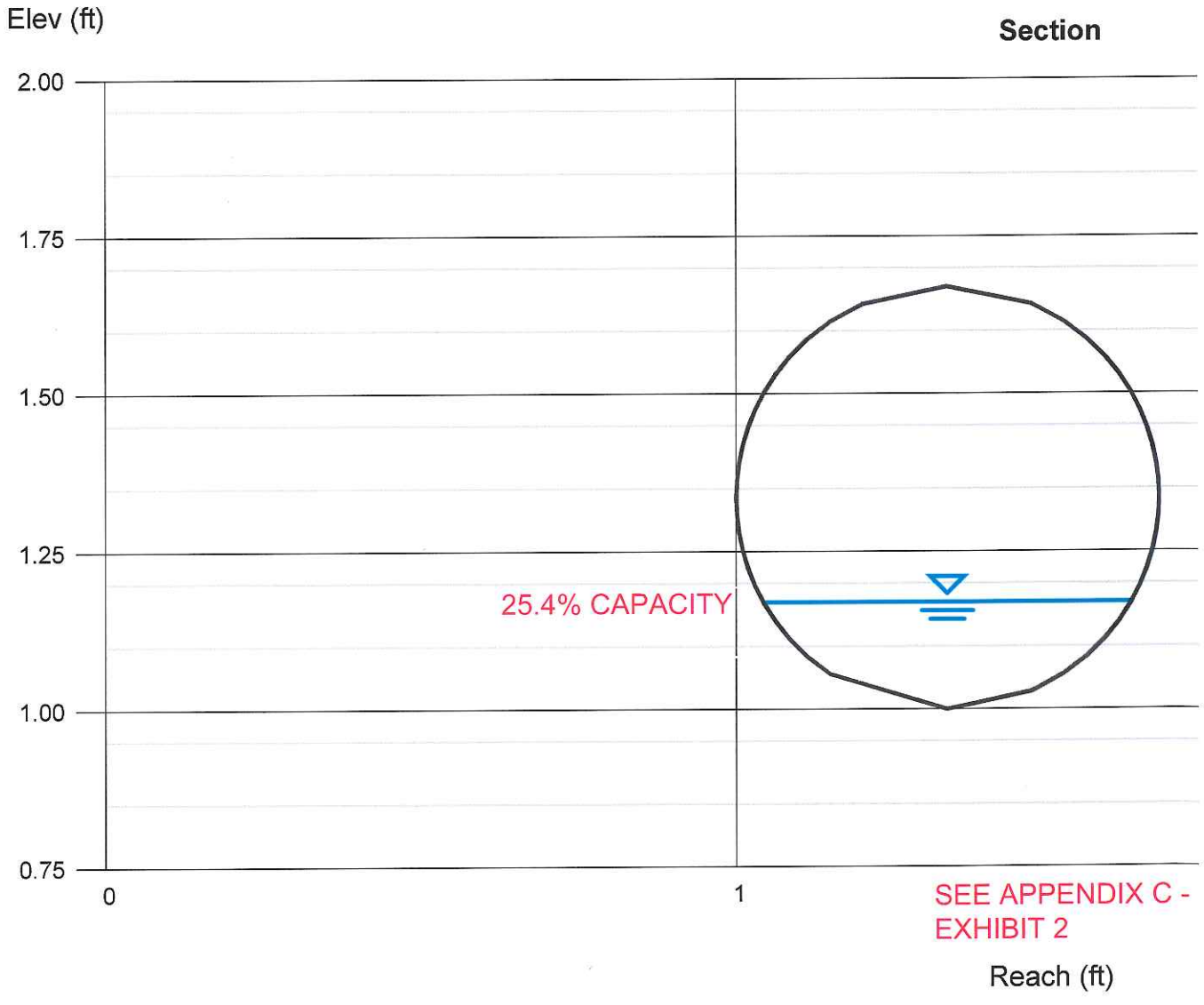
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 1.20
N-Value	= 0.017

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.17
Q (cfs)	= 0.140
Area (sqft)	= 0.07
Velocity (ft/s)	= 1.97
Wetted Perim (ft)	= 0.71
Crit Depth, Yc (ft)	= 0.17
Top Width (ft)	= 0.58
EGL (ft)	= 0.23



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing Condition (8 Inch VCP Sewer) within Agoura Road Sta. 3+67.56 to 6+67.56

Circular

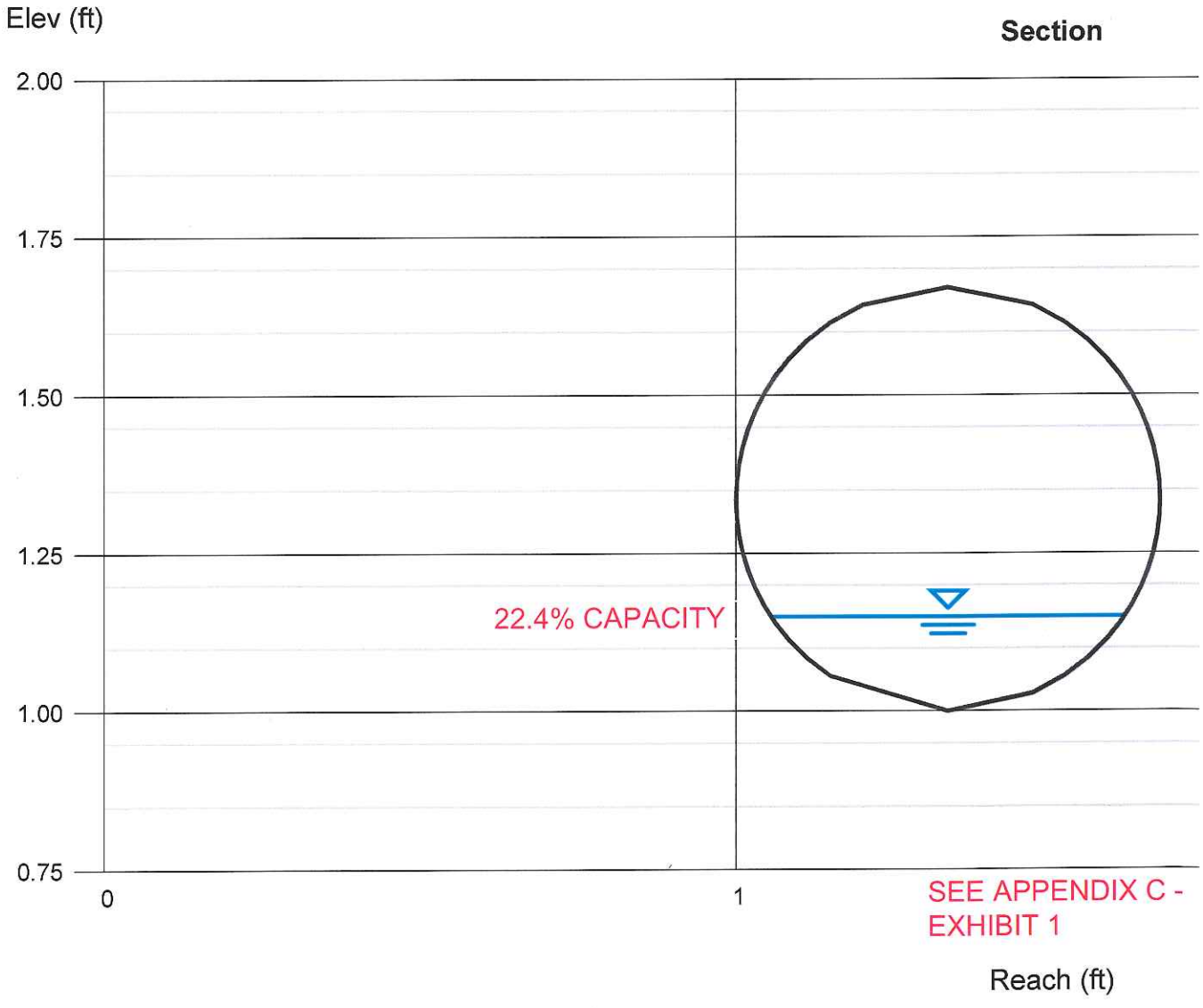
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 2.24
N-Value	= 0.017

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.15
Q (cfs)	= 0.140
Area (sqft)	= 0.06
Velocity (ft/s)	= 2.35
Wetted Perim (ft)	= 0.66
Crit Depth, Yc (ft)	= 0.17
Top Width (ft)	= 0.56
EGL (ft)	= 0.24



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing and Proposed Flow Condition (8 Inch VCP Sewer) within Agoura Road Sta. 3+

Circular

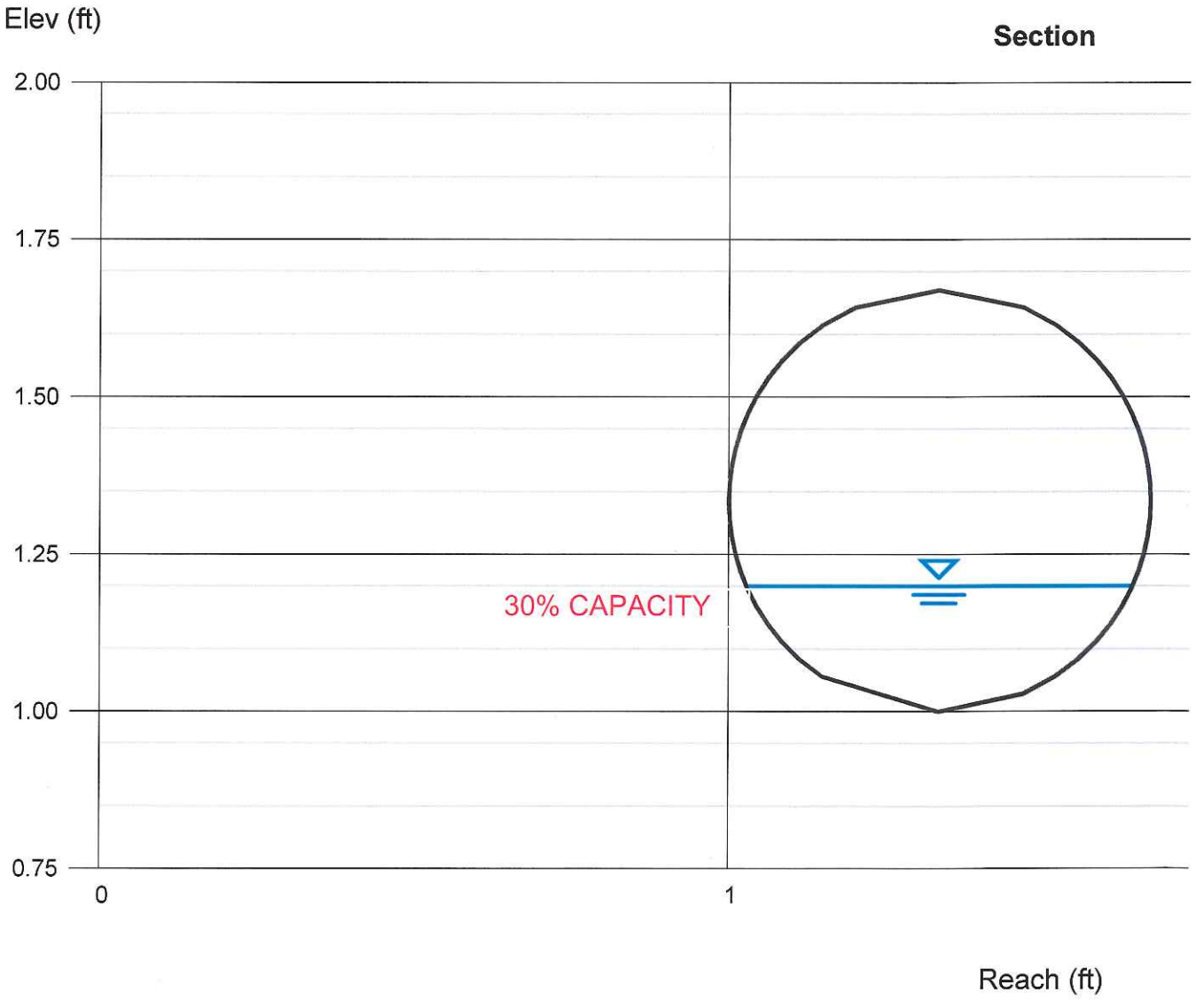
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 2.24
N-Value	= 0.017

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.26

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 0.260
Area (sqft)	= 0.09
Velocity (ft/s)	= 2.91
Wetted Perim (ft)	= 0.78
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 0.61
EGL (ft)	= 0.33



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing Trunk Line @ 75% Capacity

Circular

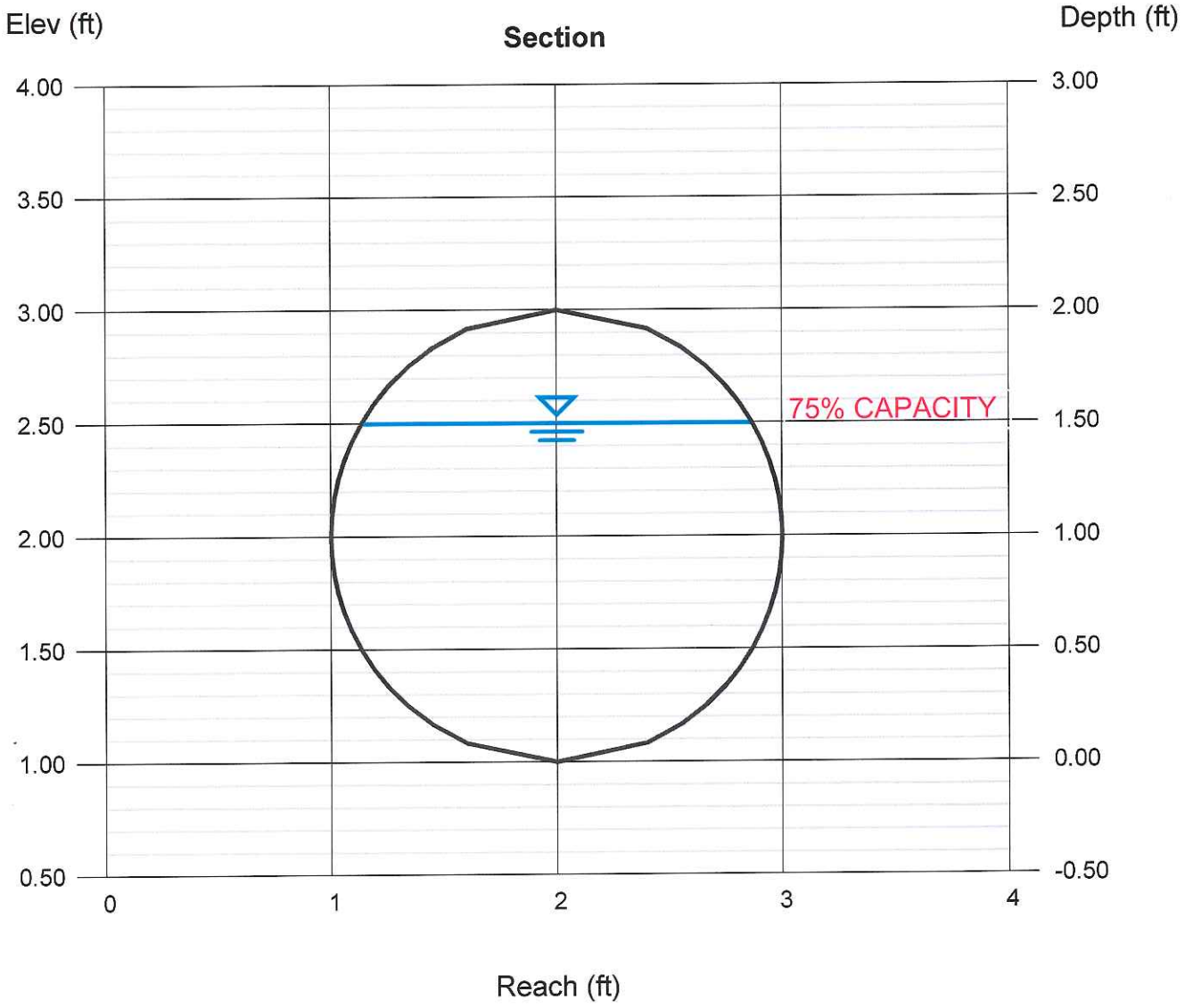
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.017

Calculations

Compute by:	Q vs Depth
No. Increments	= 12

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 15.78
Area (sqft)	= 2.53
Velocity (ft/s)	= 6.24
Wetted Perim (ft)	= 4.19
Crit Depth, Yc (ft)	= 1.33
Top Width (ft)	= 1.73
EGL (ft)	= 2.11



Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.17	0.253	0.128	1.98
0.33	1.063	0.349	3.05
0.50	2.392	0.618	3.87
0.67	4.191	0.924	4.54
0.83	6.300	1.242	5.07
1.00	8.709	1.579	5.52
1.17	11.15	1.906	5.85
1.33	13.62	2.233	6.10
1.50	15.78	2.528	6.24
1.67	17.58	2.802	6.27
1.83	18.55	3.019	6.15
2.00	17.30	3.142	5.51

Wp	Yc	TopWidth	Energy
(ft)	(ft)	(ft)	(ft)
1.18	0.01	1.11	0.23
1.69	0.17	1.50	0.48
2.10	0.36	1.73	0.73
2.47	0.54	1.89	0.99
2.81	0.72	1.97	1.23
3.15	0.89	2.00	1.47
3.48	1.05	1.97	1.70
3.83	1.20	1.88	1.91
4.19	1.33	1.73	2.11
4.61	1.43	1.48	2.28
5.12	1.51	1.10	2.42
6.28	1.55	0.00	2.47

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing Trunk Line @ 90% Capacity

Circular

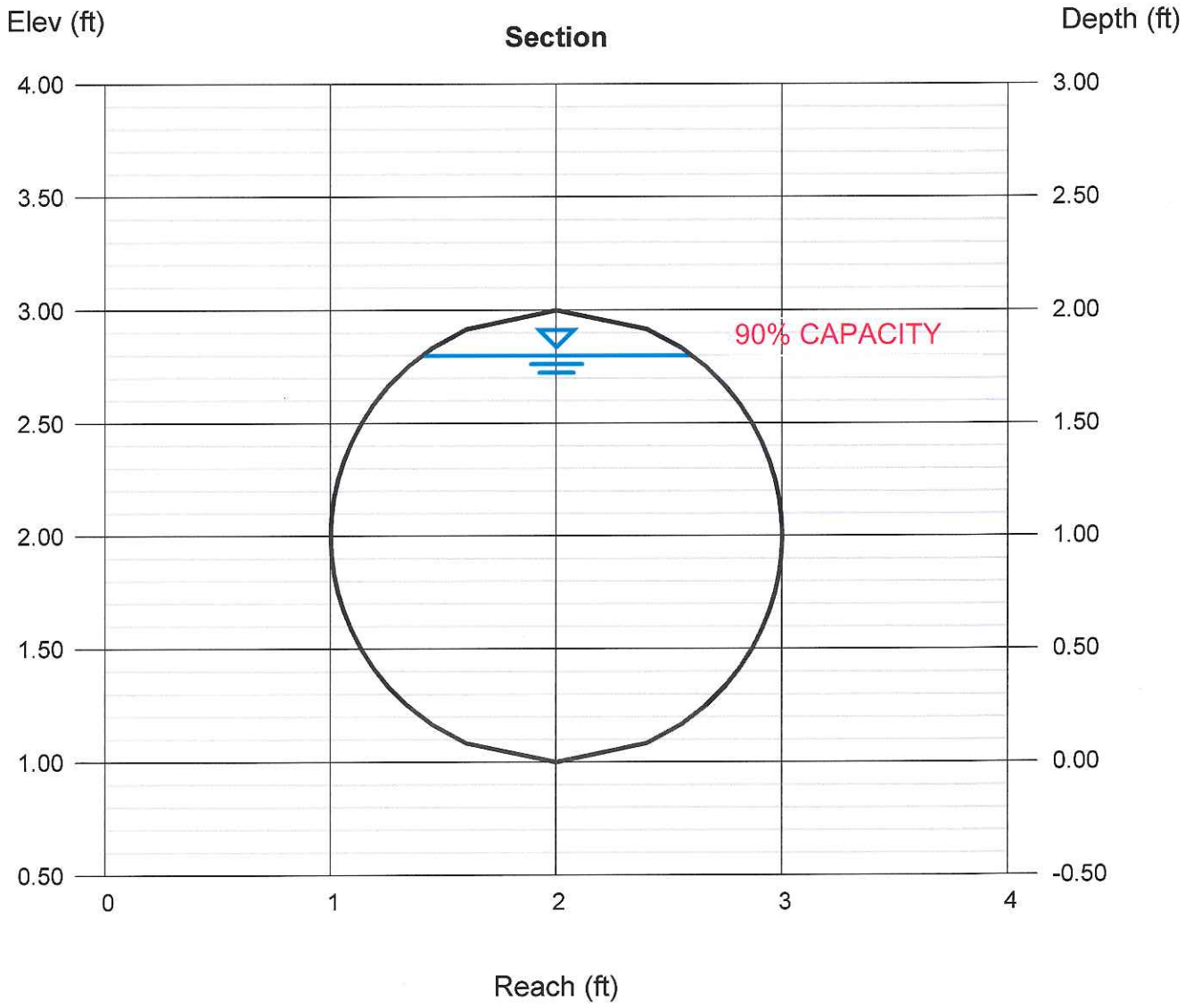
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.017

Calculations

Compute by:	Q vs Depth
No. Increments	= 50

Highlighted

Depth (ft)	= 1.80
Q (cfs)	= 18.44
Area (sqft)	= 2.98
Velocity (ft/s)	= 6.19
Wetted Perim (ft)	= 5.00
Crit Depth, Yc (ft)	= 1.54
Top Width (ft)	= 1.20
EGL (ft)	= 2.40



Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.04	0.012	0.015	0.78
0.08	0.053	0.043	1.23
0.12	0.123	0.077	1.59
0.16	0.228	0.119	1.92
0.20	0.364	0.165	2.21
0.24	0.536	0.216	2.49
0.28	0.740	0.270	2.74
0.32	0.969	0.327	2.97
0.36	1.242	0.389	3.19
0.40	1.531	0.451	3.40
0.44	1.860	0.517	3.60
0.48	2.192	0.581	3.77
0.52	2.601	0.657	3.96
0.56	3.006	0.728	4.13
0.60	3.394	0.794	4.27
0.64	3.861	0.871	4.43
0.68	4.361	0.951	4.59
0.72	4.831	1.024	4.72
0.76	5.323	1.098	4.85
0.80	5.835	1.175	4.97
0.84	6.435	1.262	5.10
0.88	6.985	1.340	5.21

Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.92	7.549	1.419	5.32
0.96	8.125	1.499	5.42
1.00	8.709	1.579	5.52
1.04	9.300	1.659	5.61
1.08	9.893	1.739	5.69
1.12	10.49	1.818	5.77
1.16	11.08	1.896	5.84
1.20	11.66	1.974	5.91
1.24	12.24	2.050	5.97
1.28	12.80	2.124	6.03
1.32	13.42	2.206	6.08
1.36	13.94	2.277	6.13
1.40	14.51	2.353	6.17
1.44	15.06	2.427	6.20
1.48	15.56	2.498	6.23
1.52	16.04	2.565	6.25
1.56	16.52	2.636	6.27
1.60	16.91	2.695	6.28
1.64	17.34	2.763	6.28
1.68	17.67	2.819	6.27
1.72	17.98	2.875	6.25
1.76	18.24	2.929	6.23

Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
1.80	18.44	2.979	6.19
1.84	18.57	3.025	6.14
1.88	18.60	3.066	6.07
1.92	18.53	3.100	5.98
1.96	18.27	3.127	5.84
2.00	17.30	3.142	5.51

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Existing Trunk Line @ 75% Capacity + Existing and Proposed Flows

Circular

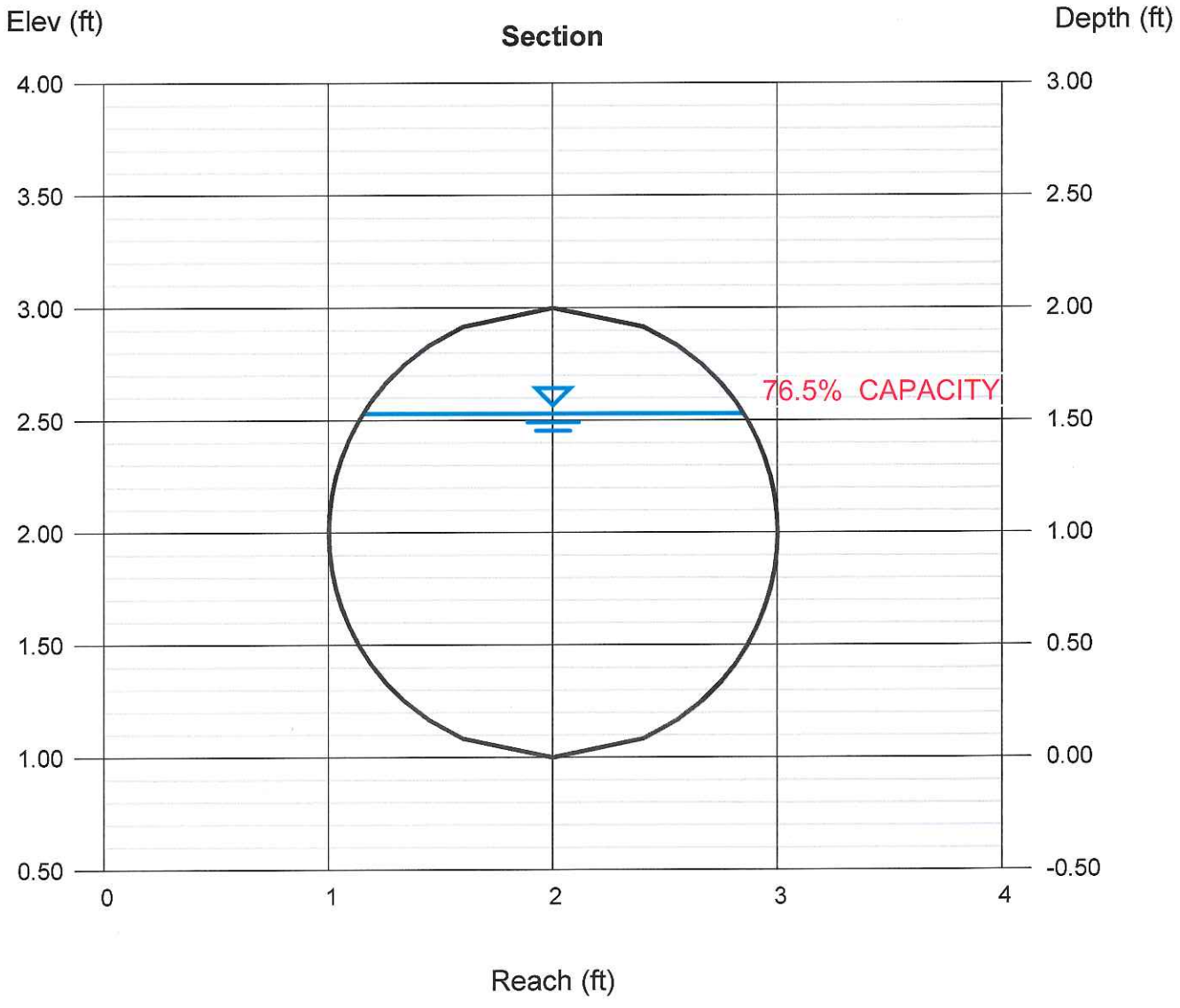
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.017

Calculations

Compute by:	Known Q
Known Q (cfs)	= 16.04

Highlighted

Depth (ft)	= 1.53
Q (cfs)	= 16.04
Area (sqft)	= 2.58
Velocity (ft/s)	= 6.22
Wetted Perim (ft)	= 4.26
Crit Depth, Yc (ft)	= 1.45
Top Width (ft)	= 1.70
EGL (ft)	= 2.13



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. Thursday, Jan 8 2015

Trunk Line at Assumed 90% + Existing & Proposed Flows

Circular

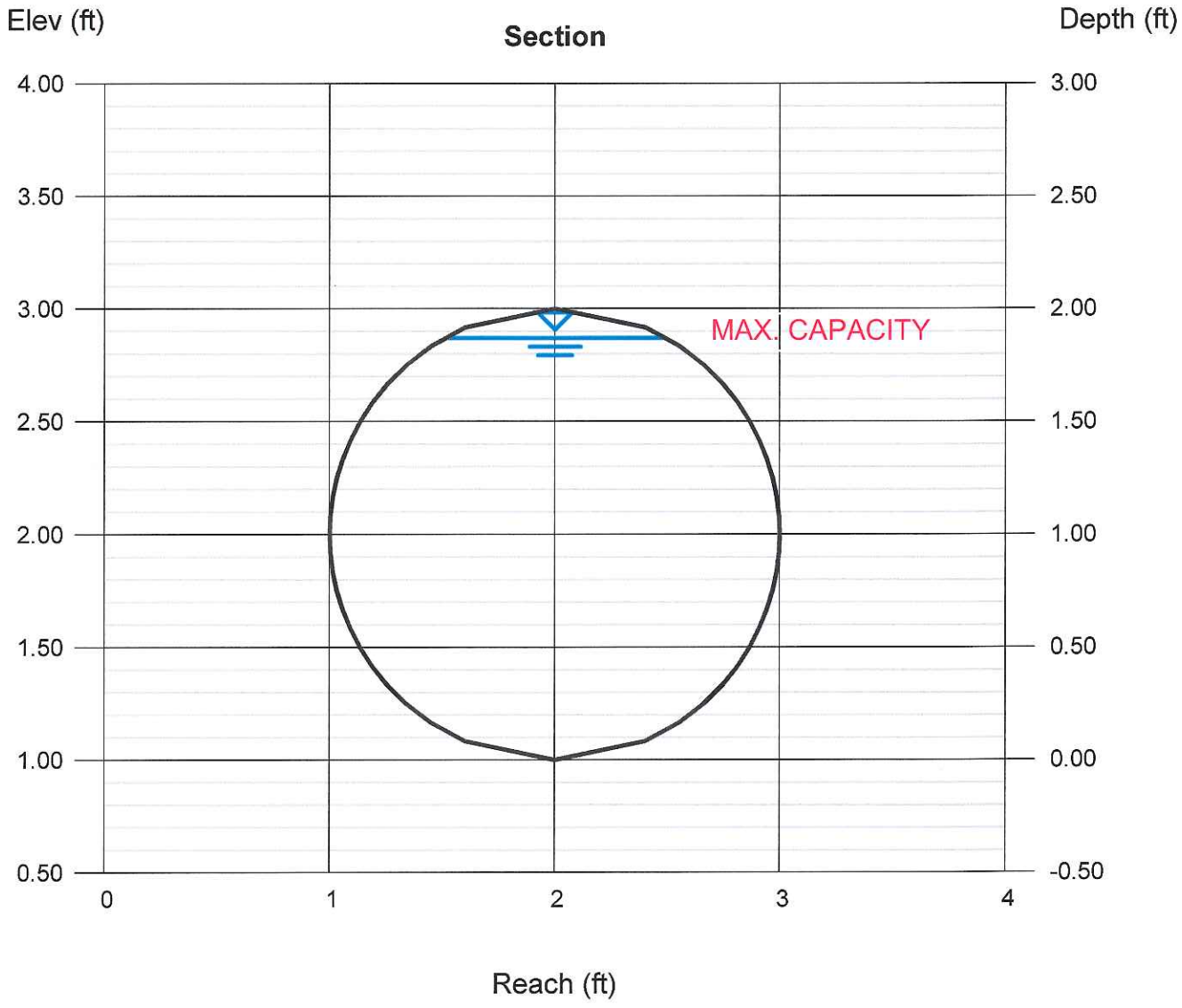
Diameter (ft)	= 2.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.017

Calculations

Compute by:	Known Q
Known Q (cfs)	= 18.60

Highlighted

Depth (ft)	= 1.87
Q (cfs)	= 18.60
Area (sqft)	= 3.06
Velocity (ft/s)	= 6.08
Wetted Perim (ft)	= 5.26
Crit Depth, Yc (ft)	= 1.56
Top Width (ft)	= 0.98
EGL (ft)	= 2.45



Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.04	0.012	0.015	0.78
0.08	0.053	0.043	1.23
0.12	0.123	0.077	1.59
0.16	0.228	0.119	1.92
0.20	0.364	0.165	2.21
0.24	0.536	0.216	2.49
0.28	0.740	0.270	2.74
0.32	0.969	0.327	2.97
0.36	1.242	0.389	3.19
0.40	1.531	0.451	3.40
0.44	1.860	0.517	3.60
0.48	2.192	0.581	3.77
0.52	2.601	0.657	3.96
0.56	3.006	0.728	4.13
0.60	3.394	0.794	4.27
0.64	3.861	0.871	4.43
0.68	4.361	0.951	4.59
0.72	4.831	1.024	4.72
0.76	5.323	1.098	4.85
0.80	5.835	1.175	4.97
0.84	6.435	1.262	5.10
0.88	6.985	1.340	5.21

Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
0.92	7.549	1.419	5.32
0.96	8.125	1.499	5.42
1.00	8.709	1.579	5.52
1.04	9.300	1.659	5.61
1.08	9.893	1.739	5.69
1.12	10.49	1.818	5.77
1.16	11.08	1.896	5.84
1.20	11.66	1.974	5.91
1.24	12.24	2.050	5.97
1.28	12.80	2.124	6.03
1.32	13.42	2.206	6.08
1.36	13.94	2.277	6.13
1.40	14.51	2.353	6.17
1.44	15.06	2.427	6.20
1.48	15.56	2.498	6.23
1.52	16.04	2.565	6.25
1.56	16.52	2.636	6.27
1.60	16.91	2.695	6.28
1.64	17.34	2.763	6.28
1.68	17.67	2.819	6.27
1.72	17.98	2.875	6.25
1.76	18.24	2.929	6.23

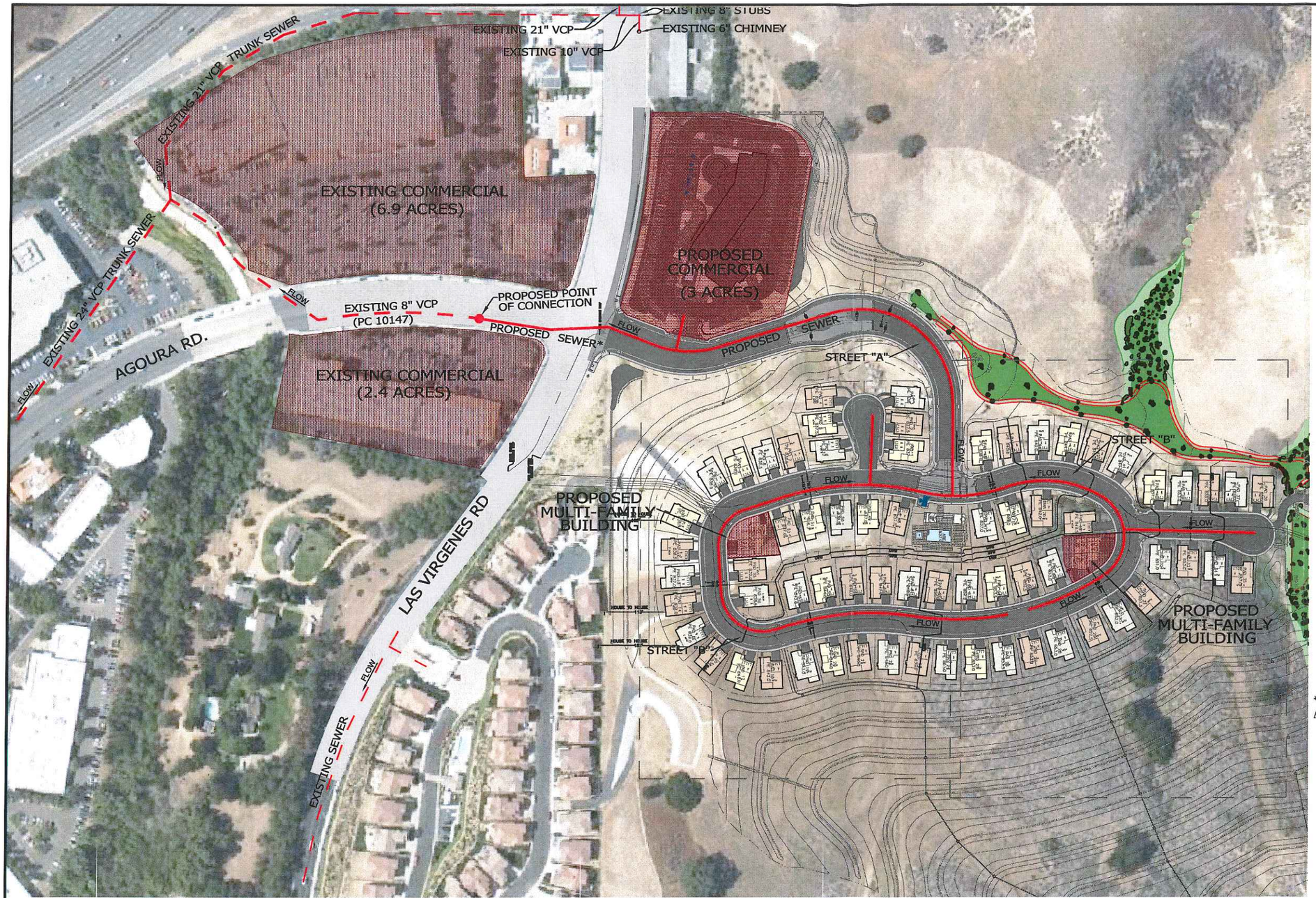
Depth	Q	Area	Veloc
(ft)	(cfs)	(sqft)	(ft/s)
1.80	18.44	2.979	6.19
1.84	18.57	3.025	6.14
1.88	18.60	3.066	6.07
1.92	18.53	3.100	5.98
1.96	18.27	3.127	5.84
2.00	17.30	3.142	5.51

Wp	Yc	TopWidth	Energy
(ft)	(ft)	(ft)	(ft)
0.57	0.01	0.56	0.05
0.81	0.04	0.79	0.10
0.99	0.08	0.95	0.16
1.15	0.12	1.09	0.22
1.29	0.17	1.20	0.28
1.42	0.21	1.30	0.34
1.54	0.25	1.39	0.40
1.65	0.30	1.47	0.46
1.76	0.34	1.54	0.52
1.86	0.39	1.60	0.58
1.96	0.43	1.66	0.64
2.05	0.48	1.71	0.70
2.15	0.52	1.76	0.76
2.24	0.56	1.80	0.83
2.32	0.61	1.83	0.88
2.41	0.65	1.87	0.95
2.50	0.69	1.90	1.01
2.58	0.74	1.92	1.07
2.66	0.78	1.94	1.13
2.74	0.82	1.96	1.18
2.83	0.85	1.98	1.24
2.91	0.90	1.99	1.30

Wp	Yc	TopWidth	Energy
(ft)	(ft)	(ft)	(ft)
2.99	0.94	1.99	1.36
3.07	0.98	2.00	1.42
3.15	1.02	2.00	1.47
3.23	1.05	2.00	1.53
3.31	1.09	1.99	1.58
3.39	1.13	1.98	1.64
3.47	1.16	1.97	1.69
3.55	1.20	1.96	1.74
3.63	1.23	1.94	1.79
3.71	1.26	1.92	1.84
3.80	1.29	1.89	1.90
3.88	1.32	1.87	1.94
3.97	1.35	1.83	1.99
4.06	1.38	1.79	2.04
4.15	1.40	1.75	2.08
4.24	1.43	1.71	2.13
4.34	1.45	1.65	2.17
4.43	1.47	1.60	2.21
4.54	1.48	1.53	2.25
4.64	1.51	1.46	2.29
4.75	1.52	1.39	2.33
4.87	1.53	1.30	2.36

Wp	Yc	TopWidth	Energy
(ft)	(ft)	(ft)	(ft)
5.00	1.54	1.20	2.40
5.14	1.55	1.08	2.43
5.30	1.55	0.94	2.45
5.48	1.56	0.78	2.48
5.72	1.55	0.56	2.49
6.28	1.54	0.00	2.47

APPENDIX C
SEWER AREA STUDY EXHIBIT & REFERENCE RECORD DRAWINGS



WASTEWATER PRODUCTION

EXISTING COMMERCIAL

ZONING COEFFICIENT:	0.015 CFS/ACRE
TOTAL ACERAGE:	9.3 ACRES
SEWER FLOW:	0.1395 CFS

PROPOSED COMMERCIAL

ZONING COEFFICIENT:	0.015 CFS/ACRE
TOTAL ACERAGE:	3 ACRES
SEWER FLOW:	0.045 CFS

PROPOSED SINGLE FAMILY

ZONING COEFFICIENT:	0.001 CFS/UNIT
TOTAL UNITS COUNT:	67 UNITS
SEWER FLOW:	0.067 CFS

PROPOSED MULTI-FAMILY

ZONING COEFFICIENT:	0.004 CFS/BUILDING
TOTAL UNITS COUNT:	2 BUILDING (4 UNITS)
SEWER FLOW:	0.008 CFS

WASTEWATER PRODUCTION TOTALS

PROPOSED SITE:	0.120 CFS
EXISTING DEVELOPMENT:	0.1395 CFS

*PROPOSED ON-SITE SEWER PIPE SIZING TO BE DETERMINED IN DESIGN PHASE, APPROX. SIZE IS 8"

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Prepared by:

RJR ENGINEERING GROUP

Planning · Civil Engineering · Flood Control/Hydrology
Geotechnical Engineering · Geology · Water Resources · Water Quality
3500 Camino Avenue, Suite 200, Oxnard, CA 93030
(805) 485-3935 (805) 485-6496 FAX
San Luis Obispo, CA
(805) 596-0216 (805) 596-0256 FAX
Sacramento, CA Malibu, CA
(530) 888-7356 (310) 456-9085
E-mail: rjr@rjreng.com

SCALE: 1" = 200'

SEWER STUDY EXHIBIT

THE NEW HOME GROUP

INTERSECTION OF AGOURA AND LAS VIRGENES ROAD
IN THE CITY OF CALABASAS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE: 1-05-15

P. C. 1014 PAGE 2

NO L.A. COUNTY CHARGE FOR CONNECTIONS
CABLE SCALE
SEE LVMWD FOR SPECIAL CONNECTION CHARGES

5106?

770
760
750

STREET OF SOUTH CURB

8" V.C.P. 2.24%

PT ℄ T. 9 M.T.D. + I.B.C.
PT ℄ T. 1 BUR. C.A.
L.A. TO OAK. G

PARCEL MAP NO. 12816
20' PT ℄ T. P.M.B. 160-59/61
EASEMENT

FUTURE CURB

PROP. T
6" WATER

SHOWN TO LEFT

AGOURA

139°41'58"

PROP. 12" WATER

℄ OF 8" V.C.P. SEWER

PROP. 6" WATER

PROP. CURB

6" H.L.

492.70'

5+55

℄ SEWER CURVE DATA
Δ = 14°37'43"
R = 1175.00', L = 300.00'
T = 150.82'

PROP F.H.

S.36
3167.56 M.H.
SEWER B.C.

6" SCG
8" N10 OLD S. R/W

PT ℄ 2 DU.
2" N10 OLD S. R/W

TRACT NO. 36896

STREET ℄
W
EX. A.C. PVMT.

ROAD

S.36
6+67.56 M.H.
SEWER E.C.

43.19'

249.01'

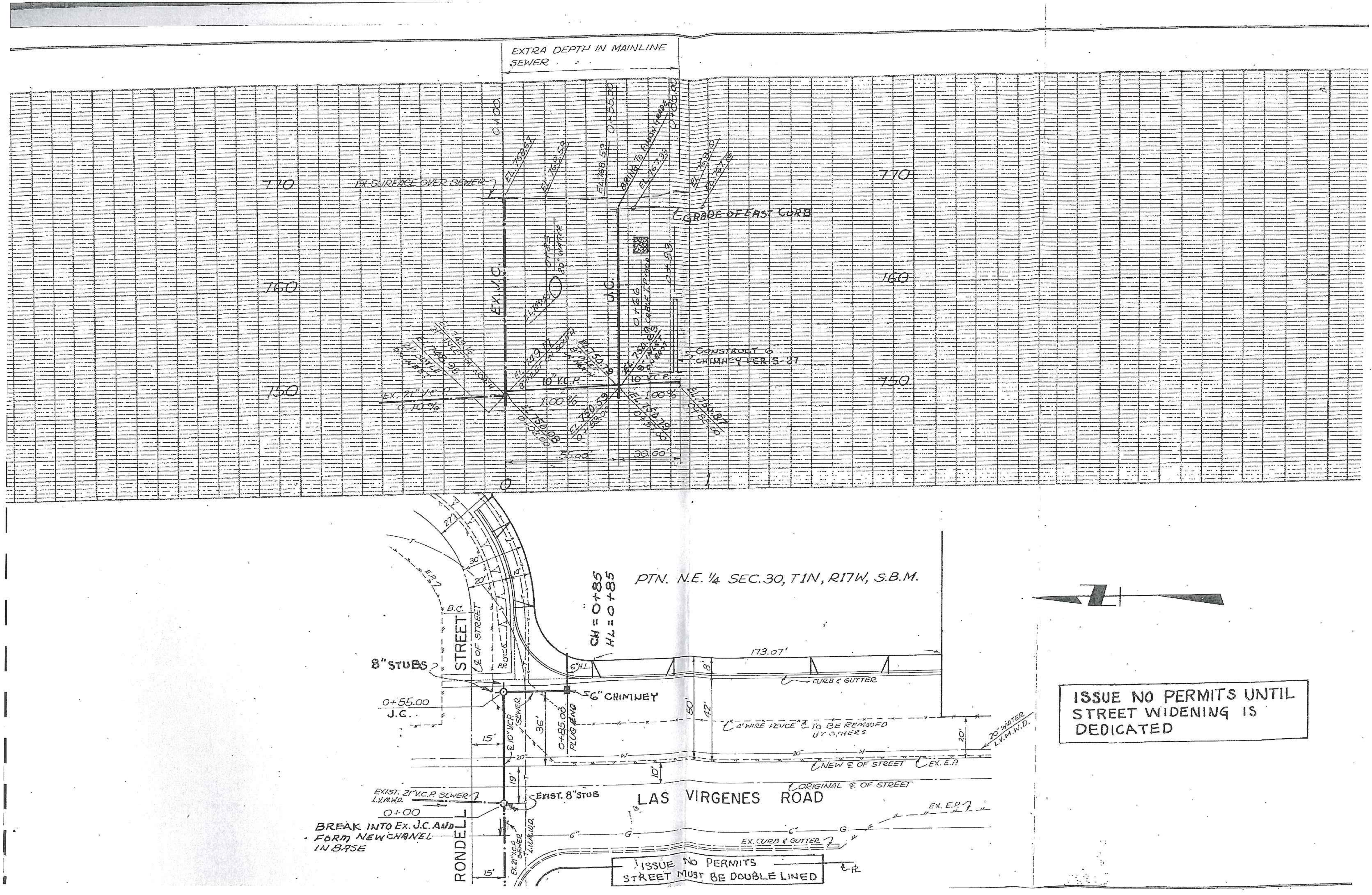
LAS VIRGENES ROAD

STREET ℄

EXHIBIT 1

PARCEL MAP NO. 12816
P.M.B. 160-59/61

EXHIBIT 2



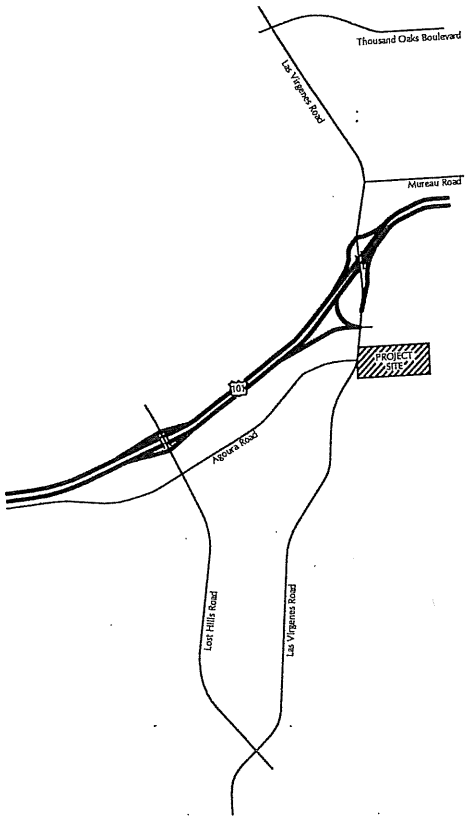
EXTRA DEPTH IN MAINLINE SEWER
770
760
750
EX. SURFACE OVER SEWER
GRADE OF EAST CURB
BRING TO FINISH GRADE
EX. V.C.
J.C.
CONSTRUCT 6" CHIMNEY PER S-27
EX. 21" V.C.P.
0.10%
10" V.C.P.
1.00%
35.00'
30.00'
0
1
PTN. N.E. 1/4 SEC. 30, T1N, R17W, S.B.M.
CH = 0+85
HL = 0+85
173.07'
CURB & GUTTER
8" STUBS
0+55.00
J.C.
6" CHIMNEY
0+85.00 PLUG END
4' WIRE FENCE TO BE REMOVED BY OTHERS
20' WATER L.V.M.W.D.
NEW ℄ OF STREET
EX. E.P.
ORIGINAL ℄ OF STREET
EXIST. 21" V.C.P. SEWER L.V.M.W.D.
EXIST. 8" STUB
0+00
LAS VIRGENES ROAD
BREAK INTO Ex. J.C. AND FORM NEW CHANEL IN BASE
EX. CURB & GUTTER
RONDELL STREET
ISSUE NO PERMITS STREET MUST BE DOUBLE LINED
ISSUE NO PERMITS UNTIL STREET WIDENING IS DEDICATED

Appendix H

Updated Traffic and Circulation Study

CANYON OAKS PROJECT
CITY OF CALABASAS, CALIFORNIA

UPDATED TRAFFIC AND CIRCULATION STUDY



June 19, 2015 **ATE Project #10051.01**

Prepared for:
Rincon Consultants
180 North Ashwood Avenue
Ventura, CA 93003

ASSOCIATED TRANSPORTATION ENGINEERS

100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110-1686 • (805) 687-4418 • FAX (805) 682-8509

ASSOCIATED TRANSPORTATION ENGINEERS
100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110 • (805) 687-4418 • FAX (805) 682-8509
Since 1978

Richard L. Pool, P.E.
Scott A. Schell, AICP, PTP

June 19, 2015

10051.01R09

Mr. Joe Power, AICP
Rincon Consultants
180 North Ashwood Avenue
Ventura, CA 93003

UPDATED TRAFFIC AND CIRCULATION STUDY FOR THE CANYON OAKS PROJECT, CITY OF CALABASAS, CALIFORNIA

Associated Transportation Engineers (ATE) has prepared the following updated traffic and circulation study for the Canyon Oaks Project, proposed in the City of Calabasas. The study evaluates the potential traffic and circulation impacts associated with the project based on the City's traffic impact thresholds. ATE prepared and submitted a study for the project in July 2014. The following revised study has been updated to address comments made by City of Calabasas and Caltrans staff.

We appreciate the opportunity to assist Rincon Consultants with this project.

Associated Transportation Engineers

Scott A. Schell, AICP, PTP
Principal Transportation Planner

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INTRODUCTION

The following traffic and circulation study contains an analysis of the potential traffic impacts associated with the Canyon Oaks Project, located in the City of Calabasas. The study provides information regarding existing and future traffic conditions within the project study-area and recommends improvements where necessary. The study also provides an analysis of the project's consistency with the policies outlined in the Los Angeles County Congestion Management Program (CMP).

PROJECT DESCRIPTION

The Canyon Oaks Project site is located at 4790 Las Virgenes Road directly east of the Las Virgenes Road/Agoura Road intersection. Figure 1 illustrates the project site location within the City of Calabasas. The project is proposing to develop 67 single family homes, 4 affordable condominium units, and a 120-room hotel. Access to the project site would be provided via a new private access road that would connect to the east side of Las Virgenes Road opposite the signalized Agoura Road intersection. The project's frontage improvements on Las Virgenes Road include adding a third northbound lane north of Agoura Road. The hotel driveway would be located on the north side of the access road approximately 115 feet west of the Agoura Road intersection. Figure 2 illustrates the project site plan.

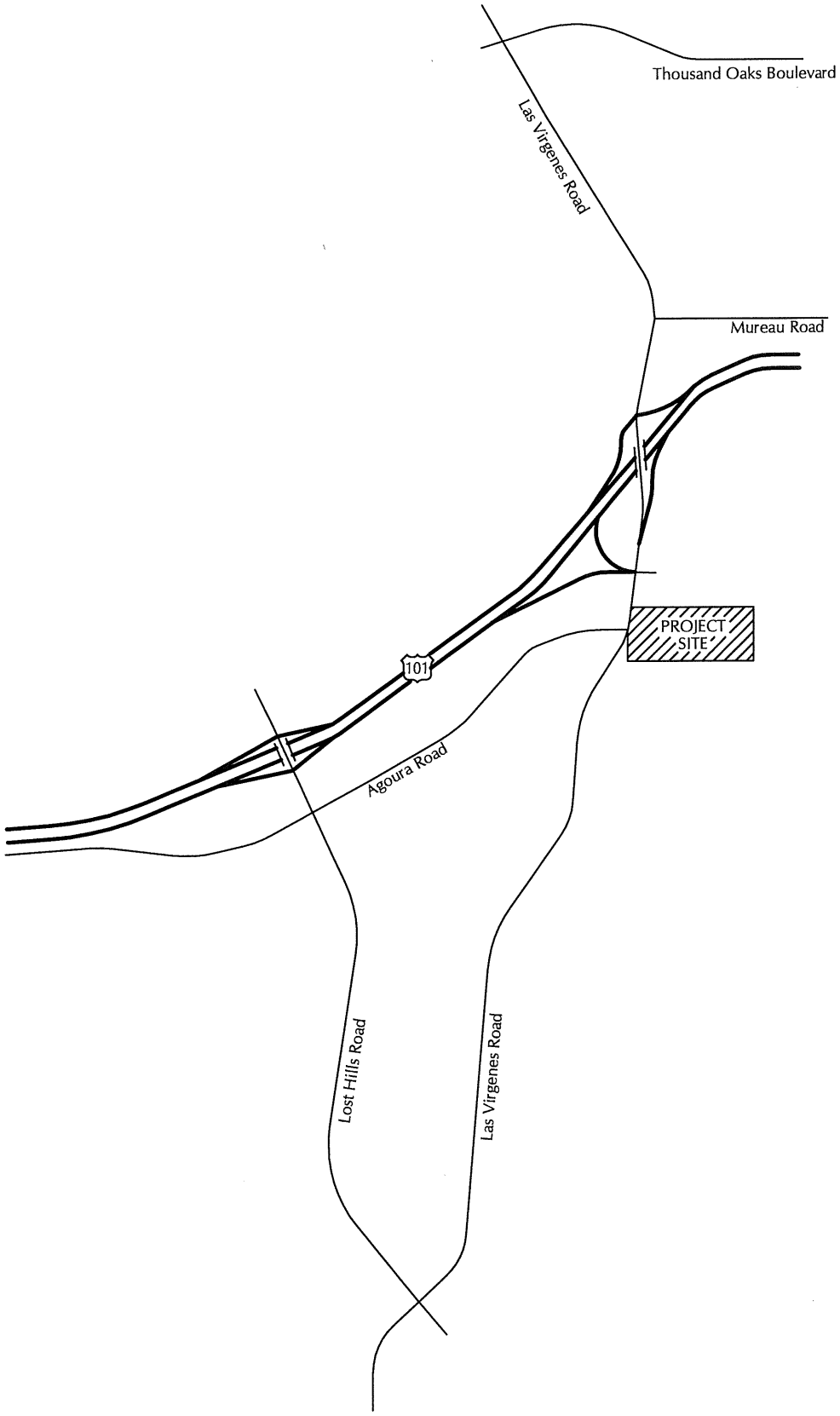
EXISTING CONDITIONS

Street Network

The project site is served by a network of highways, arterial roads and collector streets as illustrated in Figure 1. The following text provides a brief description of the major components of the study-area street network.

U.S. Highway 101, located north of the project site, is a multi-lane interstate highway serving the Pacific Coast between Los Angeles and San Francisco. U.S. 101 is the principal route between the City of Calabasas and the adjacent cities of Ventura, Oxnard, Camarillo, Thousand Oaks, Westlake Village, Agoura Hills, and Hidden Hills to the west; and the City of Los Angeles to the east. Access between the site and U.S. 101 is provided via the Las Virgenes Road interchange located just north of the site.

Las Virgenes Road is a north-south arterial street that connects Calabasas to the Malibu area via its junction with Malibu Canyon Road. The roadway provides direct access to the proposed project. Las Virgenes Road contains 4-lanes from U.S. 101 to a point south of Agoura Road, where it transitions to an intermittent 2- to 3-lane roadway. The speed limit along this segment is 45 miles per hour (mph). South of Lost Hills Road it becomes a 2-lane roadway with a speed limit of 50 mph. Figure 1 Existing Street Network and Project Site Location



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EXISTING STREET NETWORK/PROJECT LOCATION

FIGURE 1

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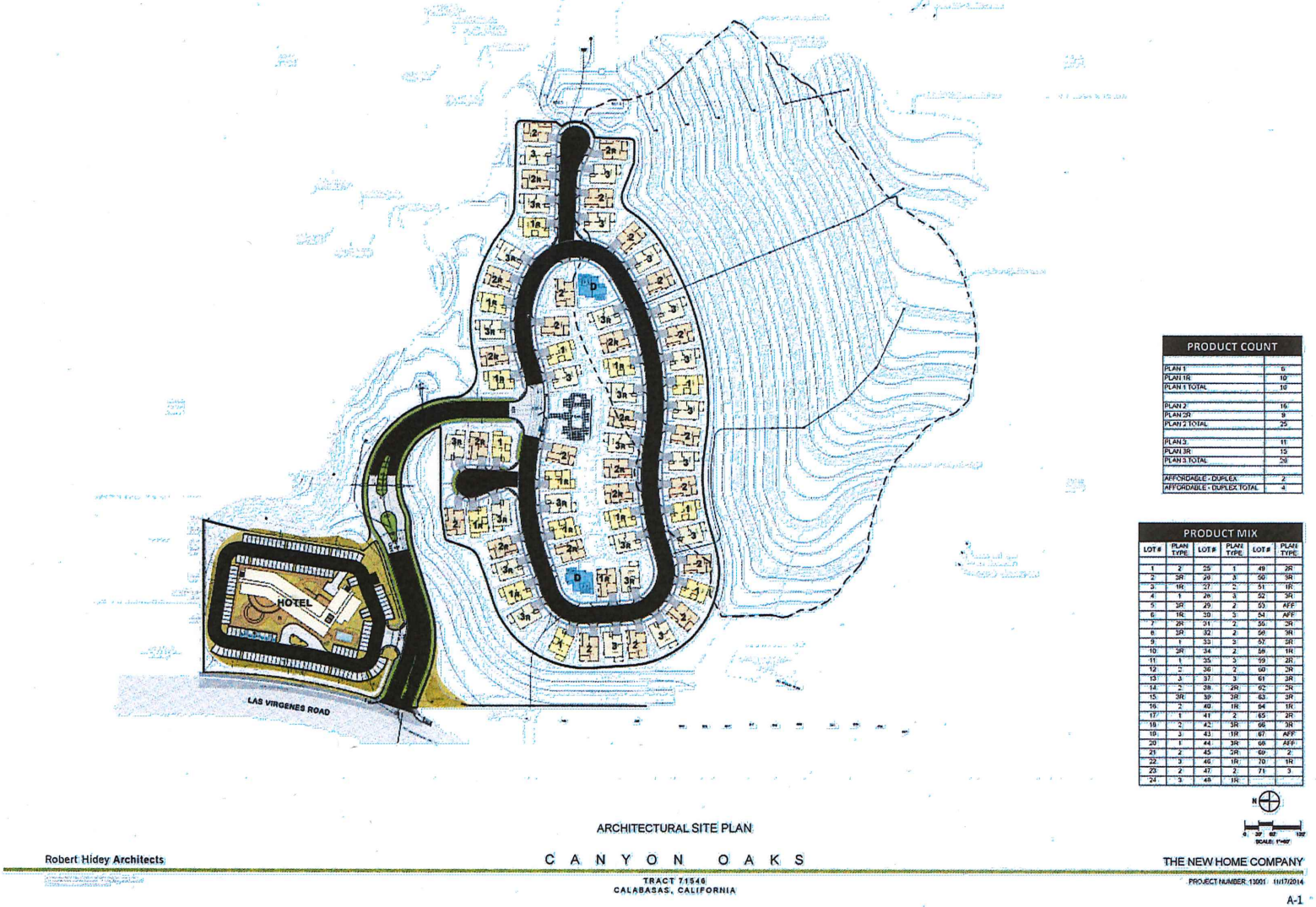

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PROJECT SITE PLAN

FIGURE 2

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Agoura Road is an east-west arterial roadway that extends westward from Las Virgenes Road to the Lost Hills Road area and beyond to the communities of Agoura Hills and Westlake Village.

Mureau Road, located north of the project site, is a 2- to 4-lane roadway that parallels the north side of U.S. 101. Mureau Road provides a connection between the eastern and western portions of the City of Calabasas. The road extends east from Las Virgenes Road as a 4-lane road and narrows to 2-lanes as it continues east, then crosses U.S. 101 terminating at Calabasas Road.

Lost Hills Road, located west of the project site, is a 2- to 4-lane north-south arterial street that extends northerly from Las Virgenes Road to its terminus at the County Landfill north of U.S. 101. The roadway provides one of the major north-south travel routes in the western portion of the City of Calabasas.

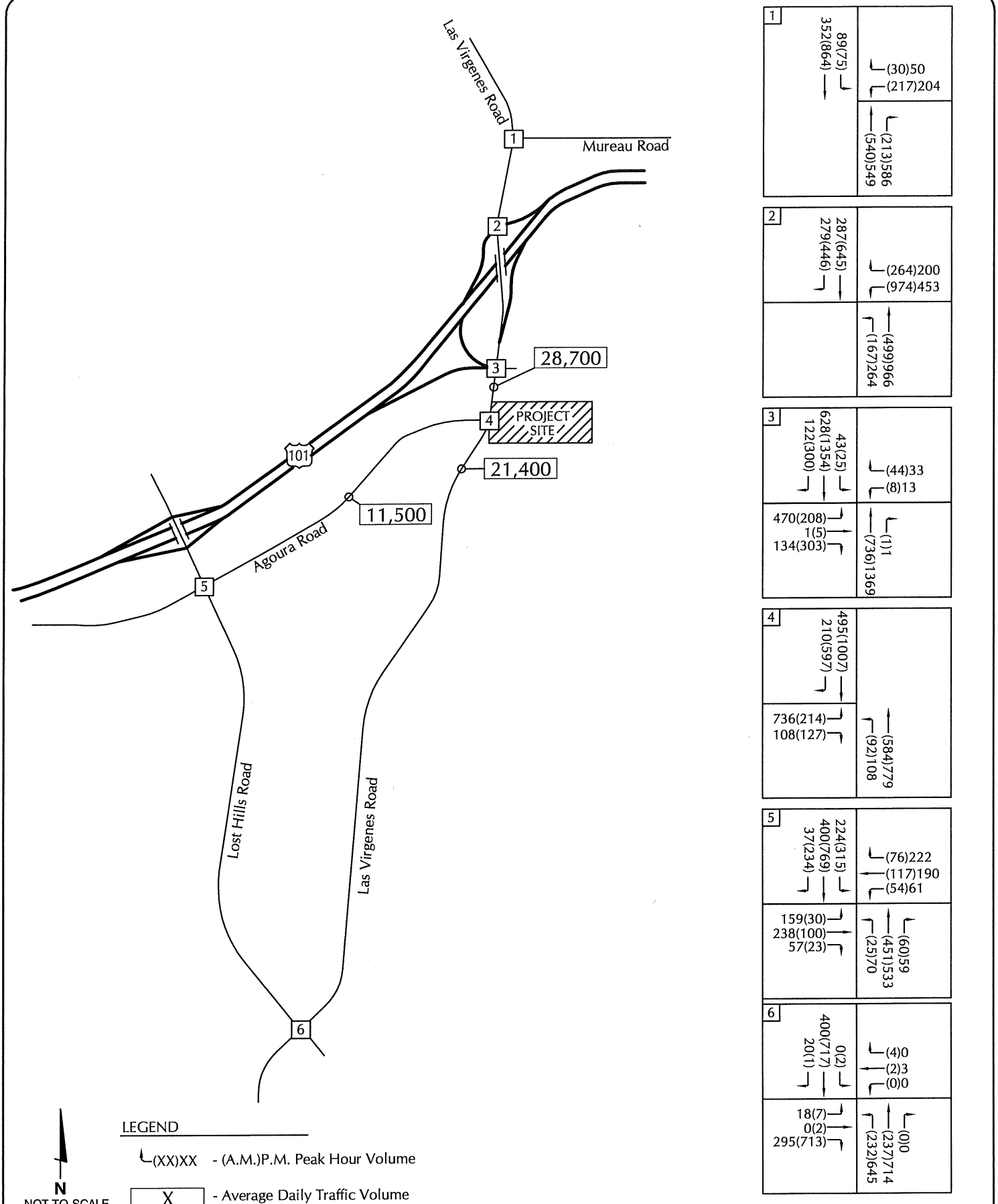
Existing Roadway Operations

Existing average daily traffic (ADT) volumes for the study-area roadway segments were collected in June 2011 during periods when the local schools were in session (traffic count data is contained in the Technical Appendix for reference). A growth factor of 1% per year was applied to the 2011 volumes to develop current 2015 traffic volumes (based on input provided by City staff). Additional spot counts were conducted in December 2014 that confirm that the factored traffic volumes closely reflect current traffic conditions within the study-area. The 2015 ADT volumes are illustrated on Figure 3.

In rating roadway segment operations, "Levels of Service" (LOS) A through F are used, with LOS A indicating free flow operations and LOS F indicating congested operations (more complete definitions of levels of service are included in the Technical Appendix). Levels of service were calculated for the study-area roadways based on standard engineering roadway design capacities (a table presenting the roadway design capacities is contained in the Technical Appendix). The City of Calabasas' General Plan has adopted a threshold of LOS C or better as the minimum acceptable operating standard for City roadway segments. Table 1 lists the existing levels of service for the study-area roadway segments.

Table 1
Existing Roadway Levels of Service

Roadway Segment	Geometry	ADT	LOS
Las Virgenes Road n/o Agoura Road	4-Lane	28,700	LOS C
Las Virgenes Road s/o Agoura Road	2-Lane	**21,400**	**LOS F**
Agoura Road w/o Las Virgenes Road	4-Lane	11,500	LOS A



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EXISTING TRAFFIC VOLUMES

FIGURE 3

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The data presented in Table 1 indicate that the 2-lane segment of Las Virgenes Road south of Agoura Road is currently operating at LOS F which is considered unacceptable based on the City's LOS C operating standard. It is noted that the City is planning the widening of this segment of Las Virgenes Road to 4 lanes, with construction anticipated to begin in the 2nd quarter of 2015 (see Planned Improvement section for more information).

Existing Intersection Operations

Because traffic flow on urban arterial roadways is most constrained at intersections, detailed traffic flow analyses focus on the operating conditions of critical intersections during peak travel periods (7:00 A.M. – 9:00 A.M. / 4:00 P.M. – 6:00 P.M.) The level of service rating system used for roadways is also applied to intersections (more complete definitions of intersection levels of service are included in the Technical Appendix).

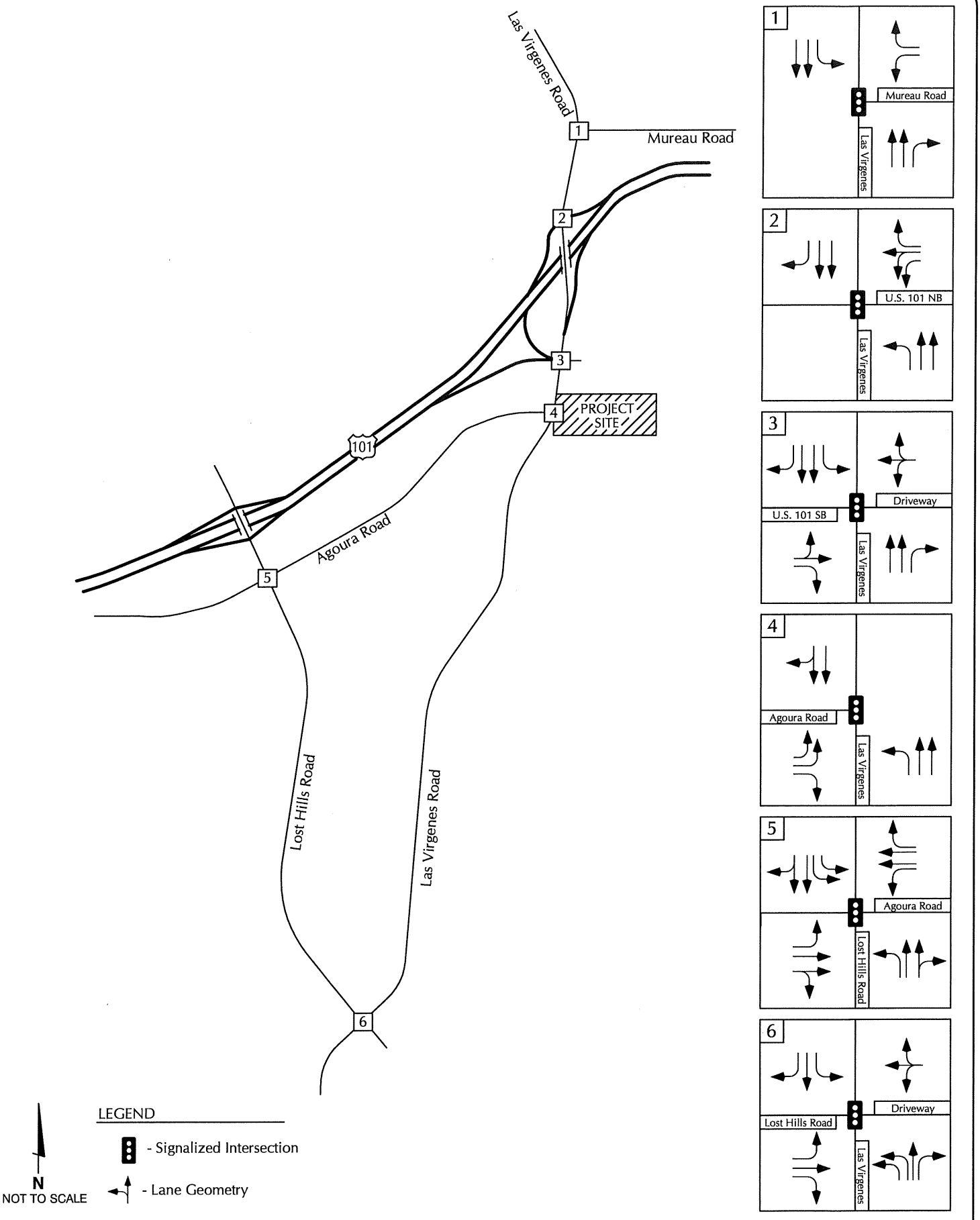
Existing A.M. and P.M. peak hour traffic volumes for the study-area intersections were obtained through counts conducted in 2014 for the Rondell Oasis Hotel Project[1] (traffic count data is contained in the Technical Appendix for reference). The analysis focuses on intersections along the Las Virgenes Road corridor including the U.S. 101 interchange. The U.S. 101/Lost Hills Road interchange was not included in the study due to the project site's close proximity to the Las Virgenes Road interchange; and the project's minor traffic additions (less than 10 trips) to the Lost Hills interchange would not result in significant impacts. The existing A.M. and P.M. peak hour traffic volumes for the study-area intersections are shown on Figure 3. Figure 4 presents the existing traffic controls and the lane geometries for the study-area intersections.

The City of Calabasas' General Plan has adopted a level of service threshold of LOS C (V/C ratio 0.80) or better as the minimum acceptable operating standard for City intersections, and LOS D (V/C ratio 0.90) or better as the minimum acceptable operating standard for freeway interchanges within the City. Levels of service were calculated for the signalized intersections located in the City based on the "Intersection Capacity Utilization" (ICU) methodology. Levels of service for the freeway interchange intersections were calculated using the Highway Capacity Manual (HCM)[2] methodology pursuant to Caltrans' Guide for the Preparation of Traffic Impact Studies[3]. Table 2 lists the existing levels of service for the study-area intersections (calculation worksheets are contained in the Technical Appendix).

[1] Rondell Oasis Hotel Traffic Impact Study, Overland Traffic Consultants, December 2014.

[2] Highway Capacity Manual, Transportation Research Board, National Research Council, 2010.

[3] Guide for the Preparation of Traffic Impact Studies, State of California Department of Transportation, December 2002.



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INTERSECTION LANE GEOMETRY AND TRAFFIC CONTROLS

FIGURE 4

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Table 2
Existing Intersection Levels of Service

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS
1. Las Virgenes Rd./Mureau Rd.	0.506	LOS A	0.650	LOS B
2. U.S. 101 NB Ramps/Las Virgenes Rd.	21.2 sec.	LOS C	13.1 sec.	LOS B
3. U.S. 101 SB Ramps/Las Virgenes Rd.	9.1 sec.	LOS A	22.2 sec.	LOS C
4. Las Virgenes Rd./Agoura Rd.	0.598	LOS A	0.573	LOS A
5. Lost Hills Rd./Agoura Rd.	0.501	LOS A	0.593	LOS A
6. Las Virgenes Rd./Lost Hills Rd.	**0.994**	**LOS E**	0.565	LOS A

Bolded values exceed City's LOS C/D standard for City intersections.

The data presented in Table 2 show that the Las Virgenes Road/Lost Hills Road intersection currently operates at LOS E during the A.M. peak hour period, which exceeds the City's LOS C/D standard. The remaining intersections operate acceptably in the LOS A - C range with existing volumes.

PLANNED IMPROVEMENTS

The City has programmed several improvements for the study-area roadways and intersections that are scheduled to be completed within the next two years. These improvements are discussed below.

Las Virgenes Road: The Las Virgenes Road Scenic Corridor Widening Project would widen Las Virgenes Road to provide 2-lanes in each direction between Agoura Road and Lost Hills Road. The project also includes constructing bike lanes and sidewalks on both sides of the street and installation of a new traffic signal at the Las Virgenes Road/Oak Glen Road intersection. Information posted on the City's website indicates that the project would begin construction during the 2nd quarter of 2015 and would take approximately 8 months to complete.

U.S. 101 Southbound Ramps/Las Virgenes Road: The improvement that has been programmed for this location includes re-striping the northbound approach to provide two through lanes and a shared through-right lane. The through movements using the shared through/right-turn lane would be restricted to vehicles accessing the U.S. 101 southbound on-ramp. It is noted that the project's frontage improvements on Las Virgenes Road north of Agoura Road will facilitate the implementation of this improvement.

Lost Hills Road/Las Virgenes Road: The City is currently designing an improvement project to implement a merge lane on southbound Las Virgenes Road south of this intersection. The new merge lane will allow the southbound approach to be re-striped to provide one left-turn

lane, one through lane and one through + right-turn lane. The eastbound approach will also be re-striped to provide one left + through lane and dual right-turn lanes. Figure 5 illustrates the proposed intersection improvements at this location.

Lost Hills Interchange Improvement Project: This project includes widening the Lost Hills Road overpass to provide 5-lanes and a new sidewalk along the western side of the road. A new Cloverleaf interchange would replace the existing northbound on- and off-ramps. Access to the residential community located to the northwest of the interchange would remain at Canwood Street. Construction on the project is expected to begin in June 2015 and would take approximately 18 months to complete.

CEQA THRESHOLDS OF SIGNIFICANCE

The City of Calabasas considers LOS C (ICU 0.80) acceptable for City roadways and intersections located within the City, and LOS D (V/C ratio 0.90) as the minimum acceptable operating standard for freeway interchanges which are under the jurisdiction of Caltrans. Projects that degrade roadways and/or intersection below the LOS C/D standard must provide measures to mitigate their impacts. According to the City of Calabasas 2030 General Plan Transportation Element, a significant impact would occur based on the criteria listed in Table 3.

Table 3
City of Calabasas Traffic Impact Thresholds

Project Related Traffic Increases that Constitute a Significant Impact Where Roadway Performance Standards Are or Will Be Exceeded (Urban Areas)		
Existing or Future Link/Intersection LOS	**Volume to Capacity (V/C) Ratio**	**Maximum Peak Hour V/C Increase**
LOS D	0.81 - 0.90	0.020
LOS E	0.91 - 1.00	0.015
LOS F	> 1.00	0.010

PROJECT-SPECIFIC ANALYSIS

Project Trip Generation

Trip generation estimates were developed for the project using the Single Family Detached Housing (land-use code #210) and Hotel (land-use code #310) rates contained in the Institute of Transportation Engineers (ITE) Trip Generation report.[4] Trip generation estimates for the affordable housing units were developed using the recommended rates contained in the Los Angeles County guidelines for traffic impact reports. Table 4 summarizes the trip generation estimates developed for the project.

[4] Trip Generation, Institute of Transportation Engineers, 9th Edition, 2012.

Table 4
Project Trip Generation

Land Use	Size	ADT		A.M. Peak Hour		P.M. Peak Hour	
		Rate	Trips	Rate	Trips (In/Out)	Rate	Trips (In/Out)
Single Family Homes	67 Units	9.52	638	0.75	50 (13/37)	1.00	67 (42/25)
Condominiums	4 Units	8.0	32	0.54	2 (0/2)	0.73	3 (2/1)
Hotel	120 Rooms	8.17	980	0.53	64 (38/26)	0.60	72 (37/35)
Project Total:			**1,650**		**116 (51/65)**		**142 (81/61**

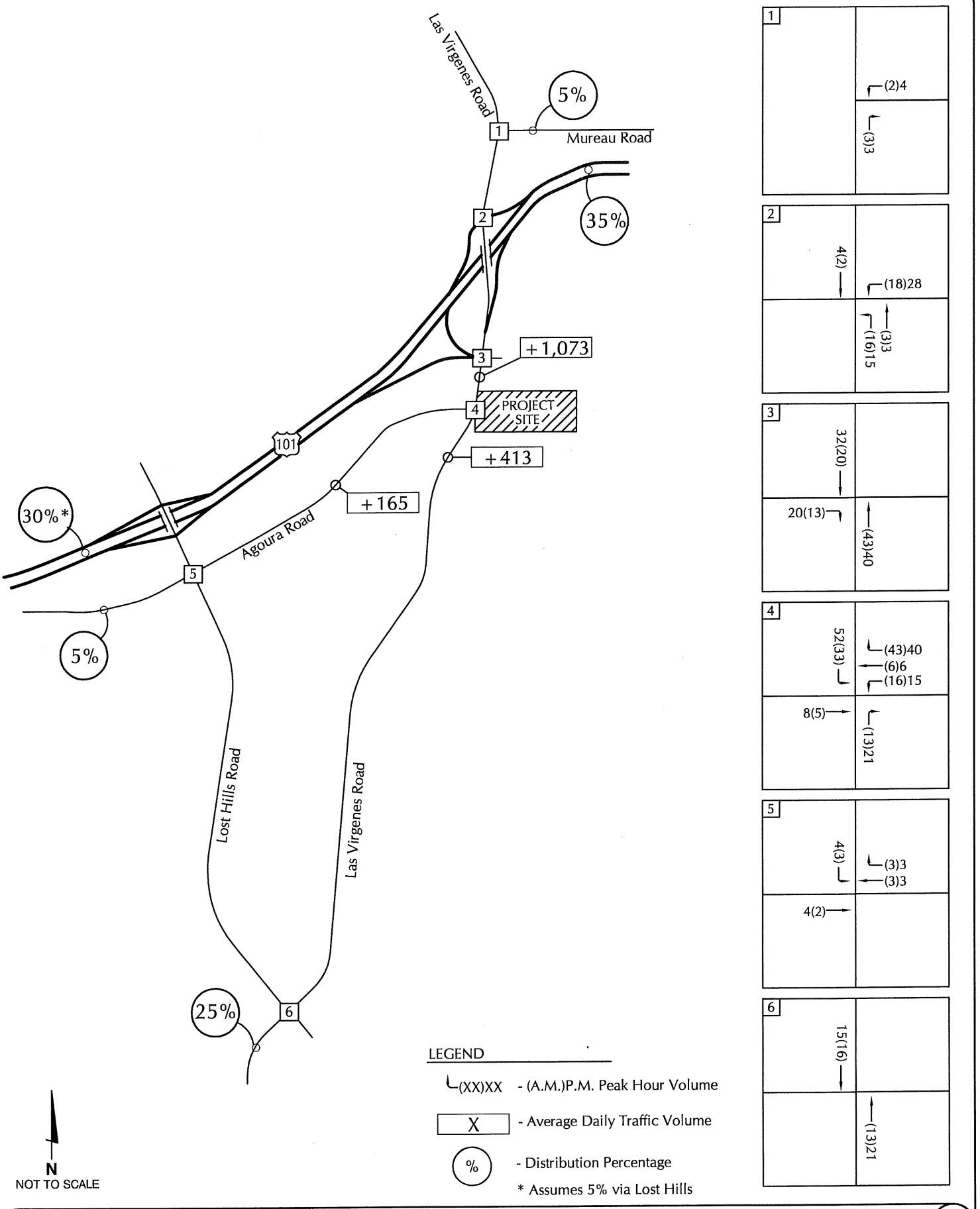
The data presented in Table 4 show that the Canyon Oaks Project is forecast to generate 1,650 average daily trips (ADT), 116 A.M. peak hour trips, and 142 P.M. peak hour trips.

Project Trip Distribution

Project-generated traffic volumes were distributed and assigned to the adjacent street network based on the percentages shown in Table 5. The trip distribution percentages were developed for the project based on input provided by City staff, existing traffic patterns observed in the study-area, and data published in recent traffic studies. The assignment of project-added traffic is also shown on Figure 5.

Table 5
Project Trip Distribution

Route	Origin/Destination	Distribution %
U.S. 101	East West	35% 30%
Las Virgenes Road	South	25%
Mureau Road	East	5%
Agoura Road	West	5%
Total:		**100%**



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PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 5

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Existing + Project Roadway Operations

Levels of service were calculated for the study-area roadway segments assuming the Existing + Project traffic volumes shown on Figure 6. The analysis assumes that the segment of Las Virgenes Road south of Agoura Road will be widened to 4-lanes prior to occupancy of the project as discussed in the Planned Improvements section of this report. Table 6 presents the Existing + Project levels of service and identifies project-specific impacts based on City thresholds.

Table 6
Existing + Project Roadway Levels of Service

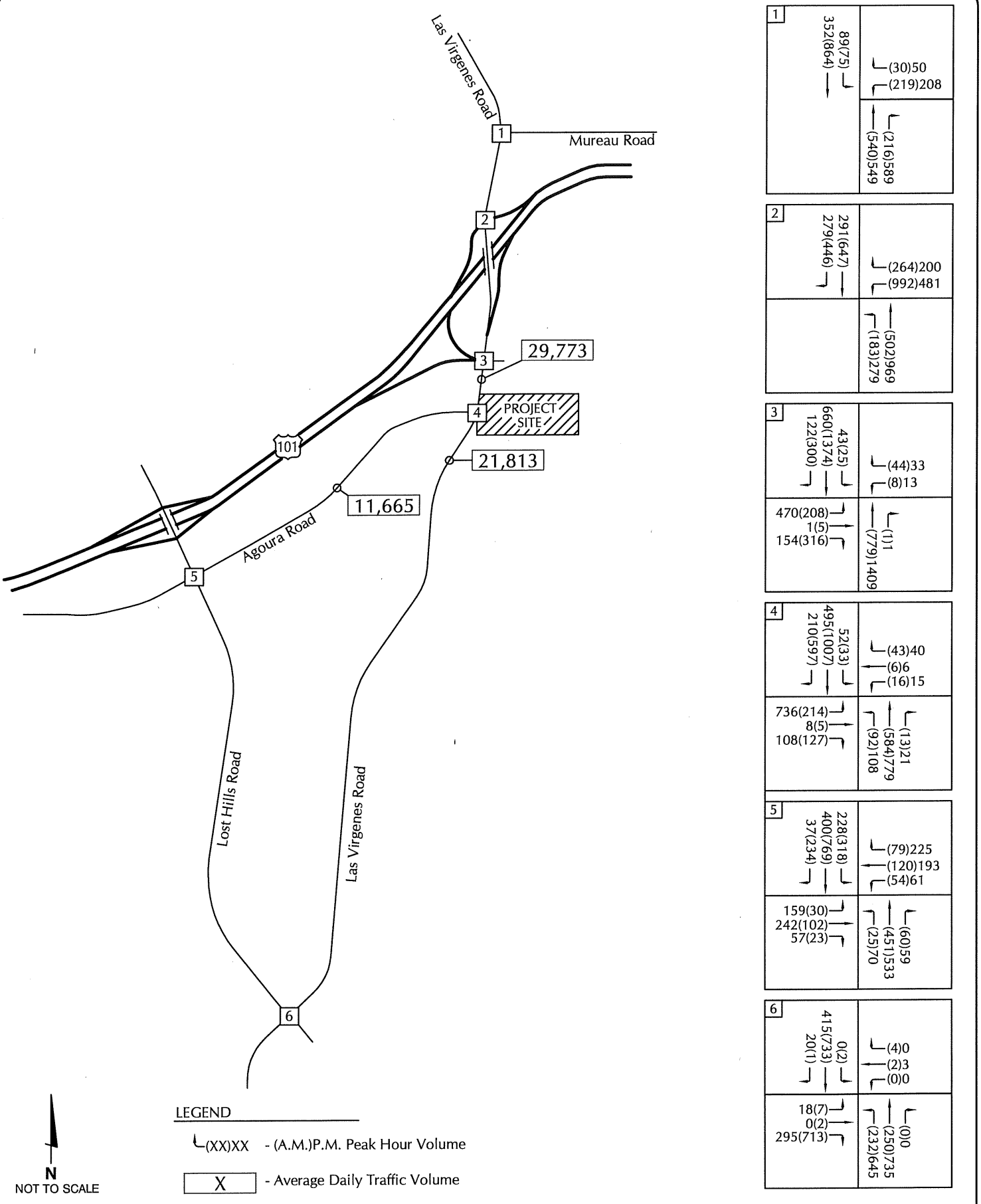
Roadway Segment	ADT		LOS	V/C Increase	Impact?
	Existing	Existing + Project			
Las Virgenes Rd. n/o Agoura Rd. (a)	28,700	29,773	LOS B	0.037	NO
Las Virgenes Rd. s/o Agoura Rd.	21,400	21,813	LOS A	0.019	No
Agoura Rd. w/o Las Virgenes Rd.	11,500	11,665	LOS A	0.014	NO

(a) Roadway LOS analysis assumes improvements implemented by the project.

The data in Table 6 show that the study-area roadway segments would operate acceptably in the LOS A-B range with Existing + Project traffic volumes. The project would therefore not generate significant project-specific impacts to the study-area roadway segments.

Existing + Project Intersection Operations

Levels of service were calculated for the study-area intersections assuming the Existing + Project traffic volumes presented on Figure 6. Tables 7 and 8 compare the Existing and Existing + Project levels of service and identify project-specific impacts based on City thresholds.



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EXISTING + PROJECT TRAFFIC VOLUMES

FIGURE 6

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Table 7
Existing + Project A.M. Peak Hour Levels of Service

Intersection	Existing		Existing + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.506	A	0.507	A	0.001	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	21.2 sec.	C	21.5 sec.	C	0.016	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	9.1 sec.	A	9.5 sec.	A	0.015	NO
4. Las Virgenes Rd./Agoura Rd.	0.598	A	0.637	B	0.039	NO
5. Lost Hills Rd./Agoura Rd.	0.501	A	0.502	A	0.001	NO
6. Las Virgenes Rd./Lost Hills Rd.	**0.994**	**E**	**1.004**	**F**	**0.010**	**YES**

Bolded values exceed City's LOS C/D standard for City intersections.

Table 8
Existing + Project P.M. Peak Hour Levels of Service

Intersection	Existing		Existing + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.650	A	0.654	A	0.004	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	13.1 sec.	B	13.3 sec.	B	0.009	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	22.2 sec.	C	23.0 sec.	C	0.012	NO
4. Las Virgenes Rd./Agoura Rd.	0.573	A	0.634	B	0.061	NO
5. Lost Hills Rd./Agoura Rd.	0.593	A	0.596	A	0.003	NO
6. Las Virgenes Rd./Lost Hills Rd.	0.565	A	0.574	A	0.009	NO

The data presented in Tables 7 and 8 indicate that the Las Virgenes Road/Lost Hills Road intersection would operate at LOS F during the A.M. peak hour periods with Existing + Project volumes. The project would generate a significant impact to this intersection since it would increase the V/C ratio by the City's 0.010 impact threshold (See Table 3). The remaining intersections would operate acceptably in the LOS A - C range with Existing and Existing + Project volumes.

2019 (OPENING YEAR) ANALYSIS

Information provided by the project applicant indicates that the Canyon Oaks Project would be fully built and operational by 2019. At the request of City staff, an opening year analysis was completed for the project. The 2019 (Opening Year) traffic volumes were developed by applying a 1% annual growth rate to the 2015 traffic volumes. Figure 7 presents the 2019 (Opening Year) traffic volumes for the study-area intersections and roadways.

2019 + Project Roadway Operations

Levels of service were calculated for the study-area roadway segments assuming the 2019 + Project traffic volumes shown on Figure 8. The analysis assumes that the segment of Las Virgenes Road south of Agoura Road would be widened to 4-lanes by the time construction is finished on the project. Table 9 presents the 2019 + Project roadway levels of service and identifies project-specific impacts based on City thresholds.

Table 9
2019 + Project Roadway Levels of Service

Roadway Segment	ADT		LOS	V/C Increase	Impact?
	2019	2019 + Project			
Las Virgenes Rd. n/o Agoura Rd. (a)	29,800	30,873	LOS B	0.035	NO
Las Virgenes Rd. s/o Agoura Rd. (b)	22,300	22,713	LOS A	0.018	NO
Agoura Rd. w/o Las Virgenes Rd.	12,000	12,165	LOS A	0.013	NO

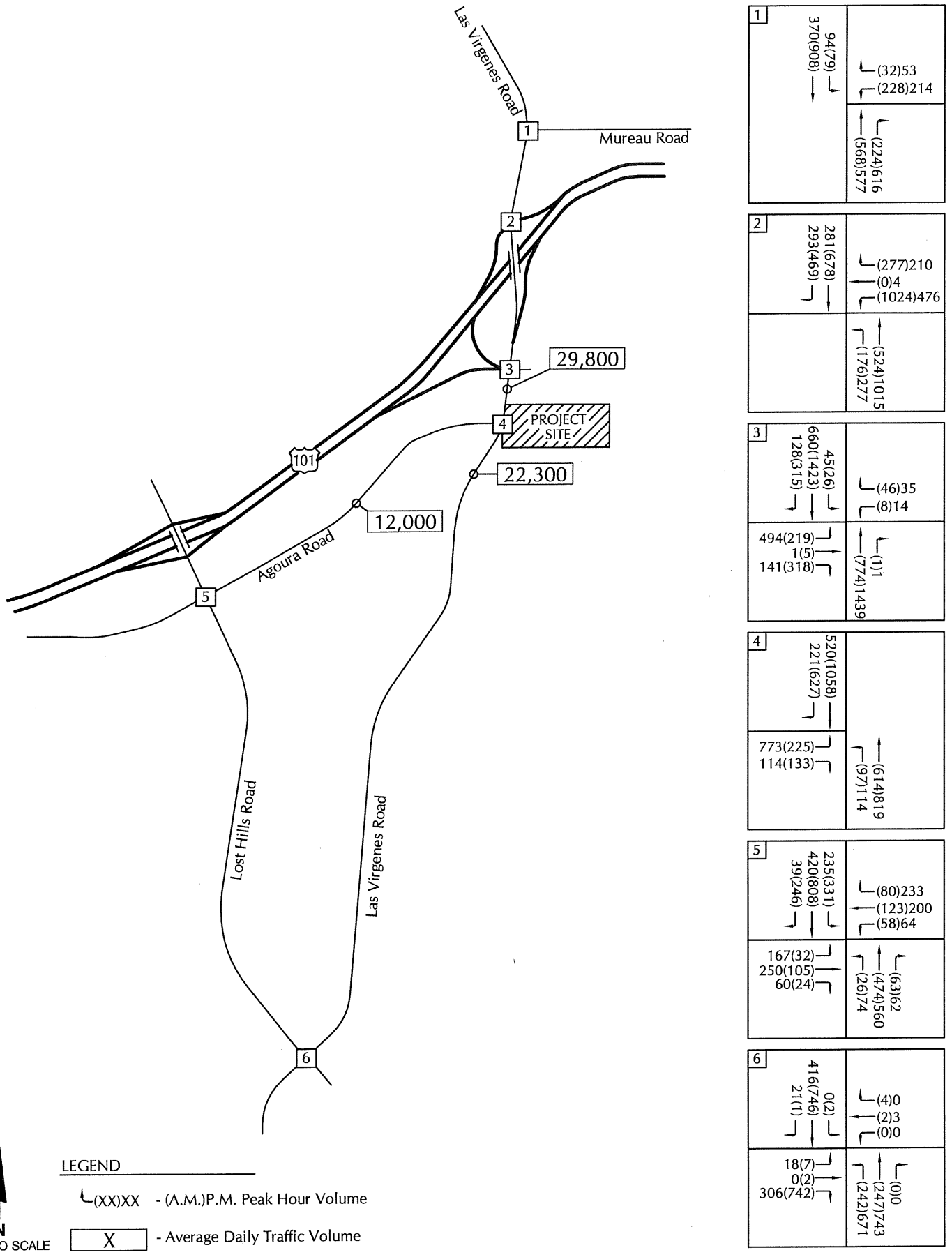
(a) Roadway LOS analysis assumes improvements implemented by the project.

(b) Assumes 4-lane segment per Las Virgenes Road Scenic Corridor Widening Project.

The data presented in Table 9 show that study-area roadway segments are forecast to operate at LOS B or better with Year 2019 + Project traffic volumes. The project would therefore not generate significant impacts to the study-area roadway segments.

2019 + Project Intersection Operations

Levels of service were calculated for the study-area intersections assuming the 2019 + Project traffic volumes presented on Figure 8. Tables 10 and 11 compare the 2019 and 2019 + Project levels of service and identify project-specific impacts based on City thresholds.



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2019 (OPENING YEAR) TRAFFIC VOLUMES

FIGURE 7

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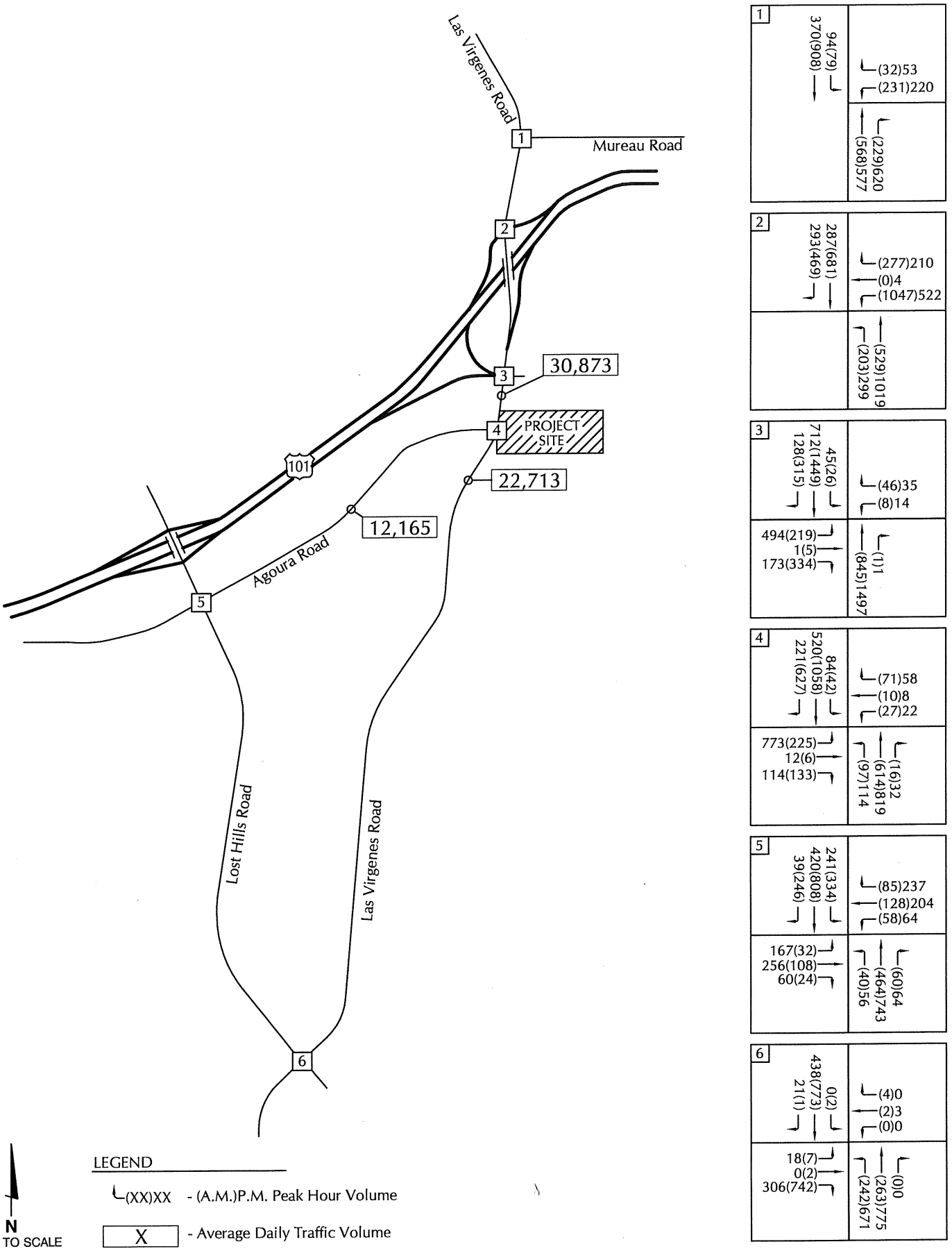

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2019 (OPENING YEAR) + PROJECT TRAFFIC VOLUMES

FIGURE 8

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Table 10
2019 + Project A.M. Peak Hour Levels of Service

Intersection	2019		2019 + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.527	A	0.528	A	0.001	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	22.6 sec.	C	24.6 sec.	C	0.016	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	9.7 sec.	A	10.1 sec.	B	0.014	NO
4. Las Virgenes Rd./Agoura Rd.	0.636	B	0.663	B	0.027	NO
5. Lost Hills Rd./Agoura Rd.	0.521	A	0.522	A	0.001	NO
6. Las Virgenes Rd./Lost Hills Rd.	**1.034**	**F**	**1.044**	**F**	**0.010**	**YES**

Bolded values exceed City's LOS C/D standard for City intersections.

Table 11
2019 + Project P.M. Peak Hour Levels of Service

Intersection	2019		2019 + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.678	B	0.682	B	0.004	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	13.2 sec.	B	13.6 sec.	C	0.010	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	26.9 sec.	C	29.3 sec.	C	0.012	NO
4. Las Virgenes Rd./Agoura Rd.	0.598	A	0.658	B	0.060	NO
5. Lost Hills Rd./Agoura Rd.	0.617	B	0.621	B	0.004	NO
6. Las Virgenes Rd./Lost Hills Rd.	0.583	A	0.592	C	0.009	NO

The data presented in Tables 10 and 11 indicate that the Las Virgenes Road/Lost Hills Road intersection would operate at LOS F during the A.M. peak hour periods with 2019 + Project volumes. The project would generate a significant impact to this intersection since it would increase the V/C ratio by more the City's 0.010 impact threshold. The remaining intersections would operate acceptably in the LOS A - C range with 2019 and 2019 + Project volumes.

SITE ACCESS AND CIRCULATION

Access to the project site would be provided via a new access road that would connect to the east side of Las Virgenes Road opposite the signalized Agoura Road intersection (see Figure 2, Project Site Plan). The hotel driveway would be located on the north side of the access road approximately 115 feet west of the Agoura Road intersection. The road would extend east from the hotel driveway to provide access to the residential units.

The project would implement improvements to the Las Virgenes Road/Agoura Road intersection to accommodate the new connection. These improvements are shown on Exhibit A contained in the Technical Appendix. The northbound Las Virgenes Road approach would be widened to provide a new through + right-turn lane and the southbound approach would be widened to provide a left-turn lane. The new eastern leg of the intersection would be configured with a westbound right-turn lane and a through + left-turn lane, a landscaped median, and a 20-foot wide entry lane. The eastbound Agoura Road approach would be restriped to provide a left-turn lane, a through + left turn lane and a right-turn lane. The analysis presented in the previous section shows that the intersection would operate acceptably in the LOS B - C range with these improvements.

The project would also be required to complete all necessary frontage improvements along Las Virgenes Road to complete the ultimate street standard, including curb, gutter and sidewalk. These frontage improvements will include a third northbound lane on Las Virgenes Road north of Agoura Road which, which will complete the ultimate section and accommodate the additional lane that the City has programed for the Las Virgenes Road/U.S. 101 SB Ramps intersection (see discussion in Planned Improvements section).

As noted above, the hotel driveway would be located on the north side of the access road approximately 115 feet west of the Agoura Road intersection. A 70-foot left-turn pocket would be provided on the access road for vehicles turning left into the hotel driveway. A queuing analysis was completed for the Las Virgenes Road/Agoura Road intersection and the hotel driveway to determine if the intersection spacing and left-turn storage provided would be adequate (see Technical Appendix for queuing analysis worksheets). The analysis found that queues on the westbound approach of the Las Virgenes Road/Agoura Road intersection would not back-up to the hotel driveway. The analysis also showed that the hotel driveway would operate at LOS A and that the left-turn queues turning into the driveway would be accommodated in the 70-foot left-turn pocket.

CUMULATIVE ANALYSIS

Cumulative Traffic Forecasts

Cumulative traffic volumes were forecast for the study-area roadways and intersections assuming development of the approved and pending projects located within the project study area. The list of approved and pending projects used for the cumulative analysis was provided by City staff and is presented in the Technical Appendix. Trip generation estimates

were developed for the cumulative projects using the rates presented in the ITE Trip Generation report (cumulative trip generation calculation worksheet contained in the Technical Appendix for reference). The traffic generated by the cumulative projects was added to the 2019 volumes based on the distribution percentages presented in existing traffic studies and environmental documents completed for developments in the study area. Figure 9 presents the Cumulative traffic volumes for the study-area roadways and intersections.

Cumulative + Project Roadway Operations

Levels of service were calculated for the study-area roadway segments assuming the Cumulative and Cumulative + Project traffic volumes shown on Figures 9 and 10. Table 12 presents the Cumulative and Cumulative + Project levels of service and identifies cumulative impacts based on City thresholds.

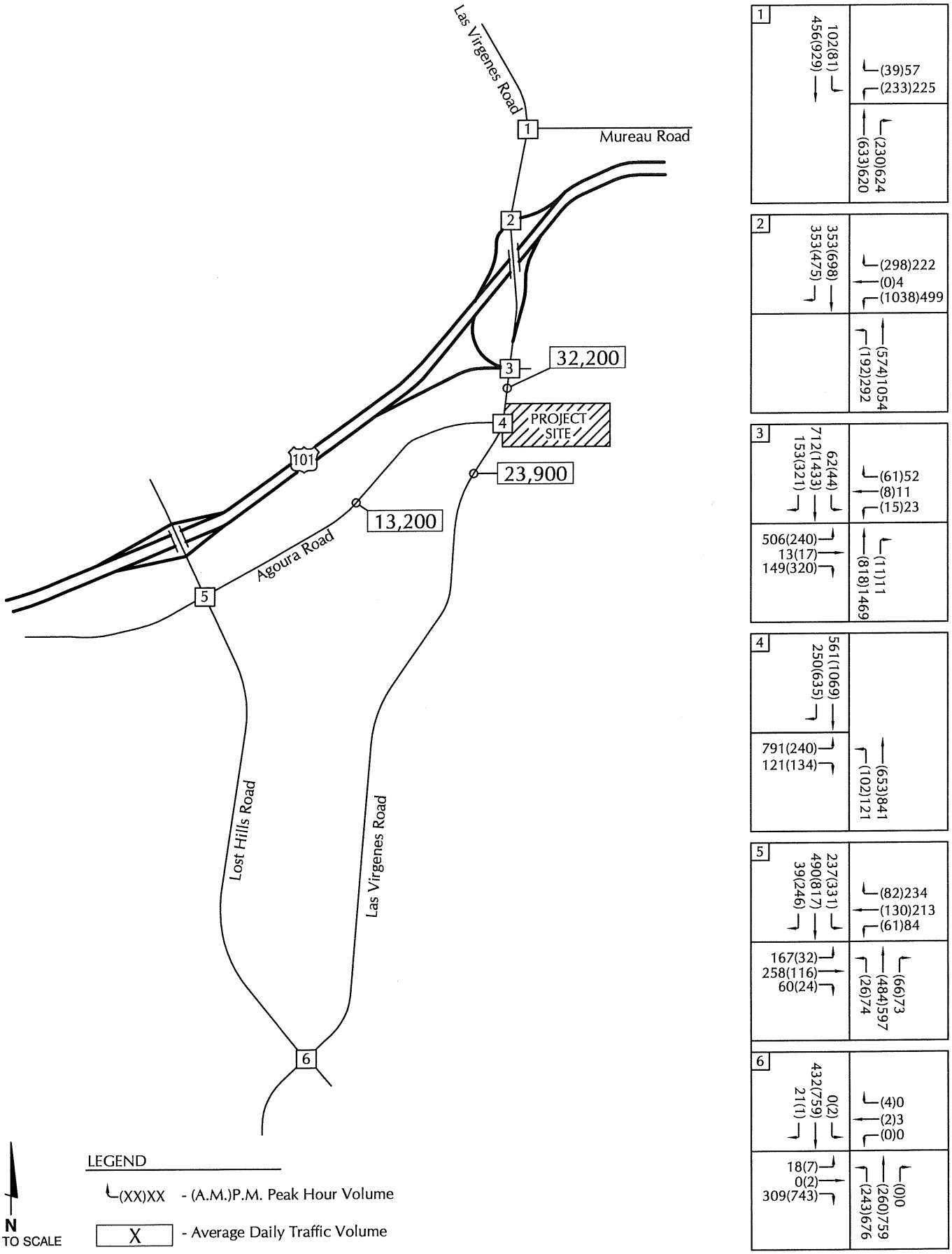
Table 12
Cumulative + Project Roadway Levels of Service

Roadway Segment	ADT		LOS	V/C Increase	Impact?
	Cumulative	Cumulative + Project			
Las Virgenes Rd. n/o Agoura Rd. (a)	32,200	33,273	LOS B	0.033	NO
Las Virgenes Rd. s/o Agoura Rd. (b)	23,900	24,313	LOS A	0.017	NO
Agoura Rd. w/o Las Virgenes Rd.	13,200	13,365	LOS A	0.013	NO

(a) Roadway LOS analysis assumes improvements implemented by the project.

(b) Assumes 4-lane segment per Las Virgenes Road Scenic Corridor Widening Project.

The data presented in Table 12 show that the study-area roadway segments are forecast to operate at LOS B or better with Cumulative + Project traffic volumes. The project would therefore not generate significant cumulative impacts to the study-area roadway segments.

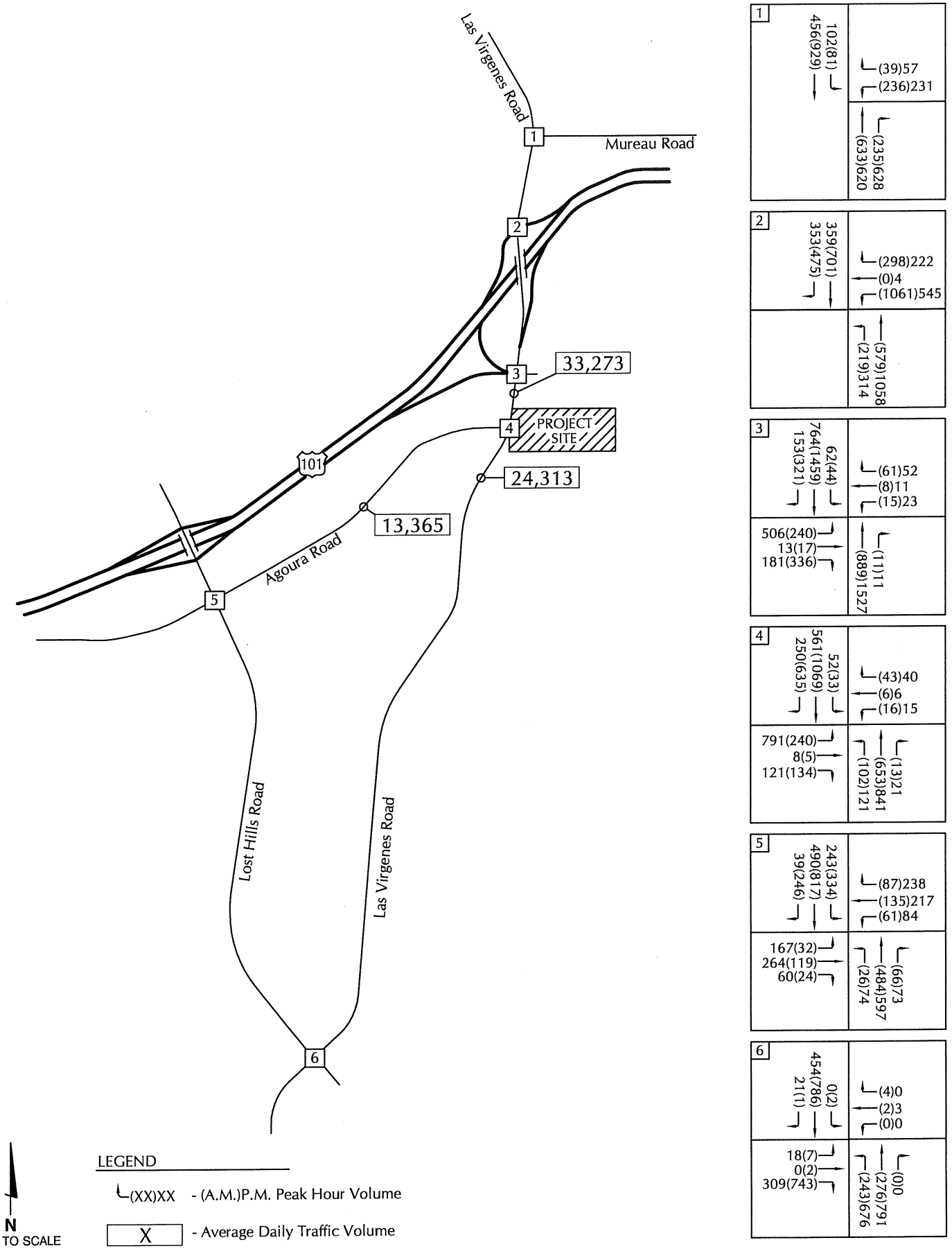


ASSOCIATED TRANSPORTATION ENGINEERS

CUMULATIVE TRAFFIC VOLUMES

FIGURE 9

MMF - #10051.01



ASSOCIATED TRANSPORTATION ENGINEERS

CUMULATIVE + PROJECT TRAFFIC VOLUMES

FIGURE 10

MMF - #10051.01

Cumulative + Project Intersection Operations

Levels of service were calculated for the study-area intersections assuming the Cumulative and Cumulative + Project traffic volumes. Tables 13 and 14 compare the Cumulative and Cumulative + Project levels of service for the study-area intersections and identify cumulative impacts based on City thresholds.

Table 13
Cumulative + Project A.M. Peak Hour Levels of Service

Intersection	Cumulative		Cumulative + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.536	A	0.537	A	0.001	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	23.4 sec.	C	25.2 sec.	C	0.016	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	10.0 sec.	B	10.4 sec.	B	0.014	NO
4. Las Virgenes Rd./Agoura Rd.	0.645	B	0.672	B	0.027	NO
5. Lost Hills Rd./Agoura Rd.	0.530	A	0.530	A	0.000	NO
6. Las Virgenes Rd./Lost Hills Rd.	**1.043**	**F**	**1.053**	**F**	**0.010**	**YES**

Bolded values exceed City's LOS C/D standard for City intersections.

Table 14
Cumulative + Project P.M. Peak Hour Levels of Service

Intersection	Cumulative		Cumulative + Project		Project Added	
	ICU/Delay	LOS	ICU/Delay	LOS	Increase	Impact?
1. Las Virgenes Rd./Mureau Rd.	0.695	B	0.699	B	0.004	NO
2. U.S. 101 NB Ramps/Las Virgenes Rd.	17.7 sec.	B	18.5 sec.	B	0.009	NO
3. U.S. 101 SB Ramps/Las Virgenes Rd.	27.9 sec.	C	29.9 sec.	C	0.013	NO
4. Las Virgenes Rd./Agoura Rd.	0.610	B	0.671	B	0.061	NO
5. Lost Hills Rd./Agoura Rd.	0.633	B	0.636	B	0.003	NO
6. Las Virgenes Rd./Lost Hills Rd.	0.594	A	0.603	A	0.009	NO

The data presented in Tables 13 and 14 indicate that the Las Virgenes Road/Lost Hills Road intersection would operate at LOS F during the A.M. peak hour periods with Cumulative + Project volumes. The project would generate a significant impact to this intersection since it would increase the V/C ratio by more the City's 0.010 impact threshold. The remaining intersections would operate acceptably in the LOS A - C range with Cumulative and Cumulative + Project volumes.

MITIGATION MEASURES

Project-Specific Mitigation Measures

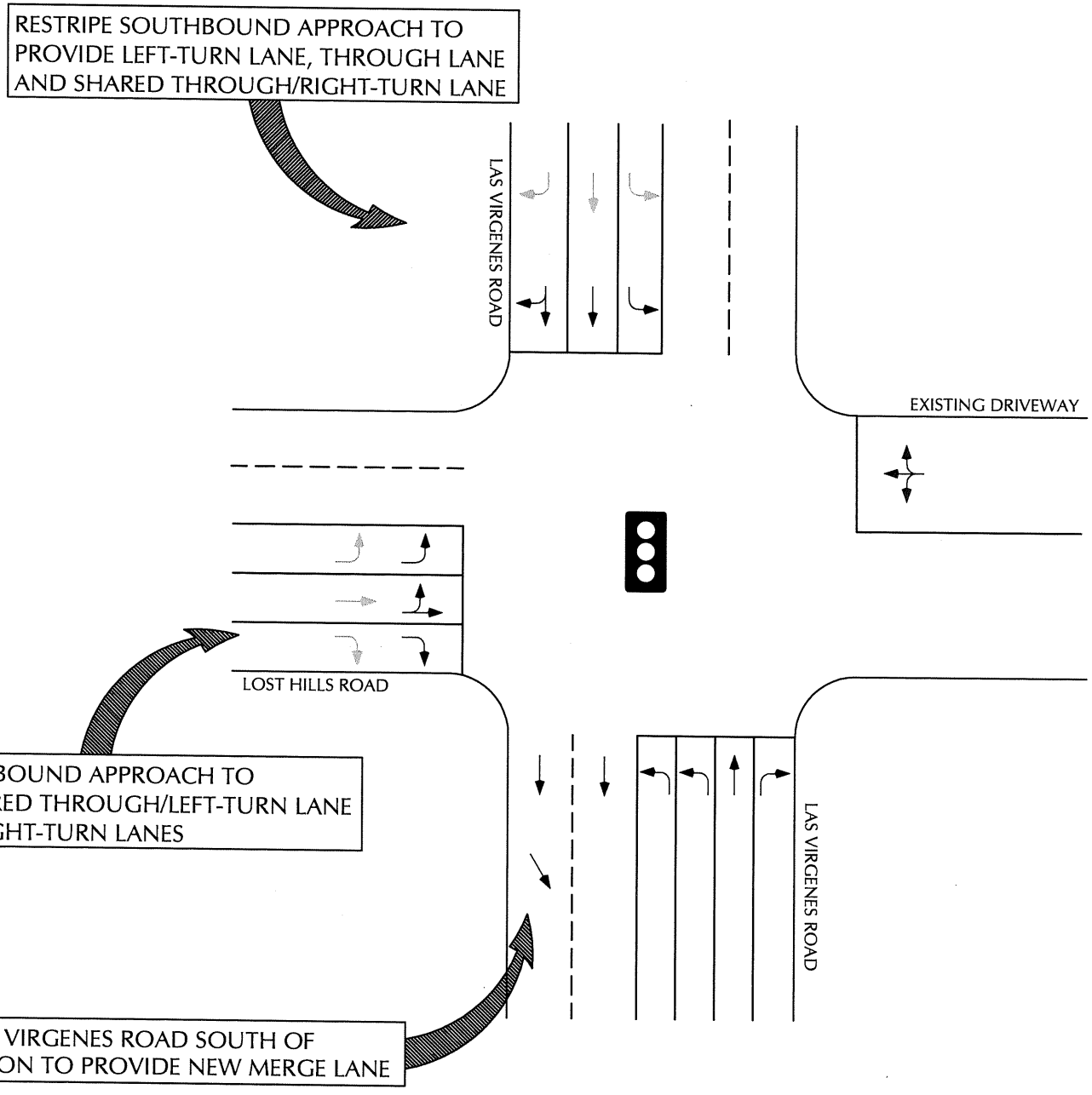
Las Virgenes Road/Lost Hills Road. This intersection is forecast to operate at LOS F during the A.M. peak hour with Existing + Project and 2019 + Project traffic volumes. The project would generate a project-specific impact to this intersection by increasing the V/C ratio by 0.010 (see Table 3). As discussed in the Planned Improvement section, the City has identified and programmed an improvement for this intersection to provide a new southbound merge lane to allow the southbound approach to be restriped to provide one left-turn lane, one through lane and one through + right-turn lane and the eastbound approach to be restriped to provide one left + through lane and dual right-turn lanes. Figure 11presents the proposed intersection improvements. The project would participate in the implementation of this improvement through the payment of the City's traffic mitigation fees.

Table 15 present the Existing + Project and 2019 + Project A.M. peak hour levels of service for this intersection with the programmed improvement.

Table 15
2015 + Project and 2019 + Project A.M. Peak Hour Levels of Service with Improvements

Intersection	2015 + Project		2019 + Project	
	ICU	LOS	ICU	LOS
Las Virgenes Road/Lost Hills Road	0.593	A	0.612	B

The data presented in Table 15 indicate that the Las Virgenes Road/Lost Hills Road intersection would operate at LOS A/B with the programmed improvements, which mitigates the project-specific impacts at this location.



ASSOCIATED TRANSPORTATION ENGINEERS

LAS VIRGENES ROAD/AGOURA ROAD INTERSECTION IMPROVEMENTS

FIGURE 11

MMF - #10051.01

Cumulative Mitigation Measures

Las Virgenes Road/Lost Hills Road. This intersection is forecast to operate at LOS F during the A.M. peak hour with Cumulative and Cumulative + Project traffic volumes. The project would generate a cumulative impact to this intersection by increasing the V/C ratio by 0.010. As discussed in the Planned Improvement section, the City has identified and programmed an improvement for this intersection to provide a new southbound merge lane to allow the southbound approach to be restriped to provide one left-turn lane, one through lane and one through + right-turn lane and the eastbound approach to be restriped to provide one left + through lane and dual right-turn lanes (see Figure 11). The project would participate in the implementation of this improvement through the payment of the City's traffic mitigation fees. Table 16 presents the Cumulative and Cumulative + Project A.M. peak hour levels of service for this intersection with the programmed improvement.

Table 16
Cumulative + Project A.M. Peak Hour Levels of Service with Improvements

Intersection	Cumulative		Cumulative + Project	
	ICU	LOS	ICU	LOS
Las Virgenes Road/Lost Hills Road	0.612	B	0.617	B

The data presented in Table 16 indicate that the Las Virgenes Road/Lost Hills Road intersection would operate at LOS B with the programmed improvements, which mitigates the cumulative impacts at this location.

U.S. 101/LAS VIRGENES ROAD INTERCHANGE QUEUEING ANALYSIS

Caltrans staff requested a queueing analysis for the on- and off-ramps at the U.S. 101/Las Virgenes Road interchange to determine if future vehicle queues will exceed 85% of the available storage. The analysis reviews queue forecasts for the freeway off-ramps as well as the left-turn lanes for the freeway on-ramps.

The queueing analysis was completed using the SYNCHRO software program and assumes the Cumulative + Project traffic forecasts in order to provide a worst-case analysis. The SYNCHRO software implements the Highway Capacity Manual (HCM) operations methodology and predicts both "50th Percentile" and "95th Percentile" queue forecasts for the peak period. The 50th Percentile queue forecasts represent the average queues during the peak period. The 95th Percentile queue forecasts represent the peak queue during the peak period and is recommended for design purposes. The following analysis is therefore based on the 95th Percentile queue forecasts.

The existing turn-lane storage was determined based on the length of the left-turn pockets plus the additional length of the off-ramp to the gore point at the freeway. Worksheets showing the queue forecasts are contained in the Technical Appendix for reference. Table 17 summarizes the available left-turn storage and the Cumulative+Project peak queue forecasts for the U.S. 101/Las Virgenes Road Interchange.

Table 17
Cumulative+Project Left-Turn Queues and Storage Requirements

Intersection	Left-Turn Lane Storage (Feet)	Queue Forecast / Capacity %		Impact?
		A.M. Peak Hour	P.M. Peak Hour	
U.S. 101 NB Ramps/Las Virgenes Road				
- WB Left-Turn (Freeway Off-Ramp) (a)	976′	798′ / 82%	410′ / 42%	No
- NB Left-Turn (Onto Freeway)	250′	213′ / 85%	153′ / 61%	No
U.S. 101 SB Ramps/Las Virgenes Road				
- EB Left-Turn (Freeway Off Ramp) (b)	1,150′	181′ / 16%	466′ / 41%	No

(a) Dual left-turn lanes. Storage/queue forecasts based on capacity of both lanes and off-ramp storage to gore point.
(b) Shared Left-turn/through lane. Storage assumes measurement from off-ramp terminus to gore point.

The data presented in Table 17 indicate that the 95th percentile queue forecasts would not exceed 85% of the available storage capacity with Cumulative+Project traffic volumes which meets the Caltrans 85% capacity utilization threshold.

LOST HILLS ROAD/U.S. 101 INTERCHANGE IMPROVEMENT PROJECT CONSTRUCTION IMPACTS

The City of Calabasas and Caltrans commenced construction of the Lost Hills Road/U.S. 101 Interchange Improvement Project in June of 2015. The construction project is anticipated to last for approximately 18 months and is scheduled to be completed in early 2017. The proposed Canyon Oaks Project is scheduled for completion in 2019, thus the Lost Hills Road/U.S. 101 improvement would be operational prior to occupancy of the project.

There would be overlapping phases of construction for the Lost Hills/U.S. 101 improvements and the Canyon Oaks Project. The MND prepared for the Lost Hills/U.S. 101 Project indicates that the construction staging plan will maintain at least one lane in each direction on Lost hills Road at all times during construction. The construction staging concept also provides freeway ramp access both to/from the north and the south at all times, with the possible exception of overnight closures to complete sections of pavement. During these short-term temporary ramp closures, detours will be designated that will direct drivers to alternative routes. The temporary ramp closures would divert traffic to the Las Virgenes Road/U.S. 101 interchange, which could create short-term congestion. The interchange construction project will be required to prepare a Traffic Management Plan (TMP) to minimize the construction impacts of the project.

Given that there will be overlapping construction periods for the Lost Hills/U.S. 101 improvements and the Canyon Oaks Project, it is recommended that a Construction Management Plan be developed for the Canyon Oaks Project to identify measures to reduce potential construction impacts and coordinate with the Lost Hills Road/U.S. 101 interchange TMP.

CONGESTION MANAGEMENT PROGRAM ANALYSIS

Impact Criteria

The following section reviews the potential impacts of the project to the Los Angeles County Congestion Management Program (CMP) system. This analysis was completed using the procedures and impact criteria outlined in Appendix D of the Los Angeles County CMP[5].

Potential Intersection Impacts

The CMP guidelines require that intersection monitoring locations included in the CMP be examined if the proposed project would add 50 peak hour trips (PHT) or more during the A.M. or P.M. peak hours. None of the intersections located in the vicinity of the project site are included in the CMP network. Therefore, no further review of potential impacts to CMP intersections is required.

Potential Freeway Impacts

The CMP guidelines require that freeway monitoring locations must be examined if the proposed project would add 150 PHT or more (in either direction) during the A.M. or P.M. peak hours. The proposed project is forecast to add 29 A.M. and 35 P.M. PHT to northbound U.S. Highway 101, and 42 A.M. and 50 P.M. PHT to southbound U.S. Highway 101, which is less than 150 PHT. Based on CMP criteria, the project would not generate a significant impact to the freeway segments located within the study-area.

■ ■ ■

5 2010 Draft Congestion Management Program for Los Angeles County, County of Los Angeles Metropolitan Transportation Authority, 2010.

REFERENCES AND PERSONS CONTACTED

Associated Transportation Engineers

Scott A. Schell, AICP, PTP, Principal Planner
Dan Dawson, PTP, Senior Transportation Planner
Matthew Farrington, Transportation Planner I
Darryl F. Nelson, PTP, Senior Transportation Planner

References

Rondell Oasis Hotel Traffic Impact Study, Overland Traffic Consultants, December 2014.

Highway Capacity Manual, Highway Research Board Special Report 209, Transportation Research Board, National Research Council, 2010.

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Persons Contacted

Tatiana Holden, City of Calabasas
Talyn Mirzakhanian, City of Calabasas
Joe Power, AICP, Rincon Consultants

TECHNICAL APPENDIX

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TRAFFIC COUNT DATA

ROADWAY DESIGN CAPACITY TABLE

LEVEL OF SERVICE DEFINITIONS

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

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Reference 2 U.S. 101 Southbound Ramps/Las Virgenes Road
Reference 3 Las Virgenes Road/Mureau Road
Reference 4 Las Virgenes Road/Agoura Road
Reference 5 Las Virgenes Road/Lost Hill Road
Reference 6 Lost Hills Road/Agoura Road

PROJECT DRIVEWAY QUEUEING ANALYSIS WORKSHEETS

CUMULATIVE PROJECT LIST/TRIP GENERATION FORECASTS

FREE OFF-RAMP QUEUING ANALYSIS WORKSHEETS

TRAFFIC COUNT DATA

Prepared by NDS/ATD

VOLUME

Agoura Rd w/o Las Virgenes Rd

Day: Thursday
Date: 5/26/2011

City: Calabasas
Project #: CA11_5184_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,678	5,402	11,080

AM Period	NB	SB	EB		WB		TOTAL	
00:00			6		6		12	
00:15			3		3		6	
00:30			1		3		4	
00:45			2	12	6	18	8	30
01:00			2		6		8	
01:15			3		3		6	
01:30			3		2		5	
01:45			2	10	0	11	2	21
02:00			1		2		3	
02:15			9		3		12	
02:30			6		3		9	
02:45			0	16	1	9	1	25
03:00			0		2		2	
03:15			0		3		3	
03:30			0		1		1	
03:45			0		1	7	1	7
04:00			2		10		12	
04:15			2		1		3	
04:30			3		6		9	
04:45			3	10	29	46	32	56
05:00			8		12		20	
05:15			6		8		14	
05:30			14		23		37	
05:45			13	41	26	69	39	110
06:00			37		41		78	
06:15			31		47		78	
06:30			26		73		99	
06:45			51	145	65	226	116	371
07:00			44		83		127	
07:15			68		114		182	
07:30			82		138		220	
07:45			56	250	140	475	196	725
08:00			71		163		234	
08:15			94		169		263	
08:30			98		162		260	
08:45			83	346	154	648	237	994
09:00			71		113		184	
09:15			56		106		162	
09:30			62		90		152	
09:45			52	241	80	389	132	630
10:00			60		69		129	
10:15			52		61		113	
10:30			71		59		130	
10:45			71	254	56	245	127	499
11:00			72		61		133	
11:15			83		79		162	
11:30			62		73		135	
11:45			71	288	99	312	170	600
TOTALS				1613		2455		4068
SPLIT %				39.7%		60.3%		36.7%

PM Period	NB	SB	EB		WB		TOTAL	
12:00			132		103		235	
12:15			110		124		234	
12:30			122		106		228	
12:45			124	488	99	432	223	920
13:00			90		123		213	
13:15			94		143		237	
13:30			94		113		207	
13:45			100	378	101	480	201	858
14:00			98		87		185	
14:15			79		77		156	
14:30			68		72		140	
14:45			75	320	69	305	144	625
15:00			95		55		150	
15:15			93		73		166	
15:30			120		81		201	
15:45			117	425	76	285	193	710
16:00			123		78		201	
16:15			105		65		170	
16:30			158		61		219	
16:45			130	516	61	265	191	781
17:00			189		81		270	
17:15			186		76		262	
17:30			195		81		276	
17:45			168	738	77	315	245	1053
18:00			129		68		197	
18:15			116		69		185	
18:30			101		46		147	
18:45			105	451	59	242	164	693
19:00			81		72		153	
19:15			81		68		149	
19:30			67		47		114	
19:45			66	295	50	237	116	532
20:00			53		61		114	
20:15			47		31		78	
20:30			58		37		95	
20:45			53	211	39	168	92	379
21:00			44		46		90	
21:15			32		25		57	
21:30			25		18		43	
21:45			29	130	19	108	48	238
22:00			29		12		41	
22:15			16		22		38	
22:30			14		20		34	
22:45			14	73	13	67	27	140
23:00			9		6		15	
23:15			9		8		17	
23:30			16		19		35	
23:45			6	40	10	43	16	83
TOTALS				4065		2947		7012
SPLIT %				58.0%		42.0%		63.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,678	5,402	11,080

AM Peak Hour			11:45	08:00	08:00
AM Pk Volume			435	648	994
Pk Hr Factor			0.824	0.959	0.945
7 - 9 Volume	0	0	596	1123	1719
7 - 9 Peak Hour			08:00	08:00	08:00
7 - 9 Pk Volume	0	0	346	648	994
Pk Hr Factor	0.000	0.000	0.883	0.959	0.945

PM Peak Hour			17:00	13:00	17:00
PM Pk Volume			738	480	1053
Pk Hr Factor			0.946	0.839	0.954
4 - 6 Volume	0	0	1254	580	1834
4 - 6 Peak Hour			17:00	17:00	17:00
4 - 6 Pk Volume	0	0	738	315	1053
Pk Hr Factor	0.000	0.000	0.946	0.972	0.954

Prepared by NDS/ATD

VOLUME

Las Virgenes Rd n/o Agoura Rd

Day: Thursday
Date: 5/26/2011

City: Calabasas
Project #: CA11_5184_002

DAILY TOTALS	NB	SB	EB	WB	Total
	13,720	13,896	0	0	27,616

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	29		21				50		12:00	210		201				411	
00:15	27		18				45		12:15	215		240				455	
00:30	13		13				26		12:30	226		211				437	
00:45	16	85	11	63			27	148	12:45	227	878	250	902			477	1780
01:00	11		13				24		13:00	216		314				530	
01:15	8		8				16		13:15	342		276				618	
01:30	10		10				20		13:30	239		235				474	
01:45	14	43	7	38			21	81	13:45	263	1060	190	1015			453	2075
02:00	7		16				23		14:00	255		188				443	
02:15	7		15				22		14:15	238		161				399	
02:30	9		5				14		14:30	237		176				413	
02:45	6	29	6	42			12	71	14:45	209	939	172	697			381	1636
03:00	4		8				12		15:00	260		157				417	
03:15	0		10				10		15:15	262		170				432	
03:30	1		3				4		15:30	326		196				522	
03:45	4	9	8	29			12	38	15:45	349	1197	232	755			581	1952
04:00	3		13				16		16:00	410		177				587	
04:15	6		9				15		16:15	287		192				479	
04:30	11		15				26		16:30	471		197				668	
04:45	14	34	44	81			58	115	16:45	331	1499	184	750			515	2249
05:00	10		34				44		17:00	343		190				533	
05:15	16		38				54		17:15	437		212				649	
05:30	38		69				107		17:30	332		195				527	
05:45	29	93	81	222			110	315	17:45	189	1301	202	799			391	2100
06:00	56		145				201		18:00	141		202				343	
06:15	69		201				270		18:15	137		208				345	
06:30	78		273				351		18:30	154		164				318	
06:45	93	296	275	894			368	1190	18:45	146	578	171	745			317	1323
07:00	96		242				338		19:00	171		195				366	
07:15	122		319				441		19:15	161		146				307	
07:30	234		321				555		19:30	148		136				284	
07:45	146	598	330	1212			476	1810	19:45	129	609	113	590			242	1199
08:00	155		371				526		20:00	168		87				255	
08:15	178		428				606		20:15	178		102				280	
08:30	242		479				721		20:30	169		82				251	
08:45	247	822	325	1603			572	2425	20:45	204	719	79	350			283	1069
09:00	191		258				449		21:00	199		80				279	
09:15	174		255				429		21:15	123		78				201	
09:30	158		241				399		21:30	133		67				200	
09:45	162	685	216	970			378	1655	21:45	97	552	63	288			160	840
10:00	141		195				336		22:00	70		64				134	
10:15	146		171				317		22:15	68		54				122	
10:30	154		180				334		22:30	72		53				125	
10:45	173	614	182	728			355	1342	22:45	37	247	39	210			76	457
11:00	171		193				364		23:00	39		37				76	
11:15	181		198				379		23:15	33		27				60	
11:30	172		193				365		23:30	42		30				72	
11:45	173	697	206	790			379	1487	23:45	22	136	29	123			51	259
TOTALS		4005		6672				10677	TOTALS		9715		7224				16939
SPLIT %		37.5%		62.5%				38.7%	SPLIT %		57.4%		42.6%				61.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	13,720	13,896	0	0	27,616

AM Peak Hour	08:15	07:45			08:00	PM Peak Hour	16:30	12:45			16:30
AM Pk Volume	858	1608			2425	PM Pk Volume	1582	1075			2365
Pk Hr Factor	0.868	0.839			0.841	Pk Hr Factor	0.840	0.856			0.885
7 - 9 Volume	1420	2815	0	0	4235	4 - 6 Volume	2800	1549	0	0	4349
7 - 9 Peak Hour	08:00	07:45			08:00	4 - 6 Peak Hour	16:30	17:00			16:30
7 - 9 Pk Volume	822	1608	0	0	2425	4 - 6 Pk Volume	1582	799	0	0	2365
Pk Hr Factor	0.832	0.839	0.000	0.000	0.841	Pk Hr Factor	0.840	0.942	0.000	0.000	0.885

Prepared by NDS/ATD

VOLUME

Las Virgenes Rd s/o Agoura Rd

Day: Thursday
Date: 5/26/2011

City: Calabasas
Project #: CA11_5184_003

DAILY TOTALS	NB	SB	EB	WB	Total
	10,333	10,262	0	0	20,595

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	15		18				33		12:00	124		143				267	
00:15	14		13				27		12:15	134		149				283	
00:30	5		10				15		12:30	141		163				304	
00:45	14	48	7	48			21	96	12:45	137	536	194	649			331	1185
01:00	6		7				13		13:00	151		219				370	
01:15	4		6				10		13:15	320		188				508	
01:30	8		6				14		13:30	184		157				341	
01:45	10	28	6	25			16	53	13:45	167	822	146	710			313	1532
02:00	5		14				19		14:00	175		119				294	
02:15	4		8				12		14:15	168		108				276	
02:30	7		6				13		14:30	193		123				316	
02:45	4	20	6	34			10	54	14:45	161	697	106	456			267	1153
03:00	1		7				8		15:00	189		113				302	
03:15	0		6				6		15:15	202		114				316	
03:30	1		3				4		15:30	244		130				374	
03:45	2	4	7	23			9	27	15:45	291	926	168	525			459	1451
04:00	1		2				3		16:00	257		160				417	
04:15	5		5				10		16:15	222		162				384	
04:30	5		12				17		16:30	270		155				425	
04:45	6	17	10	29			16	46	16:45	238	987	164	641			402	1628
05:00	4		20				24		17:00	246		163				409	
05:15	11		25				36		17:15	226		172				398	
05:30	20		51				71		17:30	250		175				425	
05:45	22	57	66	162			88	219	17:45	191	913	170	680			361	1593
06:00	22		104				126		18:00	143		167				310	
06:15	48		163				211		18:15	140		137				277	
06:30	52		224				276		18:30	113		116				229	
06:45	49	171	223	714			272	885	18:45	205	601	133	553			338	1154
07:00	70		202				272		19:00	214		126				340	
07:15	97		245				342		19:15	168		110				278	
07:30	175		225				400		19:30	162		85				247	
07:45	102	444	231	903			333	1347	19:45	128	672	73	394			201	1066
08:00	119		237				356		20:00	147		72				219	
08:15	158		298				456		20:15	131		65				196	
08:30	228		413				641		20:30	122		56				178	
08:45	229	734	233	1181			462	1915	20:45	142	542	56	249			198	791
09:00	140		179				319		21:00	153		64				217	
09:15	137		172				309		21:15	68		61				129	
09:30	117		185				302		21:30	69		47				116	
09:45	117	511	160	696			277	1207	21:45	68	358	47	219			115	577
10:00	104		150				254		22:00	60		49				109	
10:15	105		131				236		22:15	55		37				92	
10:30	113		136				249		22:30	49		44				93	
10:45	122	444	138	555			260	999	22:45	37	201	31	161			68	362
11:00	121		129				250		23:00	28		25				53	
11:15	130		149				279		23:15	26		22				48	
11:30	131		134				265		23:30	32		27				59	
11:45	117	499	144	556			261	1055	23:45	15	101	25	99			40	200
TOTALS		2977		4926				7903	TOTALS		7356		5336				12692
SPLIT %		37.7%		62.3%				38.4%	SPLIT %		58.0%		42.0%				61.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	10,333	10,262	0	0	20,595

AM Peak Hour	08:15	08:00			08:00	PM Peak Hour	15:45	12:30			15:45
AM Pk Volume	755	1181			1915	PM Pk Volume	1040	764			1685
Pk Hr Factor	0.824	0.715			0.747	Pk Hr Factor	0.893	0.872			0.918
7 - 9 Volume	1178	2084	0	0	3262	4 - 6 Volume	1900	1321	0	0	3221
7 - 9 Peak Hour	08:00	08:00			08:00	4 - 6 Peak Hour	16:00	17:00			16:30
7 - 9 Pk Volume	734	1181	0	0	1915	4 - 6 Pk Volume	987	680	0	0	1634
Pk Hr Factor	0.801	0.715	0.000	0.000	0.747	Pk Hr Factor	0.914	0.971	0.000	0.000	0.961

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

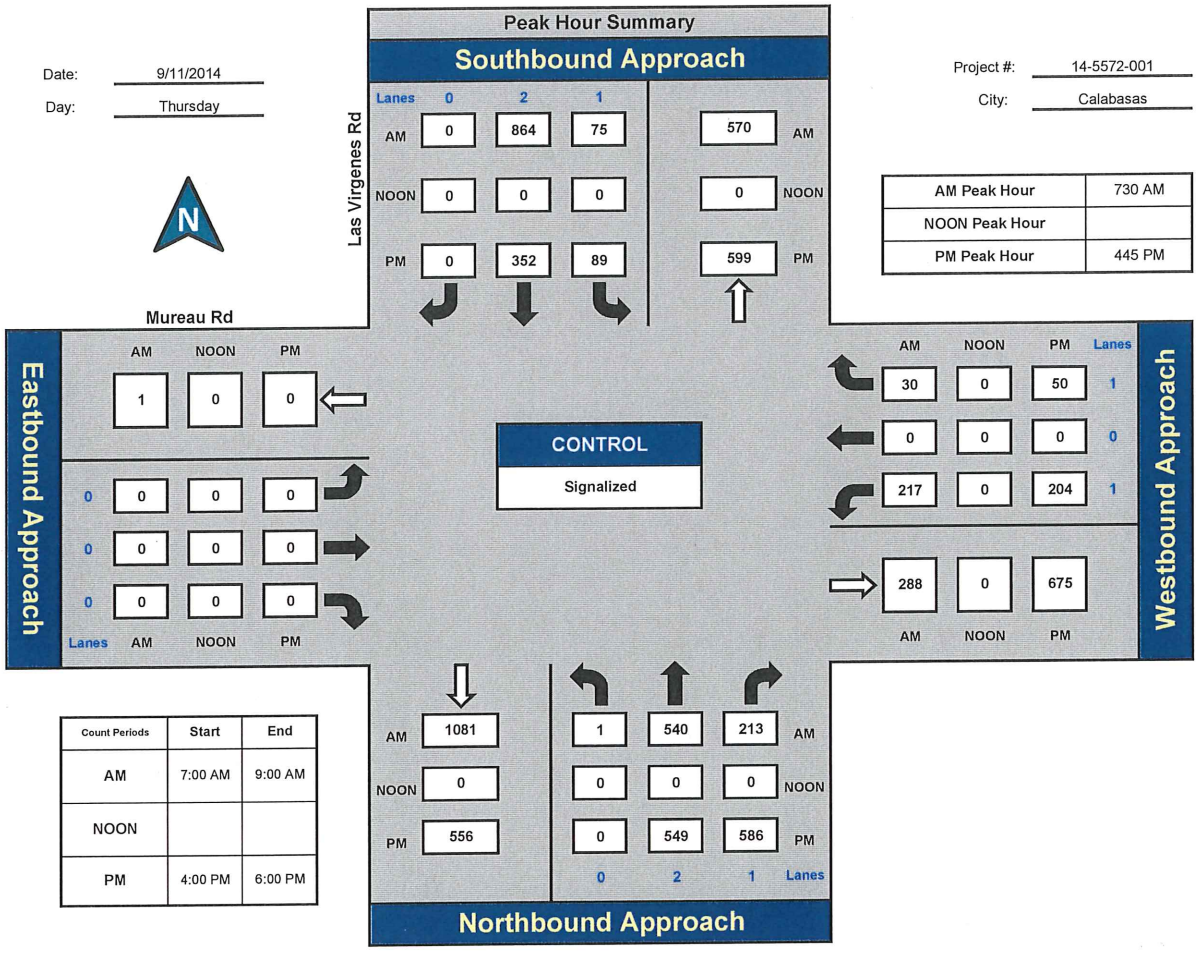
Las Virgenes Rd and Mureau Rd , Calabasas

Date: 9/11/2014

Day: Thursday

Project #: 14-5572-001

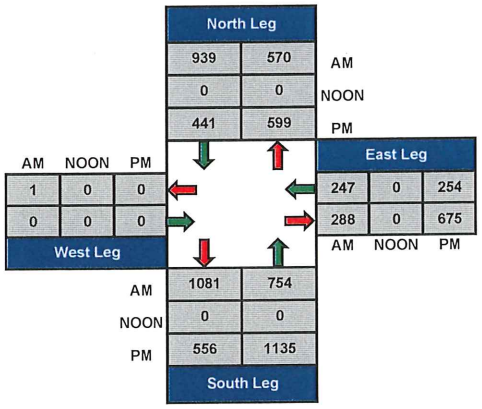
City: Calabasas



AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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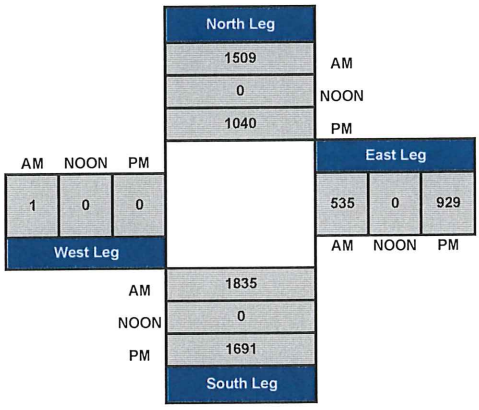


ITM Peak Hour Summary

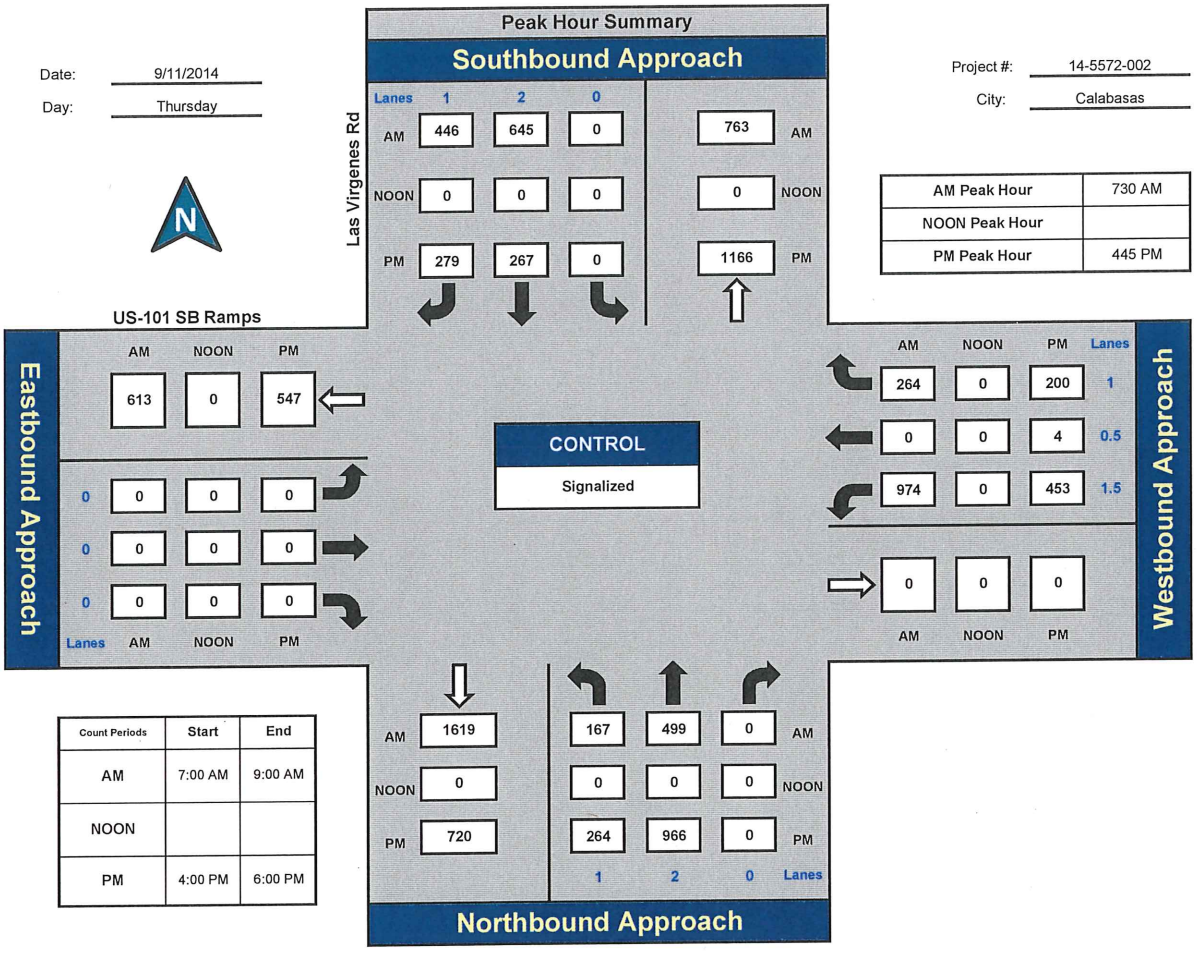
Prepared by:

National Data & Surveying Services

Las Virgenes Rd and US-101 ~~SB~~ NB Ramps , Calabasas

Date: 9/11/2014
Day: Thursday

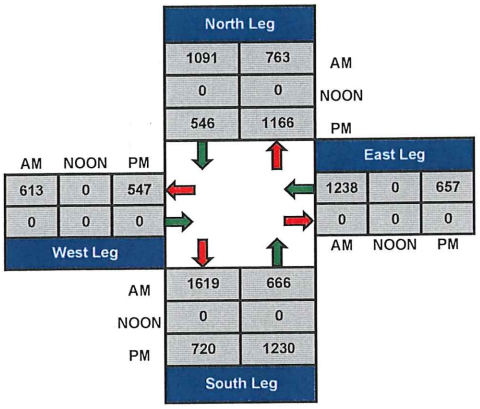
Project #: 14-5572-002
City: Calabasas



AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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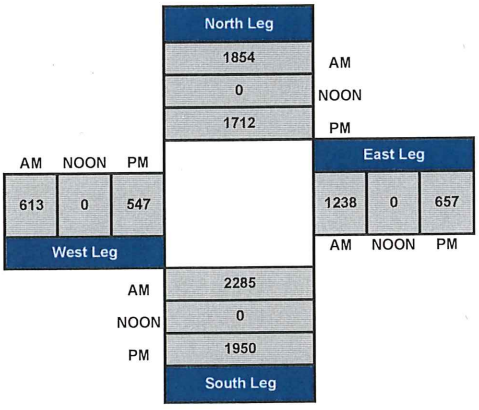


ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

SB

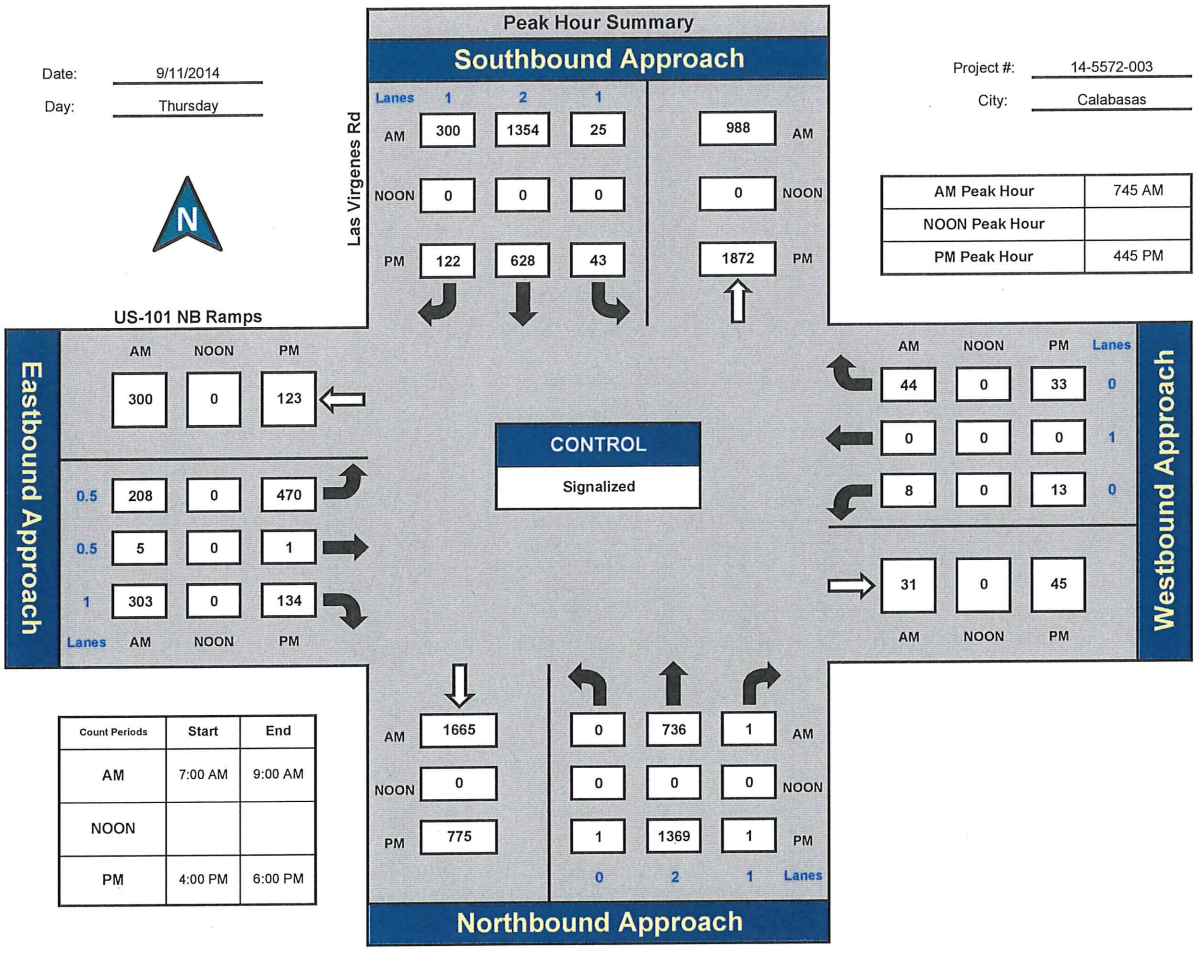
Las Virgenes Rd and US-101 ~~NB~~ Ramps , Calabasas

Date: 9/11/2014

Day: Thursday

Project #: 14-5572-003

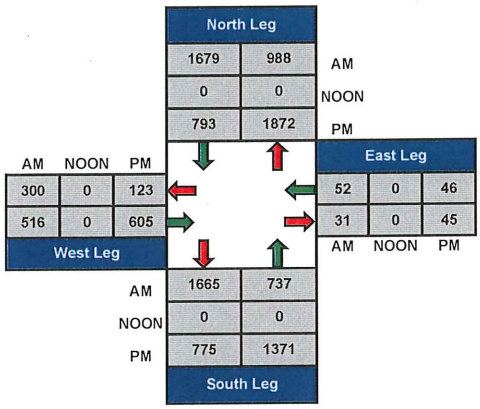
City: Calabasas



AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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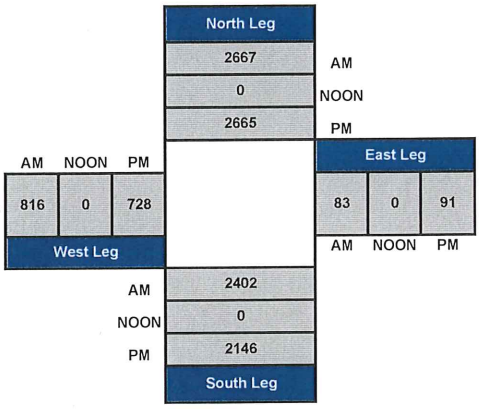


ITM Peak Hour Summary

Prepared by:

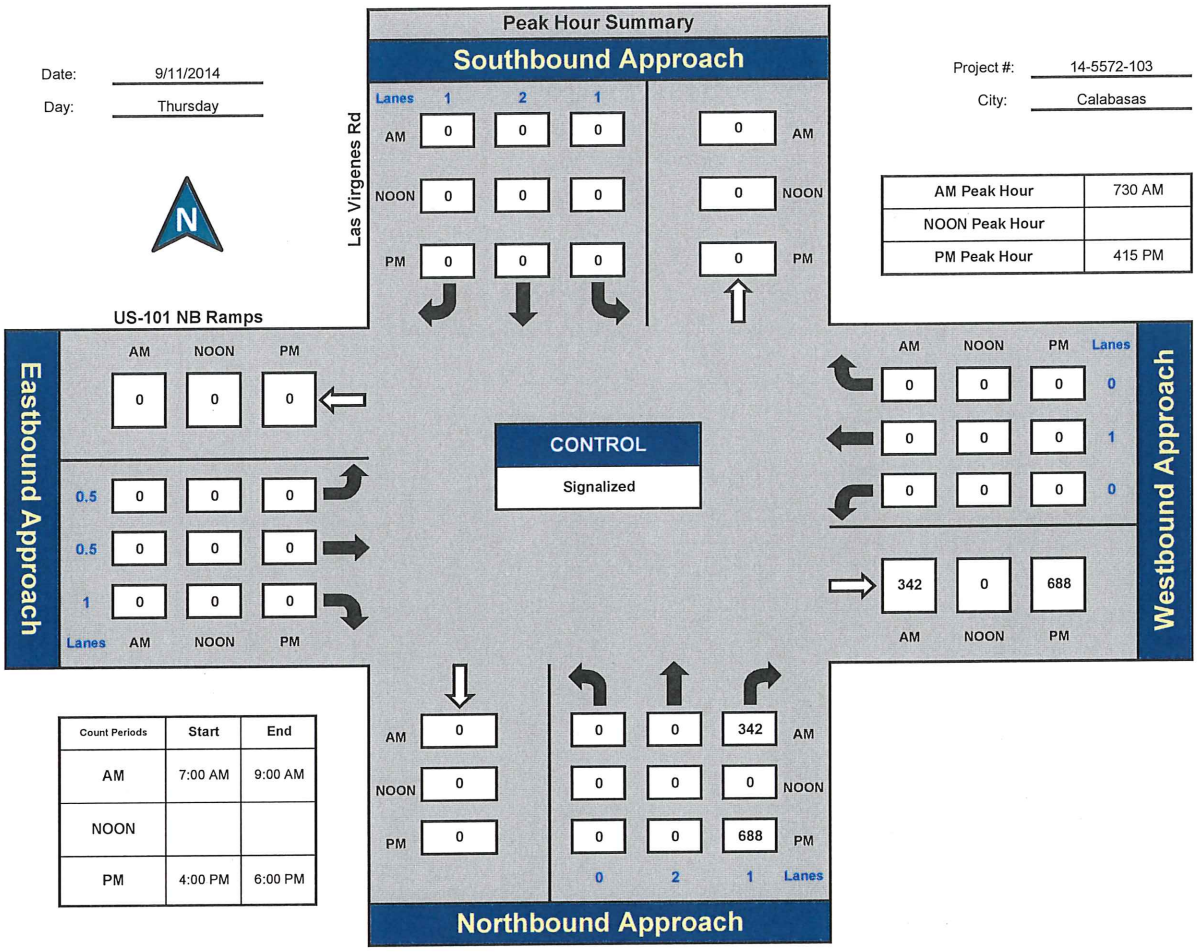
National Data & Surveying Services

Las Virgenes Rd and US-101 NB Ramps , Calabasas

Date: 9/11/2014
Day: Thursday

Project #: 14-5572-103
City: Calabasas

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	415 PM



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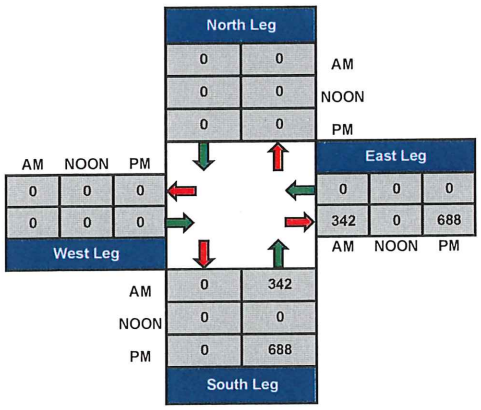

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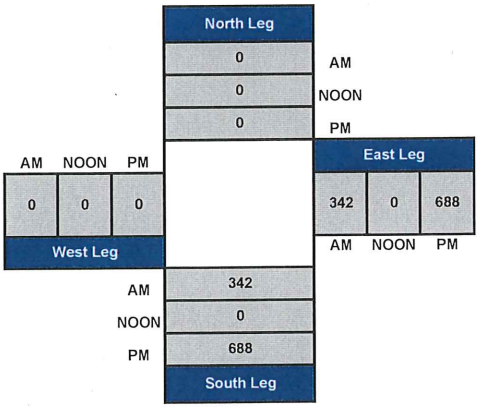


ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

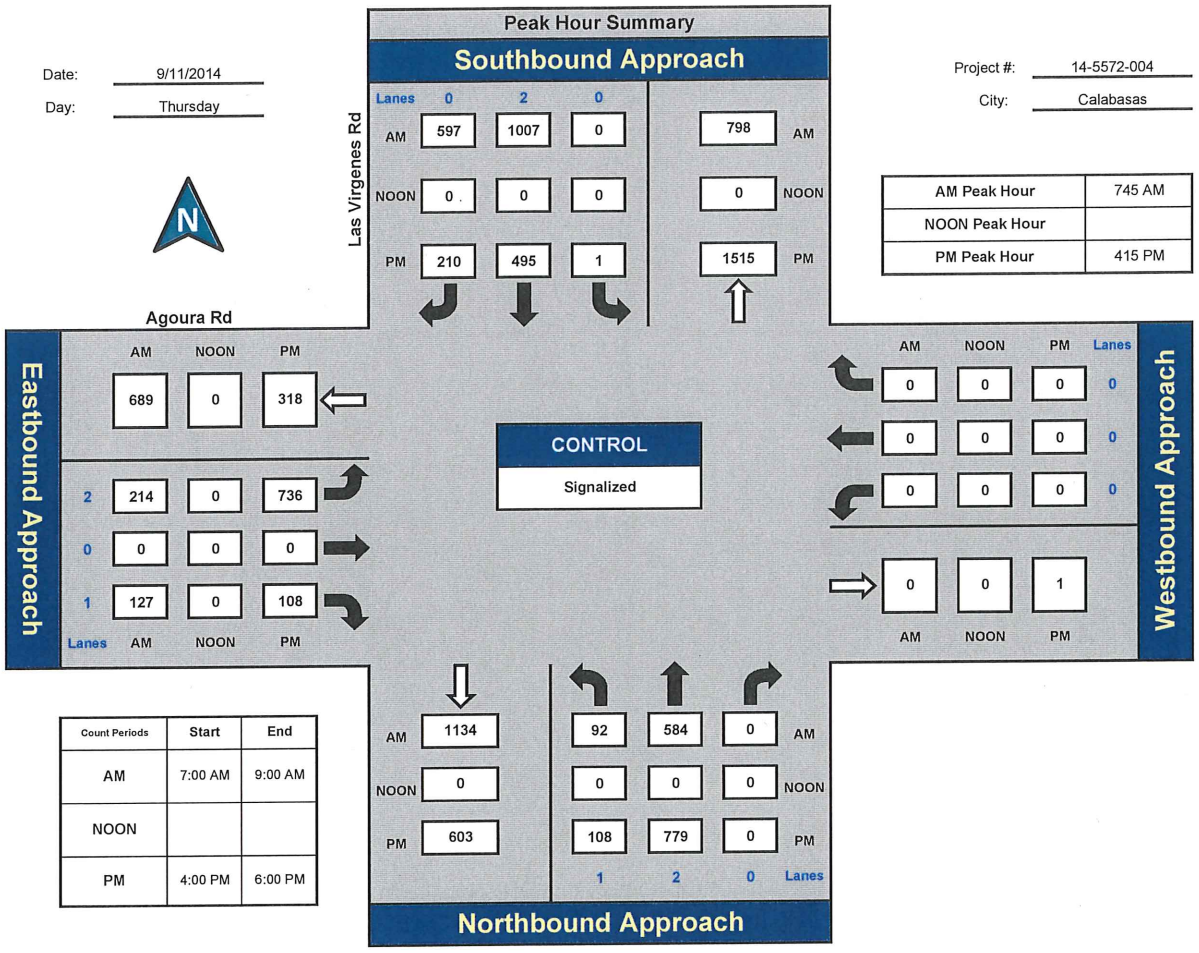
Las Virgenes Rd and Agoura Rd , Calabasas

Date: 9/11/2014

Day: Thursday

Project #: 14-5572-004

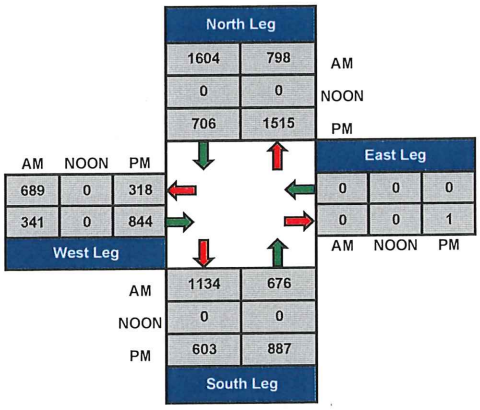
City: Calabasas



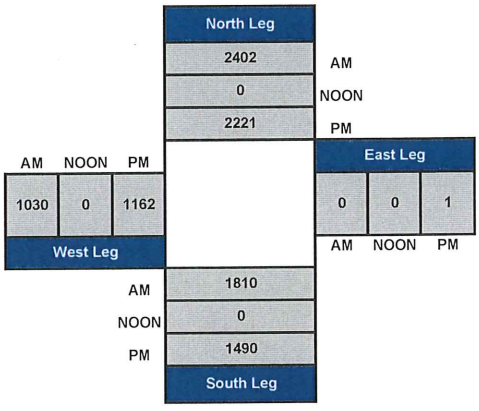
AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

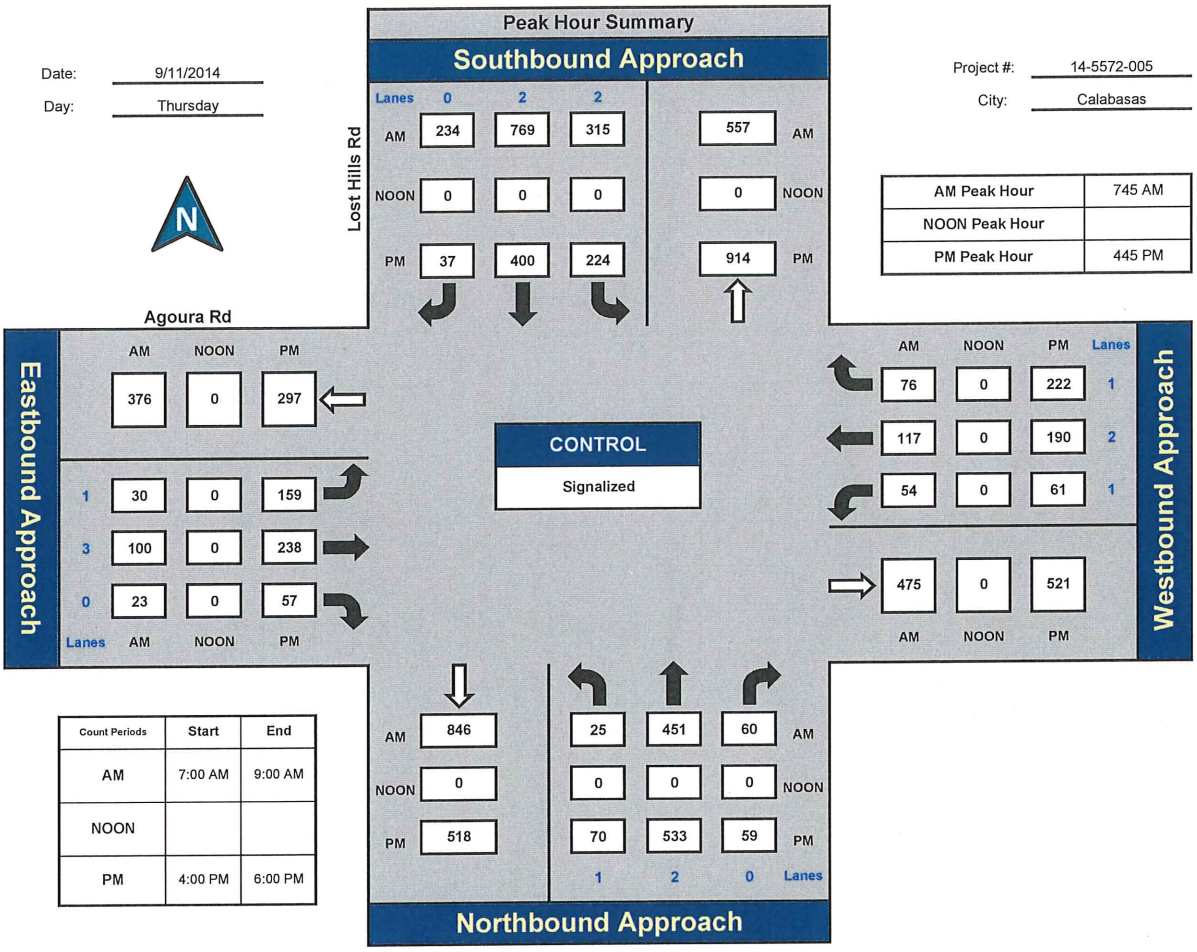
National Data & Surveying Services

Lost Hills Rd and Agoura Rd , Calabasas

Date: 9/11/2014
Day: Thursday

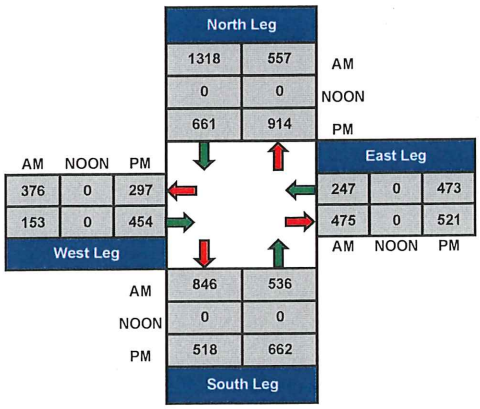
Project #: 14-5572-005
City: Calabasas

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM



Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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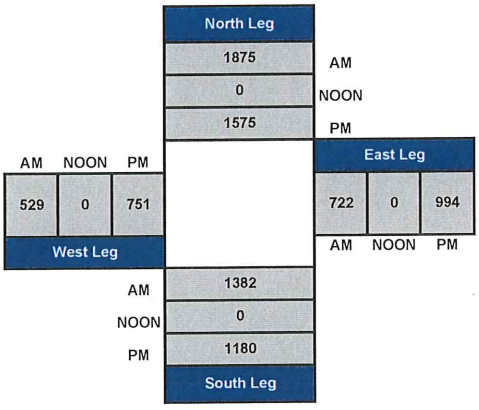


ITM Peak Hour Summary

Prepared by:

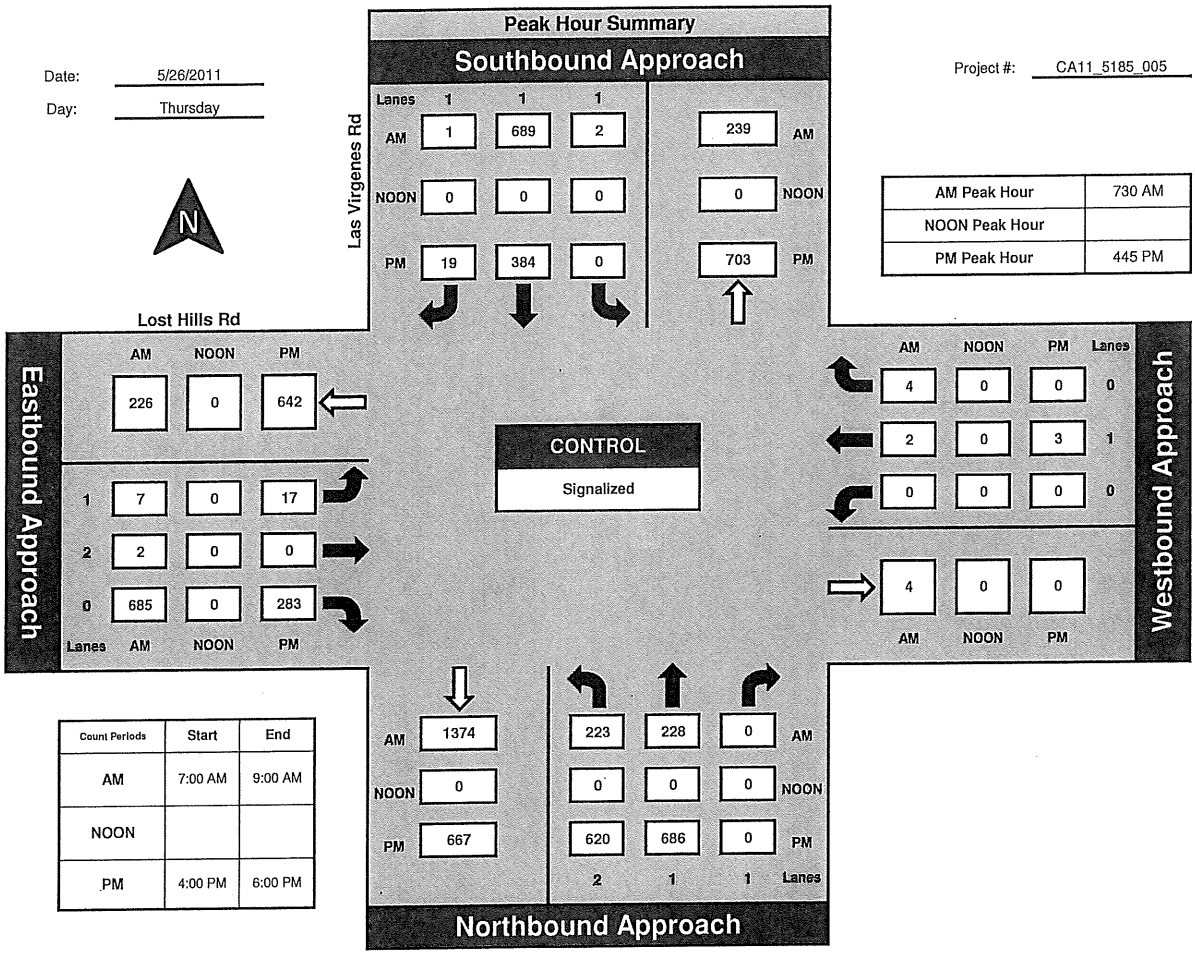
National Data & Surveying Services

Las Virgenes Rd and Lost Hills Rd , City of Calabasas

Date: 5/26/2011

Day: Thursday

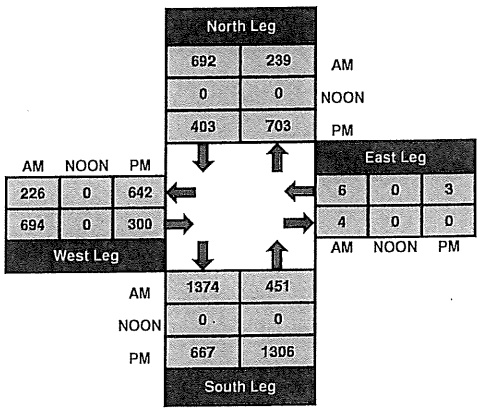
Project #: CA11_5185_005



AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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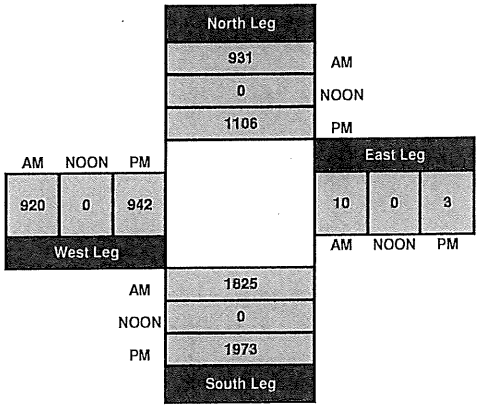

ROADWAY DESIGN CAPACITY TABLE

LEVEL OF SERVICE DEFINITIONS

Signalized Intersection Level of Service Definitions

LOS	Delay[a]	V/C Ratio	Definition
A	< 10.0	< 0.60	Progression is extremely favorable. Most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	10.1 - 20.0	0.61 - 0.70	Good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20.1 - 35.0	0.71 - 0.80	Only fair progression, longer cycle lengths, or both, result in higher cycle lengths. Cycle lengths may fail to serve queued vehicles, and overflow occurs. Number of vehicles stopped is significant, though many still pass through intersection without stopping.
D	35.1 - 55.0	0.81 - 0.90	Congestion becomes more noticeable. Unfavorable progression, long cycle lengths and high v/c ratios result in longer delays. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55.1 - 80.0	0.91 - 1.00	High delay values indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent
F	> 80.0	> 1.00	Considered unacceptable for most drivers, this level occurs when arrival flow rates exceed the capacity of lane groups, resulting in many individual cycle failures. Poor progression and long cycle lengths may also contribute to high delay levels.

[a] Average control delay per vehicle in seconds.

Unsignalized Intersection Level of Service Definitions

The HCM[1] uses *control delay* to determine the level of service at unsignalized intersections. Control delay is the difference between the travel time actually experienced at the control device and the travel time that would occur in the absence of the traffic control device. Control delay includes deceleration from free flow speed, queue move-up time, stopped delay and acceleration back to free flow speed.

LOS	Control Delay Seconds per Vehicle
A	< 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	> 50.0

[1] Highway Capacity Manual, National Research Board, 2010

ASSOCIATED TRANSPORTATION ENGINEERS
100 North Hope Avenue, Suite 4, Santa Barbara, CA 93110-1686 • (805) 687-4418 • FAX (805) 682-8509

LEVEL OF SERVICE CALCULATION WORKSHEETS

Reference 1 - Las Virgenes Road/Mureau Road
Reference 2 - U.S. 101 Northbound Ramps/Las Virgenes Road
Reference 3 - U.S. 101 Southbound Ramps/Las Virgenes Road
Reference 4 - Las Virgenes Road/Agoura Road
Reference 5 - Lost Hills Road/Agoura Road
Reference 6 - Las Virgenes Road/Lost Hills Road

#10051.01 CANYON OAKS PROJECT REF: 01_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *MUREAU ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	540	213	75	864	0	0	0	0	217	0	30
(B) PROJECT-ADDED:	0	0	3	0	0	0	0	0	0	2	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT		L R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0			- *	- *		
NBT	2	3200	540	540			0.169	0.169		
NBR	1	1600	213	216			0.133	0.135		
SBL	1	1600	75	75			0.047	0.047		
SBT	2	3200	864	864			0.270 *	0.270 *		
SBR	0	0	0	0			-	-		
EBL	0	0	0	0			- *	- *		
EBT	0	0	0	0			-	-		
EBR	0	0	0	0			-	-		
WBL	1	1600	217	219			0.136 *	0.137 *		
WBT	0	0	0	0			-	-		
WBR	1	1600	30	30			0.019	0.019		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.506**	**0.507**		
						SCENARIO LEVEL OF SERVICE:	A	A		

NOTES:

Printed: 04/24/15

#10051.01 CANYON OAKS PROJECT REF: 01_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *MUREAU ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	0	568	224	79	908	0	0	0	0	228	0	32
(B) PROJECT-ADDED:	0	0	3	0	0	0	0	0	0	2	0	0
(C) CUMULATIVE:	0	633	230	81	929	0	0	0	0	233	0	39

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT		L R

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 (OPENING YEAR) VOLUMES (A)
SCENARIO 2 = 2019 (OPENING YEAR) + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	- *	- *	- *	- *
NBT	2	3200	568	568	633	633	0.178	0.178	0.198	0.198
NBR	1	1600	224	227	230	233	0.140	0.142	0.144	0.146
SBL	1	1600	79	79	81	81	0.049	0.049	0.051	0.051
SBT	2	3200	908	908	929	929	0.284 *	0.284 *	0.290 *	0.290 *
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	1	1600	228	230	233	235	0.143 *	0.144 *	0.146 *	0.147 *
WBT	0	0	0	0	0	0	-	-	-	-
WBR	1	1600	32	32	39	39	0.020	0.020	0.024	0.024
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.527**	**0.528**	**0.536**	**0.537**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

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#10051.01 CANYON OAKS PROJECT REF: 01_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *MUREAU ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	549	586	89	352	0	0	0	0	204	0	50
(B) PROJECT-ADDED:	0	0	3	0	0	0	0	0	0	4	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT		L R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0			-	-		
NBT	2	3200	549	549			0.172	0.172		
NBR	1	1600	586	589			0.366 *	0.368 *		
SBL	1	1600	89	89			0.056 *	0.056 *		
SBT	2	3200	352	352			0.110	0.110		
SBR	0	0	0	0			-	-		
EBL	0	0	0	0			-	-		
EBT	0	0	0	0			-	-		
EBR	0	0	0	0			-	-		
WBL	1	1600	204	208			0.128 *	0.130 *		
WBT	0	0	0	0			-	-		
WBR	1	1600	50	50			0.031	0.031		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.650**	**0.654**		
						SCENARIO LEVEL OF SERVICE:	**B**	**B**		

NOTES:

Printed: 04/24/15

#10051.01 CANYON OAKS PROJECT REF: 01_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***MUREAU ROAD***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019 (OPENING YEAR):	**0**	**577**	**616**	**94**	**370**	**0**	**0**	**0**	**0**	**214**	**0**	**53**
(B) PROJECT-ADDED:	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**
(C) CUMULATIVE:	**0**	**620**	**624**	**102**	**456**	**0**	**0**	**0**	**0**	**225**	**0**	**57**

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT		L R

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 VOLUMES (A)
SCENARIO 2 = 2019 + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	2	3200	577	577	620	620	0.180	0.180	0.194	0.194
NBR	1	1600	616	619	624	627	0.385 *	0.387 *	0.390 *	0.392 *
SBL	1	1600	94	94	102	102	0.059 *	0.059 *	0.064 *	0.064 *
SBT	2	3200	370	370	456	456	0.116	0.116	0.143	0.143
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	1	1600	214	218	225	229	0.134 *	0.136 *	0.141 *	0.143 *
WBT	0	0	0	0	0	0	-	-	-	-
WBR	1	1600	53	53	57	57	0.033	0.033	0.036	0.036
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.678**	**0.682**	**0.695**	**0.699**
					SCENARIO LEVEL OF SERVICE:		**B**	**B**	**B**	**B**

NOTES:

Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	974	0	264	167	499	0	0	645	446
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1059	0	287	182	542	0	0	701	485
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	0	0	0	349
Lane Group Flow (vph)	0	0	0	529	530	138	182	542	0	0	701	136
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	8.8	31.0			18.2	18.2
Effective Green, g (s)				26.0	26.0	26.0	8.8	31.0			18.2	18.2
Actuated g/C Ratio				0.40	0.40	0.40	0.14	0.48			0.28	0.28
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	240	1688			991	443
v/s Ratio Prot				0.31	c0.32		c0.10	0.15			c0.20	
v/s Ratio Perm						0.09						0.09
v/c Ratio				0.79	0.79	0.22	0.76	0.32			0.71	0.31
Uniform Delay, d1				17.1	17.1	12.8	27.1	10.5			21.0	18.4
Progression Factor				1.00	1.00	1.00	1.07	0.96			1.00	1.00
Incremental Delay, d2				6.1	6.1	0.2	12.1	0.5			4.3	1.8
Delay (s)				23.2	23.2	13.0	41.1	10.6			25.3	20.2
Level of Service				C	C	B	D	B			C	C
Approach Delay (s)		0.0			21.0			18.3			23.2	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	992	0	264	183	502	0	0	647	446
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	1055	0	281	195	534	0	0	688	474
RTOR Reduction (vph)	0	0	0	0	0	152	0	0	0	0	0	342
Lane Group Flow (vph)	0	0	0	527	528	129	195	534	0	0	688	132
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	8.9	31.0			18.1	18.1
Effective Green, g (s)				26.0	26.0	26.0	8.9	31.0			18.1	18.1
Actuated g/C Ratio				0.40	0.40	0.40	0.14	0.48			0.28	0.28
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	242	1688			985	441
v/s Ratio Prot				0.31	c0.31		c0.11	0.15			c0.19	
v/s Ratio Perm						0.08						0.08
v/c Ratio				0.78	0.79	0.20	0.81	0.32			0.70	0.30
Uniform Delay, d1				17.0	17.1	12.7	27.2	10.5			21.0	18.5
Progression Factor				1.00	1.00	1.00	1.07	1.00			1.00	1.00
Incremental Delay, d2				6.0	6.0	0.2	16.4	0.5			4.1	1.7
Delay (s)				23.0	23.1	12.9	45.6	10.9			25.1	20.2
Level of Service				C	C	B	D	B			C	C
Approach Delay (s)		0.0			20.9			20.2			23.1	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT REF: 02_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *US. 101 NB RAMPS*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	167	499	0	0	645	446	0	0	0	974	0	264
(B) PROJECT-ADDED:	16	3	0	0	2	0	0	0	0	18	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	TT R		L LT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	167	183			0.104 *	0.114 *		
NBT	2	3200	499	502			0.156	0.157		
NBR	0	0	0	0			-	-		
SBL	0	0	0	0			-	-		
SBT	2	3200	645	647			0.202	0.202		
SBR	1	1600	446	446			0.279 *	0.279 *		
EBL	0	0	0	0			-	-		
EBT	0	0	0	0			-	-		
EBR	0	0	0	0			-	-		
WBL	0	0	974	992			-	-		
WBT	2	3200	0	0			0.304 *	0.310 *		
WBR	1	1600	264	264			0.165	0.165		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.787**	**0.803**		
						SCENARIO LEVEL OF SERVICE:	C	C		

NOTES:

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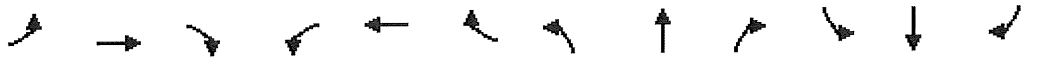
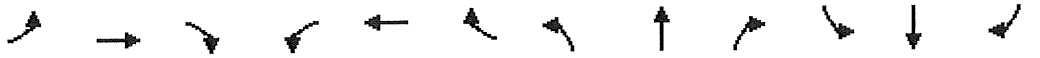


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1024	0	277	176	524	0	0	678	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1113	0	301	191	570	0	0	737	510
RTOR Reduction (vph)	0	0	0	0	0	137	0	0	0	0	0	368
Lane Group Flow (vph)	0	0	0	556	557	164	191	570	0	0	737	142
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	8.9	31.0			18.1	18.1
Effective Green, g (s)				26.0	26.0	26.0	8.9	31.0			18.1	18.1
Actuated g/C Ratio				0.40	0.40	0.40	0.14	0.48			0.28	0.28
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	242	1688			985	441
v/s Ratio Prot				0.33	c0.33		c0.11	0.16			c0.21	
v/s Ratio Perm						0.10						0.09
v/c Ratio				0.83	0.83	0.26	0.79	0.34			0.75	0.32
Uniform Delay, d1				17.5	17.5	13.0	27.1	10.6			21.4	18.6
Progression Factor				1.00	1.00	1.00	1.08	0.98			1.00	1.00
Incremental Delay, d2				8.3	8.3	0.2	14.6	0.5			5.2	1.9
Delay (s)				25.7	25.8	13.3	43.8	10.9			26.6	20.5
Level of Service				C	C	B	D	B			C	C
Approach Delay (s)		0.0			23.1			19.1			24.1	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

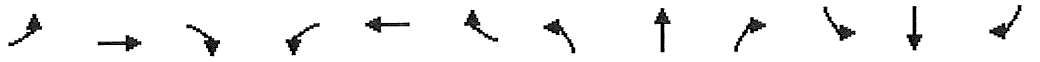


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1047	0	277	203	529	0	0	681	469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1138	0	301	221	575	0	0	740	510
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	0	0	0	369
Lane Group Flow (vph)	0	0	0	569	569	165	221	575	0	0	740	141
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	9.0	31.0			18.0	18.0
Effective Green, g (s)				26.0	26.0	26.0	9.0	31.0			18.0	18.0
Actuated g/C Ratio				0.40	0.40	0.40	0.14	0.48			0.28	0.28
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	245	1688			980	438
v/s Ratio Prot				c0.34	0.34		c0.12	0.16			c0.21	
v/s Ratio Perm						0.10						0.09
v/c Ratio				0.85	0.85	0.26	0.90	0.34			0.76	0.32
Uniform Delay, d1				17.7	17.7	13.1	27.6	10.6			21.5	18.7
Progression Factor				1.00	1.00	1.00	1.07	1.07			1.00	1.00
Incremental Delay, d2				9.7	9.7	0.2	30.5	0.5			5.4	1.9
Delay (s)				27.3	27.3	13.3	60.1	11.9			26.9	20.6
Level of Service				C	C	B	E	B			C	C
Approach Delay (s)		0.0			24.4			25.3			24.3	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1038	0	298	192	574	0	0	698	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1128	0	324	209	624	0	0	759	516
RTOR Reduction (vph)	0	0	0	0	0	118	0	0	0	0	0	379
Lane Group Flow (vph)	0	0	0	564	564	206	209	624	0	0	759	137
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	9.8	31.0			17.2	17.2
Effective Green, g (s)				26.0	26.0	26.0	9.8	31.0			17.2	17.2
Actuated g/C Ratio				0.40	0.40	0.40	0.15	0.48			0.26	0.26
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	267	1688			936	419
v/s Ratio Prot				c0.34	0.34		c0.12	0.18			c0.21	
v/s Ratio Perm						0.13						0.09
v/c Ratio				0.84	0.84	0.33	0.78	0.37			0.81	0.33
Uniform Delay, d1				17.6	17.6	13.4	26.6	10.8			22.4	19.2
Progression Factor				1.00	1.00	1.00	1.10	0.87			1.00	1.00
Incremental Delay, d2				9.1	9.1	0.3	12.7	0.6			7.6	2.1
Delay (s)				26.7	26.7	13.8	41.9	10.0			29.9	21.3
Level of Service				C	C	B	D	A			C	C
Approach Delay (s)		0.0			23.8			18.0			26.4	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1061	0	298	219	579	0	0	701	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1153	0	324	238	629	0	0	762	516
RTOR Reduction (vph)	0	0	0	0	0	116	0	0	0	0	0	381
Lane Group Flow (vph)	0	0	0	576	577	208	238	629	0	0	762	135
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.0	26.0	26.0	10.0	31.0			17.0	17.0
Effective Green, g (s)				26.0	26.0	26.0	10.0	31.0			17.0	17.0
Actuated g/C Ratio				0.40	0.40	0.40	0.15	0.48			0.26	0.26
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				672	672	633	272	1688			926	414
v/s Ratio Prot				0.34	c0.34		c0.13	0.18			c0.22	
v/s Ratio Perm						0.13						0.09
v/c Ratio				0.86	0.86	0.33	0.88	0.37			0.82	0.33
Uniform Delay, d1				17.8	17.8	13.5	26.9	10.8			22.6	19.4
Progression Factor				1.00	1.00	1.00	1.10	0.96			1.00	1.00
Incremental Delay, d2				10.5	10.6	0.3	23.2	0.6			8.2	2.1
Delay (s)				28.3	28.4	13.8	52.8	11.0			30.8	21.5
Level of Service				C	C	B	D	B			C	C
Approach Delay (s)		0.0			25.2			22.5			27.0	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM Average Control Delay	25.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	80.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

#10051.01 CANYON OAKS PROJECT REF: 02_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *US 101 NB RAMPS*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019 (OPENING YEAR):	176	524	0	0	678	469	0	0	0	1024	0	277
(B) PROJECT-ADDED:	16	3	0	0	2	0	0	0	0	18	0	0
(C) CUMULATIVE:	192	574	0	0	698	475	0	0	0	1038	0	298

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	TT R		L LT R

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 (OPENING YEAR) VOLUMES (A)
SCENARIO 2 = 2019 (OPENING YEAR) + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

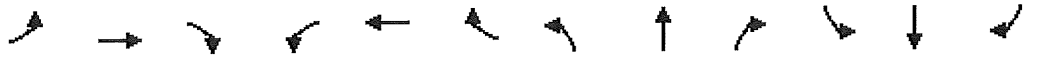
MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	176	192	192	208	0.110 *	0.120 *	0.120 *	0.130 *
NBT	2	3200	524	527	574	577	0.164	0.165	0.179	0.180
NBR	0	0	0	0	0	0	-	-	-	-
SBL	0	0	0	0	0	0	-	-	-	-
SBT	2	3200	678	680	698	700	0.212	0.213	0.218	0.219
SBR	1	1600	469	469	475	475	0.293 *	0.293 *	0.297 *	0.297 *
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	1024	1042	1038	1056	-	-	-	-
WBT	2	3200	0	0	0	0	0.320 *	0.326 *	0.324 *	0.330 *
WBR	1	1600	277	277	298	298	0.173	0.173	0.186	0.186
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.823**	**0.839**	**0.841**	**0.857**
					SCENARIO LEVEL OF SERVICE:		**D**	**D**	**D**	**D**

NOTES:

Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	476	4	210	277	1015	0	0	281	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1687	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1687	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	491	4	216	286	1046	0	0	290	302
RTOR Reduction (vph)	0	0	0	0	0	79	0	0	0	0	0	221
Lane Group Flow (vph)	0	0	0	245	250	137	286	1046	0	0	290	81
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Effective Green, g (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Actuated g/C Ratio				0.27	0.27	0.27	0.27	0.60			0.27	0.27
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	472	2123			944	422
v/s Ratio Prot				0.15	c0.15		c0.16	c0.30			0.08	
v/s Ratio Perm						0.09						0.05
v/c Ratio				0.55	0.56	0.32	0.61	0.49			0.31	0.19
Uniform Delay, d1				18.9	18.9	17.7	19.2	6.8			17.6	17.0
Progression Factor				1.00	1.00	1.00	0.93	0.63			1.00	1.00
Incremental Delay, d2				1.4	1.5	0.4	0.7	0.3			0.8	1.0
Delay (s)				20.3	20.4	18.1	18.6	4.6			18.4	18.0
Level of Service				C	C	B	B	A			B	B
Approach Delay (s)		0.0			19.7			7.6			18.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	522	4	210	299	1019	0	0	287	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1687	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1687	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	538	4	216	308	1051	0	0	296	302
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	0	0	0	221
Lane Group Flow (vph)	0	0	0	269	273	138	308	1051	0	0	296	81
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Effective Green, g (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Actuated g/C Ratio				0.27	0.27	0.27	0.27	0.60			0.27	0.27
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	472	2123			944	422
v/s Ratio Prot				0.16	c0.16		c0.17	c0.30			0.08	
v/s Ratio Perm						0.09						0.05
v/c Ratio				0.60	0.61	0.33	0.65	0.50			0.31	0.19
Uniform Delay, d1				19.2	19.2	17.7	19.5	6.8			17.6	17.0
Progression Factor				1.00	1.00	1.00	0.92	0.61			1.00	1.00
Incremental Delay, d2				2.3	2.3	0.5	0.9	0.2			0.9	1.0
Delay (s)				21.5	21.6	18.1	18.9	4.4			18.5	18.0
Level of Service				C	C	B	B	A			B	B
Approach Delay (s)		0.0			20.6			7.7			18.2	
Approach LOS		A			C			A			B	

Intersection Summary				
HCM Average Control Delay	13.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	59.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	499	4	222	292	1054	0	0	353	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1687	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1687	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	514	4	229	301	1087	0	0	364	364
RTOR Reduction (vph)	0	0	0	0	0	81	0	0	0	0	0	239
Lane Group Flow (vph)	0	0	0	257	261	148	301	1087	0	0	364	125
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				20.0	20.0	20.0	17.2	47.0			25.8	25.8
Effective Green, g (s)				20.0	20.0	20.0	17.2	47.0			25.8	25.8
Actuated g/C Ratio				0.27	0.27	0.27	0.23	0.63			0.34	0.34
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	406	2218			1217	545
v/s Ratio Prot				0.15	c0.15		c0.17	c0.31			0.10	
v/s Ratio Perm						0.09						0.08
v/c Ratio				0.57	0.58	0.35	0.74	0.49			0.30	0.23
Uniform Delay, d1				23.8	23.9	22.3	26.8	7.5			18.0	17.5
Progression Factor				1.00	1.00	1.00	1.18	0.99			1.00	1.00
Incremental Delay, d2				1.8	1.8	0.5	2.6	0.3			0.6	1.0
Delay (s)				25.6	25.7	22.8	34.2	7.8			18.6	18.5
Level of Service				C	C	C	C	A			B	B
Approach Delay (s)		0.0			24.8			13.5			18.6	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	545	4	222	314	1058	0	0	359	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	562	4	229	324	1091	0	0	370	364
RTOR Reduction (vph)	0	0	0	0	0	80	0	0	0	0	0	242
Lane Group Flow (vph)	0	0	0	281	285	149	324	1091	0	0	370	122
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				20.0	20.0	20.0	17.8	47.0			25.2	25.2
Effective Green, g (s)				20.0	20.0	20.0	17.8	47.0			25.2	25.2
Actuated g/C Ratio				0.27	0.27	0.27	0.24	0.63			0.34	0.34
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	420	2218			1189	532
v/s Ratio Prot				0.17	c0.17		c0.18	c0.31			0.10	
v/s Ratio Perm						0.09						0.08
v/c Ratio				0.63	0.63	0.35	0.77	0.49			0.31	0.23
Uniform Delay, d1				24.2	24.3	22.3	26.7	7.6			18.5	17.9
Progression Factor				1.00	1.00	1.00	1.19	1.02			1.00	1.00
Incremental Delay, d2				2.7	2.9	0.5	2.7	0.2			0.7	1.0
Delay (s)				27.0	27.2	22.8	34.4	8.0			19.1	18.9
Level of Service				C	C	C	C	A			B	B
Approach Delay (s)		0.0			25.8			14.0			19.0	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

#10051.01 CANYON OAKS PROJECT REF: 02_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***US. 101 NB RAMPS***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	264	966	0	0	267	279	0	0	0	453	4	200
(B) PROJECT-ADDED:	15	3	0	0	4	0	0	0	0	28	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	TT R		L LT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	264	279			0.165 *	0.174 *		
NBT	2	3200	966	969			0.302	0.303		
NBR	0	0	0	0			-	-		
SBL	0	0	0	0			-	-		
SBT	2	3200	267	271			0.083	0.085		
SBR	1	1600	279	279			0.174 *	0.174 *		
EBL	0	0	0	0			-	-		
EBT	0	0	0	0			-	-		
EBR	0	0	0	0			-	-		
WBL	0	0	453	481			-	-		
WBT	2	3200	4	4			0.143	0.152		
WBR	1	1600	200	200			0.125 *	0.125 *		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	0.564	0.573		
						SCENARIO LEVEL OF SERVICE:	A	A		

NOTES:

Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	453	4	200	264	966	0	0	267	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1687	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1687	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	467	4	206	272	996	0	0	275	288
RTOR Reduction (vph)	0	0	0	0	0	89	0	0	0	0	0	211
Lane Group Flow (vph)	0	0	0	233	238	117	272	996	0	0	275	77
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Effective Green, g (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Actuated g/C Ratio				0.27	0.27	0.27	0.27	0.60			0.27	0.27
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	472	2123			944	422
v/s Ratio Prot				0.14	c0.14		c0.15	c0.28			0.08	
v/s Ratio Perm						0.07						0.05
v/c Ratio				0.52	0.53	0.28	0.58	0.47			0.29	0.18
Uniform Delay, d1				18.7	18.8	17.4	19.1	6.7			17.5	17.0
Progression Factor				1.00	1.00	1.00	0.94	0.63			1.00	1.00
Incremental Delay, d2				1.1	1.1	0.4	0.7	0.3			0.8	0.9
Delay (s)				19.8	19.9	17.8	18.6	4.5			18.3	17.9
Level of Service				B	B	B	B	A			B	B
Approach Delay (s)		0.0			19.2			7.5			18.1	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	481	4	200	279	969	0	0	291	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1687	1583	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1687	1583	1770	3539			3539	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	496	4	206	288	999	0	0	300	288
RTOR Reduction (vph)	0	0	0	0	0	89	0	0	0	0	0	211
Lane Group Flow (vph)	0	0	0	248	252	117	288	999	0	0	300	77
Turn Type				Prot		Perm	Prot					Perm
Protected Phases				3	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Effective Green, g (s)				16.0	16.0	16.0	16.0	36.0			16.0	16.0
Actuated g/C Ratio				0.27	0.27	0.27	0.27	0.60			0.27	0.27
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				448	450	422	472	2123			944	422
v/s Ratio Prot				0.15	c0.15		c0.16	c0.28			0.08	
v/s Ratio Perm						0.07						0.05
v/c Ratio				0.55	0.56	0.28	0.61	0.47			0.32	0.18
Uniform Delay, d1				18.9	19.0	17.4	19.3	6.7			17.6	17.0
Progression Factor				1.00	1.00	1.00	0.93	0.61			1.00	1.00
Incremental Delay, d2				1.5	1.6	0.4	0.9	0.3			0.9	0.9
Delay (s)				20.4	20.6	17.8	18.8	4.4			18.5	17.9
Level of Service				C	C	B	B	A			B	B
Approach Delay (s)		0.0			19.7			7.6			18.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT REF: 02_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***US 101 NB RAMPS***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	277	1015	0	0	281	293	0	0	0	476	4	210
(B) PROJECT-ADDED:	15	3	0	0	4	0	0	0	0	28	0	0
(C) CUMULATIVE:	292	1054	0	0	353	318	0	0	0	499	4	222

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	TT R		L LT R

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 (OPENING YEAR) VOLUMES (A)
SCENARIO 2 = 2019 (OPENING YEAR) + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	277	292	292	307	0.173 *	0.183 *	0.183 *	0.192 *
NBT	2	3200	1015	1018	1054	1057	0.317	0.318	0.329	0.330
NBR	0	0	0	0	0	0	-	-	-	-
SBL	0	0	0	0	0	0	-	-	-	-
SBT	2	3200	281	285	353	357	0.088	0.089	0.110	0.112
SBR	1	1600	293	293	318	318	0.183 *	0.183 *	0.199 *	0.199 *
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	476	504	499	527	-	-	-	-
WBT	2	3200	4	4	4	4	0.150	0.159	0.157	0.166
WBR	1	1600	210	210	222	222	0.131 *	0.131 *	0.139 *	0.139 *
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.587**	**0.597**	**0.621**	**0.630**
					SCENARIO LEVEL OF SERVICE:		**A**	**A**	**B**	**B**

NOTES:

Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	208	5	303	8	0	44	0	736	1	25	1354	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.89			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1638			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.95			1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)		1283	1583		1568			3539	1583	592	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	5	329	9	0	48	0	800	1	27	1472	326
RTOR Reduction (vph)	0	0	22	0	35	0	0	0	0	0	0	125
Lane Group Flow (vph)	0	231	307	0	22	0	0	800	1	27	1472	201
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		17.0	17.0		17.0			40.0	40.0	40.0	40.0	40.0
Effective Green, g (s)		17.0	17.0		17.0			40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio		0.26	0.26		0.26			0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		336	414		410			2178	974	364	2178	974
v/s Ratio Prot								0.23			c0.42	
v/s Ratio Perm		0.18	c0.19		0.01				0.00	0.05		0.13
v/c Ratio		0.69	0.74		0.05			0.37	0.00	0.07	0.68	0.21
Uniform Delay, d1		21.6	22.0		18.0			6.2	4.8	5.0	8.2	5.5
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.43	0.40	0.41
Incremental Delay, d2		5.8	7.0		0.1			0.5	0.0	0.3	1.1	0.3
Delay (s)		27.4	29.0		18.0			6.7	4.8	2.4	4.4	2.6
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		28.3			18.0			6.7			4.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	208	5	316	8	0	44	0	779	1	25	1374	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.89			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1638			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.95			1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)		1283	1583		1568			3539	1583	554	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	226	5	343	9	0	48	0	847	1	27	1493	326
RTOR Reduction (vph)	0	0	21	0	35	0	0	0	0	0	0	127
Lane Group Flow (vph)	0	231	322	0	22	0	0	847	1	27	1493	199
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		17.3	17.3		17.3			39.7	39.7	39.7	39.7	39.7
Effective Green, g (s)		17.3	17.3		17.3			39.7	39.7	39.7	39.7	39.7
Actuated g/C Ratio		0.27	0.27		0.27			0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		341	421		417			2162	967	338	2162	967
v/s Ratio Prot								0.24			c0.42	
v/s Ratio Perm		0.18	c0.20		0.01				0.00	0.05		0.13
v/c Ratio		0.68	0.77		0.05			0.39	0.00	0.08	0.69	0.21
Uniform Delay, d1		21.4	22.0		17.7			6.5	4.9	5.2	8.5	5.6
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.43	0.41	0.42
Incremental Delay, d2		5.3	8.1		0.1			0.5	0.0	0.3	1.3	0.3
Delay (s)		26.6	30.1		17.8			7.0	4.9	2.6	4.8	2.7
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		28.7			17.8			7.0			4.4	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT REF: 03_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *US. 101 NB RAMPS*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
VOLUMES	L	T	R	L	T	R	L	T	R	L	T	R
(A) EXISTING:	0	736	1	25	1354	300	208	5	303	8	0	44
(B) PROJECT-ADDED:	0	43	0	0	20	0	0	0	13	0	0	0

GEOMETRICS

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
LANE GEOMETRICS	L TT	TT R		L LT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0			- *	- *		
NBT	2	3200	736	779			0.230	0.243		
NBR	1	1600	1	1			0.001	0.001		
SBL	1	1600	25	25			0.016	0.016		
SBT	2	3200	1354	1374			0.423 *	0.429 *		
SBR	1	1600	300	300			0.188	0.188		
EBL	0	0	208	208			-	-		
EBT	1	1600	5	5			0.133	0.133		
EBR	1	1600	303	316			0.189 *	0.198 *		
WBL	0	0	8	8			- *	- *		
WBT	1	1600	0	0			0.033	0.033		
WBR	0	0	44	44			-	-		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.712**	**0.727**		
						SCENARIO LEVEL OF SERVICE:	C	C		

NOTES:

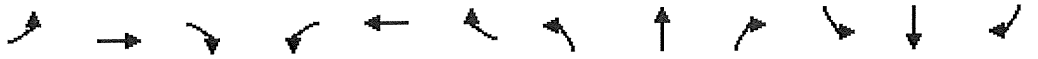
Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	219	5	318	8	0	46	0	774	1	26	1423	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.89			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1637			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.95			1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)		1280	1583		1568			3539	1583	557	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	5	346	9	0	50	0	841	1	28	1547	342
RTOR Reduction (vph)	0	0	18	0	37	0	0	0	0	0	0	134
Lane Group Flow (vph)	0	243	328	0	22	0	0	841	1	28	1547	208
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		17.4	17.4		17.4			39.6	39.6	39.6	39.6	39.6
Effective Green, g (s)		17.4	17.4		17.4			39.6	39.6	39.6	39.6	39.6
Actuated g/C Ratio		0.27	0.27		0.27			0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		343	424		420			2156	964	339	2156	964
v/s Ratio Prot								0.24			c0.44	
v/s Ratio Perm		0.19	c0.21		0.01				0.00	0.05		0.13
v/c Ratio		0.71	0.77		0.05			0.39	0.00	0.08	0.72	0.22
Uniform Delay, d1		21.5	22.0		17.7			6.5	5.0	5.2	8.8	5.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.45	0.42	0.43
Incremental Delay, d2		6.6	8.5		0.1			0.5	0.0	0.3	1.3	0.3
Delay (s)		28.1	30.5		17.7			7.0	5.0	2.6	5.0	2.8
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		29.5			17.7			7.0			4.6	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	219	5	334	8	0	46	0	845	1	26	1449	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.89			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1637			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.95			1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)		1280	1583		1569			3539	1583	497	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	5	363	9	0	50	0	918	1	28	1575	342
RTOR Reduction (vph)	0	0	17	0	36	0	0	0	0	0	0	137
Lane Group Flow (vph)	0	243	346	0	23	0	0	918	1	28	1575	205
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		18.0	18.0		18.0			39.0	39.0	39.0	39.0	39.0
Effective Green, g (s)		18.0	18.0		18.0			39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.28	0.28		0.28			0.60	0.60	0.60	0.60	0.60
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		354	438		434			2123	950	298	2123	950
v/s Ratio Prot								0.26			c0.45	
v/s Ratio Perm		0.19	c0.22		0.01				0.00	0.06		0.13
v/c Ratio		0.69	0.79		0.05			0.43	0.00	0.09	0.74	0.22
Uniform Delay, d1		21.0	21.8		17.2			7.0	5.2	5.5	9.4	6.0
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.46	0.43	0.46
Incremental Delay, d2		5.4	9.4		0.1			0.6	0.0	0.4	1.4	0.3
Delay (s)		26.4	31.2		17.3			7.7	5.2	2.9	5.5	3.0
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		29.3			17.3			7.7			5.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	17	320	15	8	61	0	818	11	44	1433	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1780	1583		1666			3539	1583	1770	3539	1583
Flt Permitted		0.74	1.00		0.93			1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)		1369	1583		1560			3539	1583	522	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	18	348	16	9	66	0	889	12	48	1558	349
RTOR Reduction (vph)	0	0	20	0	48	0	0	0	5	0	0	136
Lane Group Flow (vph)	0	279	328	0	43	0	0	889	7	48	1558	213
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		17.4	17.4		17.4			39.6	39.6	39.6	39.6	39.6
Effective Green, g (s)		17.4	17.4		17.4			39.6	39.6	39.6	39.6	39.6
Actuated g/C Ratio		0.27	0.27		0.27			0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		366	424		418			2156	964	318	2156	964
v/s Ratio Prot								0.25			c0.44	
v/s Ratio Perm		0.20	c0.21		0.03				0.00	0.09		0.13
v/c Ratio		0.76	0.77		0.10			0.41	0.01	0.15	0.72	0.22
Uniform Delay, d1		21.9	22.0		17.9			6.6	5.0	5.5	8.9	5.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.45	0.41	0.32
Incremental Delay, d2		9.1	8.6		0.1			0.6	0.0	0.6	1.2	0.3
Delay (s)		31.0	30.5		18.0			7.2	5.0	3.1	4.9	2.1
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		30.7			18.0			7.2			4.3	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	17	336	15	8	61	0	889	11	44	1459	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1780	1583		1666			3539	1583	1770	3539	1583
Flt Permitted		0.73	1.00		0.93			1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		1369	1583		1561			3539	1583	466	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	18	365	16	9	66	0	966	12	48	1586	349
RTOR Reduction (vph)	0	0	18	0	48	0	0	0	5	0	0	138
Lane Group Flow (vph)	0	279	347	0	43	0	0	966	7	48	1586	211
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		17.7	17.7		17.7			39.3	39.3	39.3	39.3	39.3
Effective Green, g (s)		17.7	17.7		17.7			39.3	39.3	39.3	39.3	39.3
Actuated g/C Ratio		0.27	0.27		0.27			0.60	0.60	0.60	0.60	0.60
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		373	431		425			2140	957	282	2140	957
v/s Ratio Prot								0.27			c0.45	
v/s Ratio Perm		0.20	c0.22		0.03				0.00	0.10		0.13
v/c Ratio		0.75	0.80		0.10			0.45	0.01	0.17	0.74	0.22
Uniform Delay, d1		21.6	22.0		17.7			7.0	5.1	5.7	9.2	5.9
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.46	0.42	0.33
Incremental Delay, d2		8.0	10.5		0.1			0.7	0.0	0.7	1.3	0.3
Delay (s)		29.6	32.5		17.8			7.7	5.1	3.3	5.2	2.3
Level of Service		C	C		B			A	A	A	A	A
Approach Delay (s)		31.2			17.8			7.6			4.6	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT REF: 03_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *US 101 SB RAMPS*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019 (OPENING YEAR):	0	774	1	26	1423	315	219	5	318	8	0	49
(B) PROJECT-ADDED:	0	43	0	0	20	0	0	0	13	0	0	0
(C) CUMULATIVE:	0	818	11	44	1433	321	240	17	320	15	8	61

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT R	LT R	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 (OPENING YEAR) VOLUMES (A)
SCENARIO 2 = 2019 (OPENING YEAR) + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	- *	- *	- *	- *
NBT	2	3200	774	817	818	861	0.242	0.255	0.256	0.269
NBR	1	1600	1	1	11	11	0.001	0.001	0.007	0.007
SBL	1	1600	26	26	44	44	0.016	0.016	0.028	0.028
SBT	2	3200	1423	1443	1433	1453	0.445 *	0.451 *	0.448 *	0.454 *
SBR	1	1600	315	315	321	321	0.197	0.197	0.201	0.201
EBL	0	0	219	219	240	240	-	-	-	-
EBT	1	1600	5	5	17	17	0.140	0.140	0.161	0.161
EBR	1	1600	318	331	320	333	0.199 *	0.207 *	0.200 *	0.208 *
WBL	0	0	8	8	15	15	-	-	-	-
WBT	1	1600	0	0	8	8	0.036 *	0.036 *	0.053 *	0.053 *
WBR	0	0	49	49	61	61	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.780**	**0.794**	**0.801**	**0.815**
						SCENARIO LEVEL OF SERVICE:	C	C	C	D

NOTES:

Printed: 04/24/15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	1	134	13	0	33	0	1369	1	43	628	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1774	1583		1659			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.88			1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)		1286	1583		1473			3539	1583	266	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	505	1	144	14	0	35	0	1472	1	46	675	131
RTOR Reduction (vph)	0	0	86	0	9	0	0	0	1	0	0	70
Lane Group Flow (vph)	0	506	58	0	40	0	0	1472	0	46	675	61
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Effective Green, g (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio		0.40	0.40		0.40			0.47	0.47	0.47	0.47	0.47
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		514	633		589			1652	739	124	1652	739
v/s Ratio Prot								c0.42			0.19	
v/s Ratio Perm		c0.39	0.04		0.03				0.00	0.17		0.04
v/c Ratio		0.98	0.09		0.07			0.89	0.00	0.37	0.41	0.08
Uniform Delay, d1		17.8	11.2		11.1			14.6	8.5	10.3	10.5	8.9
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.52	0.47	0.76
Incremental Delay, d2		35.4	0.1		0.0			7.7	0.0	7.8	0.7	0.2
Delay (s)		53.2	11.3		11.2			22.3	8.5	13.2	5.6	6.9
Level of Service		D	B		B			C	A	B	A	A
Approach Delay (s)		43.9			11.2			22.3			6.2	
Approach LOS		D			B			C			A	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	1	154	13	0	33	0	1409	1	43	660	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1774	1583		1659			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.88			1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)		1286	1583		1473			3539	1583	266	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	505	1	166	14	0	35	0	1515	1	46	710	131
RTOR Reduction (vph)	0	0	88	0	8	0	0	0	1	0	0	70
Lane Group Flow (vph)	0	506	78	0	41	0	0	1515	0	46	710	61
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Effective Green, g (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio		0.40	0.40		0.40			0.47	0.47	0.47	0.47	0.47
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		514	633		589			1652	739	124	1652	739
v/s Ratio Prot								c0.43			0.20	
v/s Ratio Perm		c0.39	0.05		0.03				0.00	0.17		0.04
v/c Ratio		0.98	0.12		0.07			0.92	0.00	0.37	0.43	0.08
Uniform Delay, d1		17.8	11.4		11.1			14.9	8.5	10.3	10.7	8.9
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.49	0.44	0.71
Incremental Delay, d2		35.4	0.1		0.1			9.6	0.0	7.7	0.8	0.2
Delay (s)		53.2	11.4		11.2			24.5	8.5	12.7	5.4	6.5
Level of Service		D	B		B			C	A	B	A	A
Approach Delay (s)		42.9			11.2			24.5			6.0	
Approach LOS		D			B			C			A	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT REF: 03_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***US. 101 NB RAMPS***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	1369	1	43	628	122	470	1	134	13	0	33
(B) PROJECT-ADDED:	0	40	0	0	32	0	0	0	20	0	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT R	LT R	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0			-	-		
NBT	2	3200	1369	1409			0.428 *	0.440 *		
NBR	1	1600	1	1			0.001	0.001		
SBL	1	1600	43	43			0.027 *	0.027 *		
SBT	2	3200	628	660			0.196	0.206		
SBR	1	1600	122	122			0.076	0.076		
EBL	0	0	470	470			-	-		
EBT	1	1600	1	1			0.294 *	0.294 *		
EBR	1	1600	134	154			0.084	0.096		
WBL	0	0	13	13			-	-		
WBT	1	1600	0	0			0.029 *	0.029 *		
WBR	0	0	33	33			-	-		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.878**	**0.890**		
						SCENARIO LEVEL OF SERVICE:	**D**	**D**		

NOTES:

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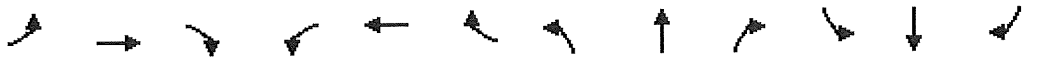
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	494	1	141	14	0	35	0	1439	1	45	660	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1774	1583		1659			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.87			1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)		1281	1583		1462			3539	1583	266	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	531	1	152	15	0	38	0	1547	1	48	710	138
RTOR Reduction (vph)	0	0	88	0	7	0	0	0	1	0	0	74
Lane Group Flow (vph)	0	532	64	0	46	0	0	1547	0	48	710	64
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Effective Green, g (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio		0.40	0.40		0.40			0.47	0.47	0.47	0.47	0.47
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		512	633		585			1652	739	124	1652	739
v/s Ratio Prot								c0.44			0.20	
v/s Ratio Perm		c0.42	0.04		0.03				0.00	0.18		0.04
v/c Ratio		1.04	0.10		0.08			0.94	0.00	0.39	0.43	0.09
Uniform Delay, d1		18.0	11.3		11.1			15.2	8.5	10.4	10.7	8.9
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.52	0.46	0.74
Incremental Delay, d2		50.3	0.1		0.1			11.5	0.0	8.3	0.8	0.2
Delay (s)		68.3	11.3		11.2			26.6	8.5	13.7	5.7	6.8
Level of Service		E	B		B			C	A	B	A	A
Approach Delay (s)		55.6			11.2			26.6			6.3	
Approach LOS		E			B			C			A	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	494	1	173	14	0	35	0	1497	1	45	712	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.90			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1774	1583		1659			3539	1583	1770	3539	1583
Flt Permitted		0.69	1.00		0.87			1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)		1281	1583		1462			3539	1583	266	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	531	1	186	15	0	38	0	1610	1	48	766	138
RTOR Reduction (vph)	0	0	75	0	5	0	0	0	1	0	0	74
Lane Group Flow (vph)	0	532	111	0	48	0	0	1610	0	48	766	64
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Effective Green, g (s)		24.0	24.0		24.0			28.0	28.0	28.0	28.0	28.0
Actuated g/C Ratio		0.40	0.40		0.40			0.47	0.47	0.47	0.47	0.47
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		512	633		585			1652	739	124	1652	739
v/s Ratio Prot								c0.45			0.22	
v/s Ratio Perm		c0.42	0.07		0.03				0.00	0.18		0.04
v/c Ratio		1.04	0.18		0.08			0.97	0.00	0.39	0.46	0.09
Uniform Delay, d1		18.0	11.6		11.2			15.7	8.5	10.4	10.9	8.9
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.50	0.46	0.69
Incremental Delay, d2		50.3	0.1		0.1			16.9	0.0	8.1	0.9	0.2
Delay (s)		68.3	11.7		11.2			32.5	8.5	13.4	5.9	6.4
Level of Service		E	B		B			C	A	B	A	A
Approach Delay (s)		53.6			11.2			32.5			6.3	
Approach LOS		D			B			C			A	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	506	13	149	23	11	52	0	1469	11	62	712	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.92			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1689			3539	1583	1770	3539	1583
Flt Permitted		0.71	1.00		0.79			1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)		1315	1583		1353			3539	1583	207	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	544	14	160	25	12	56	0	1580	12	67	766	165
RTOR Reduction (vph)	0	0	78	0	7	0	0	0	5	0	0	86
Lane Group Flow (vph)	0	558	82	0	86	0	0	1580	7	67	766	79
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		31.0	31.0		31.0			36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)		31.0	31.0		31.0			36.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio		0.41	0.41		0.41			0.48	0.48	0.48	0.48	0.48
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		544	654		559			1699	760	99	1699	760
v/s Ratio Prot								c0.45			0.22	
v/s Ratio Perm		c0.42	0.05		0.06				0.00	0.32		0.05
v/c Ratio		1.03	0.13		0.15			0.93	0.01	0.68	0.45	0.10
Uniform Delay, d1		22.0	13.6		13.8			18.3	10.2	15.0	12.9	10.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.48	0.40	0.55
Incremental Delay, d2		45.3	0.1		0.1			10.5	0.0	29.5	0.8	0.3
Delay (s)		67.3	13.7		13.9			28.9	10.2	36.7	6.0	6.2
Level of Service		E	B		B			C	B	D	A	A
Approach Delay (s)		55.4			13.9			28.7			8.1	
Approach LOS		E			B			C			A	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	506	13	181	23	11	52	0	1527	11	62	764	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.92			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1689			3539	1583	1770	3539	1583
Flt Permitted		0.71	1.00		0.79			1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)		1315	1583		1353			3539	1583	207	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	544	14	195	25	12	56	0	1642	12	67	822	165
RTOR Reduction (vph)	0	0	66	0	6	0	0	0	5	0	0	86
Lane Group Flow (vph)	0	558	129	0	87	0	0	1642	7	67	822	79
Turn Type	Perm		Perm	Perm					Perm	Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)		31.0	31.0		31.0			36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)		31.0	31.0		31.0			36.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio		0.41	0.41		0.41			0.48	0.48	0.48	0.48	0.48
Clearance Time (s)		4.0	4.0		4.0			4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		544	654		559			1699	760	99	1699	760
v/s Ratio Prot								c0.46			0.23	
v/s Ratio Perm		c0.42	0.08		0.06				0.00	0.32		0.05
v/c Ratio		1.03	0.20		0.16			0.97	0.01	0.68	0.48	0.10
Uniform Delay, d1		22.0	14.0		13.8			18.9	10.2	15.0	13.2	10.7
Progression Factor		1.00	1.00		1.00			1.00	1.00	0.47	0.41	0.51
Incremental Delay, d2		45.3	0.1		0.1			15.2	0.0	28.9	0.9	0.3
Delay (s)		67.3	14.2		13.9			34.1	10.2	36.1	6.3	5.7
Level of Service		E	B		B			C	B	D	A	A
Approach Delay (s)		53.5			13.9			33.9			8.1	
Approach LOS		D			B			C			A	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

#10051.01 CANYON OAKS PROJECT REF: 03_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***US 101 SB RAMPS***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	0	1439	1	45	660	128	494	1	141	14	0	35
(B) PROJECT-ADDED:	0	40	0	0	32	0	0	0	20	0	0	0
(C) CUMULATIVE:	0	1469	11	62	712	153	506	13	149	23	11	52

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT R	L TT R	LT R	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 (OPENING YEAR) VOLUMES (A)
SCENARIO 2 = 2019 (OPENING YEAR) + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	2	3200	1439	1479	1469	1509	0.450 *	0.462 *	0.459 *	0.472 *
NBR	1	1600	1	1	11	11	0.001	0.001	0.007	0.007
SBL	1	1600	45	45	62	62	0.028 *	0.028 *	0.039 *	0.039 *
SBT	2	3200	660	692	712	744	0.206	0.216	0.223	0.233
SBR	1	1600	128	128	153	153	0.080	0.080	0.096	0.096
EBL	0	0	494	494	506	506	-	-	-	-
EBT	1	1600	1	1	13	13	0.309 *	0.309 *	0.324 *	0.324 *
EBR	1	1600	141	161	149	169	0.088	0.101	0.093	0.106
WBL	0	0	14	14	23	23	-	-	-	-
WBT	1	1600	0	0	11	11	0.031 *	0.031 *	0.054 *	0.054 *
WBR	0	0	35	35	52	52	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.918**	**0.930**	**0.976**	**0.989**
					SCENARIO LEVEL OF SERVICE:		**E**	**E**	**E**	**E**

NOTES:

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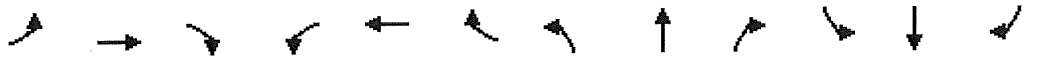


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	506	13	149	23	11	52	0	1469	11	62	712	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.91		1.00	0.95	1.00
Frt		1.00	0.85		0.92			1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00		0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1689			5080		1770	3539	1583
Flt Permitted		0.66	1.00		0.85			1.00		0.17	1.00	1.00
Satd. Flow (perm)		1237	1583		1459			5080		323	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	544	14	160	25	12	56	0	1580	12	67	766	165
RTOR Reduction (vph)	0	0	35	0	2	0	0	1	0	0	0	101
Lane Group Flow (vph)	0	558	125	0	91	0	0	1591	0	67	766	64
Turn Type	Perm		Perm	Perm						Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8						6		6
Actuated Green, G (s)		28.9	28.9		28.9			23.1		23.1	23.1	23.1
Effective Green, g (s)		28.9	28.9		28.9			23.1		23.1	23.1	23.1
Actuated g/C Ratio		0.48	0.48		0.48			0.39		0.39	0.39	0.39
Clearance Time (s)		4.0	4.0		4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		596	762		703			1956		124	1363	609
v/s Ratio Prot								c0.31			0.22	
v/s Ratio Perm		c0.45	0.08		0.06					0.21		0.04
v/c Ratio		0.94	0.16		0.13			0.81		0.54	0.56	0.10
Uniform Delay, d1		14.7	8.8		8.6			16.5		14.3	14.5	11.8
Progression Factor		1.00	1.00		1.00			1.00		0.55	0.52	0.96
Incremental Delay, d2		22.2	0.1		0.1			3.8		14.6	1.5	0.3
Delay (s)		36.9	8.9		8.7			20.4		22.5	9.0	11.6
Level of Service		D	A		A			C		C	A	B
Approach Delay (s)		30.6			8.7			20.4			10.4	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	506	13	181	23	11	52	0	1527	11	62	764	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0			4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00			0.91		1.00	0.95	1.00
Frt		1.00	0.85		0.92			1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99			1.00		0.95	1.00	1.00
Satd. Flow (prot)		1776	1583		1689			5080		1770	3539	1583
Flt Permitted		0.66	1.00		0.85			1.00		0.17	1.00	1.00
Satd. Flow (perm)		1237	1583		1459			5080		323	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	544	14	195	25	12	56	0	1642	12	67	822	165
RTOR Reduction (vph)	0	0	28	0	1	0	0	1	0	0	0	101
Lane Group Flow (vph)	0	558	167	0	92	0	0	1653	0	67	822	64
Turn Type	Perm		Perm	Perm						Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8						6		6
Actuated Green, G (s)		28.9	28.9		28.9			23.1		23.1	23.1	23.1
Effective Green, g (s)		28.9	28.9		28.9			23.1		23.1	23.1	23.1
Actuated g/C Ratio		0.48	0.48		0.48			0.39		0.39	0.39	0.39
Clearance Time (s)		4.0	4.0		4.0			4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		596	762		703			1956		124	1363	609
v/s Ratio Prot								c0.33			0.23	
v/s Ratio Perm		c0.45	0.11		0.06					0.21		0.04
v/c Ratio		0.94	0.22		0.13			0.84		0.54	0.60	0.10
Uniform Delay, d1		14.7	9.0		8.6			16.8		14.3	14.8	11.8
Progression Factor		1.00	1.00		1.00			1.00		0.55	0.53	0.93
Incremental Delay, d2		22.2	0.1		0.1			4.7		14.4	1.8	0.3
Delay (s)		36.9	9.2		8.7			21.5		22.3	9.5	11.4
Level of Service		D	A		A			C		C	A	B
Approach Delay (s)		29.7			8.7			21.5			10.6	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

#10051.01 CANYON OAKS PROJECT **REFERENCE #04AM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***EXISITNG GEOMETRY***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING	92	584	0	0	1007	597	214	0	127	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	T TR	LL R	

TRAFFIC SCENARIOS

SCENARIO 1: EXISTING (A)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	92			0.058 *			
NBT	2	3200	584			0.183			
NBR	0	0	0			0.000			
SBL	0	0	0			0.000			
SBT	2	3200	1007			0.315			
SBR *(a)*	1	1600	597			0.373 *			
EBL	2	3200	214			0.067 *			
EBT	0	0	0			0.000			
EBR	1	1600	127			0.079			
WBL	0	0	0			0.000			
WBT	0	0	0			0.000			
WBR	0	0	0			0.000			
			LOST TIME:			0.100 *			
			INTERSECTION CAPACITY UTILIZATION:			**0.598**			
			LEVEL OF SERVICE:			**A**			

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT REFERENCE #04AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***FUTURE GEOMETRY WITH SPLIT PHASE***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING	92	584	0	0	1007	597	214	0	127	0	0	0
(B) PROJECT	0	0	13	33	0	0	0	5	0	16	6	43

GEOMETRICS

GEOMETRICS	NORTH BOUND L TT R	SOUTH BOUND L T TR	EAST BOUND L LT R	WEST BOUND LT R

TRAFFIC SCENARIOS

SCENARIO 1:

SCENARIO 2: EXISTING + PROJECT (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600		92				0.058 *		
NBT	2	3200		584				0.183		
NBR	1	1600		13				0.008		
SBL	1	1600		33				0.021		
SBT	2	3200		1007				0.315		
SBR *(a)*	1	1600		597				0.373 *		
EBL	0	0		214				0.000		
EBT	2	3200		5				0.068		
EBR	1	1600		127				0.079 *		
WBL	0	0		16				0.000		
WBT	1	1600		6				0.014		
WBR	1	1600		43				0.027 *		
				LOST TIME:				0.100 *		
				INTERSECTION CAPACITY UTILIZATION:				**0.637**		
				LEVEL OF SERVICE:				**B**		

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04AM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***EXISITNG GEOMETRY***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019	97	614	0	0	1058	627	225	0	133	0	0	0
(B) PROJECT	0	0	0	0	0	0	0	0	0	0	0	0
(C) CUMULATIVE	102	653	0	0	1069	635	240	0	134	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	T TR	LL R	

TRAFFIC SCENARIOS

SCENARIO 1: 2019 (A)

SCENARIO 3: CUMULATIVE (C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	97	102		0.061 *		0.064 *	
NBT	2	3200	614	653		0.192		0.204	
NBR	0	0	0	0		0.000		0.000	
SBL	0	0	0	0		0.000		0.000	
SBT	2	3200	1058	1069		0.331		0.334	
SBR *(a)*	1	1600	627	635		0.392 *		0.397 *	
EBL	2	3200	225	240		0.070		0.075	
EBT	0	0	0	0		0.000		0.000	
EBR	1	1600	133	134		0.083 *		0.084 *	
WBL	0	0	0	0		0.000		0.000	
WBT	0	0	0	0		0.000		0.000	
WBR	0	0	0	0		0.000		0.000	
			LOST TIME:			0.100 *		0.100 *	
			INTERSECTION CAPACITY UTILIZATION:			**0.636**		**0.645**	
			LEVEL OF SERVICE:			**B**		**B**	

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04AM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***FUTURE GEOMETRY WITH SPLIT PHASE***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019	97	614	0	0	1058	627	225	0	133	0	0	0
(B) PROJECT	0	0	13	33	0	0	0	5	0	16	6	43
(C) CUMULATIVE	102	653	0	0	1069	635	240	0	134	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND L TT R	SOUTH BOUND L T TR	EAST BOUND L LT R	WEST BOUND LT R

TRAFFIC SCENARIOS

SCENARIO 1:
SCENARIO 2: 2019 + PROJECT (A+B)
SCENARIO 3:
SCENARIO 4: CUMULATIVE + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	97	97	102	102		0.061 *		0.064 *
NBT	2	3200	614	614	653	653		0.192		0.204
NBR	1	1600	0	13	0	13		0.008		0.008
SBL	1	1600	0	33	0	33		0.021		0.021
SBT	2	3200	1058	1058	1069	1069		0.331		0.334
SBR *(a)*	1	1600	627	627	635	635		0.392 *		0.397 *
EBL	0	0	225	225	240	240		0.000		0.000
EBT	2	3200	0	5	0	5		0.072		0.077
EBR	1	1600	133	133	134	134		0.083 *		0.084 *
WBL	0	0	0	16	0	16		0.000		0.000
WBT	1	1600	0	6	0	6		0.014		0.014
WBR	1	1600	0	43	0	43		0.027 *		0.027 *
					LOST TIME:			0.100 *		0.100 *
					INTERSECTION CAPACITY UTILIZATION:			**0.663**		**0.672**
					LEVEL OF SERVICE:			**B**		**B**

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *PM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.*

CONTROL TYPE: SIGNAL

EXISTING GEOMETRY

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING	108	779	0	1	495	210	736	0	108	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	T TR	LL R	

TRAFFIC SCENARIOS

SCENARIO 1: EXISTING (A)

LEVEL OF SERVICE CALCULATIONS

MOVEMENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1		2	3	4	
NBL	1	1600	108				0.068					
NBT	2	3200	779				0.243	*				
NBR	0	0	0				0.000					
SBL	0	0	1				0.000	*				
SBT	2	3200	495				0.155					
SBR *(a)*	1	1600	181				0.113					
EBL	2	3200	736				0.230	*				
EBT	0	0	0				0.000					
EBR	1	1600	25				0.016					
WBL	0	0	0				0.000					
WBT	0	0	0				0.000					
WBR	0	0	0				0.000					
			LOST TIME:				0.100	*				
			INTERSECTION CAPACITY UTILIZATION:				**0.573**					
			LEVEL OF SERVICE:				**A**					

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *PM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***FUTURE GEOMETRY WITH SPLIT PHASE***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING	108	779	0	1	495	210	736	0	108	0	0	0
(B) PROJECT	0	0	21	52	0	0	0	8	0	15	6	40

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT R	L T TR	L LT R	LT R

TRAFFIC SCENARIOS

SCENARIO 2: EXISTING + PROJECT (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	108					0.068		
NBT	2	3200	779					0.243 *		
NBR	1	1600	21					0.013		
SBL	1	1600	53					0.033 *		
SBT	2	3200	495					0.155		
SBR *(a)*	1	1600	210					0.131		
EBL	0	0	736					0.000		
EBT	2	3200	8					0.233 *		
EBR	1	1600	108					0.068		
WBL	0	0	15					0.000		
WBT	1	1600	6					0.013		
WBR	1	1600	40					0.025 *		
			LOST TIME:					0.100 *		
			INTERSECTION CAPACITY UTILIZATION:					**0.634**		
			LEVEL OF SERVICE:					**B**		

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *PM*

N/S STREET: *LAS VIRGENES RD.*

E/W STREET: *AGOURA RD.* ***EXISTING GEOMETRY***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019	114	819	0	0	520	221	773	0	114	0	0	0
(B) PROJECT	0	0	0	0	0	0	0	0	0	0	0	0
(C) CUMULATIVE	121	841	0	0	561	250	791	0	121	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT	T TR	LL R	

TRAFFIC SCENARIOS

SCENARIO 1: 2019 (A)

SCENARIO 3: CUMULATIVE (C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	114		121		0.071		0.076	
NBT	2	3200	819		841		0.256 *		0.263 *	
NBR	0	0	0		0		0.000		0.000	
SBL	0	0	0		0		0.000 *		0.000 *	
SBT	2	3200	520		561		0.163		0.175	
SBR *(a)*	1	1600	221		250		0.138		0.156	
EBL	2	3200	773		791		0.242 *		0.247 *	
EBT	0	0	0		0		0.000		0.000	
EBR	1	1600	114		121		0.071		0.076	
WBL	0	0	0		0		0.000		0.000	
WBT	0	0	0		0		0.000		0.000	
WBR	0	0	0		0		0.000		0.000	
				LOST TIME:			0.100 *		0.100 *	
			INTERSECTION CAPACITY UTILIZATION:				**0.598**		**0.610**	
			LEVEL OF SERVICE:				**A**		**B**	

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #04PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***09/11/2014***

TIME PERIOD: ***PM***

N/S STREET: ***LAS VIRGENES RD.***

E/W STREET: ***AGOURA RD.*** ***FUTURE GEOMETRY WITH SPLIT PHASE***

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019	114	819	0	0	520	221	773	0	114	0	0	0
(B) PROJECT	0	0	21	52	0	0	0	8	0	15	6	40
(C) CUMULATIVE	121	841	0	0	561	250	791	0	121	0	0	0

GEOMETRICS

GEOMETRICS	NORTH BOUND L TT R	SOUTH BOUND L T TR	EAST BOUND L LT R	WEST BOUND LT R

TRAFFIC SCENARIOS

SCENARIO 2: 2019 + PROJECT (A+B)

SCENARIO 4: CUMULATIVE + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	114	114	121	121		0.071		0.076
NBT	2	3200	819	819	841	841		0.256 *		0.263 *
NBR	1	1600	0	21	0	21		0.013		0.013
SBL	1	1600	0	52	0	52		0.033 *		0.033 *
SBT	2	3200	520	520	561	561		0.163		0.175
SBR (a)	1	1600	221	221	250	250		0.138		0.156
EBL	0	0	773	773	791	791		0.000		0.000
EBT	2	3200	0	8	0	8		0.244 *		0.250 *
EBR	1	1600	114	114	121	121		0.071		0.076
WBL	0	0	0	15	0	15		0.000		0.000
WBT	1	1600	0	6	0	6		0.013		0.013
WBR	1	1600	0	40	0	40		0.025 *		0.025 *
					LOST TIME:			0.100 *		0.100 *
					INTERSECTION CAPACITY UTILIZATION:			**0.658**		**0.671**
					LEVEL OF SERVICE:			**B**		**B**

NOTES:

(a) 23-foot wide #2 through lane acts as de-facto right-turn lane.

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #05AM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LOST HILLS RD.*

E/W STREET: *AGOURA RD.*

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING	25	451	60	315	769	234	30	100	23	54	117	76
(B) PROJECT	0	0	0	3	0	0	0	2	0	0	3	3

GEOMETRICS

GEOMETRICS	NORTH BOUND L T TR	SOUTH BOUND _L T TR	EAST BOUND L T TR	WEST BOUND L T T R

TRAFFIC SCENARIOS

SCENARIO 1: EXISTING (A)

SCENARIO 2: EXISTING + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	25	25			0.016 *	0.016 *		
NBT	2	3200	451	451			0.160	0.160		
NBR	0	0	60	60			0.000	0.000		
SBL	2	3200	315	318			0.098	0.099		
SBT	2	3200	769	769			0.313 *	0.313 *		
SBR	0	0	234	234			0.000	0.000		
EBL	1	1600	30	30			0.019	0.019		
EBT	2	3200	100	102			0.038 *	0.039 *		
EBR	0	0	23	23			0.000	0.000		
WBL	1	1600	54	54			0.034 *	0.034 *		
WBT	2	3200	117	120			0.037	0.038		
WBR	1	1600	76	79			0.048	0.049		
						LOST TIME:	0.100 *	0.100 *		
						INTERSECTION CAPACITY UTILIZATION:	**0.501**	**0.502**		
						LEVEL OF SERVICE:	**A**	**A**		

NOTES:

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #05AM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *AM*

N/S STREET: *LOST HILLS RD.*

E/W STREET: *AGOURA RD.*

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019	26	474	63	331	808	246	32	105	24	58	123	80
(B) PROJECT	0	0	0	3	0	0	0	2	0	0	3	3
(C) CUMULATIVE	26	484	66	331	817	246	32	116	24	61	130	82

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L T TR	_L T TR	L T TR	L T T R

TRAFFIC SCENARIOS

SCENARIO 1: 2019 (A)
SCENARIO 2: 2019 + PROJECT (A+B)
SCENARIO 3: CUMULATIVE (C)
SCENARIO 4: CUMULATIVE + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	26	26	26	26	0.016 *	0.016 *	0.016 *	0.016 *
NBT	2	3200	474	474	484	484	0.168	0.168	0.172	0.172
NBR	0	0	63	63	66	66	0.000	0.000	0.000	0.000
SBL	2	3200	331	334	331	334	0.103	0.104	0.103	0.104
SBT	2	3200	808	808	817	817	0.329 *	0.329 *	0.332 *	0.332 *
SBR	0	0	246	246	246	246	0.000	0.000	0.000	0.000
EBL	1	1600	32	32	32	32	0.020	0.020	0.020	0.020
EBT	2	3200	105	107	116	118	0.040 *	0.041 *	0.044 *	0.044 *
EBR	0	0	24	24	24	24	0.000	0.000	0.000	0.000
WBL	1	1600	58	58	61	61	0.036 *	0.036 *	0.038 *	0.038 *
WBT	2	3200	123	126	130	133	0.038	0.039	0.041	0.042
WBR	1	1600	80	83	82	85	0.050	0.052	0.051	0.053
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					INTERSECTION CAPACITY UTILIZATION:		**0.521**	**0.522**	**0.530**	**0.530**
					LEVEL OF SERVICE:		**A**	**A**	**A**	**A**

NOTES:

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #05PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *PM*

N/S STREET: *LOST HILLS RD.*

E/W STREET: *AGOURA RD.*

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING	70	533	59	224	400	37	159	238	57	61	190	222
(B) PROJECT	0	0	0	4	0	0	0	4	0	0	3	3

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L T TR	LL T TR	L T TR	L T T R

TRAFFIC SCENARIOS

SCENARIO 1: EXISTING (A)

SCENARIO 2: EXISTING + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	70	70			0.044	0.044		
NBT	2	3200	533	533			0.185 *	0.185 *		
NBR	0	0	59	59			0.000	0.000		
SBL	2	3200	224	228			0.070 *	0.071 *		
SBT	2	3200	400	400			0.137	0.137		
SBR	0	0	37	37			0.000	0.000		
EBL	1	1600	159	159			0.099 *	0.099 *		
EBT	2	3200	238	242			0.092	0.093		
EBR	0	0	57	57			0.000	0.000		
WBL	1	1600	61	61			0.038	0.038		
WBT	2	3200	190	193			0.059	0.060		
WBR	1	1600	222	225			0.139 *	0.141 *		
				LOST TIME:			0.100 *	0.100 *		
			INTERSECTION CAPACITY UTILIZATION:				**0.593**	**0.596**		
			LEVEL OF SERVICE:				**A**	**A**		

NOTES:

04/24/15

#10051.01 CANYON OAKS PROJECT **REFERENCE #05PM**

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *09/11/2014*

TIME PERIOD: *PM*

N/S STREET: *LOST HILLS RD.*

E/W STREET: *AGOURA RD.*

CONTROL TYPE: SIGNAL

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019	74	560	62	235	420	39	167	250	60	64	200	233
(B) PROJECT	0	0	0	4	0	0	0	4	0	0	3	3
(C) CUMULATIVE	74	597	73	237	490	39	167	258	60	84	213	234

GEOMETRICS

GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L T TR	LL T TR	L T TR	L T T R

TRAFFIC SCENARIOS

SCENARIO 1: 2019 (A)
SCENARIO 2: 2019 + PROJECT (A+B)
SCENARIO 3: CUMULATIVE (C)
SCENARIO 4: CUMULATIVE + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	74	74	74	74	0.046	0.046	0.046	0.046
NBT	2	3200	560	560	597	597	0.194 *	0.194 *	0.209 *	0.209 *
NBR	0	0	62	62	73	73	0.000	0.000	0.000	0.000
SBL	2	3200	235	239	237	241	0.073 *	0.075 *	0.074 *	0.075 *
SBT	2	3200	420	420	490	490	0.143	0.143	0.165	0.165
SBR	0	0	39	39	39	39	0.000	0.000	0.000	0.000
EBL	1	1600	167	167	167	167	0.104 *	0.104 *	0.104 *	0.104 *
EBT	2	3200	250	254	258	262	0.097	0.098	0.099	0.101
EBR	0	0	60	60	60	60	0.000	0.000	0.000	0.000
WBL	1	1600	64	64	84	84	0.040	0.040	0.053	0.053
WBT	2	3200	200	203	213	216	0.063	0.063	0.067	0.068
WBR	1	1600	233	236	234	237	0.146 *	0.148 *	0.146 *	0.148 *
			LOST TIME:				0.100 *	0.100 *	0.100 *	0.100 *
			INTERSECTION CAPACITY UTILIZATION:				**0.617**	**0.621**	**0.633**	**0.636**
			LEVEL OF SERVICE:				**B**	**B**	**B**	**B**

NOTES:

04/24/15

#10051.01 CANYON OAKS PROJECT REF: 06_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2015:	232	237	0	2	717	1	7	2	713	0	2	4
(B) PROJECT-ADDED:	0	13	0	0	16	0	0	0	0	0	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	LL T R	L T R	L T R	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2015 VOLUMES (A)

SCENARIO 2 = 2015 + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4		
NBL	2	3200	232	232			0.073 *	0.073 *				
NBT	1	1600	237	250			0.148	0.156				
NBR	1	1600	0	0			0.000	0.000				
SBL	1	1600	2	2			0.001	0.001				
SBT	1	1600	717	733			0.448 *	0.458 *				
SBR	1	1600	1	1			0.001	0.001				
EBL	1	1600	7	7			0.004	0.004				
EBT	1	1600	2	2			0.001	0.001				
EBR (a)	1	1600	597	597			0.373 *	0.373 *				
WBL	0	0	0	0			-	-				
WBT	1	1600	2	2			0.004	0.004				
WBR	0	0	4	4			-	-				
						LOST TIME:	0.100 *	0.100 *				
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.994**	**1.004**				
						SCENARIO LEVEL OF SERVICE:	**E**	**E**				

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 01/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	242	247	0	2	746	1	7	2	742	0	2	4
(B) PROJECT-ADDED:	0	13	0	0	16	0	0	0	0	0	0	0
(C) CUMULATIVE:	243	260	0	2	759	1	7	2	743	0	2	4

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND LL T R	SOUTH BOUND L T R	EAST BOUND L T R	WEST BOUND LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 VOLUMES (A)
SCENARIO 2 = 2019 + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	242	242	243	243	0.076 *	0.076 *	0.076 *	0.076 *
NBT	1	1600	247	260	260	273	0.154	0.163	0.163	0.171
NBR	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
SBL	1	1600	2	2	2	2	0.001	0.001	0.001	0.001
SBT	1	1600	746	762	759	775	0.466 *	0.476 *	0.474 *	0.484 *
SBR	1	1600	1	1	1	1	0.001	0.001	0.001	0.001
EBL	1	1600	7	7	7	7	0.004	0.004	0.004	0.004
EBT	1	1600	2	2	2	2	0.001	0.001	0.001	0.001
EBR (a)	1	1600	621	621	622	622	0.388 *	0.388 *	0.389 *	0.389 *
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	2	2	2	2	0.004 *	0.004 *	0.004 *	0.004 *
WBR	0	0	4	4	4	4	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		1.034	1.044	1.043	1.053
					SCENARIO LEVEL OF SERVICE:		F	F	F	F

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 04/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2015:	645	714	0	0	400	20	18	0	295	0	3	0
(B) PROJECT-ADDED:	0	21	0	0	15	0	0	0	0	0	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND LL T R	SOUTH BOUND L T R	EAST BOUND L T R	WEST BOUND LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2015 VOLUMES (A)

SCENARIO 2 = 2015 + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	645	645			0.202 *	0.202 *		
NBT	1	1600	714	735			0.446	0.459		
NBR	1	1600	0	0			0.000	0.000		
SBL	1	1600	0	0			0.000	0.000		
SBT	1	1600	400	415			0.250 *	0.259 *		
SBR	1	1600	20	20			0.013	0.013		
EBL	1	1600	18	18			0.011 *	0.011 *		
EBT	1	1600	0	0			0.000	0.000		
EBR (a)	1	1600	0	0			0.000	0.000		
WBL	0	0	0	0			-	-		
WBT	1	1600	3	3			0.002 *	0.002 *		
WBR	0	0	0	0			-	-		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.565**	**0.574**		
						SCENARIO LEVEL OF SERVICE:	A	A		

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 01/14/15

#10051.01 CANYON OAKS PROJECT **REF:** 06_PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: ***05/26/2011***

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LAS VIRGENES ROAD***

E/W STREET: ***LOST HILLS ROAD***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	**671**	**743**	**0**	**0**	**416**	**21**	**18**	**0**	**306**	**0**	**3**	**0**
(B) PROJECT-ADDED:	**0**	**21**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
(C) CUMULATIVE:	**676**	**759**	**0**	**0**	**432**	**21**	**18**	**0**	**309**	**0**	**3**	**0**

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND LL T R	SOUTH BOUND L T R	EAST BOUND L T R	WEST BOUND LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 VOLUMES (A)
SCENARIO 2 = 2019 + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	671	671	676	676	0.210 *	0.210 *	0.211 *	0.211 *
NBT	1	1600	743	764	759	780	0.464	0.478	0.474	0.488
NBR	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
SBL	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
SBT	1	1600	416	431	432	447	0.260 *	0.269 *	0.270 *	0.279 *
SBR	1	1600	21	21	21	21	0.013	0.013	0.013	0.013
EBL	1	1600	18	18	18	18	0.011 *	0.011 *	0.011 *	0.011 *
EBT	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
EBR (a)	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	3	3	3	3	0.002 *	0.002 *	0.002 *	0.002 *
WBR	0	0	0	0	0	0	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.583**	**0.592**	**0.594**	**0.603**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 04/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_AM_MIT

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD* *WITH PROGRAMMED IMPROVEMENTS*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
VOLUMES	L	T	R	L	T	R	L	T	R	L	T	R
(A) 2015:	232	237	0	2	717	1	7	2	713	0	2	4
(B) PROJECT-ADDED:	0	13	0	0	16	0	0	0	0	0	0	0

GEOMETRICS

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
LANE GEOMETRICS	LL T R	L T TR	LT RR	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2015 VOLUMES (A)

SCENARIO 2 = 2015 + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	232	232			0.073 *	0.073 *		
NBT	1	1600	237	250			0.148	0.156		
NBR	1	1600	0	0			0.000	0.000		
SBL	1	1600	2	2			0.001	0.001		
SBT	2	3200	717	733			0.224 *	0.229 *		
SBR	0	0	1	1			-	-		
EBL	0	0	7	7			-	-		
EBT	1	1600	2	2			0.006	0.006		
EBR (a)	2	3200	597	597			0.187 *	0.187 *		
WBL	0	0	0	0			-	-		
WBT	1	1600	2	2			0.004 *	0.004 *		
WBR	0	0	4	4			-	-		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.588**	**0.593**		
						SCENARIO LEVEL OF SERVICE:	A	A		

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 01/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_AM_MIT

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD* *WITH PROGRAMMED IMPROVEMENTS*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2019 (OPENING YEAR):	242	247	0	2	746	1	7	2	742	0	2	4
(B) PROJECT-ADDED:	0	13	0	0	16	0	0	0	0	0	0	0
(C) CUMULATIVE:	243	260	0	2	759	1	7	2	743	0	2	4

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	LL T R	L T TR	LT RR	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 VOLUMES (A)
SCENARIO 2 = 2019 + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	242	242	243	243	0.076 *	0.076 *	0.076 *	0.076 *
NBT	1	1600	247	260	260	273	0.154	0.163	0.163	0.171
NBR	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
SBL	1	1600	2	2	2	2	0.001	0.001	0.001	0.001
SBT	2	3200	746	762	759	775	0.233 *	0.238 *	0.238 *	0.243 *
SBR	0	0	1	1	1	1	-	-	-	-
EBL	0	0	7	7	7	7	-	-	-	-
EBT	1	1600	2	2	2	2	0.006	0.006	0.006	0.006
EBR (a)	2	3200	621	621	622	622	0.194 *	0.194 *	0.194 *	0.194 *
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	2	2	2	2	0.004 *	0.004 *	0.004 *	0.004 *
WBR	0	0	4	4	4	4	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		0.607	0.612	0.612	0.617
					SCENARIO LEVEL OF SERVICE:		B	B	B	B

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 04/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_PM_MIT

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD* *WITH PROGRAMMED IMPROVEMENTS*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) 2015:	639	707	0	0	396	20	18	2	291	0	3	0
(B) PROJECT-ADDED:	0	32	0	0	22	0	0	0	0	0	0	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	LL T R	L T TR	LT RR	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2015 VOLUMES (A)

SCENARIO 2 = 2015 + PROJECT VOLUMES (A+B)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	639	639	0	0	0.200	0.200		
NBT	1	1600	707	739	0	32	0.442 *	0.462 *		
NBR	1	1600	0	0	0	0	0.000	0.000		
SBL	1	1600	0	0	0	0	0.000 *	0.000 *		
SBT	2	3200	396	418	0	22	0.130	0.137		
SBR	0	0	20	20	0	0	-	-		
EBL	0	0	18	18	0	0	-	-		
EBT	1	1600	2	2	0	0	0.013	0.013		
EBR (a)	2	3200	0	0	0	0	0.000 *	0.000 *		
WBL	0	0	0	0	0	0	-	-		
WBT	1	1600	3	3	0	0	0.002 *	0.002 *		
WBR	0	0	0	0	0	0	-	-		
						LOST TIME:	0.100 *	0.100 *		
						TOTAL INTERSECTION CAPACITY UTILIZATION:	**0.544**	**0.564**		
						SCENARIO LEVEL OF SERVICE:	A	A		

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 01/14/15

#10051.01 CANYON OAKS PROJECT REF: 06_PM_MIT

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *05/26/2011*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *LAS VIRGENES ROAD* *WITH PROGRAMMED IMPROVEMENTS*

E/W STREET: *LOST HILLS ROAD*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) 2019 (OPENING YEAR):	671	743	0	0	416	21	18	2	306	0	3	0
(B) PROJECT-ADDED:	0	21	0	0	15	0	0	0	0	0	0	0
(C) CUMULATIVE:	676	759	0	0	432	21	18	2	309	0	3	0

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	LL T R	L T TR	LT RR	LTR

TRAFFIC SCENARIOS

SCENARIO 1 = 2019 VOLUMES (A)
SCENARIO 2 = 2019 + PROJECT VOLUMES (A+B)
SCENARIO 3 = CUMULATIVE (C)
SCENARIO 4 = CUMULATIVE + PROJECT VOLUMES (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVEMENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	2	3200	671	671	676	676	0.210	0.210	0.211	0.211
NBT	1	1600	743	764	759	780	0.464 *	0.478 *	0.474 *	0.488 *
NBR	1	1600	0	0	0	0	0.000	0.000	0.000	0.000
SBL	1	1600	0	0	0	0	0.000 *	0.000 *	0.000 *	0.000 *
SBT	2	3200	416	431	432	447	0.137	0.141	0.142	0.146
SBR	0	0	21	21	21	21	-	-	-	-
EBL	0	0	18	18	18	18	-	-	-	-
EBT	1	1600	2	2	2	2	0.013 *	0.013 *	0.013 *	0.013 *
EBR (a)	2	3200	0	0	0	0	0.000	0.000	0.000	0.000
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	3	3	3	3	0.002 *	0.002 *	0.002 *	0.002 *
WBR	0	0	0	0	0	0	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.579**	**0.593**	**0.589**	**0.603**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

(a) Right-turns reduced for overlap arrow with NB left-turn.

Printed: 04/14/15

PROJECT DRIVEWAY QUEUEING ANALYSIS WORKSHEETS

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	125	126	161	24	47	125	790	36	1887
v/c Ratio	0.70	0.70	0.51	0.12	0.22	0.76	0.25	0.34	0.94
Control Delay	85.3	85.4	14.7	62.5	18.3	93.6	13.0	76.8	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.3	85.4	14.7	62.5	18.3	93.6	13.0	76.8	37.0
Queue Length 50th (ft)	126	127	0	22	0	121	120	35	827
Queue Length 95th (ft)	#223	#222	72	52	41	#226	144	74	968
Internal Link Dist (ft)		599		71			616		514
Turn Bay Length (ft)									
Base Capacity (vph)	179	180	313	192	211	165	3145	106	2014
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.70	0.51	0.13	0.22	0.76	0.25	0.34	0.94

Intersection Summary

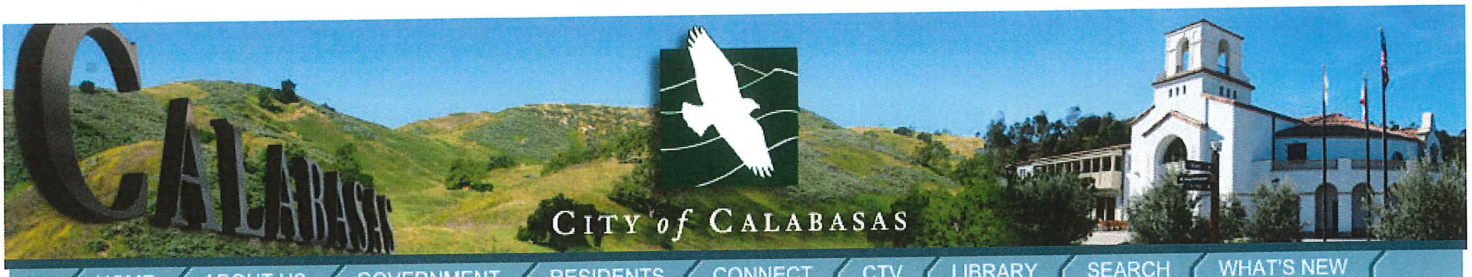
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	395	388	133	23	43	123	1013	57	1002
v/c Ratio	0.75	0.77	0.19	0.04	0.07	0.66	0.50	0.31	0.68
Control Delay	23.1	24.7	3.9	7.6	3.9	33.6	9.9	13.7	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	24.7	3.9	7.6	3.9	33.6	9.9	13.7	10.8
Queue Length 50th (ft)	74	73	4	3	1	21	57	8	70
Queue Length 95th (ft)	#195	#196	25	12	12	#87	84	30	120
Internal Link Dist (ft)		245		316			256		228
Turn Bay Length (ft)									
Base Capacity (vph)	525	505	696	584	657	186	2034	186	1468
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.77	0.19	0.04	0.07	0.66	0.50	0.31	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

CUMULATIVE PROJECT LIST/TRIP GENERATION FORECASTS



CITY of CALABASAS

PROJECTS, PLANS & REPORTS IN THE CITY OF CALABASAS

Community Development Department
Public Works Department
Code Enforcement

MAJOR DEVELOPMENT PROJECTS IN CALABASAS

- BSVERCOM Project
- Calabasas Hilton Garden Inn Expansion
- Canyon Oaks Project
- Cheesecake Factory
- City of Calabasas Senior Center
- Craftsman's Corner Territory Annexation
- Las Virgenes Road/Thousand Oaks Blvd. Commercial Center
- Las Virgenes - Triunfo Joint Powers Authority Solar Generation Project Recycled Water Pump Station
- Malamut Vintage Auto Dealership
- Old Town Calabasas Park and Ride Parking Lot
- Paxton Calabasas Project
- Rondell Oasis Hotel
- Viewpoint Phase III
- Village at Calabasas
- Westin Hotel
- Wireless Telecommunications Facility Information

ROAD WORK/STREET CLOSURES/RESURFACING

- Las Virgenes Road Scenic Corridor Widening Project
- Las Virgenes Rd./Thousand Oaks Blvd. Intersection Improvements
- Lost Hills Interchange Improvement Project
- Mulholland Highway Scenic Corridor Operations Improvement Project, Phase III
- Parkway Calabasas/US101 S/B Off-Ramp Intersection Modifications
- West Calabasas Road Improvement Project

NOTABLE PROJECTS NEAR CALABASAS

- Santa Monica CA Incline Replacement project - April 2015 - Summer 2016
- Malibu Canyon to be Closed 9pm-5am for 7 Months beginning January 15, 2015
- Important Public Hearing Notice - Local Costal Program - July 10, 2014
  LCP Amendment No. LCP-4LAC-14-0109-4
  Los Angeles County- Santa Monica Mountains LCP
- Calabasas Peak Motorway Residences
- Hidden Terraces Specific Plan

- Los Angeles County General Plan and Antelope Valley Area Plan Updates
- Los Angeles County Regional Planning Commission (RPC) case and hearing information
- The Malibu Institute
  - Notice of Preparation - LA County Dept. of Regional Planning

TRAILS

- Las Virgenes Creek Trail

MAJOR ORDINANCES

INITIATIVES

- 2010 Calabasas Building Standards Code
- Mont Calabasas Annexation
- Mountain View Estates Annexation

MONTHLY REPORTS

- Development Notices and Monthly Projects Report

GENERAL PLAN AND MASTER PLANS

- Calabasas General Plan
- Development Code Update
- Bicycle Master Plan
- Parks Master Plan
- Pedestrian Master Plan
- Trails Master Plan
- Las Virgenes, McCoy and Dry Canyon Creeks Master Plan

ARCHIVED PROJECTS

2014

- The Horizons - Senior Condominiums
- 2014 Annual Street Resurfacing Project
- Mureau Road Pipeline Project

2013

- PARK CAPRI/PARK GRANADA TRAFFIC SIGNAL PROJECT
- Parkway Calabasas Drop-off and Median Improvements/Park Sorrento Median Circles Landscape Improvements
- Calabasas Road Water Line Replacement

2012

- Mulholland Hwy 2012 Overlay Project
- Edison to Complete Infrastructure Upgrade Project
- 2012 Annual Citywide Resurfacing Project
- Calabasas Sewer Upgrade Project (a Los Angeles County project)
- Safe Routes to School

2011

- Thomas Safran Associates Senior Affordable Housing Development
- 2011 Annual Citywide Resurfacing Project

A.E. Wright Middle School Pedestrian and Bicycle Footbridge and Trail

- City-Wide Signal Interconnect Project
- Clover Trail Water Main Extension

2010

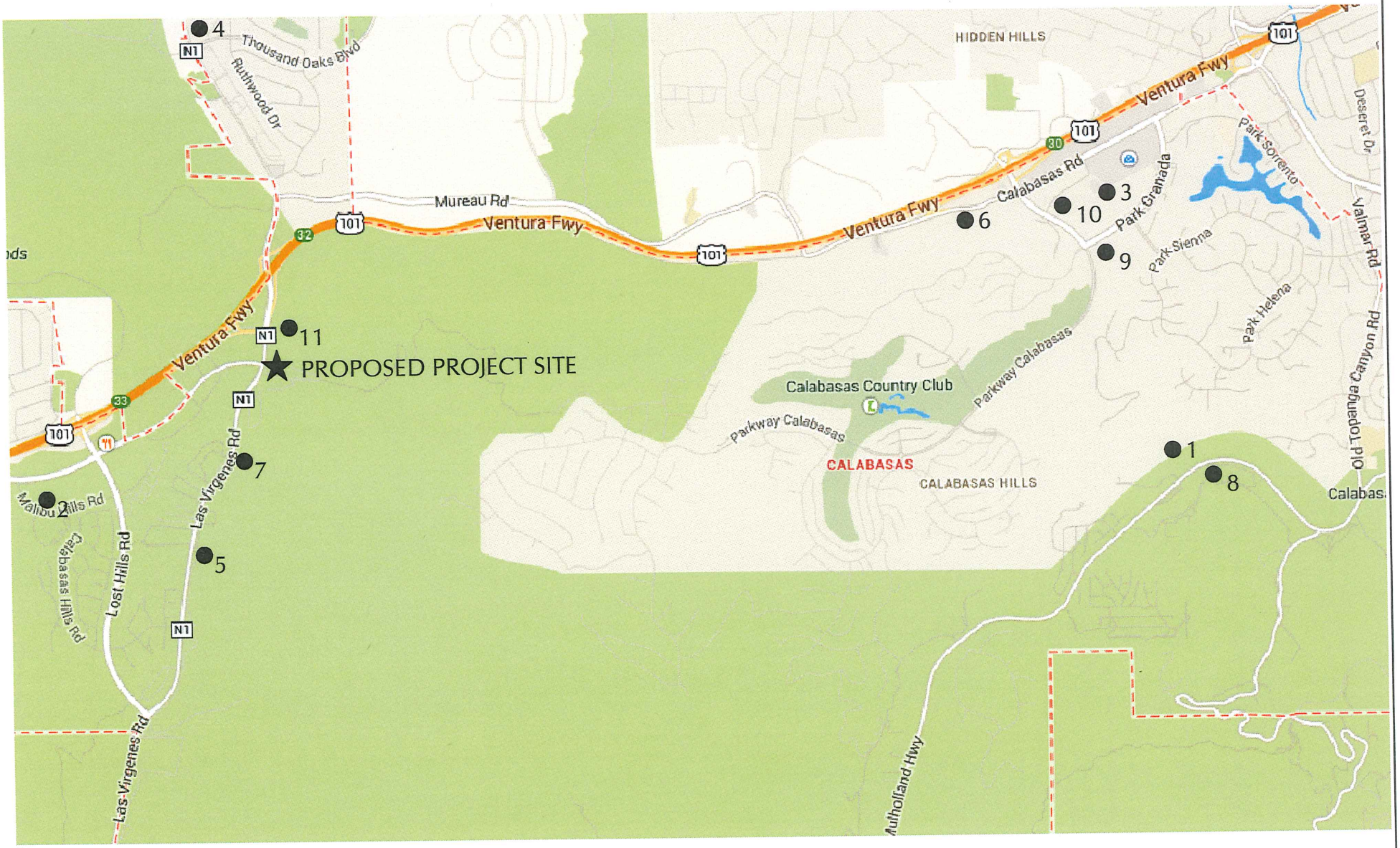
- 2010 Annual Citywide Resurfacing Project
- ADA Citywide Sidewalk Ramp Improvement Project
- Calabasas Road/US 101 Southbound On-Ramp Intersection Improvement
- Mulholland Hwy Sewer Upgrade Road Delays
- Swim Center West
- Time Warner Cable Installation
- Time Warner Cable Optic Line Installation

2008

- Summit at Calabasas

To receive updates via email on projects in the City of Calabasas, please click here to sign up on the Connect with Calabasas page.

City of Calabasas © 2015



ASSOCIATED
TRANSPORTATION
ENGINEERS

CUMULATIVE PROJECT LOCATIONS

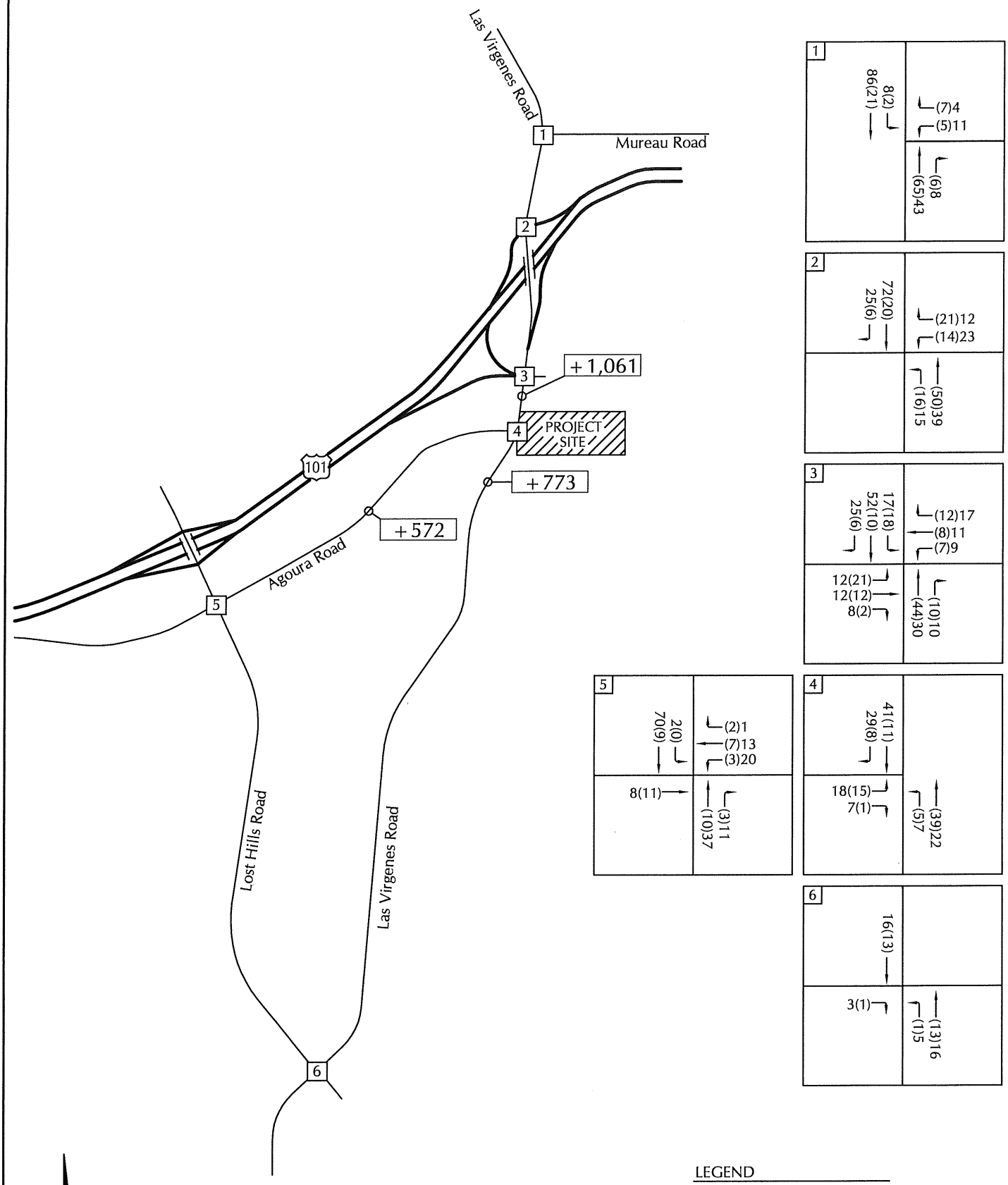
FIGURE

MMF - #10051.01

Associated Transportation Engineers
Trip Generation Worksheet - With In/Out Splits

CUMULATIVE PROJECT TRIP GENERATION

Land Use	Size	Multi-Trip	ADT		A.M.						P.M.					
			Rate	Trips	Rate	Trips	In %	Trips	Out %	Trips	Rate	Trips	In %	Trips	Out %	Trips
1 Bservcom	3	1.00	9.57	29	0.750	2	25%	1	75%	1	1.01	3	63%	2	37%	1
2 Cheesecake Factory	18,268	1.00	89.95	1,643	0.81	15	63%	9	37%	6	7.49	137	67%	92	33%	45
3 Senior Center																
4 Las Virgenes/Thousand Oaks Retail	25,820	1.00	44.32	1,144	1.33	34	62%	21	38%	13	2.71	70	44%	31	56%	39
Las Virgenes/Thousand Oaks Office	35,074	1.00	11.03	387	1.56	55	88%	48	12%	7	1.49	52	17%	9	83%	43
5 Solar Generators																
6 Malamut Dealership	20983	1.00		198		0		0		0		26	40%	10	60%	16
7 Paxton (Calabasas Blue)	86	1.00	5.81	500	0.440	38	17%	6	83%	32	0.52	45	67%	30	33%	15
8 Horizons Senior Housing	60	1.00	3.44	206	0.200	12	34%	4	66%	8	0.25	15	54%	8	46%	7
9 Village @ Calabasas (ATE #12088)				706		50		10		40		60		38		22
10 Hilton Garden Inn Expansion	51	1.00	8.17	417	0.530	27	59%	16	41%	11	0.60	31	51%	16	49%	15
11 Rondell Oasis Hotel	127	1.00	8.17	1,038	0.530	67	59%	40	41%	27	0.60	76	51%	39	49%	37



ASSOCIATED TRANSPORTATION ENGINEERS

CUMULATIVE-PROJECT ADDED TRAFFIC VOLUMES

FIGURE

MMF - #10051.01

FREEWAY OFF-RAMP QUEUING ANALYSIS WORKSHEETS

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	576	577	324	238	629	762	516
v/c Ratio	0.86	0.86	0.43	0.88	0.37	0.82	0.65
Control Delay	33.2	33.4	7.8	60.8	11.1	31.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	33.4	7.8	60.8	11.1	31.9	6.6
Queue Length 50th (ft)	211	211	32	93	61	148	0
Queue Length 95th (ft)	#398	#400	87	m#213	107	#235	67
Internal Link Dist (ft)		1686			1420	1561	
Turn Bay Length (ft)	300			200			220
Base Capacity (vph)	672	672	750	272	1688	926	795
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.86	0.43	0.88	0.37	0.82	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	279	365	91	966	12	48	1586	349
v/c Ratio	0.75	0.81	0.19	0.45	0.01	0.17	0.74	0.32
Control Delay	34.5	35.5	8.3	8.4	3.5	4.1	5.6	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	35.5	8.3	8.4	3.5	4.1	5.6	0.8
Queue Length 50th (ft)	95	118	7	107	0	1	58	0
Queue Length 95th (ft)	#181	#236	36	147	6	m3	m210	m0
Internal Link Dist (ft)	1922		206	640			1420	
Turn Bay Length (ft)		600			150	125		500
Base Capacity (vph)	421	504	526	2136	960	281	2136	1093
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.72	0.17	0.45	0.01	0.17	0.74	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	281	285	229	324	1091	370	364
v/c Ratio	0.63	0.63	0.46	0.77	0.49	0.31	0.47
Control Delay	31.5	31.7	15.4	35.5	8.1	20.3	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	31.7	15.4	35.5	8.1	20.3	4.8
Queue Length 50th (ft)	121	123	44	152	116	67	0
Queue Length 95th (ft)	204	206	105	m153	m126	107	58
Internal Link Dist (ft)		1686			1420	1561	
Turn Bay Length (ft)	300			200			220
Base Capacity (vph)	448	450	502	496	2218	1188	773
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.63	0.46	0.65	0.49	0.31	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBT	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	558	195	93	1642	12	67	822	165
v/c Ratio	1.03	0.27	0.16	0.97	0.02	0.68	0.48	0.20
Control Delay	70.4	7.6	13.4	35.6	6.8	43.4	6.4	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.4	7.6	13.4	35.6	6.8	43.4	6.4	1.6
Queue Length 50th (ft)	~268	23	23	370	1	14	82	0
Queue Length 95th (ft)	#466	62	53	#542	9	m#66	121	m5
Internal Link Dist (ft)	1922		206	640			1420	
Turn Bay Length (ft)		600			150	125		500
Base Capacity (vph)	544	721	566	1699	765	99	1699	846
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.27	0.16	0.97	0.02	0.68	0.48	0.20

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.