Volume 3

DRAFT ENVIRONMENTAL IMPACT REPORT

Rowland Heights Plaza and Hotel Project

Rowland Heights, Los Angeles County, California

Appendices D through H

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January 2016

VOLUME 3

DRAFT ENVIRONMENTAL IMPACT REPORT

ROWLAND HEIGHTS PLAZA AND HOTEL PROJECT

ROWLAND HEIGHTS, LOS ANGELES COUNTY, CALIFORNIA

APPENDICES D THROUGH H

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JANUARY 2016

Table of Contents

Page

VOLUME 1

VOLUME 2

APPENDICES

VOLUME 3

VOLUME 4

VOLUME 5

APPENDIX D

GEOTECHNICAL REPORTS

D-1: GEOTECHNICAL INVESTIGATION AND LIQUEFACTION EVALUATION

GEOTECHNICAL INVESTIGATION AND LIQUEFACTION EVALUATION PROPOSED MIXED USE DEVELOPMENT

18800 East Gale Avenue
Los Angeles County, California
for
Parallax Corporation

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL
A California Corporation

February 3, 2014

Parallax Corporation
c/o Thienes Engineering
14349 Firestone Boulevard
La Mirada, California 90638

Attention: Mr. Jeff Potter

Project No.: **13G184-1**

Subject: **Geotechnical Investigation and Liquefaction Evaluation**
Proposed Mixed Used Development
18800 East Gale Avenue
Los Angeles County, California

Gentlemen:

In accordance with your request, we have conducted a geotechnical investigation and liquefaction evaluation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- Very dense, weathered bedrock was encountered at various depths below the existing site grades. The bedrock materials were encountered at relatively shallow depths near the center of the site, and at greater depths in the northern (14½ to 33± feet) and southern (19½ to 49± feet) portions of the site. A boring drilled to 61½± feet the southwestern portion of the site, did not encounter bedrock.
- Groundwater was encountered at depths of 25 to 37± feet, in the southern portion of the site, and at a depth of 25± feet near the northeast corner of the site. The borings drilled in the central and northwest portions of the site did not encounter groundwater.
- A site-specific liquefaction evaluation was performed as part of this geotechnical investigation. Based on the results of our liquefaction evaluation, liquefaction is not considered to be a design concern for the majority of the proposed buildings at the subject site, due to the presence of very dense bedrock at depths shallower than the historic high groundwater table. However, liquefiable soils were encountered within portions of the northeastern-most office/retail building, and beneath a portion of the southeastern-most hotel building.
- Liquefaction analyses performed for three of the deep borings indicate total dynamic settlements on the order of 1± inch in the northeast portion of the site and 1¼± inches in the southwest portion of the site. A boring drilled in the southeast portion of the site did not identify any liquefiable soils.
- The liquefaction induced differential settlements are expected to be equal to the total dynamic settlements. These settlements are assumed to occur over a distance of 100± feet producing angular distortions of less than 0.002 inches per inch.
- At the present time, grading plans are not available for the proposed development. Based on the existing site topography, we expect that cuts and fills of up to 15± feet may be necessary to achieve the proposed site grades. Additionally, we understand that some of the proposed buildings including the two 6-story hotel buildings and the 3-story retail building may incorporate one or two subterranean levels for parking. Preliminary grading and foundation design recommendations have been included in subsequent sections of this report. However, it should be understood that these recommendations are based on preliminary assumptions and will require review and may be revised upon review of grading and foundation plans.
- Based on the subsurface conditions encountered at the subject site, the office and retail buildings may be supported on conventional shallow foundation systems. It is also expected that the two 6-story hotel buildings will be supported on shallow foundations. However, this assumption is subject to review of the grading plans and foundation loads when this information becomes available. Due to relatively large anticipated foundation loads and other considerations, it may be desirable or necessary to support the one or both of the 6-story

hotel buildings on an alternative foundation system such as a mat foundation or a deep foundation system.

Site Preparation

- Site stripping should include removal of any surficial vegetation and topsoil. Based on conditions encountered at the time of the subsurface exploration, stripping of sparse to moderate grass and weed growth will be necessary at the site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.
- Initial site preparation should also include demolition of the newly constructed temporary street, existing asphalt parking areas, and the remnants of an old asphaltic concrete road. Any remnants of previous development and including pavements, foundations, floor slabs, and debris resulting from demolition activities should be properly disposed of off-site. Concrete and asphalt debris may be re-used within the compacted fills, provided they are pulverized and the maximum particle size is less than 2 inches.
- Undocumented fill soils were encountered at several of the boring locations, extending to depths of 1½ to 8½± feet. These soils possess variable strengths, densities, and marginal consolidation/collapse characteristics and are not considered suitable for the support of the new buildings.
- Remedial grading is recommended to be performed within the new building pad areas to remove all of the undocumented fill soils and a portion of the near-surface native soils. The overexcavation should extend to a depth of at least 5 feet below the existing grade, 5 feet below the proposed pad grade and to a depth sufficient to remove all of the existing undocumented fill soils.
- Within the proposed building areas, the overexcavation should remove existing soils and bedrock materials in cut and shallow fill areas to provide a minimum 5-foot thick blanket of newly placed compacted fill, below pad grade in order to mitigate possible differential settlement due to cut/fill transitions.
- Additional overexcavation should be performed within the influence zones of the new foundations, to provide for a new layer of compacted structural fill extending to a depth of at least 3 feet below proposed bearing grade in the areas of single and 2-story office and retail buildings. Within the areas of the two proposed 6-story hotel buildings and the 3-story retail building, the overexcavation below shallow foundations should extend to a depth equal to the width of the footing, or into suitable bedrock materials.
- Following completion of the recommended overexcavation, the exposed soils or bedrock materials should be evaluated by the geotechnical engineer. Based on conditions encountered at the boring locations, additional overexcavation may be required where porous, low density, or otherwise unsuitable soils are encountered. After the subgrade soils have been approved by the geotechnical engineer, the previously excavated soils may then be replaced and compacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 2,500 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least six (6) No. 5 rebars (3 top and 3 bottom) in strip footings due to the presence of medium to highly expansive soils and liquefaction potential

of the soils in localized areas. Additional reinforcement may be necessary for structural considerations.

Building Floor Slabs

- Conventional slabs-on-grade, minimum 5½ inches thick.
- Minimum slab reinforcement: No. 4 bars at 16 inches on-center, in both directions, due to medium to high expansive potentials of the near-surface soils and the presence of liquefiable soils in localized areas. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed loading.

Pavements

ASPHALT PAVEMENTS (R = 10)				
Materials	**Thickness (inches)**			
	Auto Parking (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)
Asphalt Concrete	3	3	3½	4
Aggregate Base	6	9	12	15
Compacted Subgrade (90% minimum compaction)	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS			
Materials	**Thickness (inches)**		
	Auto Parking & Drives (TI = 5.0)	Light Truck Traffic (TI =6.0)	Moderate Truck Traffic (TI = 7.0)
PCC	5	5½	7
Compacted Subgrade (95% minimum compaction)	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 13P359-1R2, dated November 4, 2013. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. Based on the location of the subject site, this investigation also included a site-specific liquefaction evaluation. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located on the north side of East Gale Avenue, approximately 835 feet west of the intersection of East Gale Avenue and Nogales Street in the unincorporated Rowland Heights area of Los Angeles County, California. The site is bounded to the north by a Union Pacific railroad easement, to the east by a retail building, to the south by East Gale Avenue, and to the west by several commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, included as Plate 1 in Appendix A of this report.

The site consists of an irregular shaped parcel, 14.06± acres in size. A paved temporary access road trending north-south bisects the subject site, dividing the site into an east-half and west-half. We understand that this access road will be utilized as a temporary detour to divert traffic during construction of improvements on Nogales Street between Railroad Street and Gale Avenue. The access road was closed at the time of our site investigation. The southwest portion of the site was being utilized as an equipment storage and construction staging area for the upcoming Nogales Street improvements by the Griffith Company. This area was surrounded by a chain link fence. A construction trailer was located in the southwest corner of this area. Multiple soil stockpiles covered in plastic were also located in the central portion of this area. At the time of subsurface exploration, these stockpiles were generally 5 to 8± feet in height and 8 to 10± feet in diameter. Metal pipes, traffic control equipment, light standards, and other miscellaneous construction equipment were being stored along the east and north sides of the chain link fence. The ground surface cover in the fenced area consists of exposed soil.

Remnants of an old asphaltic concrete road trends roughly east-west in the central area of the west half of the site and roughly north-south along the western property line in the northern portion of the west half of the site. This road is in poor condition with major cracks throughout the road and appears to have been part of a previous development of the site. The ground surface cover in the western half of the site consists of exposed soil with sparse to moderate native grass and weed growth. An earthen drainage channel is located along the northern property line and on the west side of a parking area in the northeast corner of the site The channel ranges from 5 to 9 feet in depth.

The eastern half of the subject site is generally undeveloped, except for localized areas along the east property line. An asphaltic concrete parking lot for the retail building on the easterly adjacent site extends into the northeast corner of the subject site. This parking lot is in good condition. Another asphaltic concrete parking lot for the easterly adjacent retail building extends into the subject site, along the eastern property line near the southeast corner of the site. This parking lot is located east of the toe of an existing slope. The pavements in this area are also in good condition. The remaining areas of the eastern half of the site are vacant and undeveloped. Several large soil stockpiles were located in the southern portion of the eastern half of the site. These stockpiles ranged from 40± to 90± feet in width, 100± to 285± feet in length, and 10 to

15± feet in height. Dump trucks were depositing soil to the stockpiles in this area at the time of our subsurface investigation.

Detailed topographic information was obtained from a topographic plan provided by Thienes Engineering, Inc. The plan indicates that the site elevation ranges from elevation 467.8± feet mean sea level (msl) in the southeastern area of the site to elevation 435.7± feet msl in the northwestern area of the site. The eastern side of the site slopes downward to the north. This slope is about 25± feet in height with portions as steep as 4h:1v (4 horizontal to 1 vertical). Another slope is located around the southeast corner of the site and descends toward the south and east property lines. This slope ranges from approximately 11 to 17± feet in height with an inclination of about 2.5h:1v. An asphaltic concrete parking area for the easterly adjacent retail development is present along the toe of the east side of the slope.

3.2 Proposed Development

The preliminary site plans for the proposed development were obtained from Gene Fong Associates. We understand that the proposed development will consist of two phases, Phase I and Phase II. The proposed development for Phase I will consist of five (5) new retail and office buildings, identified as Buildings 1 through Building 5, and one hotel building, identified as the Sheraton hotel. The five retail buildings will possess footprint areas ranging from 9,400± ft^2 to 24,795± ft^2. The plan indicates that the largest of these retail buildings, Building 5, will be three stories in height and may include a subterranean parking level. The footprint area for the proposed Sheraton hotel was not provided on the plan. The hotel will be six stories in height with a total of 280 rooms and will include a 9,500± ft^2 ballroom on the ground floor. The hotel may include one or two-levels of below grade parking.

The proposed development for Phase II will include a six-story hotel building located in the northwestern area of the site. The hotel is identified as the Select Service hotel. The building will have a total of 220 rooms and may include one or two-levels of below grade parking.

All of the buildings are expected to be surrounded by concrete flatwork, asphaltic concrete pavements in the parking and drive lanes, and landscape planter areas throughout the site.

We assume that the proposed retail buildings will be single story structures except for Building 5, since the plan does not specifically indicate that these buildings will have multiple stories. We assume that the retail buildings will consist of wood frame construction, supported on conventional shallow foundation systems with concrete slab-on-grade floors. Building 5 will be a three-story structure. Detailed structural information has not been provided for this building. Therefore, we assume that this structure will be of wood frame construction supported on a conventional shallow foundation system with a concrete slab-on-grade floor. The two (2) hotel buildings will be six-story structures. Detailed structural information has also not been provided for these buildings. Therefore, we assume that these structures will be of cast-in-place concrete or steel frame structures supported on conventional shallow foundation systems. Based on the assumed construction, maximum column and wall loads for the single story retail buildings are expected to be on the order of 30 kips and 1 to 2 kips per linear foot, respectively. The maximum column and wall loads for Building 5 are expected to be on the order of 80 kips and 2 to 4 kips per linear foot, respectively. The maximum column and wall loads for the six-story hotel buildings are expected to be on the order of 200 kips and 3 to 5 kips per linear foot, respectively.

Building 5, the hotel building, and the proposed parking structure, may each include one to two subterranean levels for parking. The remainder of the proposed development is not expected to include any significant amounts of below grade construction such as basements or crawl spaces.

Grading plans were not available at the time of our investigation. Based on the existing site grades, it is assumed that cuts and fills of up to 15± feet will be required. However, these estimates are exclusive of site preparation and overexcavation requirements.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration conducted for this project consisted of eighteen (18) borings advanced to depths of 5 to 61½± feet below currently existing site grades. Two (2) of the borings were drilled to at least 50± feet, as part of the liquefaction evaluation. We attempted to extend several other borings to depths of at least 50± feet, but most of these borings encountered very dense bedrock at shallower depths. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow-stem augers, by a truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. Samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Pavements

Two (2) of the borings were drilled through the existing pavements. At Boring Nos. B-11 and B-14, these pavements consist of 3± inches of asphaltic concrete underlain by 3 to 5± inches of underlying aggregate base.

Artificial Fill

Artificial fill soils were encountered beneath the pavements at Boring Nos. B-11 and B-14 and at the ground surface at Boring Nos. B-4, B-7, B-9, B-12, and B-15 through B-18. These fill soils extend to depths of 1½ to 8½± feet below existing grade. These fill soils generally consist of dark gray brown to gray brown, loose to medium dense clayey fine sands, clayey fine to medium sands, and silty fine sands and medium stiff to stiff fine to medium sandy clays and silty clays.

The fill soils possess variable strengths and a disturbed appearance, resulting in their classification as fill.

Colluvium

Native colluvium was encountered beneath the fill soils at Boring No B-9 and at the ground surface at Boring Nos. B-2, B-3, B-8, and B-13. The colluvium extends to depths of 4½ to 12± feet below existing grade. The colluvium generally consists of dark gray brown to black, medium stiff to hard silty clays with varying amounts of calcareous veining and bedrock fragments.

Alluvium

Native alluvial soils were encountered beneath the fill materials, colluvium, and/or at the ground surface at most of the boring locations. The alluvium generally consists of loose to dense fine sands, silty fine sands, silty fine to medium sands, clayey fine sands and clayey fine to medium sands, and medium stiff to stiff fine to medium sandy clays and silty clays extending to depths of 14½ to 47± feet and to at least the maximum depth explored of 61½± feet at Boring No. B-5.

Bedrock

Silty claystone and sandy siltstone bedrock of the Monterey Formation was encountered beneath the colluvium and alluvium at most of the boring locations. The Monterey Formation bedrock extends from depths of 4½ to 47± feet below the ground surface to depths of at least 56± feet, the maximum depth of drilling before refusal conditions were encountered at Boring No. B-6. Bedrock was generally encountered at shallower depths within the central portion of the site, and at greater depths in the northern and southern portions of the site. The bedrock generally consisted of friable, weakly to moderately cemented, thinly interbedded stiff to hard gray brown silty claystone, fine grained sandy siltstone, and silty fine grained sandstone with iron oxide staining and calcareous veining. The bedrock was also slightly diatomaceous and possessed relatively high moisture contents while appearing to be less moist.

Groundwater

Very moist to wet soils were encountered during drilling at Boring Nos. B-4, B-5, B-6, B-11, and B-17 at depths ranging from 25 to 37± feet below the existing site grades (elevations of 414 to 431± feet msl). Delayed readings taken within the open boreholes identified free water at similar depths.

Based on the water level measurements, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at elevations between 423 and 431± feet msl in the southern area of the site and at an elevation of 414± feet msl in the northeastern area of the site at the time of the subsurface exploration.

As part of our research, we reviewed historic high groundwater levels reported in the CA DMG Open-File Report 98-10 for the La Habra Quadrangle. Plate 1.2 of OFR 98-19 is a map which displays the historically highest ground water levels using contour lines. This map indicates that the historic high ground water level at the subject site and surrounding areas is approximately 20± feet below existing site grades.

4.3 Geologic Conditions

Geologic research indicates that the site is underlain by the Yorba member shale of the Monterey Formation bedrock. The primary available reference applicable to the subject site is the Geology Map of the Whittier and La Habra Quadrangles, (Western Puente hills), Los Angeles and Orange Counties, California, by T.W. Dibblee, 2001. A portion of this map indicating the location of the subject site is included herein as Plate 3 in Appendix A.

This map indicates that the subject site is underlain by the Yorba member shale of the Monterey Formation. The Yorba member shale of the Monterey Formation is described as thin-bedded, white-weathering, platy, siliceous, to light gray, semi-siliceous to silty, locally with thin layers of fine-grained sandstone; locally includes few thin layers of hard dolomite. The bedding attitude on this map indicates that the beds in the area of the subject site strike generally east-west, dipping 32 degrees downward to the north. Based on the conditions encountered in the exploratory borings, the geologic mapping is considered to be consistent with the subject site except for the angle of the bedding which is further described in Section 6.2 of this report. The majority of the borings encountered Monterey Formation bedrock at depths of 4½ to 47± feet below existing site grades.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. The field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

In-situ Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-15 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

Representative bulk samples have been tested for their maximum dry densities and optimum moisture contents. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557. These tests are generally used to compare the in-situ densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date. The results of this test are plotted on Plates C-16 through C-19 in Appendix C of this report.

Direct Shear

Direct shear tests were performed on selected soil samples to determine their shear strength parameters. The test was performed in accordance with ASTM D-3080. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Three samples of the same soil are prepared by remolding them to 90± percent compaction and near optimum moisture. Each of the three samples are then loaded with different normal loads and the resulting shear strength is determined for that particular normal load. The shearing of the samples is performed at a rate slow enough to permit the dissipation of excess pore water pressure. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The results of the direct shear test are presented on Plates C-20 through C-22.

Soluble Sulfates

Representative samples of the near-surface soils were submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes into contact with these soils. The result of the soluble sulfate testing is presented below, and is discussed further in a subsequent section of this report.

Sample Identification	**Soluble Sulfates (%)**	**ACI 318 Classification**
B-1 @ 0 to 5 feet	0.001	Negligible
B-5 @ 0 to 5 feet	0.004	Negligible
B-12 @ 0 to 5 feet	0.004	Negligible
B-18 @ 0 to 5 feet	0.008	Negligible

Expansion Index

The expansion potential of the on-site soils was determined in general accordance with ASTM D-4829 as required by the California Building Code. The testing apparatus is designed to accept a 4-inch diameter, 1-in high, remolded sample. The sample is initially remolded to 50± 1 percent saturation and then loaded with a surcharge equivalent to 144 pounds per square foot. The sample is then inundated with water, and allowed to swell against the surcharge. The resultant swell or consolidation is recorded after a 24-hour period. The results of the EI testing are as follows:

Sample Identification	**Expansion Index**	**Expansive Potential**
B-1 @ 0 to 5 feet	73	Medium
B-8 @ 0 to 5 feet	106	High
B-12 @ 0 to 5 feet	73	Medium

Resistivity and pH Testing

Selected representative bulk samples of soil collected from the building areas were submitted to a subcontracted analytical laboratory for determination of electrical resistivity and pH. The resistivity of the soils is a measure of their potential to attack buried metal improvements such as utility lines. The results of the resistivity and pH testing are presented below, and are discussed further in a subsequent section of this report.

Sample Identification	**Resistivity (ohm-cm)**	**pH**
B-1 @ 0 to 5	6500	7.5
B-8 @ 0 to 5	4100	7.5
B-12 @ 0 to 5	5200	7.6

6.0 CONCLUSIONS AND RECOMMENDATIONS

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the site is considered low.

Seismic Design Parameters

The 2013 California Building Code (CBC) was adopted by all municipalities within Southern California on January 1, 2014. The CBC provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

The 2013 CBC Seismic Design Parameters have been generated using U.S. Seismic Design Maps, a web-based software application developed by the United States Geological Survey. This software application, available at the USGS web site, calculates seismic design parameters in accordance with the 2013 CBC, utilizing a database of deterministic site accelerations at 0.01 degree intervals. The table below is a compilation of the data provided by the USGS application. A copy of the output generated from this program is included as Plate E-1 in Appendix E of this report. A copy of the Design Response Spectrum, as generated by the USGS application is also included in Appendix E. Based on this output, the following parameters may be utilized for the subject site:

2013 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	2.155
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.766
Site Class	---	C*
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	2.155
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	0.996
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.437
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.664

*The 2013 CBC requires that Site Class F be assigned to any profile containing soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils. For Site Class F, the site coefficients are to be determined in accordance with Section 11.4.7 of ASCE 7-10. However, Section 20.3.1 of ASCE 7-10 indicates that for sites with structures having a fundamental period of vibration equal to or less than 0.5 seconds, the site class is determined using the standard procedures. Based on the liquefaction evaluation, two of the buildings at the subject site may be underlain by potentially liquefiable soils. **If the proposed structures have fundamental periods greater than 0.5 seconds, SCG should be contacted to revise these seismic design parameters.**

Ground Motion Parameters

For the purposes of the liquefaction analysis performed for this study, we utilized a site acceleration that is consistent with maximum considered earthquake ground motions, as required by the 2013 CBC. The peak ground acceleration (PGA_M) was determined in accordance with Section 11.8.3 of ASCE 7-10. The parameter PGA_M is the maximum considered earthquake geometric mean (MCE_G) PGA, multiplied by the appropriate site coefficient from Table 11.8-1 of ASCE 7-10. The web-based software application U.S. Seismic Design Maps (described in the previous section) was used to determine PGA_M, using ASCE 7-10 as the building code reference document. A portion of the program output is included as Plate E-2 in Appendix E of this report

Liquefaction

Research of the Seismic Hazards Zones Map for the La Habra Quadrangle, published by the California Geological Survey (CGS) indicates that a portion of the site subject site is located within a liquefaction hazard zone. Based on this mapping, and the subsurface conditions encountered at the borings, the scope of this investigation included a detailed liquefaction evaluation in order to determine the site-specific liquefaction potential.

The liquefaction evaluation was performed using the reported historic groundwater depth of 20 feet. The primary reference used to determine the historic groundwater depths in this area is CGS Open File Report 98-10, the Seismic Hazard Evaluation of the La Habra Quadrangle.

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The liquefaction analysis was conducted in accordance with the requirements of Special Publication 117A (CDMG, 2008), and currently accepted practice (SCEC, 1997). The liquefaction potential of the subject site was evaluated using the empirical method developed by Boulanger and Idriss (Boulanger and Idriss, 2008). This method predicts the earthquake-induced liquefaction potential of the site based on a given design earthquake magnitude and peak ground acceleration at the subject site. This procedure essentially compares the cyclic resistance ratio (CRR) [the cyclic stress ratio required to induce liquefaction for a cohesionless soil stratum at a given depth] with the earthquake-induced cyclic stress ratio (CSR) at that depth from a specified design earthquake (defined by a peak ground surface acceleration and an associated earthquake moment magnitude). CRR is determined as a function of the corrected SPT N-value $(N_1)_{60\text{-}cs}$, adjusted for fines content. The factor of safety against liquefaction is defined as CRR/CSR. Based on Special Publication 117A, a factor of safety of at least 1.3 is required in order to demonstrate that a given soil stratum is non-liquefiable. Additionally, in accordance with Special Publication 117A, clayey soils which do not meet the criteria for liquefiable soils defined by Bray and Sancio (2006), loose soils with a plasticity index (PI) less than 12 and moisture content greater than 85% of the liquid limit, are considered to be insusceptible to liquefaction. Non-sensitive soils with a PI greater than 18 are also considered non-liquefiable.

The liquefaction analysis procedure is tabulated on the spreadsheet forms included in Appendix F of this report. The liquefaction analysis was performed for Boring Nos. B-6, B-11 and B-17, which were each advanced to depths of at least 50± feet, except Boring No. B-11 which encountered refusal conditions on very dense bedrock at a depth of 37± feet. Prior to subsurface exploration, additional deep borings were intended to be drilled in the northwest and central portions of the site, for the purpose of evaluating the liquefaction hazard. However, the majority of these borings encountered very dense bedrock at depths shallower than the depth of the historic high groundwater table. The liquefaction potential was analyzed at the three boring locations utilizing a PGA_M of 0.796g related to a 6.99M magnitude seismic event.

If liquefiable soils are identified, the potential settlements that could occur as a result of liquefaction are determined using the equation for volumetric strain due to post-cyclic reconsolidation (Yoshimine et. al, 2006). This procedure uses an empirical relationship between the induced cyclic shear strain and the corrected N-value to determine the expected volumetric strain of saturated sands subjected to earthquake shaking. This analysis is also documented on the spreadsheets included in Appendix F.

Conclusions and Recommendations

Since a grading plan is not available for the proposed development, the results of this liquefaction evaluation are considered preliminary. Changing the site grades in the areas susceptible to liquefaction will change the soil overburden pressure which will affect the results of the analysis. The calculated settlement may increase or decrease as a result of such changes.

Liquefaction is not considered to be a design concern for most of the proposed buildings, due to the presence of very dense bedrock at depths shallower than the historic high groundwater table. However, native alluvial soils extending to depths greater than the historic high and existing groundwater table elevations were encountered at borings which were drilled near the southwest, southeast, and northeast corners of the site.

The results of the liquefaction analysis have identified potentially liquefiable soils at Boring Nos. B-6 and B-11, which were drilled in the southwest and northeast building locations, respectively. Liquefiable soils were not encountered at boring number B-17, which was drilled within the southeastern-most building location. The potentially liquefiable soils are located between depths of 20 to 32± feet. Soils which are located above the historic groundwater table (20 feet), or possessing factors of safety in excess of 1.3 are considered non-liquefiable. The silty clay stratum encountered between depths of 20 and 22± feet at Boring No. B-17 is also considered non-liquefiable due to its cohesive characteristics and the results of the Atterberg limits testing with respect to the requirements of Special Publication 117A. Settlement analyses were conducted for each of the potentially liquefiable strata.

Based on the settlement analysis (also tabulated on the spreadsheets in Appendix F) total dynamic (liquefaction induced) settlements on the order of 1.25 inches at Boring No. B-6 which represents a portion of the subsurface profile beneath the southwestern-most proposed hotel building, and dynamic settlements on the order of 0.96 inches could be expected at boring No. B-11, which represents a portion of the subsurface profile beneath the northwestern-most, proposed retail/office building. The remaining buildings are considered to be in areas which are not susceptible to liquefaction due to the presence of bedrock at depths shallower than the historic high groundwater table.

The subsurface profiles beneath both of these buildings possess variable liquefaction potentials, due the varying bedrock depths. Portions of each of these building areas are considered to be insusceptible to liquefaction due to the presence of relatively shallow, dense soils and/or very dense bedrock. Therefore, the associated differential settlements for each of these buildings are considered to be equal to the potential total dynamic settlements. The associated differential settlement in the area of the southwestern-most hotel building would therefore be on the order of 1¼± inches. The associated differential settlement in the area of the northeastern-most retail/office building would be on the order of 1± inch.

The estimated differential settlements for these two buildings should be assumed to occur across a distance of 100 feet, indicating maximum angular distortions of less than 0.002 inches per inch. These settlements are considered to be within the structural tolerances of typical buildings supported on shallow foundation systems. However, it should be noted that minor to moderate repairs, including repair of damaged drywall and stucco, etc., could be required after the occurrence of liquefaction-induced settlements.

Shallow foundation systems can be designed to resist the effects of the anticipated differential settlements, to the extent that the structures would not catastrophically fail. Designing the proposed structures to remain completely undamaged during a major seismic event is not considered to be economically feasible. Based on this understanding, the use of a shallow foundation system is considered to be the most economical means of supporting the majority of the proposed structures. Although shallow foundations can be designed to resist the effects of the anticipated differential settlements, it may be necessary or desirable support the heaviest structures, such as the two 6-story hotel buildings, on an alternative foundation system such as a mat foundation or deep foundations, as discussed in the subsequent Foundation Design section of this report.

In order to support the proposed buildings on shallow foundations (such as spread footings) the structural engineer should verify that the structure would not catastrophically fail due to the predicted dynamic differential settlements. Any utility connections to the structures should be designed to withstand the estimated differential settlements. It should also be noted that minor to moderate repairs, including releveling, restoration of utility connections, repair of damaged drywall and stucco, etc., would likely be required after occurrence of the liquefaction-induced settlements.

The use of shallow foundation systems, as described in this report, is typical for buildings of these types, where they are underlain by the extent of liquefiable soils encountered at this site. The post-liquefaction damage that could occur within the buildings at this site will also be typical of similar buildings in the vicinity of this project. However, if the owner determines that this level of potential damage is not acceptable, other geotechnical and structural options are available, including the use of ground improvement, deep foundations or a mat foundation.

6.2 Geotechnical Design Considerations

General

At the present time, grading plans are not available for the proposed development. Additionally, proposed building pad elevations are not available. Based on the existing site topography, we expect that cuts and fills of up to 15± feet may be necessary to achieve the proposed site grades. Additionally, we understand that some of the buildings (including the two hotel buildings and the 3-story retail building may incorporate one or two subterranean levels for parking). Preliminary grading and foundation design recommendations have been included in subsequent sections of this report. However, it should be understood that these recommendations are based on preliminary assumptions and will require review and may be revised upon review of grading and foundation plans. Factors which may affect the grading and foundation design recommendations include the depth of bedrock with respect to the proposed building pad elevations, foundation loads, and if the proposed buildings will include below grade subterranean parking levels. It may be necessary to perform additional subsurface exploration in the areas of the proposed buildings in order to update the grading and foundation design recommendations after the finished building pad elevations and foundation loads become available.

The most noteworthy geotechnical feature of the subject site is the variable depth bedrock below the ground surface, throughout the subject site. In general, Monterey Formation bedrock consisting primarily of interbedded layers of silty claystone and silty sandstone was encountered at depths as shallow as 5½± feet in the central portion of the site, at depths of 14½ to 33± feet in the northern portion of the site, and at depths as great as 19½ to 49± feet in the southern portion of the site. Boring No. B-5, in the southwestern portion of the site, did not encounter bedrock within the upper 61½± feet.

The near surface soils at the subject site consist of artificial fill materials, colluvium, and native alluvium. The artificial fill soils possess variable strengths, composition, and densities. These soils are not considered suitable to support the foundation loads of the new structures. Additionally some of the artificial fill materials possess unfavorable consolidation/collapse characteristics. Therefore, remedial grading is recommended to remove the artificial fill soils in their entirety. The native alluvial soils and colluvium generally possess higher strengths and more favorable consolidation/collapse characteristics. Some remedial grading of these materials is recommended in order to provide uniform support characteristics for new structures, to limit settlement, and to eliminate cut/fill transitions within the building pads.

As discussed in a previous section of this report, potentially liquefiable soils were identified in localized areas of the site. The presence of the recommended layer of newly placed compacted structural fill above these liquefiable soils will help to reduce any surface manifestations that could occur as a result of liquefaction. The foundation and floor slab design recommendations presented in the subsequent sections of this report also contain recommendations to provide additional rigidity in order to reduce the potential effects of differential settlement that could occur as a result of liquefaction. The liquefaction analysis should be revised after the grading plan becomes available. The depths of cut or fill performed within these areas will affect the potential settlement.

High angle bedding was observed within the samples of bedrock materials recovered at the boring locations. However, conventional drilling techniques do not maintain the directional orientation of the samples as they are withdrawn from the borehole. Therefore, it was not possible to determine the bedding attitudes of the bedrock materials. The Geologic Map, included as Plate 3 in Appendix A of this report, indicates that the bedrock materials possess a bedding angle of 32 degrees dipping downward to the north. However, the bedding angles of recovered bedrock samples appeared to be steeper than 32 degrees. Based on these considerations, additional subsurface exploration consisting of backhoe test pits should be performed in areas where slopes, retaining walls or basements will extend into the bedrock materials, so that the actual bedding attitudes may be determined. If adverse bedding conditions are present, it may be necessary to design slopes, retaining walls and basement walls for a geologic surcharge.

Settlement

The near surface fill soils possess variable strengths, compositions, and densities. Some of the artificial fill materials also possess marginal consolidation/collapse characteristics. The recommended remedial grading will remove the artificial fill soils and the upper portion of the native soils from the building pad areas. The native soil and bedrock materials remaining beneath the depth of overexcavation generally possess greater strengths. The proposed remedial grading will also help mitigate the potential for differential settlement across cut-fill transitions. Provided that the recommended remedial grading is completed, the post-construction static settlements of the proposed structure are expected to be within tolerable limits.

Cut/Fill Transitions

Due to the varying existing topography within the proposed building areas, cut/fill transitions are likely to be created within the proposed building pad areas. The differing support conditions of the native soils and bedrock versus the newly compacted fill soils may result in excessive differential settlements if not mitigated. Remedial grading will be required to eliminate the cut/fill transitions which will occur at building pad and foundation bearing grades.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the selected samples of the on-site soils contain negligible concentrations of soluble sulfates, in accordance with American Concrete Institute (ACI) guidelines. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at pad grade within the building area.

Expansion

Most of the near surface soils at this site consist of sandy clays and silty clays. Laboratory testing indicates that these materials have medium to high expansion potentials (EI = 73 and 106). The recommendations contained in this report are made with respect to this condition. **Based on the presence of expansive soils, special care should be taken to properly moisture condition and maintain adequate moisture content within all subgrade soils as well as newly placed fill soils.** Due to the significant amount of grading expected to be performed at this site, it is recommended that additional expansion index testing be performed subsequent to grading to confirm the actual conditions at the building pad subgrade elevations. Based on the varied expansion potentials, and with respect to the relatively large volume of grading which is proposed, it is expected that the finished lot will possess a medium expansion potential.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the native alluvial soils and colluvium is estimated to result in an average shrinkage of 8 to 12 percent. Relatively minor bulking on the order of 0 to 5 percent may occur in areas of significant cut into weathered bedrock materials.

Minor ground subsidence is expected to occur in the soils below the zone of removal due to settlement and machinery working. The subsidence is estimated to be 0.1 feet. This estimate is based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

Detailed grading and foundation plans were not available at the time of this report. It is therefore recommended that we be provided with copies of the preliminary plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping and Demolition

Development of the subject site will require demolition of the newly constructed temporary street, existing parking lot pavements, remnants of the former asphaltic concrete road, and any utilities, septic systems, or other improvements that will not remain in place with the new development. Any remnants of previous structures, including foundations, slabs, and debris resulting from demolition activities should be properly disposed of off-site. Concrete and asphalt debris may be re-used within the compacted fills, provided they are pulverized and the maximum particle size is less than 2 inches.

Initial site stripping should include removal of any surficial vegetation and topsoil. Based on conditions encountered at the time of the subsurface exploration, stripping of grass and weeds will be necessary, especially near the drainage ditches along the northern property line in the northeast corner of the site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

Treatment of Existing Soils: Building Pads

Remedial grading should be performed within the proposed building areas in order to provide uniform foundation support characteristics by removing the upper portion of the native soils and the artificial fill materials in their entirety. Based on conditions encountered at the boring locations, the existing soils within the proposed building areas are recommended to be overexcavated to a depth of at least 5 feet below the proposed building pad subgrade elevation and to a depth of at least 5 feet below existing grade, whichever is greater. The depth of the overexcavation should also extend to a depth sufficient to remove all artificial fill soils or any soils disturbed during demolition. Artificial fill materials extended to depths 1½ to 8½± feet at the boring locations.

Additional overexcavation should be performed within the influence zones of the new foundations, to provide for a new layer of compacted structural fill extending to a depth of 3 feet below proposed bearing grade in the areas of single-story office and retail buildings. Within the areas of the two proposed 6-story hotel buildings and the 3-story retail building, the overexcavation should extend below the foundation bearing grade to a depth equal to the width of the footing, or into suitable bedrock materials, in order to limit potential settlements to within tolerable limits.

In order to reduce the potential for excessive differential settlement due to the differing support conditions provided by the native soils and/or weathered bedrock and the newly placed fill soils, the cut portion of the building pads should be overexcavated to at least 5 feet below the proposed pad grade and to at least 3 feet below foundation bearing grade.

The overexcavation areas should extend outside the building perimeter to at least 5 feet beyond the edges of the foundations, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the overexcavation should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the building areas should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose or otherwise unstable soils that must be removed.

The borings generally encountered soils at or near the optimum moisture content within the upper 10 to 20± feet in native alluvial soils. The near surface native colluvium, deeper alluvial soils, and bedrock materials generally possess elevated moisture contents. If very moist silt or clay layers are encountered at the base of the overexcavations, some subgrade stabilization may be required. Scarification and air drying of these materials may be sufficient to obtain a stable subgrade. However, if highly unstable soils are identified, and if the construction schedule does not allow for delays associated with drying, mechanical stabilization of these materials may be necessary. Some localized areas of deeper excavation may be required if additional fill materials or loose, porous, or low density native soils are encountered at the base of the overexcavations.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches and moisture treated to 2 to 4 percent above optimum moisture content. The subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of any proposed retaining walls should be overexcavated to a depth of 3 feet below foundation bearing grade and replaced as compacted structural fill, as discussed above for the proposed building pads. Subgrade soils in areas of non-retaining site walls should be overexcavated to a depth of 2 feet below proposed bearing grade. In both cases, the overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning to 2 to 4 percent above optimum moisture content and recompacting the upper 12 inches of exposed subgrade soils. The previously excavated soils may then be replaced as compacted structural fill. Expansive sandy clays and silty clays should not be used as backfill material behind retaining walls. Therefore, on-site silty sands and sandy soils should be selectively graded for use as retaining wall backfill.

Treatment of Existing Soils: Flatwork Areas

Subgrade preparation in the new flatwork areas should initially consist of removal of all soils disturbed during stripping and demolition operations. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Consideration should be given to selectively grading sands and silty sands encountered during excavation and selectively placing such materials within the proposed lightly loaded flatwork areas.

Treatment of Existing Soils: Parking Areas

Subgrade preparation in the new parking areas should initially consist of removal of all soils disturbed during stripping and demolition operations. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength alluvial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not mitigate the extent of undocumented fill soils in the parking areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, all of the existing undocumented fill soils within these areas should be removed and replaced as structural fill.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer. Some of the existing near surface soils are expected to possess elevated moisture contents. Drying of these materials will likely be required in order to obtain a moisture content suitable for recompaction.
- All grading and fill placement activities should be completed in accordance with the requirements of the CBC and the grading code of the County of Los Angeles.

- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Due to the varied expansive potentials of the on-site soils, fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Imported Structural Fill

All imported structural fill should consist of low (EI < 50), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. As an alternative, a clean sand (minimum Sand Equivalent of 30) may be placed within trenches and compacted in place (jetting or flooding is not recommended). Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the County of Los Angeles. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near surface soils generally consist of sandy clays and silty clays with underlying layers of sands, silty sands and clayey sands. These materials may be subject to minor caving within shallow excavations. Where caving does occur within shallow excavations, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 1.5h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Moisture Sensitive Subgrade Soils

Most of the near surface soils possess appreciable silt and clay content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

If the construction schedule dictates that site grading will occur during a period of wet weather, allowances should be made for costs and delays associated with drying the on-site soils or import of a drier, less moisture sensitive fill material.

Expansive Soils

The near surface on-site soils have been determined to possess a medium to high expansion potential. Therefore, care should be given to proper moisture conditioning of all building pad subgrade soils to a moisture content of 2 to 4 percent above the Modified Proctor optimum during site grading. All imported fill soils should have low expansive (EI < 50) characteristics. **In addition to adequately moisture conditioning the subgrade soils and fill soils during grading, special care must be taken to maintain moisture content of these soils at 2 to 4 percent above the Modified Proctor optimum. This will require the contractor to frequently moisture condition these soils throughout the grading process, unless grading occurs during a period of relatively wet weather**.

Due to the presence of expansive soils at this site, provisions should be made to limit the potential for surface water to penetrate the soils immediately adjacent to the structures. These provisions should include directing surface runoff into rain gutters and area drains, reducing the extent of landscaped areas around the structure, and sloping the ground surface away from the buildings. Where possible, it is recommended that landscaped planters not be located immediately adjacent to the buildings. If landscaped planters around the buildings are necessary, it is recommended that drought tolerant plants or a drip irrigation system be utilized, to minimize the potential for deep moisture penetration around the structures. Presented below is a list of additional soil moisture control recommendations that should be considered by the owner, developer, and civil engineer:

- Ponding and areas of low flow gradients in unpaved walkways, grass and planter areas should be avoided. In general, minimum drainage gradients of 2 percent should be maintained in unpaved areas.
- Bare soil within five feet of proposed structures should be sloped at a minimum 2 percent gradient away from the structure (about three inches of fall in five feet), or the same area could be paved with a minimum surface gradient of one percent. Pavement is preferable.
- Decorative gravel ground cover tends to provide a reservoir for surface water and may hide areas of ponding or poor drainage. Decorative gravel is, therefore, not recommended and should not be utilized for landscaping unless equipped with a subsurface drainage system designed by a licensed landscape architect.
- Positive drainage devices, such as graded swales, paved ditches, and catch basins should be installed at appropriate locations within the area of the proposed development.
- Concrete walks and flatwork should not obstruct the free flow of surface water to the appropriate drainage devices.
- Area drains should be recessed below grade to allow free flow of water into the drain. Concrete or brick flatwork joints should be sealed with mortar or flexible mastic.
- Gutter and downspout systems should be installed to capture all discharge from roof areas. Downspouts should discharge directly into a pipe or paved surface system to be conveyed offsite.
- Enclosed planters adjoining, or in close proximity to proposed structures, should be sealed at the bottom and provided with subsurface collection systems and outlet pipes.

- Depressed planters should be raised with soil to promote runoff (minimum drainage gradient two percent or five percent, see above), and/or equipped with area drains to eliminate ponding.
- Drainage outfall locations should be selected to avoid erosion of slopes and/or properly armored to prevent erosion of graded surfaces. No drainage should be directed over or towards adjoining slopes.
- All drainage devices should be maintained on a regular basis, including frequent observations during the rainy season to keep the drains free of leaves, soil and other debris.
- Landscape irrigation should conform to the recommendations of the landscape architect and should be performed judiciously to preclude either soaking or excessive drying of the foundation soils. This should entail regular watering during the drier portions of the year and little or no irrigation during the rainy season. Automatic sprinkler systems should, therefore, be switched to manual operation during the rainy season. Good irrigation practice typically requires frequent application of limited quantities of water that are sufficient to sustain plant growth, but do not excessively wet the soils. Ponding and/or run-off of irrigation water are indications of excessive watering.

Other provisions, as determined by the landscape architect or civil engineer, may also be appropriate.

Groundwater

Based on the conditions encountered in the borings, the groundwater table is expected to be located approximately between approximate elevations of 423 and 431± feet msl in the southern area of the site and at an elevation of 414± feet msl in the northeastern corner of the site (depths of 25 to 37± feet below the existing ground surface). Based on the depths to groundwater, it is not expected that the groundwater will affect excavations for the foundations or utilities. However, grading plans are currently unavailable.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pads will be underlain by structural fill soils used to replace artificial fill soils and the upper portion of the near surface native alluvium and colluvium. In the areas of the proposed single-story buildings, the new structural fill soils are expected to extend to a depth of at least 3 feet below foundation bearing grade, underlain by an additional 12 inches of soils that have been moisture conditioned and compacted in place. In the areas of 3-story retail and 6-story story hotel buildings, the structural fill soils will extend at least to a depth equal to the foundation width below foundation bearing grades, assuming the at these structures will be supported on shallow foundations.

Based on this subsurface profile, all of the office and retail buildings may be supported on conventional shallow foundation systems. It is also expected that the two 6-story hotel buildings can be supported on shallow foundations. However, this recommendation is subject to review of the grading plans and foundation loads when this information becomes available. Due to the height of the 6-story hotel buildings, greater foundation loads are anticipated. These buildings may also incorporate additional levels of subterranean parking. The 6-story building in the southwest is partially underlain by potentially liquefiable soils. Based on these considerations, it may be desirable to support one or both of the 6-story hotel buildings on an alternative foundation system, such as a mat foundation or a deep foundation system. Recommendations for alternative foundation systems can be provided following review of the grading plans and foundation loads for these buildings. Additional subsurface exploration may be necessary in order to provide an alternative foundation design. Until such information becomes available, it is assumed that both of the hotel buildings can be supported on conventional shallow foundation systems.

Building Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 2,500 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: six (6) No. 5 rebars (3 top and 3 bottom), due to the medium to high expansive potential and the liquefaction potential (in localized areas) of the soils at this site.
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent grade.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by 1/3 when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice, given the magnitude of predicted liquefaction-induced settlements, and the structure type proposed for this site. Additional rigidity may be necessary for structural considerations, or to resist the effects of the liquefaction-induced differential settlements as discussed in Section 6.1. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Within the new building areas, soils suitable for direct foundation support should consist of newly placed structural fill, compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, bedrock, or competent native alluvial soils, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to at least 2 to 4 percent of the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 30-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch. These settlements are in addition to the liquefaction-induced settlements previously discussed in Section 6.1 of this report.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 250 lbs/ft^3
- Friction Coefficient: 0.28

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against suitable compacted structural fill. The maximum allowable passive pressure is 2500 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support new floor slabs should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floors of the proposed structures may be constructed as a conventional slabs-on-grade, supported on newly placed structural fill, extending to depths of at least 5 feet below finished pad grades. Based on geotechnical considerations, the floor slabs may be designed as follows:

- Minimum slab thickness: 5½ inches.

- Minimum slab reinforcement: No. 4 bars at 16 inches on-center, in both directions, due to the medium to high expansive potential and liquefaction potential (in localized areas) of the on-site soils. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed loading.

- Consideration should be given to structurally connecting the floor slabs to the perimeter foundations and/or grade beams. The method of connection should be determined by the structural engineer.

- If moisture sensitive floor coverings will be used, then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire area of the proposed slab. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. Stego® Wrap Vapor Barrier, 15 mils in thickness, meets this specification. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

- The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement. The steel reinforcement recommendations presented above are based on standard geotechnical practice, given the presence of medium to highly expansive soils, the magnitude of predicted liquefaction-induced settlements (where applicable), and the structure type proposed for this site. Additional rigidity may be necessary for structural considerations, or to resist the effects of the liquefaction-induced differential settlements, as discussed in Section 6.1.

6.7 Concrete Flatwork Design and Construction

Presented below are recommendations for flatwork which will be subject only to pedestrian traffic. Based on recommendations presented in Section 6.3 of this report, the flatwork areas will be underlain by at least 12 inches of compacted structural fill. It is recommended that the concrete flatwork incorporate the following characteristics:

- Concrete Thickness: 5 inches due to the presence of medium to highly expansive soils.

- Reinforcement: No. 3 bars at 18 inches on center in both directions, due to the presence of medium to highly expansive soils.

- Consideration should be given to selectively grading sands and silty sands encountered during excavation and selectively placing such materials within the upper 1± foot below lightly loaded flatwork areas.

- Subgrade Preparation: Moisture condition all flatwork subgrade soils to 2 to 4 percent above the optimum moisture content and compact to at least 90 percent of the ASTM D-1557 maximum dry density. The moisture content of all flatwork subgrade soils should be maintained within this range until concrete is poured.

- Where the flatwork is adjacent to a landscape planter or another area with exposed soil, it should incorporate a turned down edge. This turned down edge should be at least 18 inches in depth and 6 inches in width. The turned down edge should incorporate longitudinal steel reinforcement consisting of at least one No. 3 bar.

- Flatwork which is constructed immediately adjacent to the new structure should be dowelled into the perimeter foundations in a manner determined by the structural engineer.

These recommendations are contingent upon additional expansion index testing being conducted at the completion of rough grading, to verify the actual expansion potential of the flatwork subgrade soils.

6.8 Retaining Wall Design and Construction

Although not indicated on the site plan, some retaining walls may be required to facilitate the new site grades. If subterranean parking levels are constructed, the basement walls should be designed to resist lateral earth pressures. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. We have provided parameters assuming the use of sands and silty sands for retaining wall backfill. However, the near surface soils at the site generally consist of sandy clays and silty clays which possess medium to high expansion potentials. **Expansive sandy clays, silty clays, and claystone bedrock materials should not be used. Therefore, on-site silty sands and sandy soils should be selectively graded for use as retaining wall backfill.** Based on the results of direct shear testing, the on-site silty sand materials are expected to possess a friction angle of 30 degrees.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

<u>RETAINING WALL DESIGN PARAMETERS</u>

Design Parameter		**Soil Type**
		On-Site Silty Sands
Internal Friction Angle (ϕ)		30°
Unit Weight		125 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	42 lbs/ft^3
	Active Condition (2h:1v backfill)	67 lbs/ft^3
	At-Rest Condition (level backfill)	63 lbs/ft^3

Regardless of the backfill type, the walls should be designed using a soil-footing coefficient of friction of 0.28 and an equivalent passive pressure of 250 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Retaining Wall Foundation Design

The foundation subgrade soils for any new retaining walls should be prepared in accordance with the grading recommendations presented in Section 6.3 of this report. The foundations should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Seismic Lateral Earth Pressures

In accordance with the 2013 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Backfill Material

With exception to expansive silty clay, sandy clay, and claystone bedrock materials, the on-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well graded.

It is recommended that a a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 4-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 8-foot on-center spacing. The weep holes should include a one cubic foot gravel pocket surrounded by a suitable geotextile at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system.

6.9 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The near surface soils generally consist of sandy clays, silty clays, clayey sands, sands and silty sands. Based on their classifications, these materials are expected to possess poor to fair pavement support characteristics, with R-values in the range of 5 to 30. Since R-value testing was not included in the scope of services for this project, the subsequent pavement design is based upon an assumed R-value of 10. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that R-value testing be performed after completion of rough grading. Depending upon the results of the R-value testing, it may be feasible to use thinner pavement sections in some areas of the site.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20 year design life, assuming six operational traffic days per week.

Traffic Index	**No. of Heavy Trucks per Day**
4.0	0
5.0	1
6.0	3
7.0	11

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R = 10)				
Materials	**Thickness (inches)**			
	Auto Parking (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)
Asphalt Concrete	3	3	3½	4
Aggregate Base	6	9	12	15
Compacted Subgrade (90% minimum compaction)	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS			
Materials	**Thickness (inches)**		
	Auto Parking & Drives (TI = 5.0)	Light Truck Traffic (TI =6.0)	Moderate Truck Traffic (TI = 7.0)
PCC	5	5½	7
Compacted Subgrade (95% minimum compaction)	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. Reinforcing within all pavements should consist of at least heavy welded wire mesh (6x6-W2.9xW2.9 WWF) placed at mid-height in the slab. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness.

7.0 GENERAL COMMENTS

This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

8.0 REFERENCES

California Division of Mines and Geology (CDMG), "Guidelines for Evaluating and Mitigating Seismic Hazards in California," State of California, Department of Conservation, Division of Mines and Geology, Special Publication 117A, 2008.

Idriss, I. M. and Boulanger, R. W., "Soil Liquefaction During Earthquakes", Earthquake Engineering Research Institute, 2008.

National Research Council (NRC), "Liquefaction of Soils During Earthquakes," Committee on Earthquake Engineering, National Research Council, Washington D. C., Report No. CETS-EE-001, 1985.

Seed, H. B., and Idriss, I. M., "Simplified Procedure for Evaluating Soil Liquefaction Potential using field Performance Data," Journal of the Soil Mechanics and Foundations Division, American Society of Civil Engineers, September 1971, pp. 1249-1273.

Sadigh, K., Chang, C. –Y., Egan, J. A., Makdisi. F., Youngs, R. R., "*Attenuation Relationships for Shallow Crustal Earthquakes Based on California Strong Motion Data"*, Seismological Research Letters, Seismological Society of America, Volume 68, Number 1, January/ February 1997, pp. 180-189.

Southern California Earthquake Center (SCEC), University of Southern California, "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California," Committee formed 1997.

Tokimatsu K., and Seed, H. B., "Evaluation of Settlements in Sands Due to Earthquake Shaking," Journal of the Geotechnical Engineering Division, American society of Civil Engineers, Volume 113, No. 8, August 1987, pp. 861-878.

Tokimatsu, K. and Yoshimi, Y., "*Empirical Correlations of Soil Liquefaction Based on SPT N-value and Fines Content,"* Seismological Research Letters, Eastern Section Seismological Society Of America, Volume 63, Number 1, p. 73.

Youd, T. L. and Idriss, I. M. (Editors), "Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils," Salt Lake City, UT, January 5-6 1996, NCEER Technical Report NCEER-97-0022, Buffalo, NY.

APPENDIX A

SOURCE: LOS ANGELES COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED MIXED USE DEVELOPMENT

LOS ANGELES COUNTY, CALIFORNIA

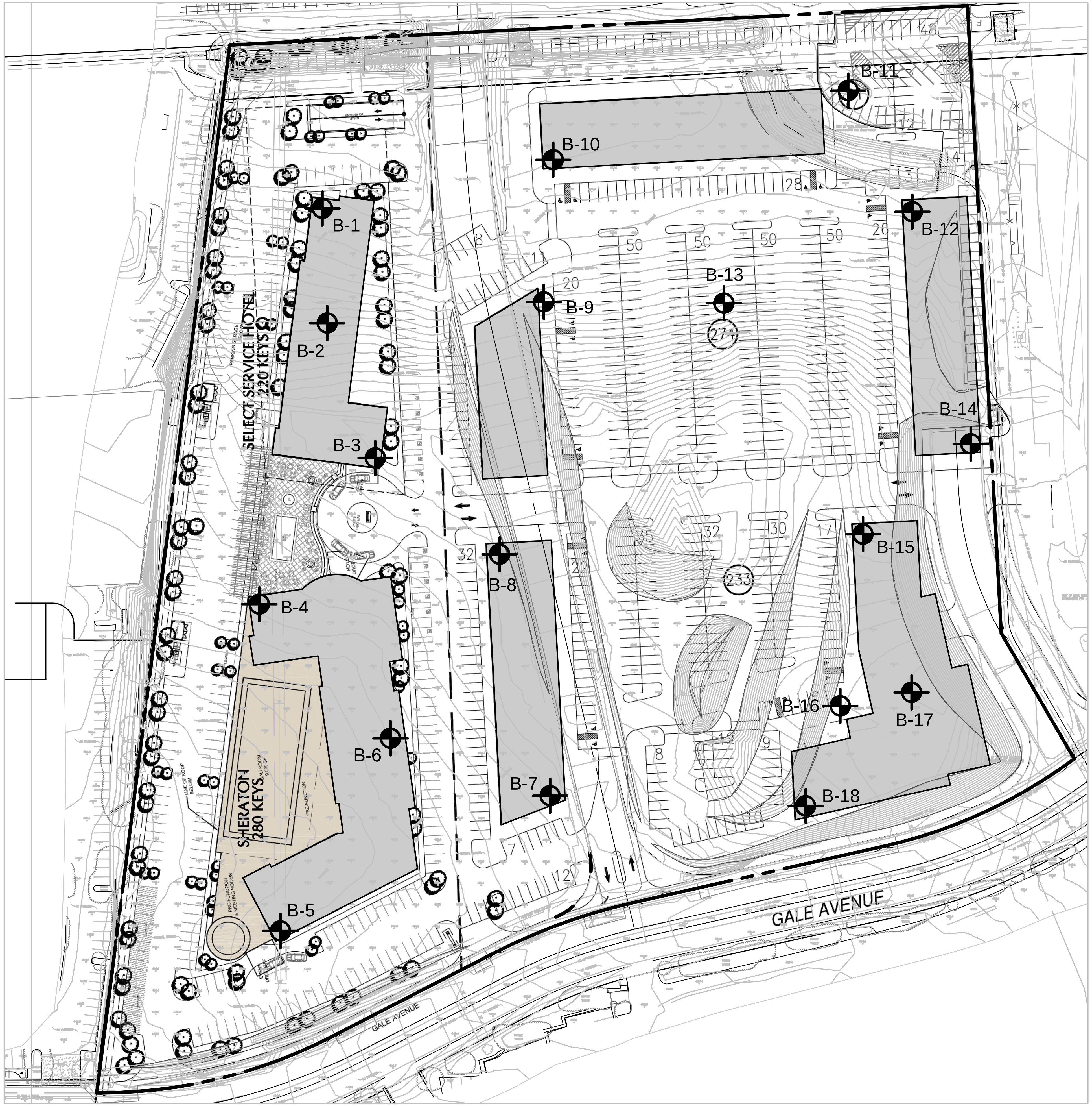
SCALE: 1" = 2400'

DRAWN: ENT
CHKD: JAS

SCG PROJECT
13G184-1

PLATE 1

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

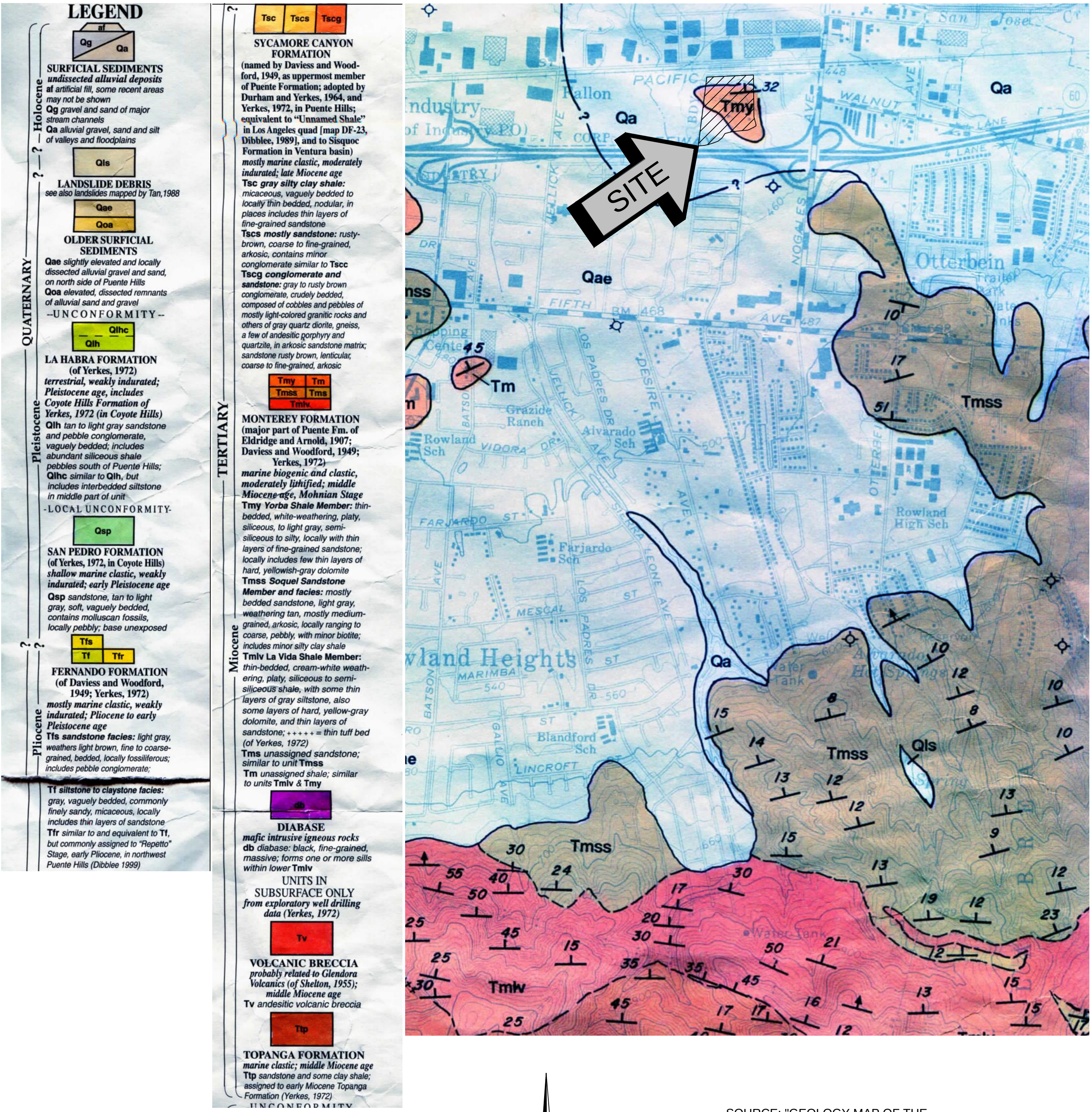
⌖	APPROXIMATE BORING LOCATION
▨	PROPOSED BUILDING

NOTE: BASE MAP PREPARED BY THIENES ENGINEERING, INC.

BORING LOCATION PLAN
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 100'
DRAWN: ENT
CHKD: JAS
SCG PROJECT
13G184-1
PLATE 2

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



LEGEND

af | Qg | Qa

SURFICIAL SEDIMENTS
undissected alluvial deposits
af *artificial fill, some recent areas may not be shown*
Qg *gravel and sand of major stream channels*
Qa *alluvial gravel, sand and silt of valleys and floodplains*

Qls

LANDSLIDE DEBRIS
see also landslides mapped by Tan,1988

Qae | Qoa

OLDER SURFICIAL SEDIMENTS
Qae *slightly elevated and locally dissected alluvial gravel and sand, on north side of Puente Hills*
Qoa *elevated, dissected remnants of alluvial sand and gravel*

--UNCONFORMITY--

Qlhc | Qlh

LA HABRA FORMATION
(of Yerkes, 1972)
terrestrial, weakly indurated; Pleistocene age, includes Coyote Hills Formation of Yerkes, 1972 (in Coyote Hills)
Qlh *tan to light gray sandstone and pebble conglomerate, vaguely bedded; includes abundant siliceous shale pebbles south of Puente Hills;*
Qlhc *similar to* **Qlh**, *but includes interbedded siltstone in middle part of unit*

-LOCAL UNCONFORMITY-

Qsp

SAN PEDRO FORMATION
(of Yerkes, 1972, in Coyote Hills)
shallow marine clastic, weakly indurated; early Pleistocene age
Qsp *sandstone, tan to light gray, soft, vaguely bedded, contains molluscan fossils, locally pebbly; base unexposed*

Tfs | Tf | Tfr

FERNANDO FORMATION
(of Daviess and Woodford, 1949; Yerkes, 1972)
mostly marine clastic, weakly indurated; Pliocene to early Pleistocene age
Tfs ***sandstone facies:*** *light gray, weathers light brown, fine to coarse-grained, bedded, locally fossiliferous; includes pebble conglomerate;*
Tf ***siltstone to claystone facies:*** *gray, vaguely bedded, commonly finely sandy, micaceous, locally includes thin layers of sandstone*
Tfr *similar to and equivalent to* **Tf**, *but commonly assigned to "Repetto" Stage, early Pliocene, in northwest Puente Hills (Dibblee 1999)*

Tsc | Tscs | Tscg

SYCAMORE CANYON FORMATION
(named by Daviess and Woodford, 1949, as uppermost member of Puente Formation; adopted by Durham and Yerkes, 1964, and Yerkes, 1972, in Puente Hills; equivalent to "Unnamed Shale" in Los Angeles quad [map DF-23, Dibblee, 1989], and to Sisquoc Formation in Ventura basin)
mostly marine clastic, moderately indurated; late Miocene age
Tsc ***gray silty clay shale:*** *micaceous, vaguely bedded to locally thin bedded, nodular, in places includes thin layers of fine-grained sandstone*
Tscs ***mostly sandstone:*** *rusty-brown, coarse to fine-grained, arkosic, contains minor conglomerate similar to* **Tscc**
Tscg ***conglomerate and sandstone:*** *gray to rusty brown conglomerate, crudely bedded, composed of cobbles and pebbles of mostly light-colored granitic rocks and others of gray quartz diorite, gneiss, a few of andesitic porphyry and quartzite, in arkosic sandstone matrix; sandstone rusty brown, lenticular, coarse to fine-grained, arkosic*

Tmy | Tm | Tmss | Tms | Tmlv

MONTEREY FORMATION
(major part of Puente Fm. of Eldridge and Arnold, 1907; Daviess and Woodford, 1949; Yerkes, 1972)
marine biogenic and clastic, moderately lithified; middle Miocene age, Mohnian Stage
Tmy ***Yorba Shale Member:*** *thin-bedded, white-weathering, platy, siliceous, to light gray, semi-siliceous to silty, locally with thin layers of fine-grained sandstone; locally includes few thin layers of hard, yellowish-gray dolomite*
Tmss ***Soquel Sandstone Member and facies:*** *mostly bedded sandstone, light gray, weathering tan, mostly medium-grained, arkosic, locally ranging to coarse, pebbly, with minor biotite; includes minor silty clay shale*
Tmlv La Vida Shale Member: *thin-bedded, cream-white weathering, platy, siliceous to semi-siliceous shale, with some thin layers of gray siltstone, also some layers of hard, yellow-gray dolomite, and thin layers of sandstone; + + + + + = thin tuff bed (of Yerkes, 1972)*
Tms *unassigned sandstone; similar to unit* **Tmss**
Tm *unassigned shale; similar to units* **Tmlv** *&* **Tmy**

db

DIABASE
mafic intrusive igneous rocks
db *diabase: black, fine-grained, massive; forms one or more sills within lower* **Tmlv**

UNITS IN SUBSURFACE ONLY
from exploratory well drilling data (Yerkes, 1972)

Tv

VOLCANIC BRECCIA
probably related to Glendora Volcanics (of Shelton, 1955); middle Miocene age
Tv *andesitic volcanic breccia*

Ttp

TOPANGA FORMATION
marine clastic; middle Miocene age
Ttp *sandstone and some clay shale; assigned to early Miocene Topanga Formation (Yerkes, 1972)*

-UNCONFORMITY

SOURCE: "GEOLOGY MAP OF THE WHITTIER AND LA HABRA QUADGRANGLES, (WESTERN PUENTE HILLS), LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA" DIBBLEE, 2001

GEOLOGIC MAP

PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 2000'

DRAWN: DRK
CHKD: JAS

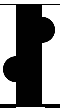
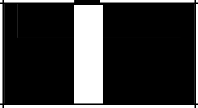
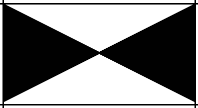
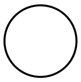
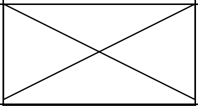
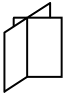
SCG PROJECT
13G184-1

PLATE 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3” indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

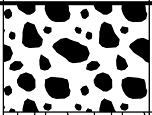
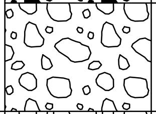
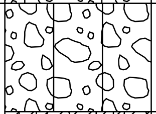
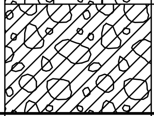
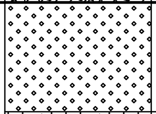
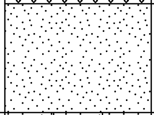
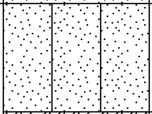
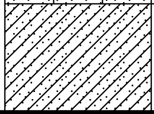
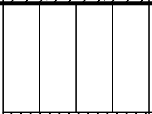
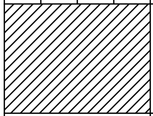
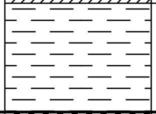
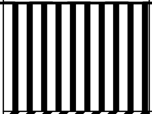
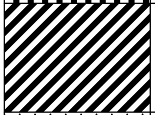
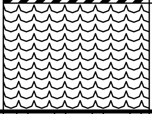
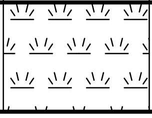
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-1

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

SURFACE ELEVATION: 439.5 feet MSL

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG		DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	
					ALLUVIUM: Brown fine Sandy Clay, trace Silt, very stiff-damp							
	☒	37	4.5+			114	11					EI = 73 @ 0 to 5'
	☒	27	4.5+			97	13					
5												
					Light Brown fine Sand, loose-damp							
	☒	33				110	6					
10					Brown fine to medium Sand, trace fine Gravel, medium dense-damp							
					Brown Silty fine Sand, trace to little Clay, medium dense-damp to moist							
	☒	42				106	13					
					Gray Brown Silty fine to medium Sand, medium dense-damp to moist							
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Silty Claystone, thinly interbedded with fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-moist to very moist							
15	☒	58	4.5+			83	31					
	☒	63	3.0			80	40					
20	☒	61	4.5+			86	30					
					Dark Gray Brown Siltstone, slightly diatomaceous, cemented, hard-moist							
25	☒	50/5"					21					

Boring Terminated at 27' due to refusal on very dense Bedrock

TEST BORING LOG

BORING NO. B-2

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 31 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 447.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					COLLUVIUM: Gray Brown Silty Clay, some fine Sand, trace fine Gravel, abundant calcareous veining, hard-damp							
	☒	32	4.5+				12					
5												
					ALLUVIUM: Brown fine Sandy Clay, little Silt, very stiff-damp							
	☒	24	4.5				15					
10												
					Gray Brown fine Sandy Silt, medium dense-damp to moist							
	☒	23					14					
15			2.0		BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Brown Silty Claystone with thinly interbedded with fine grained Sandy Siltstone lenses, Iron oxide staining, friable, stiff to very stiff-moist		22					
					@ 17 feet, transitions to Gray Brown fine grained Sandy Siltstone with thinly interbedded Brown Silty fine grained Sandstone lenses, very dense-moist to very moist							
	☒	58					30					
20												
	☒	59	4.5+				31					
25												
					@ 27 feet, transitions to Dark Gray Brown Silty Claystone with thinly interbedded Gray Brown fine grained Sandy Siltstone lenses, hard to very dense-moist							
	☒	87/8"	4.5				25					
30												
					@ 32 feet, transitions to Gray fine grained Sandy Silstone with thinly interbedded Silty fine grained Sandstone lenses, very dense-moist							
	☒	88/8"					26					

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-2

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California
DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas
WATER DEPTH: Dry
CAVE DEPTH: 31 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	98/7"		▨	Gray fine grained Sandy Silstone with thinly interbedded Silty fine grained Sandstone lenses, Iron oxide staining, slightly diatomaceous, friable, very dense-moist		22					
					Boring Terminated at 39' due to refusal on very dense Bedrock							

BORING NO.
B-3

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California
DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas
WATER DEPTH: Dry
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 458 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	COLLUVIUM: Dark Gray Brown Silty Clay, trace fine Sand, abundant Bedrock fragments, very stiff-moist							
	⧗	22	4.5+	▨		82	22					
	⧗	51	4.5+	▨		84	24					
5				▩	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Silty Claystone with thinly interbedded Gray Brown fine grained Sandy Siltstone lenses, Iron oxide staining, abundant calcareous veining, friable, hard-damp							
10	⧗	84	4.5+	▩		97	20					
				▩	@ 12 feet, transitions to Light Gray fine Sandy Siltstone with thinly interbedded Silty fine grained Sandstone, very dense-damp to moist							
15	⧗	69/11"	4.5+	▩		93	28					
20	⧗	86/10"	4.5+	▩		101	21					
				▩	Interbedded Gray Silty Claystone and Brown fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-damp							
25	⧗	71/9"	4.5+	▩		90	26					
30	⧖	78/11"	3.0	▩			26					
	⧖	44	3.0	▩			30					

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

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BORING NO. B-3

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	Interbedded Gray Silty Claystone and Brown fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-damp							
	☒	48	3.0	▨			29					
40				▨								
					Boring Terminated at 41' due to refusal on very dense Bedrock							

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 32 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 452 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧗	35	4.5+		FILL: Dark Gray Brown Silty Clay, some fine to medium Sand, trace fine Gravel, mottled, very stiff-damp	111	13					
	⧗	40	4.5+		ALLUVIUM: Orange Brown fine Sandy Clay, some calcareous veining, very stiff-damp	103	9					
5					Light Brown Silty fine Sand, medium dense-damp							
					Brown fine to coarse Sand, some fine to coarse Gravel, medium dense to dense-damp							
10	⧗	42				116	4					
	⧗	33			@ 12½ feet, trace Silt	95	11					
15	⧗	28				109	4					
20	⧗	51				101	4					
					Brown Clayey fine to coarse Sand, abundant fine to coarse Gravel, 3" lense of Gray Brown Silty Clay, medium dense-moist							
25	⧖	28					19					
					Brown Gravelly fine to coarse Sand, dense-very moist							
30	⧗	55				116	8					
					▽ @ 33 feet, Water encountered during drilling							
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown Silty Claystone, thinly interbedded with Brown fine Sandy Siltstone strata, Iron oxide staining,							

BORING NO. B-4

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 32 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	50/1"			friable, hard to dense-damp to moist							
					<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Light Gray Brown Silty Claystone, thinly interbedded with Brown fine Sandy Siltstone strata, Iron oxide staining, friable, hard to dense-damp to moist							
	☒	35					31					
40												
					Boring Terminated at 40'							

BORING NO. B-5

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 26 feet
CAVE DEPTH: 32 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 449 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					ALLUVIUM: Brown fine Sandy Clay, stiff-damp							
	⧗	18	4.5+			111	14					
					Brown Clayey fine Sand, medium dense-damp							
	⧗	24				109	9					
5												
					Brown fine to medium Sand, trace to little Silt, medium dense-damp							
	⧗	31				100	6					
10												
	⧗	38				102	8					
					Dark Brown Clayey fine to medium Sand, trace fine Gravel, dense-damp							
15	⧗	46					8					Disturbed Sample
					Dark Brown Clayey fine to coarse Sand, trace fine to coarse Gravel, dense-damp							
	⧗	46				115	7					
20	⧗	35				109	7					
					Orange Brown Silty fine Sand, medium dense-damp							
					Gray Brown Clayey Silt, medium stiff-very moist							
25	⧗	16	2.5		▽	95	27					
					Gray Brown fine Sandy Silt, Iron oxide staining, medium dense-very moist @ 26 feet, Water encountered during drilling							
					Brown Clayey fine to medium Sand, medium dense-wet							
30	⊠	22					18					
					Brown fine to medium Sandy Clay, very stiff-wet							
					Brown fine to coarse Sand, medium dense-wet							

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 26 feet
CAVE DEPTH: 32 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	■	18	2.0		Brown fine to coarse Sand, medium dense-wet	102	21					
40	⊠	13					19					
					Brown Clayey fine to coarse Sand, medium dense-wet							
45	■	25			Gray Brown Silty Clay, very stiff-wet	102	22					
			3.0									
					Gray Brown fine to medium Sandy Clay, little Silt, Iron oxide staining, very stiff-wet							
50	⊠	28	1.5				23					
					Gray Brown fine to coarse Sand, little fine to coarse Gravel, trace Silt, dense-wet							
55	⊠	41					13					
60	⊠	45					22					
					Boring Terminated at 61½'							

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BORING NO. B-6

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 25 feet
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 452 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					ALLUVIUM: Brown Clayey fine Sand, medium dense-damp							
	☒	20					11					
5												
					Brown Silty Clay, stiff to very stiff-moist							
	☒	13	3.5				19					
10												
					Brown fine to coarse Sand, trace fine to coarse Gravel, medium dense-damp							
	☒	22					6					
15					Dark Brown Clayey fine to coarse Sand, medium dense-damp to moist							
	☒	25			@ 18½' trace fine to coarse Gravel		12			16		
20												
					Gray Brown Silty Clay, little Silt, very stiff-moist							
	☒	19	2.5		@ 23½' two 1" thick lenses of Light Brown fine to coarse Sand		10	46	19	58		
25					▽ @ 25' Water encountered during drilling							
					Gray Brown Clayey fine Sand, loose-wet							
	☒	14					29			32 21		
30					Light Gray Brown Silty fine Sand, medium dense-wet							
					Brown fine to coarse Sand, trace Silt, medium dense-wet							
	☒	23					13			9		

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-6

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California
DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas
WATER DEPTH: 25 feet
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				⁘	Brown fine to coarse Sand, trace Silt, medium dense-wet							
40	☒	29	3.0	▨	Gray Brown Clayey fine to coarse Sand, very stiff-wet		17			34		
45	☒	33		⁘	Brown fine to coarse Sand, trace Silt, trace fine to coarse Gravel, dense-wet		13					
	☒	57	4.0	▨	Gray Brown Silty Clay, trace fine to medium Sand, medium stiff-wet		32					
50			4.5+	▩	<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Dark Gray Clayey Siltstone, thinly interbedded with Brown Silty fine grained Sandstone, abundant Iron oxide staining, slightly diatomaceous, friable, hard to dense-moist		28					
55	☒	83/11"		▩			21					

Boring Terminated at 56' due to refusal on very dense Bedrock

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-7

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 18 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 455 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧗	19	4.5+		FILL: Brown fine to medium Sandy Clay to Clayey fine to medium Sand, mottled, loose to very stiff-damp to moist	92	12					
					ALLUVIUM: Light Brown Silty fine Sand, slightly to moderately porous, trace fine root fibers, medium dense-damp							
	⧗	39	4.5+		Dark Brown fine Sandy Clay, very stiff-damp	119	11					
5	⧗	36			Brown Silty fine Sand, trace calcareous veining, medium dense-damp	113	10					
	⧗	26	4.5+		Gray Brown Silty Clay, very stiff-moist	99	20					
	⧗	32	4.5+		Brown fine Sandy Clay, some Silt, medium stiff to stiff-moist	112	14					
10					Brown Silty fine Sand, medium dense-moist							
15	⧗	45			Brown fine to coarse Sand, little fine to coarse Gravel, trace Silt, dense-damp	116	4					
20	⧗	59			Brown Silty fine to coarse Sand, little fine to coarse Gravel, trace Clay, dense-damp	115	10					

Boring Terminated at 20'

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BORING NO. B-8

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 458 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	13	4.5+	▨	COLLUVIUM: Dark Gray Brown to Black Silty Clay, trace fine Sand, mottled, stiff-dry		13					EI = 106 @ 0 to 5'
5	☒	15	4.5+	▨	COLLUVIUM: Dark Gray Brown to Black Silty Clay, some fine to medium Sand, trace calcareous veining, stiff to very stiff-moist		15					
	☒	35	4.5	▩	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Brown Silty Claystone interbedded with Light Brown Silty fine Sandstone, slightly diatomaceous, friable, hard to dense-damp to moist		27					
10	☒	25	3.0	▩			32					
15	☒	26	1.0	▩			33					
					Boring Terminated at 15'							

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TEST BORING LOG

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BORING NO. B-9

JOB NO.: 13G184	DRILLING DATE: 12/11/13	WATER DEPTH: Dry
PROJECT: Proposed Mixed Use Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 15 feet
LOCATION: Los Angeles County, California	LOGGED BY: Daryl Kas	READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 444 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					FILL: Gray Brown Clayey fine to medium Sand, loose-damp							
	⧗	33				82	16					
					COLLUVIUM: Dark Gray Brown to Black fine to medium Sandy Clay, very stiff-moist							
			4.5									
	⧗	45	4.5+			88	21					
5	⧗	32	4.5+			92	22					
	⧗	30	4.5+			88	27					
					COLLUVIUM: Dark Brown Silty Clay, abundant Siltstone fragments, abundant calcareous veining, very stiff-moist							
	⧗	36	4.5+			93	28					
10												
					ALLUVIUM: Gray Brown fine Sandy Clay, very stiff-moist							
	⧗	40	4.5+			100	22					
15												
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Brown fine grained Sandy Siltstone, thinly interbedded wtih Light Brown Silty fine grained Sandstone, Iron oxide staining, weakly cemented, medium dense-damp							
	⧖	24	2.0				24					
20												
					Boring Terminated at 20' due to refusal on very dense Bedrock							

TEST BORING LOG

BORING NO.
B-10

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 14 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 437 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	ALLUVIUM: Dark Gray Brown fine Sandy Clay, very stiff-damp							
	⧗	28	4.5+	▨		99	8					
	⧗	33	4.5+	▨		111	10					
5	⧗	27	4.5+	▨	Gray Brown fine Sandy Clay to Clayey fine Sand, dense to very stiff-damp	113	9					
	⧗	17	4.0	▥	Brown Silty fine Sand, loose-damp	103	10					
				▨	Gray Brown fine Sandy Clay, stiff-damp							
	⧗	24	4.0	▨	Gray Brown Silty Clay, very stiff-moist	100	18					
10				▨								
	⧗	34	4.5+	▨		108	17					
15				▥	Gray Brown fine Sandy Silt, trace Clay, medium dense-moist							
				▩	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Brown Silty fine grained Sandstone, weakly cemented, Iron oxide staining, friable, very dense-damp to moist							
	⧗	88/8"		▩		84	17					
20												
					Boring Terminated at 20'							

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BORING NO. B-11

JOB NO.: 13G184	DRILLING DATE: 11/21/13	WATER DEPTH: 25 feet
PROJECT: Proposed Mixed Use Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 19 feet
LOCATION: Los Angeles County, California	LOGGED BY: Daryl Kas	READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 439 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Asphaltic concrete, 3± inches Aggregate base							
	☒	8			FILL: Dark Gray Brown fine Sandy Clay, trace fine Gravel, mottled, medium stiff to stiff-damp		14					
	☒	9					10					
5												
	☒	27					13 8					
					ALLUVIUM: Brown fine Sandy Clay, very stiff-dry to damp							
					Brown Clayey fine Sand, medium dense-damp							
	☒	13					6					
10	☒	6			Brown Silty fine Sand, trace to little Clay, loose-damp		8					
15	☒	5					10					
20	☒	11					8 11			22 4		
					Light Brown fine Sand, medium dense-damp							
					Orange Brown Silty fine Sand, some fine Gravel, Iron oxide staining, dense-very moist to wet ▽							
25	☒	50/5.5"					22					
					Brown fine to coarse Gravlley Sand, occasional Cobbles, very dense-wet							
30	☒	50/2"					19					
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown fine grained Sandy Siltstone, weakly cemented, Iron oxide staining, friable, very dense-wet							

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TEST BORING LOG

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BORING NO.
B-11

JOB NO.: 13G184	DRILLING DATE: 11/21/13	WATER DEPTH: 25 feet
PROJECT: Proposed Mixed Use Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 19 feet
LOCATION: Los Angeles County, California	LOGGED BY: Daryl Kas	READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	50/3"		▨	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown fine grained Sandy Siltstone, weakly cemented, Iron oxide staining, friable, very dense-wet		27					
					Boring Terminated at 37' due to refusal on very dense Bedrock							

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

BORING NO.
B-12

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 13 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 439 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	FILL: Gray Brown fine Sandy Clay, very stiff-damp							
	☒	29	4.5+	▨			8					EI = 73 @ 0 to 5'
				▨	ALLUVIUM: Brown fine Sandy Clay, very stiff-damp							
	☒	26	4.5+	▨			9					
5				▨								
				▨	Brown Clayey fine Sand, medium dense-damp							
	☒	23		▨			10					
				░	Light Brown Silty fine Sand, medium dense-damp							
	☒	22		░			7					
10				░								
				▒	Light Gray Gravelly fine to coarse Sand, very dense-dry to damp							
	☒	50/5"		▒			3					
15				▒								
				▧	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown Silty fine grained Sandstone, weakly cemented, Iron oxide staining, friable, very dense-moist							
	☒	71		▧			21					
20					Boring Terminated at 20'							

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BORING NO. B-13

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 3 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 447 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	17	4.5+	▨	COLLUVIUM: Dark Gray to Black Silty Clay, some fine Sand, trace calcareous veining, very stiff-moist		19					
	☒	20	4.5+	▨	COLLUVIUM: Dark Gray to Black Silty Clay, abundant Siltstone fragments, trace calcareous veining, stiff-moist		18					
5												
					Boring Terminated at 5'							

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 11/21/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 445 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				■	3± inches Asphaltic concrete, 5± inches Aggregate base							
	☒	72		▨	FILL: Gray Brown Clayey fine Sand, mottled, Plastic fragments, very dense-damp		8					Disturbed Sample
	☒	32		░	FILL: Brown Silty fine Sand, trace fine Gravel, medium dense-damp	97	8					
5	☒	51		▨	FILL: Light Brown Clayey fine to medium Sand, trace fine to coarse Gravel, occasional Cobbles, trace Siltstone fragments, dense-damp	116	8					
	☒	26	4.5+	▩	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray to Light Gray Brown Silty Claystone, interbedded with Clayey Siltstone, weakly cemented, Iron oxide staining, friable, medium stiff-moist	75	31					
	☒	34	4.5+	▩		77	33					
10				▩								
	☒	29	4.5+	▩		79	32					
15					Boring Terminated at 15'							

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BORING NO.
B-15

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 35 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 462 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	
					FILL: Gray Brown Clayey fine Sand, medium dense-damp							
	⧓	24				103	6					
	⧓	71			ALLUVIUM: Brown Clayey fine Sand, trace to little medium Sand, very dense-damp	118	7					
5	⧓	28			ALLUVIUM: Brown Clayey fine to medium Sand, trace coarse Sand, trace fine Gravel, medium dense-damp		7					Disturbed Sample
	⧓	44			Brown Silty fine to coarse Sand, some fine to coarse Gravel, medium dense to very dense-damp	116	6					
10	⧓	41				114	8					
15	⧓	72/10"			@ 14 feet, Siltstone fragments	120	8					
					Light Gray Brown Silty Clay, stiff-moist							
20	☒	17	3.0				43					
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Dark Gray Brown Silty Claystone, interbedded with Light Gray Brown Sandy Siltstone, weakly cemented, Iron oxide staining, friable, slightly diatomaceous, stiff to medium dense-moist							
25	⧓	40	4.5+			75	38					
					@ 27 feet, transitions to Light Gray Brown fine grained Sandy Siltstone, thinly interbedded with Silty fine grained Sandstone, dense-moist							
30	☒	64					34					
	☒	53	2.5		@ 32 feet, transitions to Gray Silty Claystone thinly interbedded with Brown fine grained Sandy Siltstone, hard to dense-moist		50					

TEST BORING LOG

BORING NO. B-15

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 35 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	Gray Silty Claystone thinly interbedded with Brown fine grained Sandy Siltstone, hard to dense-moist							
	☒	46	4.5+	▨			33					
40				▨								
				▨	Dark Gray Siltstone, cemented, hard-moist							
	☒	74/9"		▨			23					
45												
					Boring Terminated at 45' due to refusal on very dense Bedrock							

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BORING NO. B-16

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH:
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 466 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	22		▨	FILL: Gray Brown Clayey fine Sand, trace fine Gravel, medium dense-dry		5					
			4.5+	▨	FILL: Gray Brown Silty Clay, trace fine Sand, stiff-damp		11					
	☒	37	4.5+	▨	ALLUVIUM: Brown fine Sandy Clay, trace medium Sand, very stiff-damp		11					
5					Boring Terminated at 5'							

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TEST BORING LOG

BORING NO. B-17

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/12/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 37 feet
CAVE DEPTH: 27 feet
READING TAKEN: At Completion

SURFACE ELEVATION: 468 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	40			FILL: Brown Silty fine Sand, trace medium to coarse Sand, trace fine Gravel, dense-damp		7					
	☒	21			FILL: Brown to Orange Brown Clayey fine to medium Sand, medium dense-damp		9					
5												
	☒	23					10					
	☒	28			ALLUVIUM: Brown Silty fine to coarse Sand, abundant fine to coarse Gravel, medium dense to very dense-damp		8					
10												
	☒	51					7					
15												
	☒	12					9			14		
			2.5		Light Gray Brown Silty Clay, trace to little fine Sand, some Iron oxide staining, stiff-moist to very moist		41	45	24	86		
20												
					Orange Brown fine Sand, trace medium to coarse Sand, Iron oxide staining, very dense-dry to damp							
	☒	56					3					
25												
					Gray Brown fine Sandy Clay, trace Silt, Iron oxide staining, hard-moist							
	☒	31	3.0				17			67		
30												
					Light Brown fine to medium Sand, trace fine Gravel, with 2" thick lense of Gray Brown Silty fine Sand to fine Sandy Silt, dense-very moist							
	☒	36					12					

TEST BORING LOG

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/12/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 37 feet
CAVE DEPTH: 27 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					Light Brown fine to medium Sand, trace fine Gravel, with 2" thick lense of Gray Brown Silty fine Sand to fine Sandy Silt, dense-very moist ▽							
					Light Gray fine to coarse Sand, trace Silt, medium dense-wet @ 37 feet, Water encountered during drilling							
	☒	26					15			5		
40												
	☒	31			@ 43½ feet, 2" lense of Gray Silty Clay, medium dense-wet		17			14		
45												
					<u>MONTEREY FORMATION: YORBA MEMBER BEDROCK (Tmy):</u> Dark Gray Silty Claystone, thinly interbedded with Clayey Siltstone, cemented, hard-damp to moist							
	☒	80/11"					27					
50												
					Boring Terminated at 50' due to refusal on very dense Bedrock							

BORING NO. B-18

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/12/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

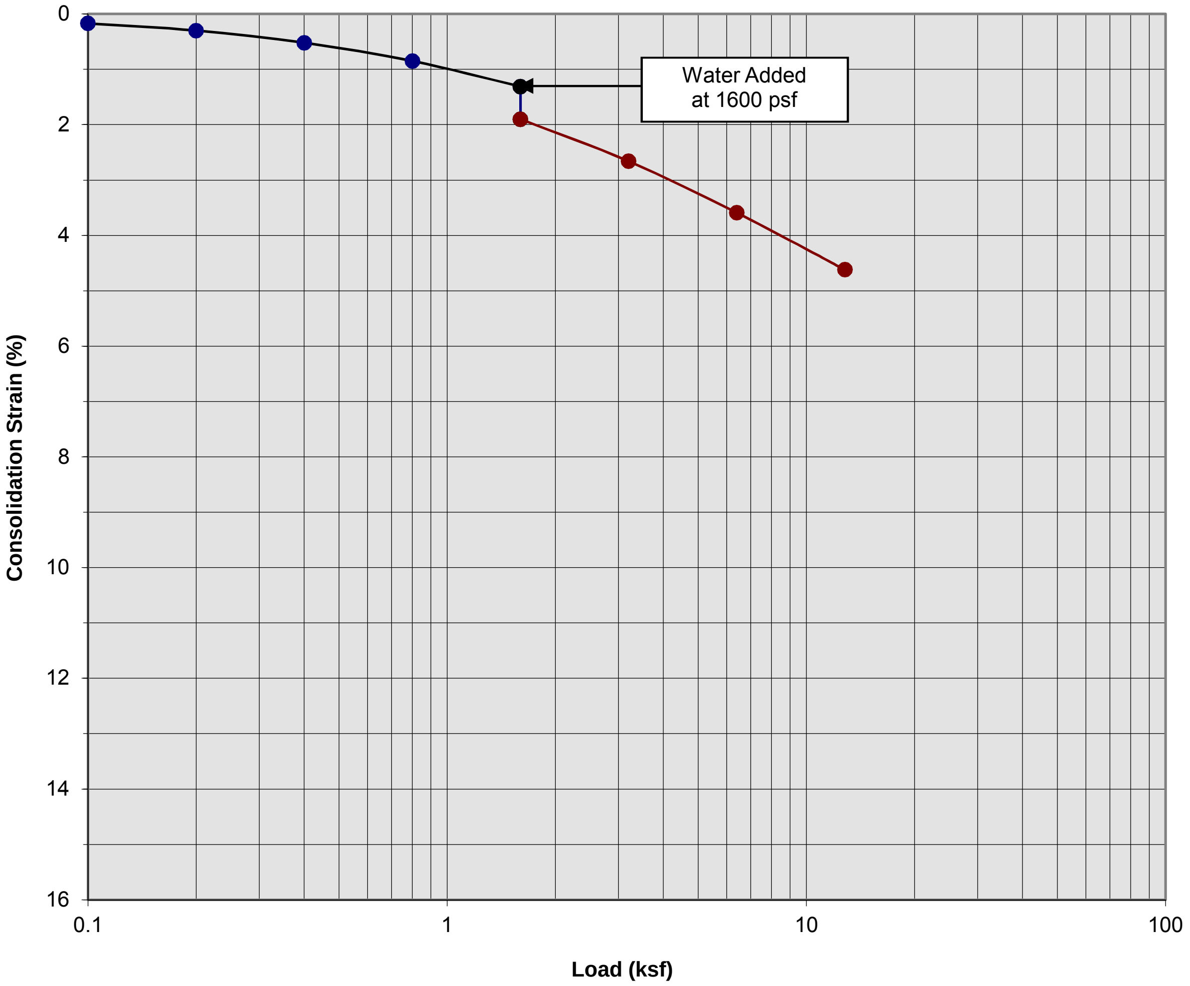
WATER DEPTH: Dry
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 463 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧓	34			<u>FILL:</u> Gray Brown Silty fine Sand, trace medium to coarse Sand, trace Claystone fragments, medium dense-dry to damp	113	5					
	⧓	32			<u>FILL:</u> Brown to Orange Brown Clayey fine to medium Sand, medium dense-damp	115	7					
5	⧓	43			<u>FILL:</u> Orange Brown Clayey fine to coarse Sand, some fine to coarse Gravel, medium dense-damp	120	5					
	⧓	37				112	10					
	⧓	34			<u>ALLUVIUM:</u> Brown fine Sandy Silt, medium dense-moist	102	20					
10					Orange Brown Silty fine Sand, trace Clay, medium dense-moist							
					Brown Silty fine to coarse Sand, some fine to coarse Gravel, very dense-damp							
15	⧓	73				119	8					
					Brown fine Sand, trace to little Silt, dense-damp							
20	⋈	41					8					
					Brown to Dark Brown Silty fine to coarse Sand, trace fine to coarse Gravel, very dense-damp							
25	⋈	63					3					
					Gray Brown Silty Clay, trace fine Sand, very stiff-very moist							
30	⋈	20	1.25				23					
					Boring Terminated at 30'							

TEST BORING LOG

APPENDIX C

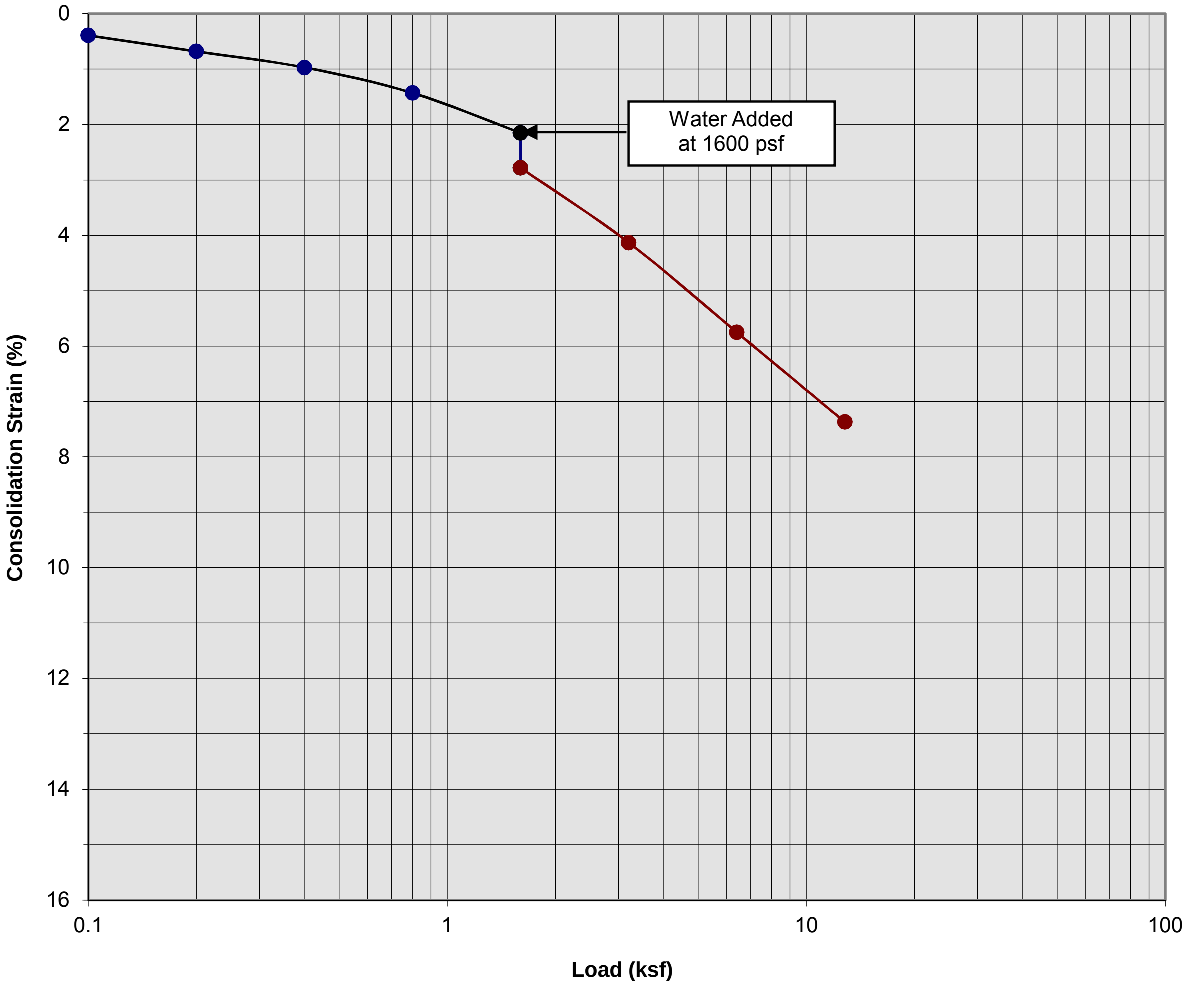
Consolidation/Collapse Test Results



Classification: Brown fine to medium Sand, trace fine Gravel

Boring Number:	B-1	Initial Moisture Content (%)	6
Sample Number:	---	Final Moisture Content (%)	16
Depth (ft)	9 to 10	Initial Dry Density (pcf)	109.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	114.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.59

Consolidation/Collapse Test Results



Classification: Brown Silty fine Sand, trace to little Clay

Boring Number:	B-1	Initial Moisture Content (%)	14
Sample Number:	---	Final Moisture Content (%)	17
Depth (ft)	12½ to 13½	Initial Dry Density (pcf)	106.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.63

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 2

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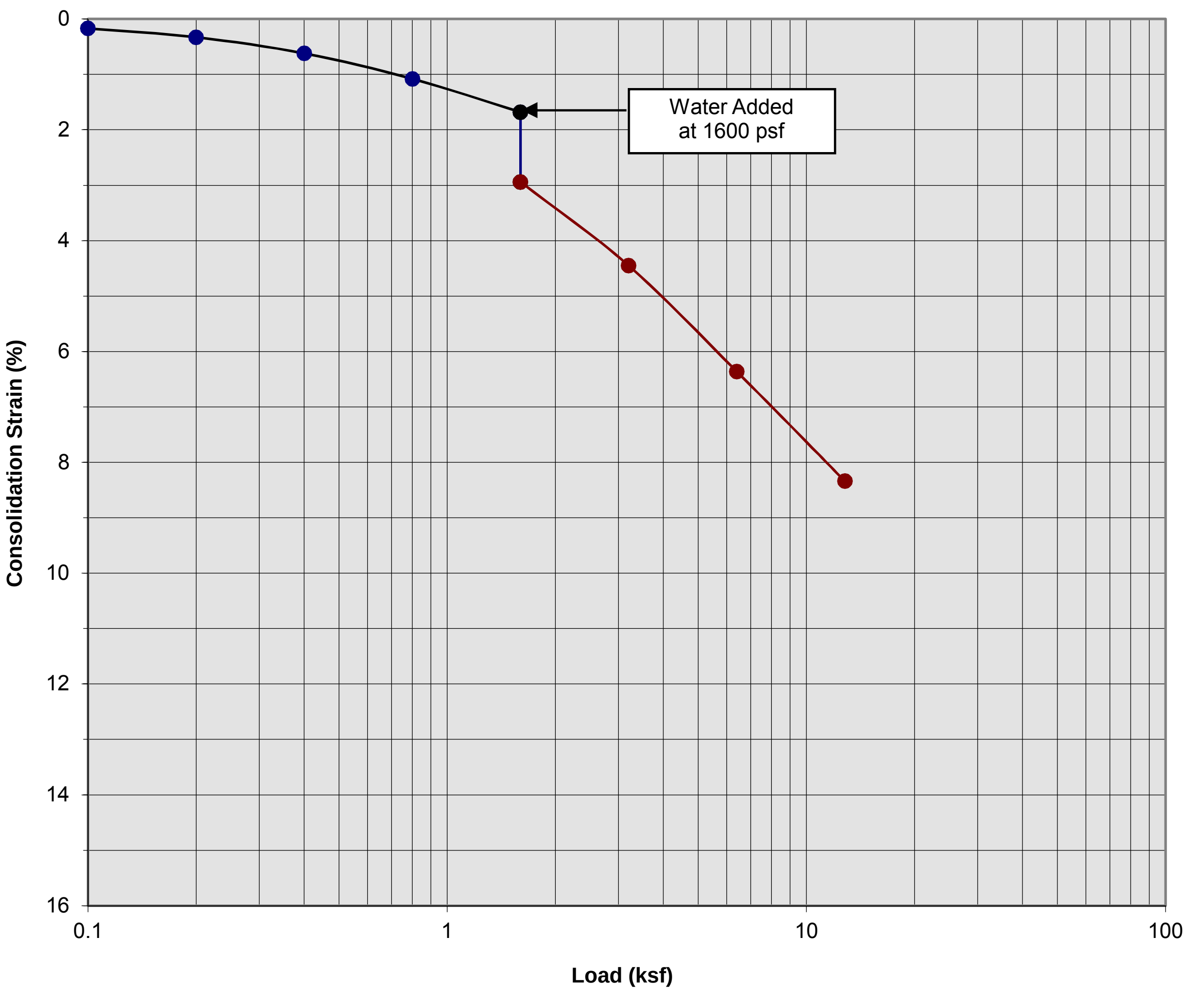
Consolidation/Collapse Test Results



Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4	Initial Moisture Content (%)	11
Sample Number:	---	Final Moisture Content (%)	22
Depth (ft)	12½ to 13½	Initial Dry Density (pcf)	94.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	102.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.26

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 3

SoCalGeo
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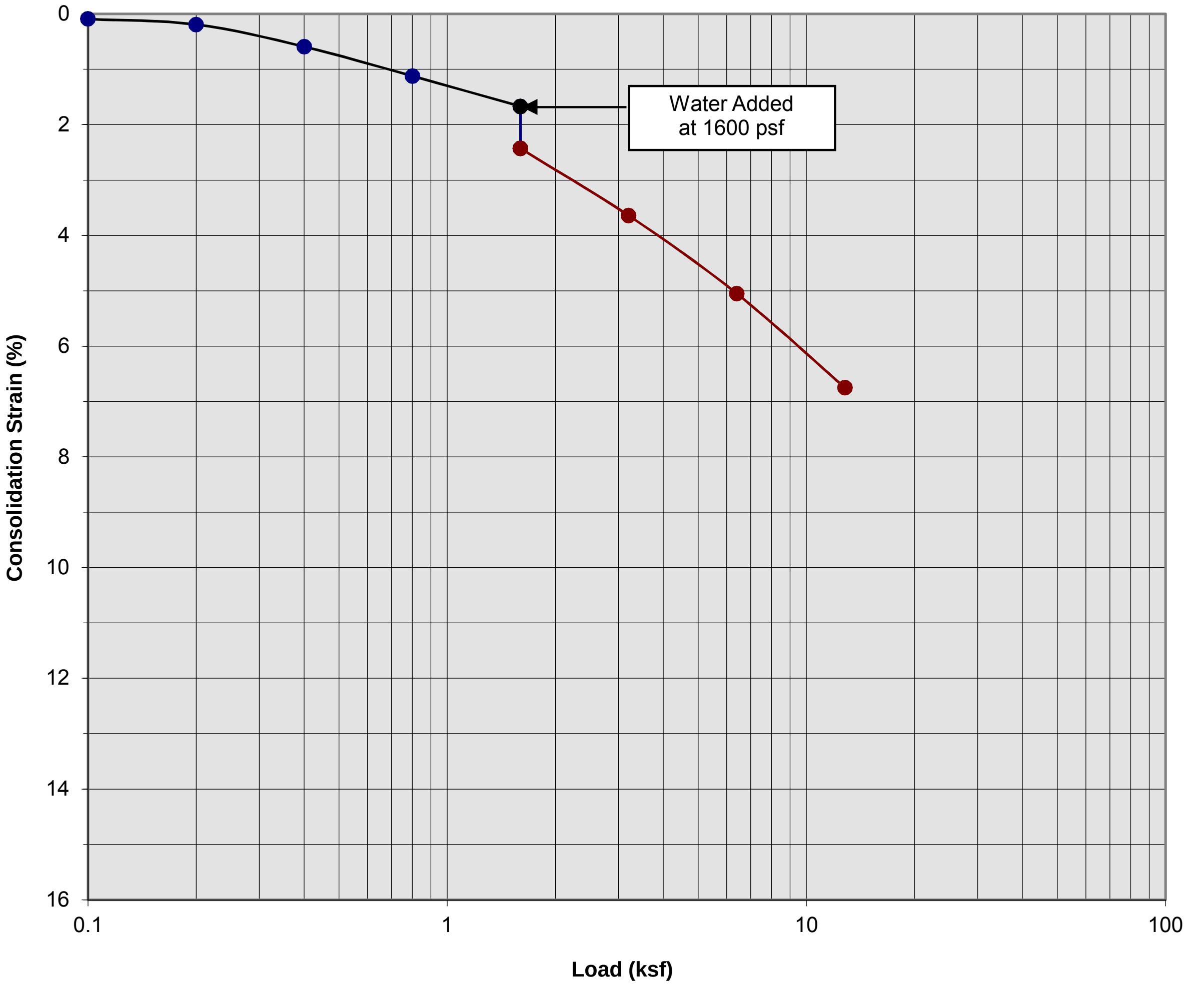
Consolidation/Collapse Test Results



Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4	Initial Moisture Content (%)	4
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	15 to 16	Initial Dry Density (pcf)	108.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.76

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 4

SoCalGeo
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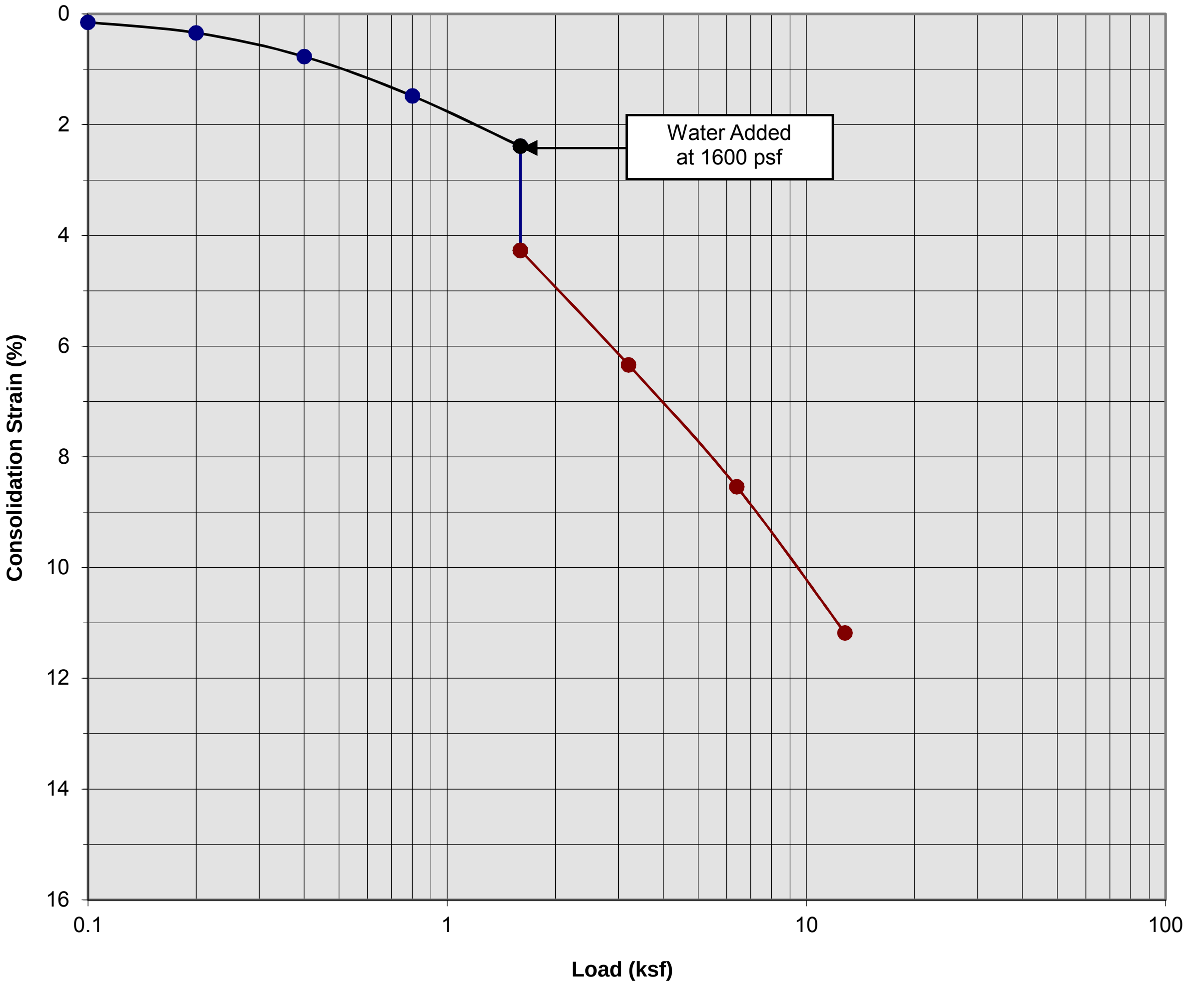
Consolidation/Collapse Test Results

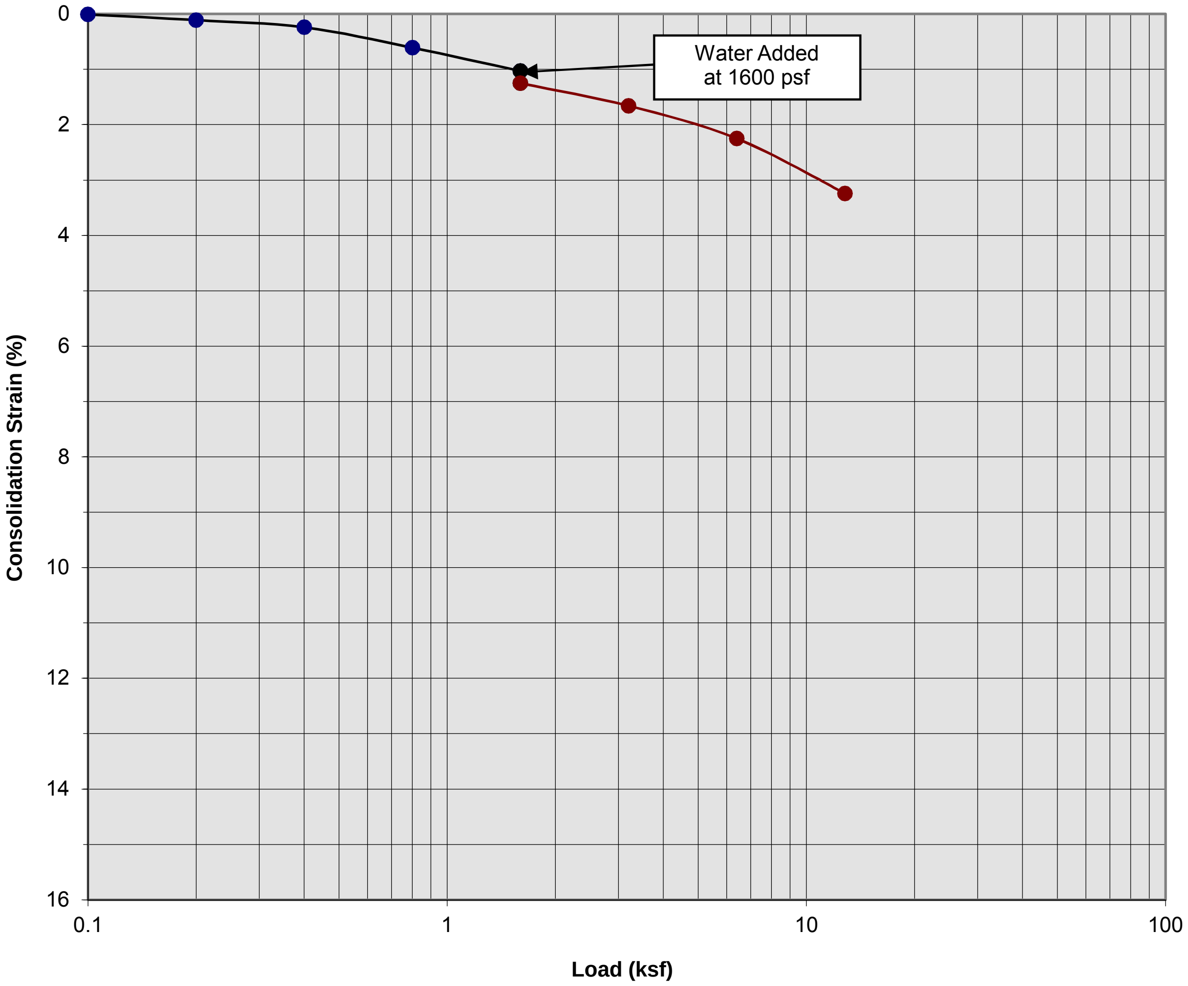


Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4
Sample Number:	---
Depth (ft)	20 to 21
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

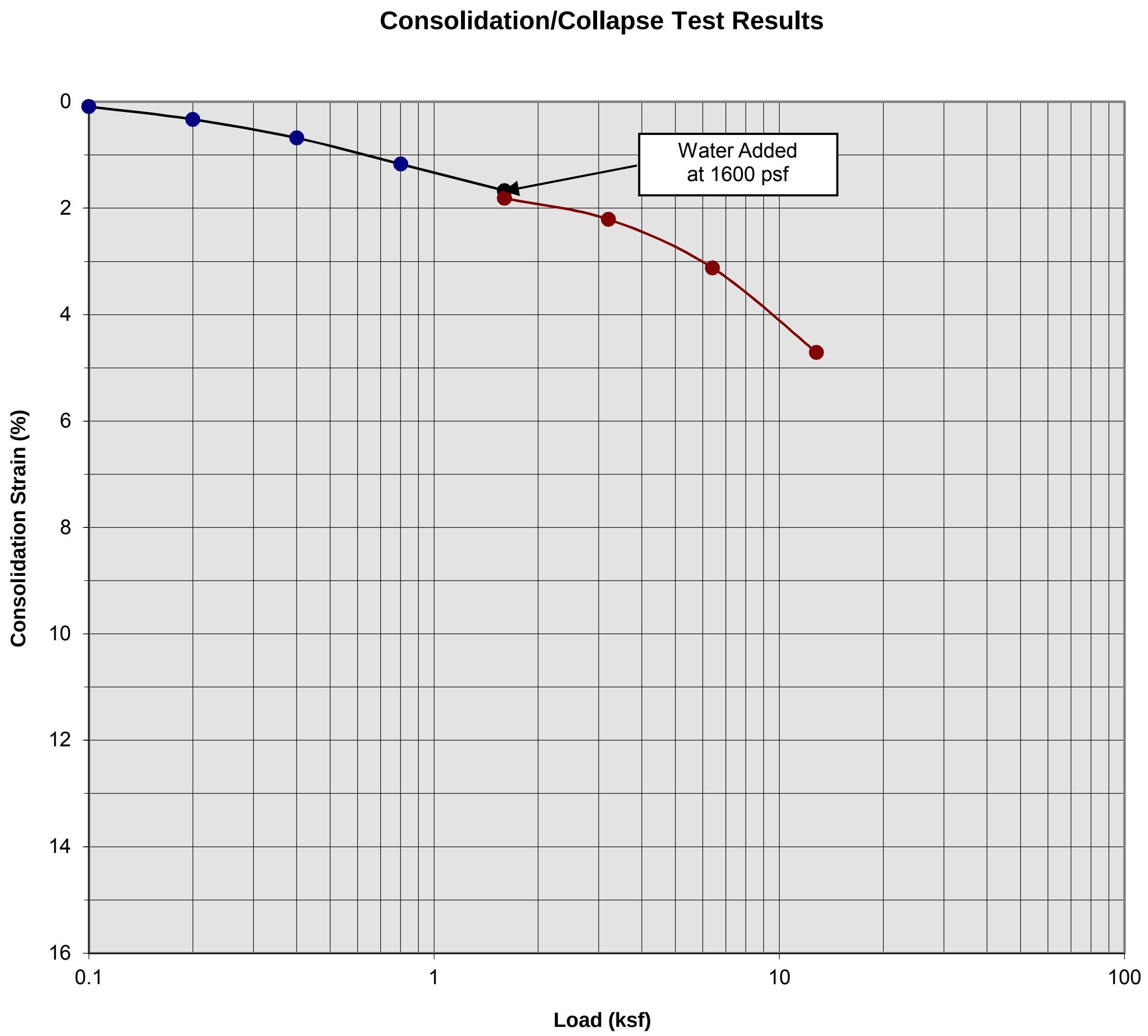
Initial Moisture Content (%)	5
Final Moisture Content (%)	15
Initial Dry Density (pcf)	100.8
Final Dry Density (pcf)	114.5
Percent Collapse (%)	1.88

Consolidation/Collapse Test Results



Classification: Dark Gray Brown fine Sandy Clay

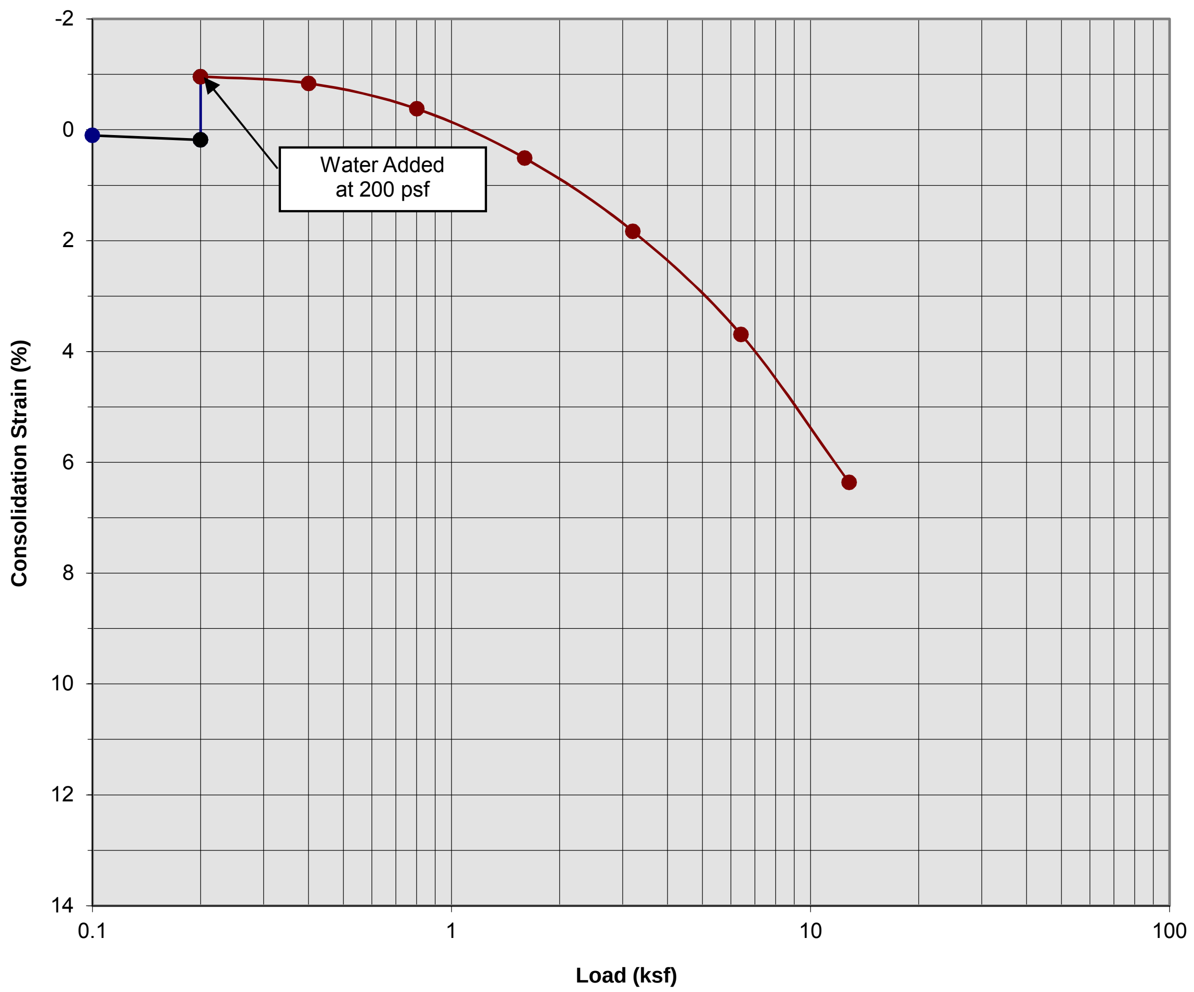
Boring Number:	B-10	Initial Moisture Content (%)	9
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	3 to 4	Initial Dry Density (pcf)	121.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	125.9
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.22



Classification: Gray Brown fine Sandy Clay to Clayey fine Sand

Boring Number:	B-10	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	5 to 6	Initial Dry Density (pcf)	113.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.8
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.14

Consolidation/Collapse Test Results



Classification: Gray Brown fine Sandy Clay

Boring Number:	B-10	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	7 to 8	Initial Dry Density (pcf)	102.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	109.8
Specimen Thickness (in)	1.0	Percent Swell	1.14

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 8

SoCalGeo
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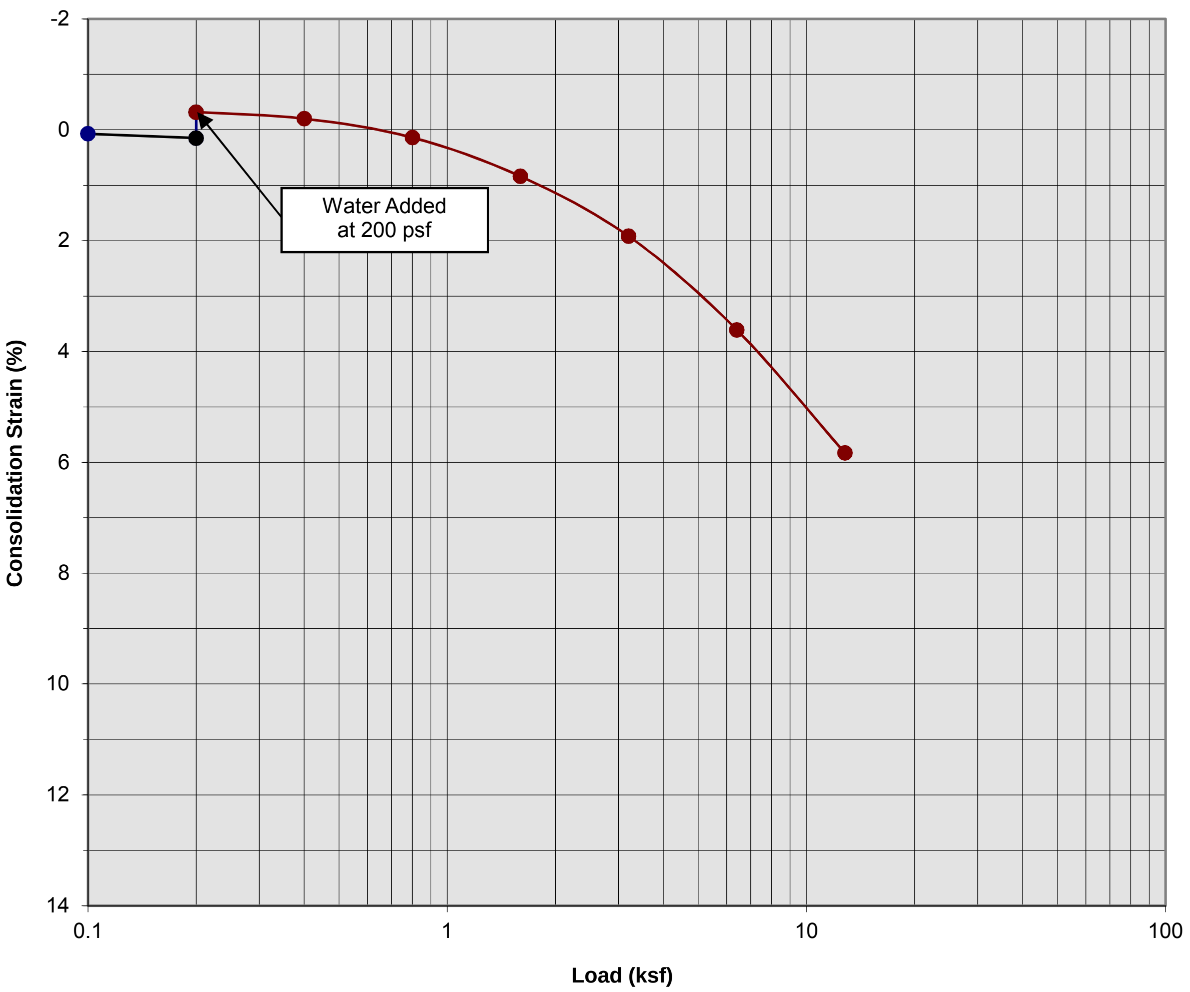
Consolidation/Collapse Test Results



Classification: Gray Brown Silty Clay

Boring Number:	B-10	Initial Moisture Content (%)	19
Sample Number:	---	Final Moisture Content (%)	22
Depth (ft)	9 to 10	Initial Dry Density (pcf)	100.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	106.9
Specimen Thickness (in)	1.0	Percent Swell (%)	0.47

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-9

SoCalGeo
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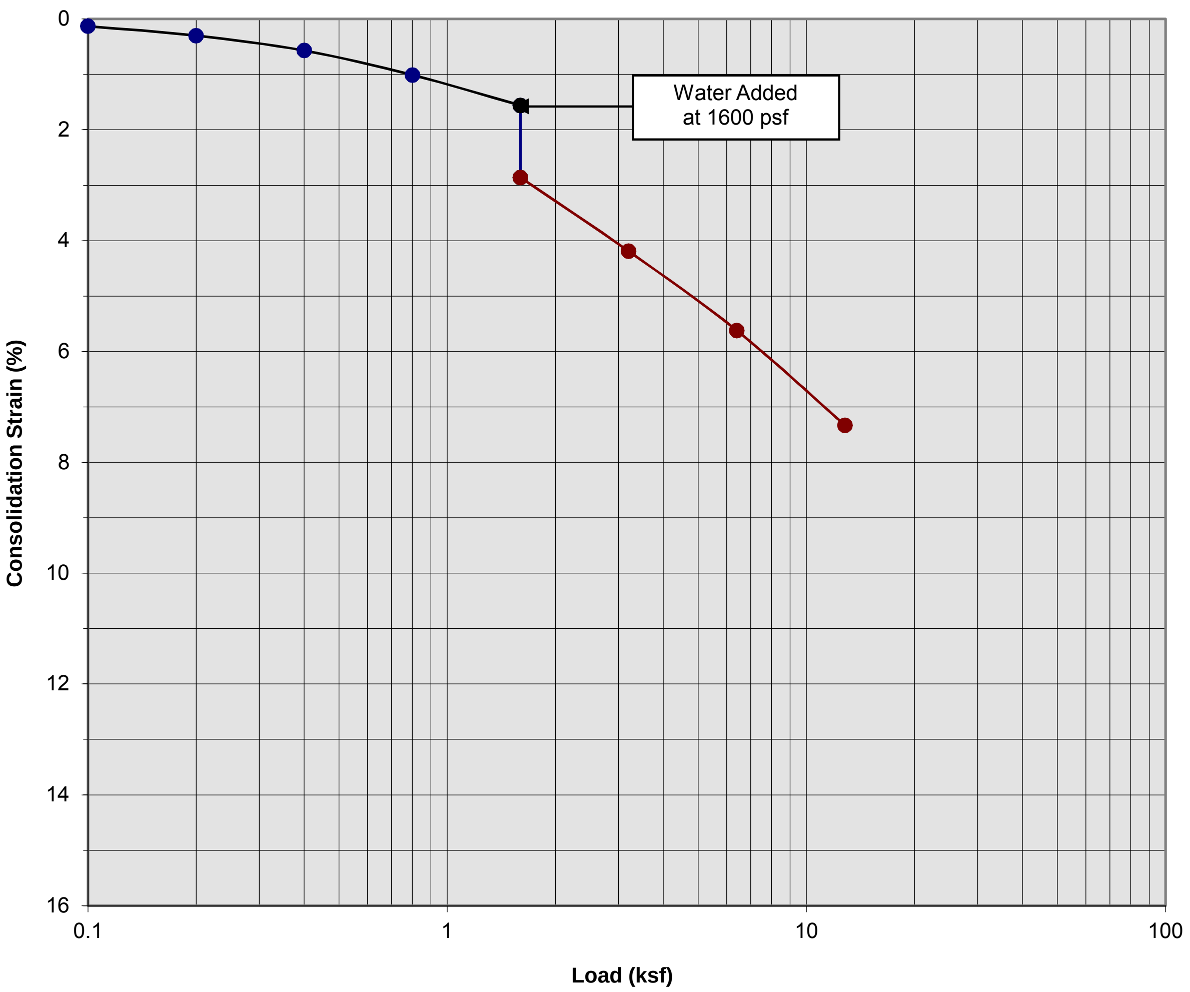
Consolidation/Collapse Test Results



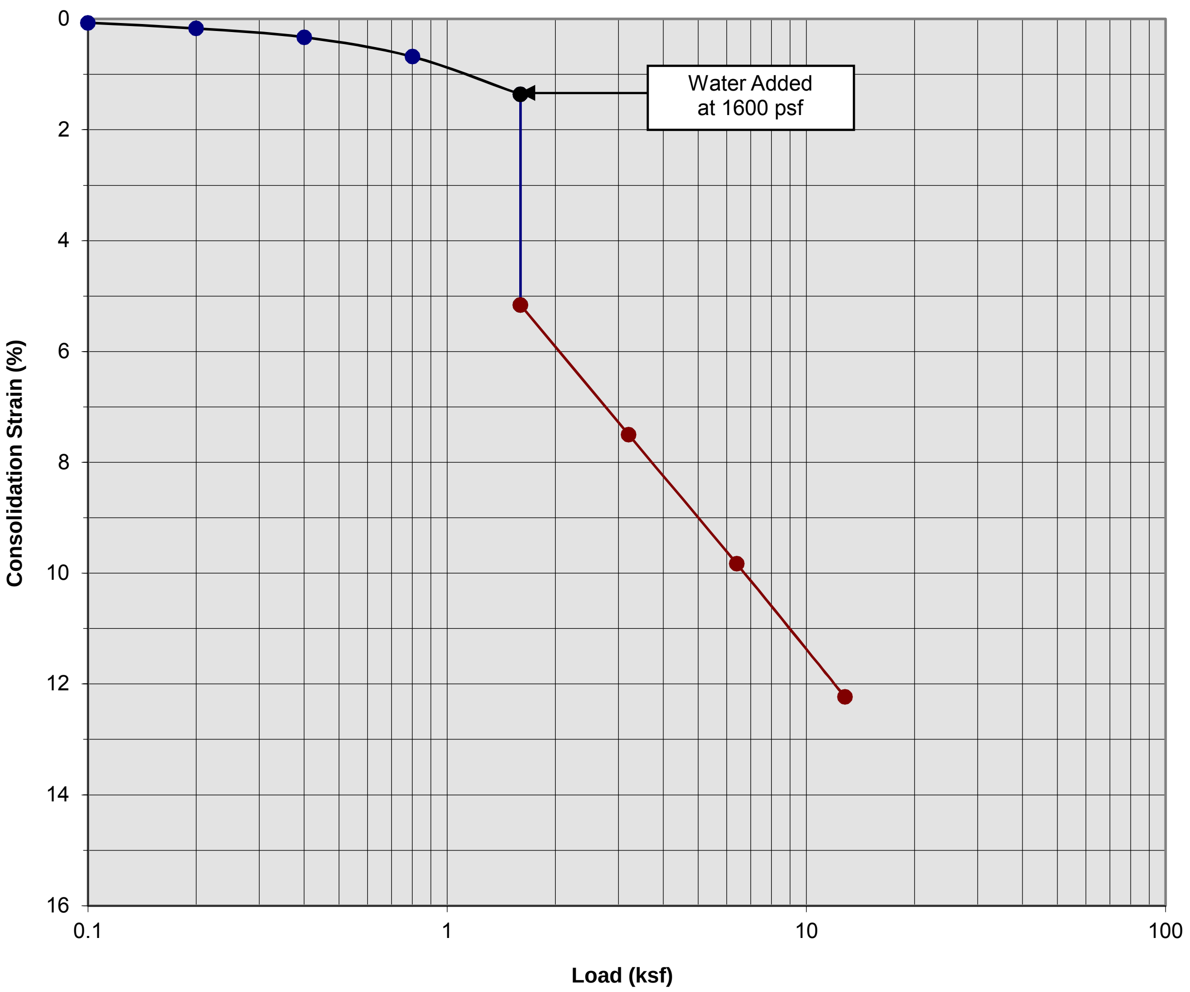
Classification: FILL: Gray Brown Silty fine Sand, trace medium to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	1 to 2	Initial Dry Density (pcf)	112.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	120.9
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.30

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 10

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

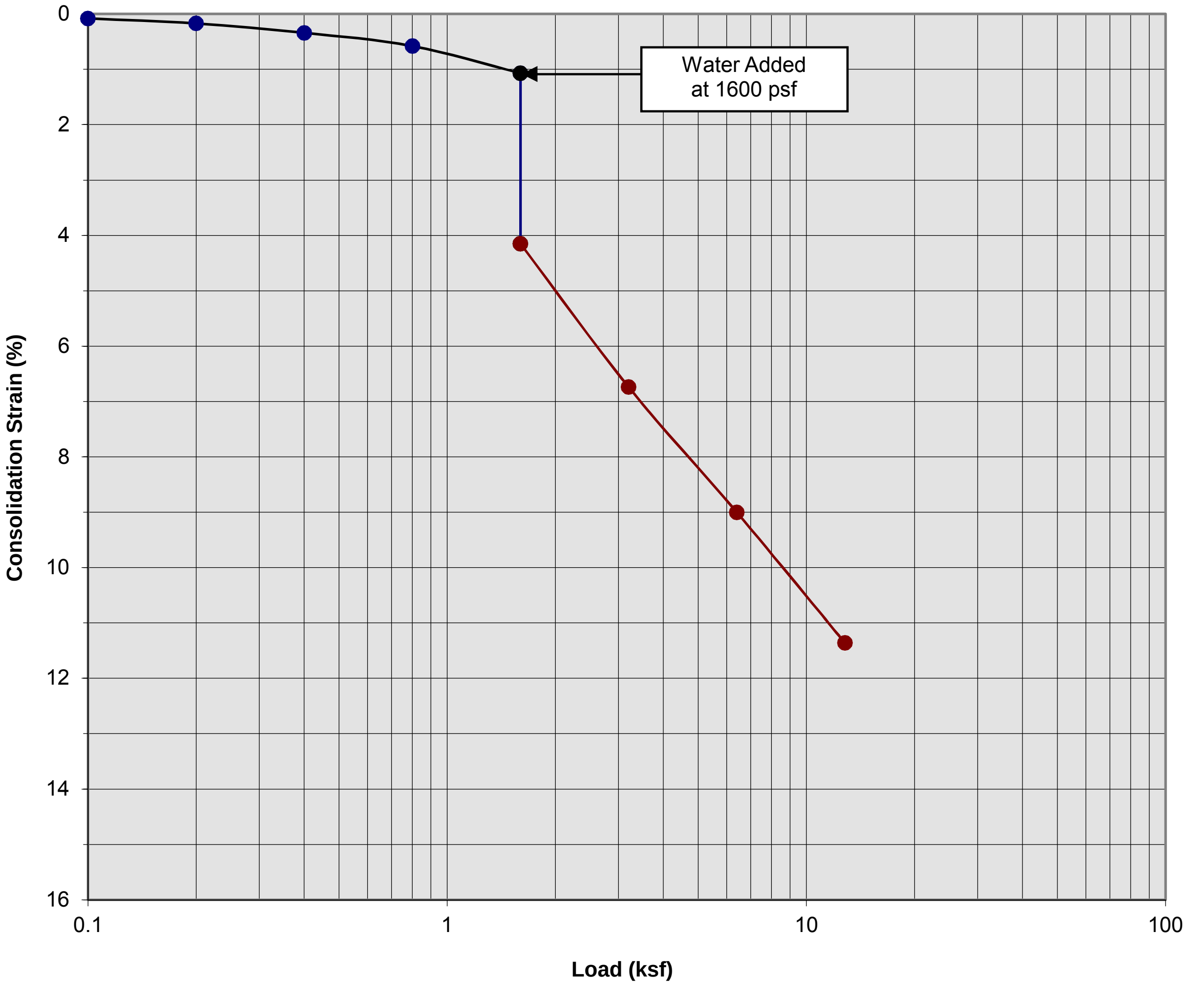
Consolidation/Collapse Test Results



Classification: Brown to Orange Brown Clayey fine to medium Sand

Boring Number:	B-18	Initial Moisture Content (%)	7
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	3 to 4	Initial Dry Density (pcf)	115.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	130.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	3.80

Consolidation/Collapse Test Results



Classification: FILL: Orange Brown Clayey fine to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	5 to 6	Initial Dry Density (pcf)	119.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	131.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	3.08

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 12

SoCalGeo
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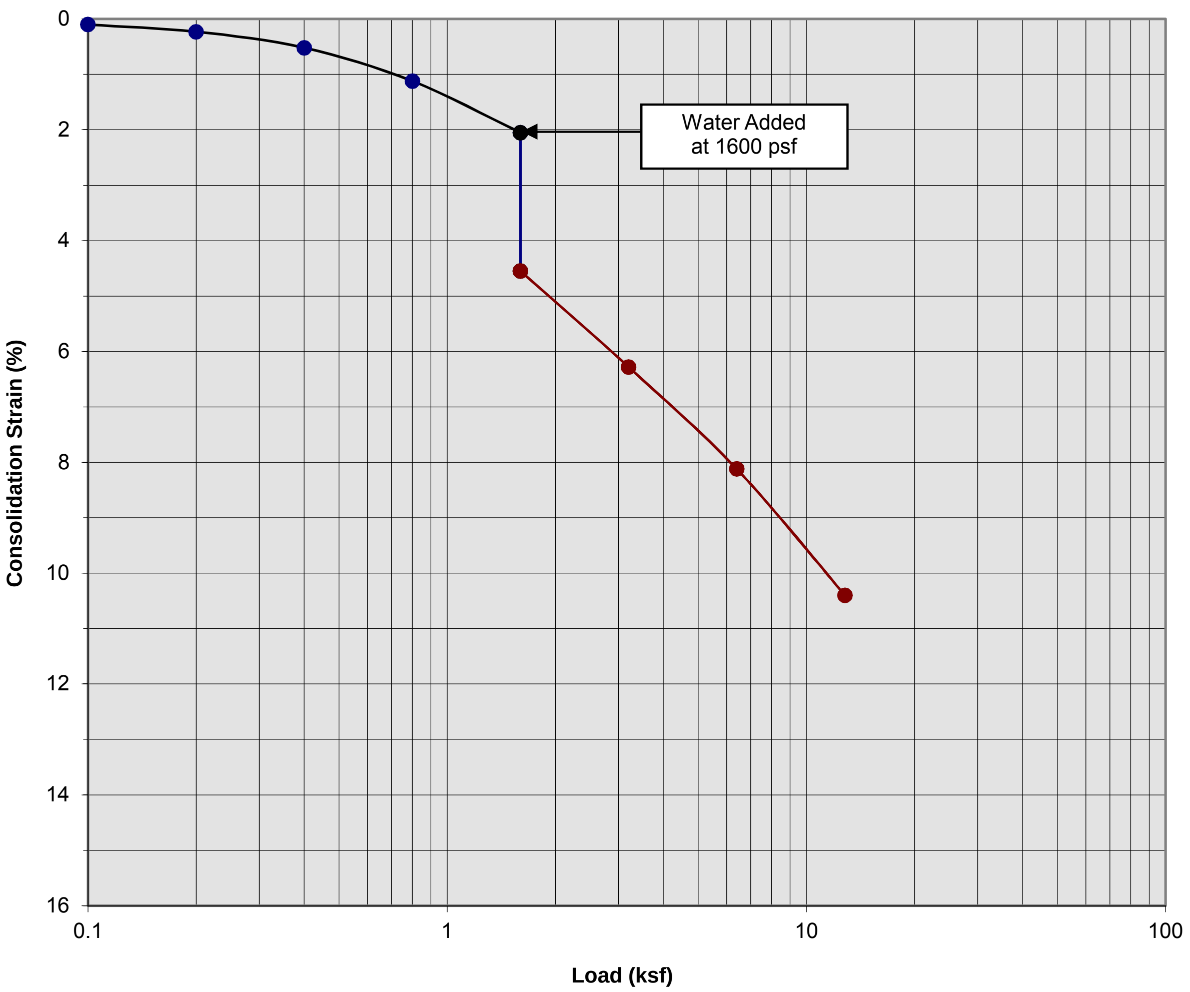
Consolidation/Collapse Test Results



Classification: FILL: Orange Brown Clayey fine to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	7 to 8	Initial Dry Density (pcf)	112.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	125.7
Specimen Thickness (in)	1.0	Percent Collapse (%)	2.50

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 13

SoCalGeo
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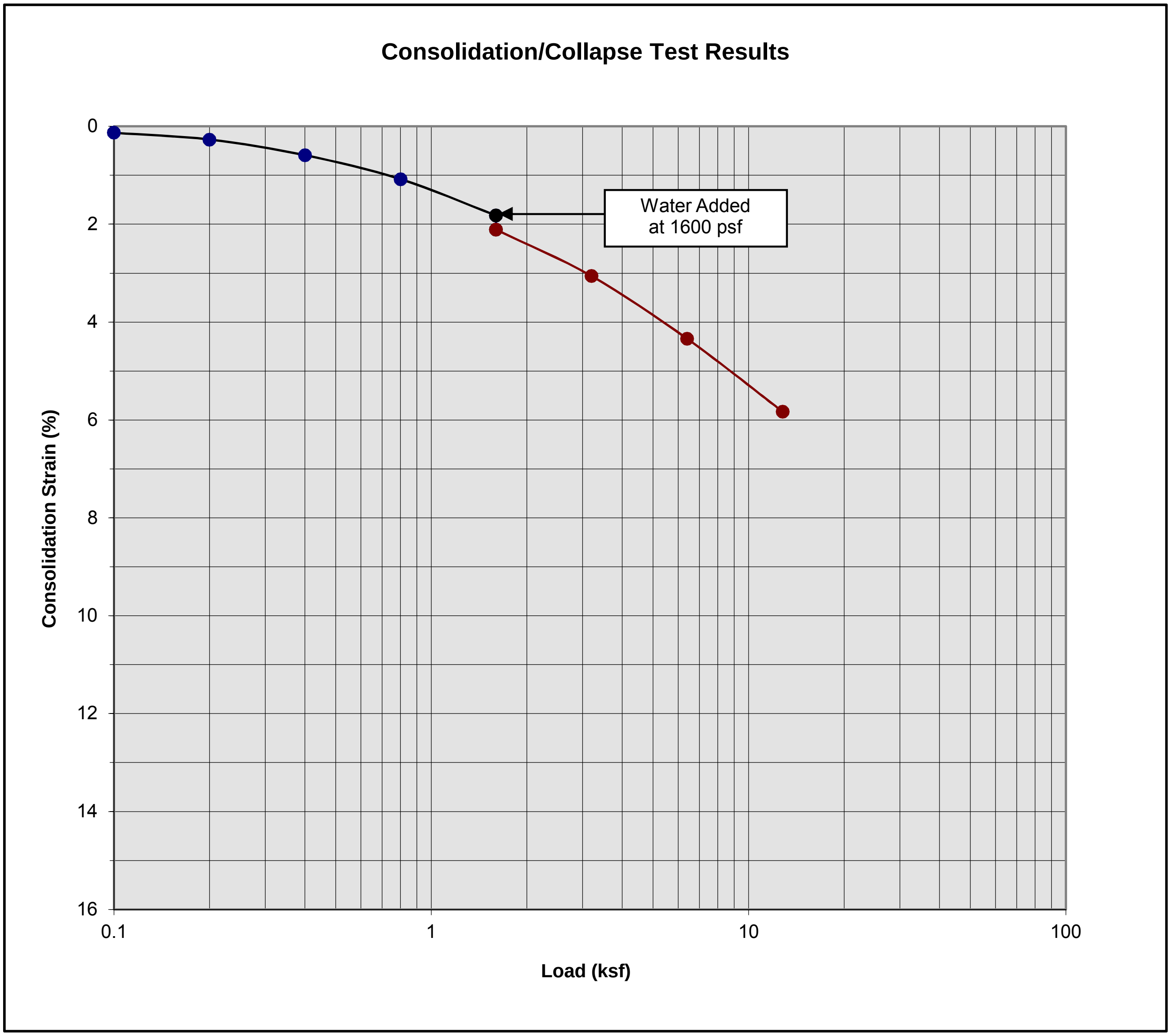
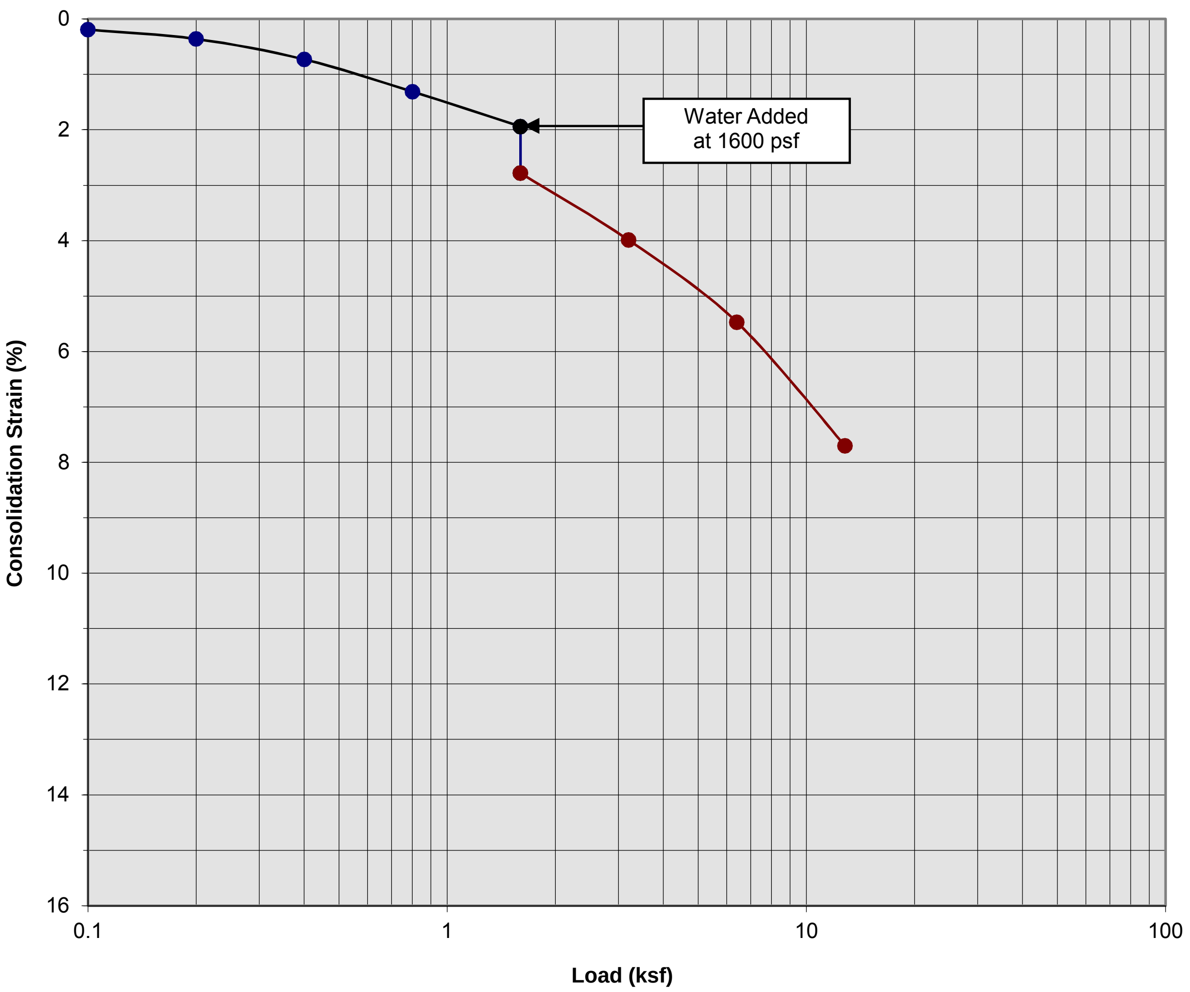


Classification: Orange Brown Silty fine Sand, trace Clay

Boring Number:	B-18	Initial Moisture Content (%)	20
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	9 to 10	Initial Dry Density (pcf)	101.8
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	117.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.29

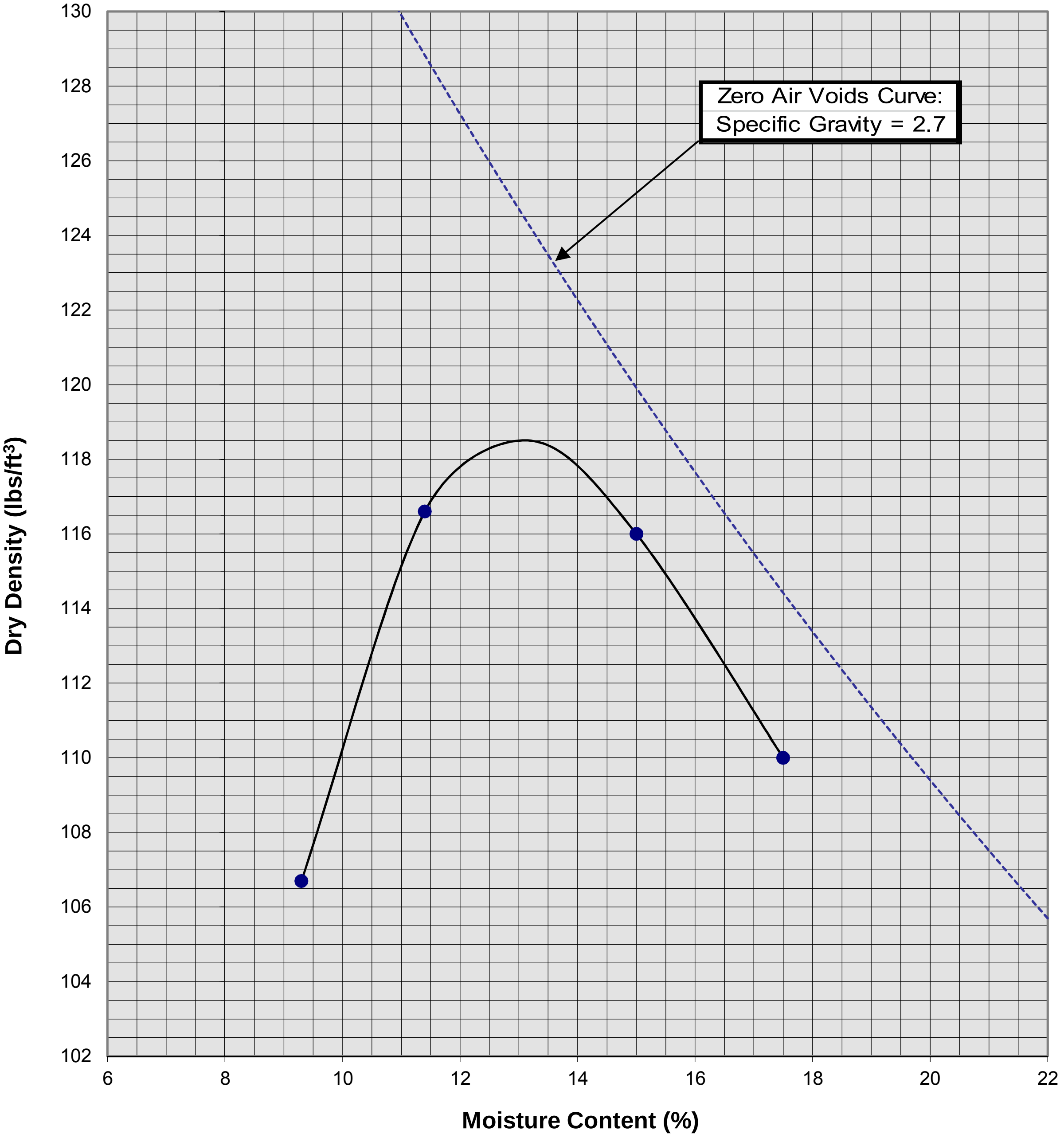
Consolidation/Collapse Test Results



Classification: Brown Silty fine to coarse Sand, some fine to coarse Gravel

Boring Number:	B-18	Initial Moisture Content (%)	8
Sample Number:	---	Final Moisture Content (%)	13
Depth (ft)	15 to 16	Initial Dry Density (pcf)	118.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	128.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.84

Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-1 @ 0 to 5'
Optimum Moisture (%)	13
Maximum Dry Density (pcf)	118
Soil Classification	Brown fine Sandy Clay, trace Silt

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-16

SOUTHERN CALIFORNIA GEOTECHNICAL
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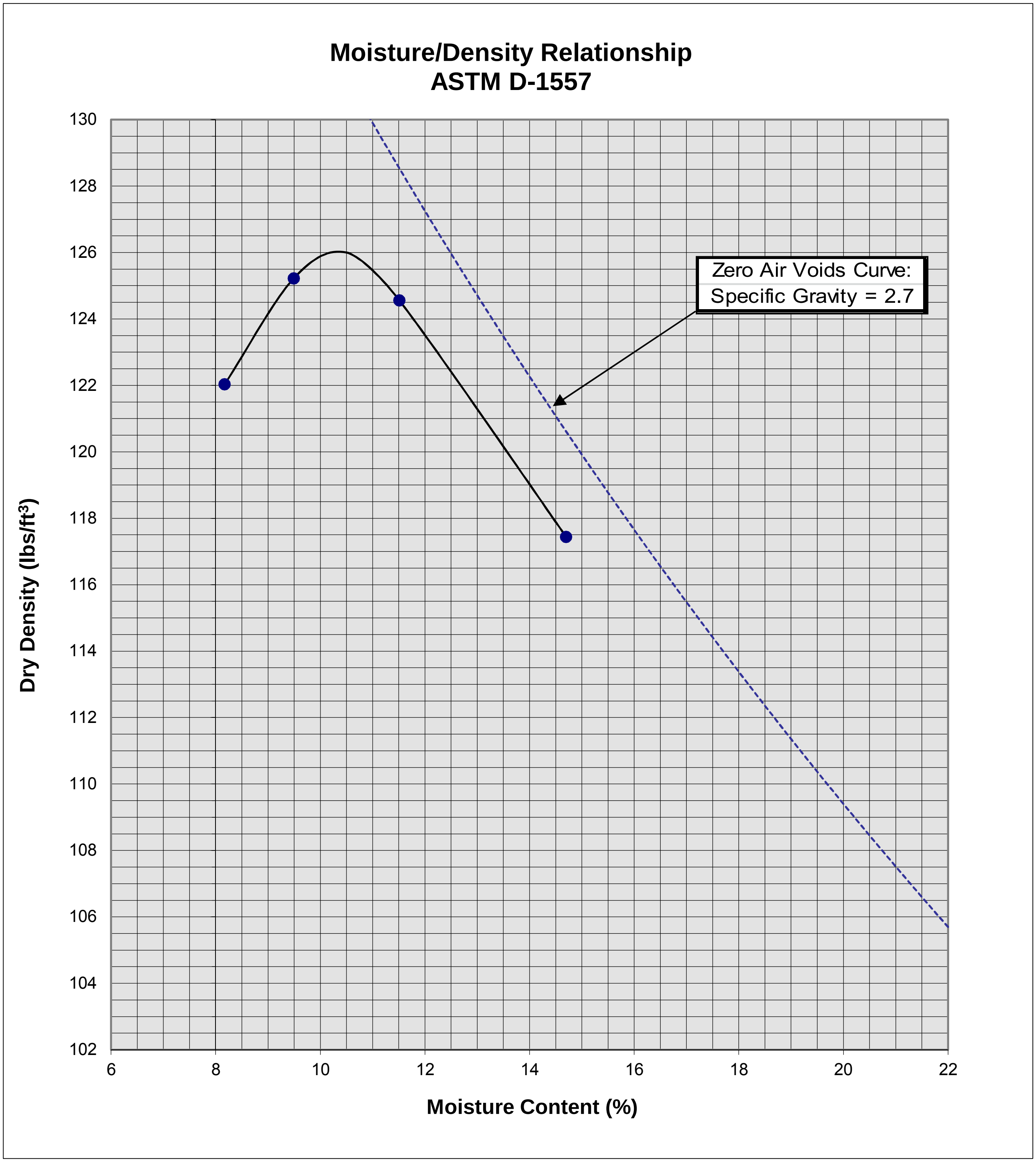

Soil ID Number	B-5 @ 0 to 5'
Optimum Moisture (%)	10.5
Maximum Dry Density (pcf)	126
Soil Classification	Brown fine Sandy Clay, trace to little fine to coarse Gravel

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-17

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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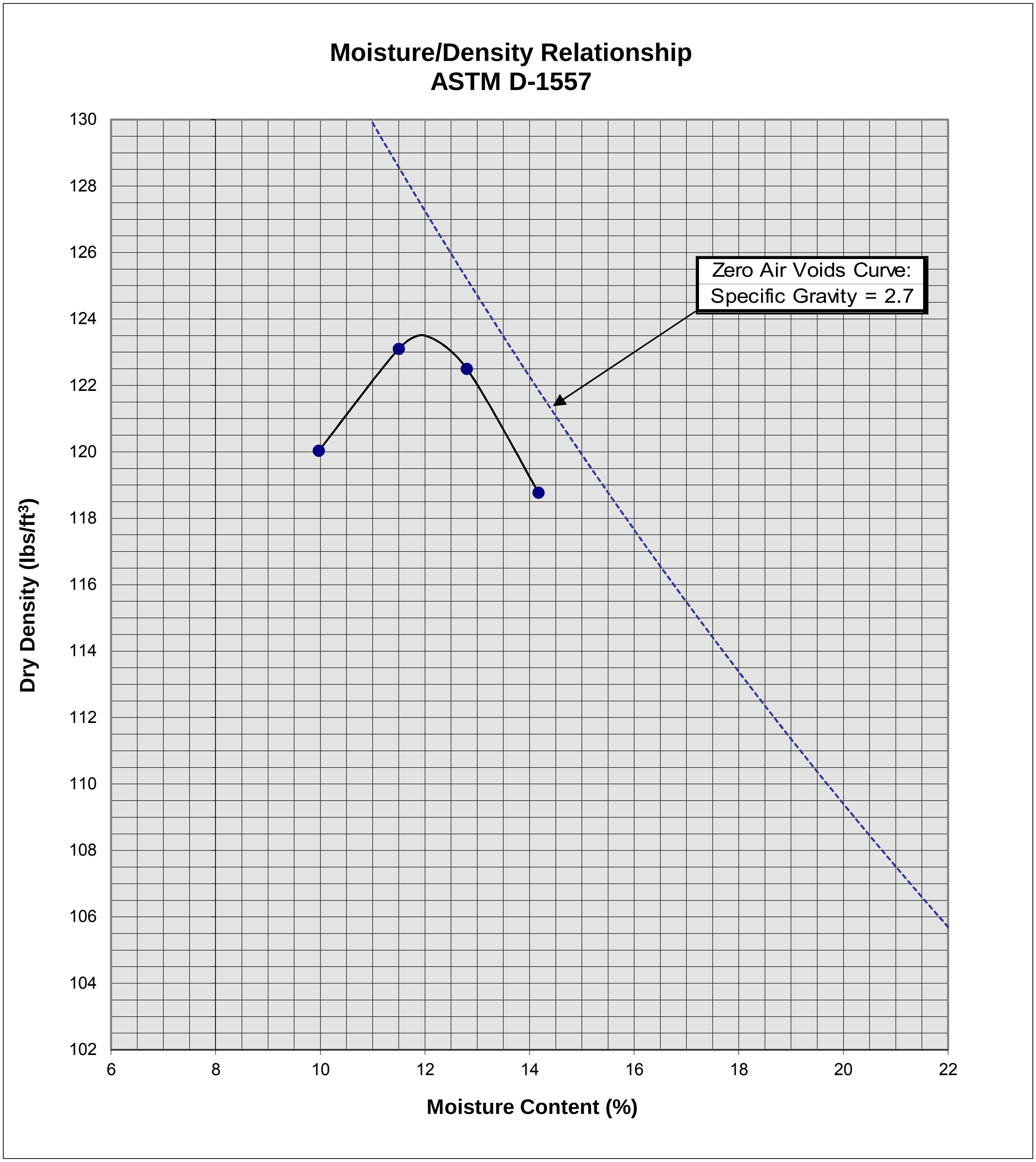

Soil ID Number	B-12 @ 0 to 5'
Optimum Moisture (%)	12
Maximum Dry Density (pcf)	123.5
Soil Classification	Brown fine Sandy Clay, trace Silt

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-18

SOUTHERN CALIFORNIA GEOTECHNICAL
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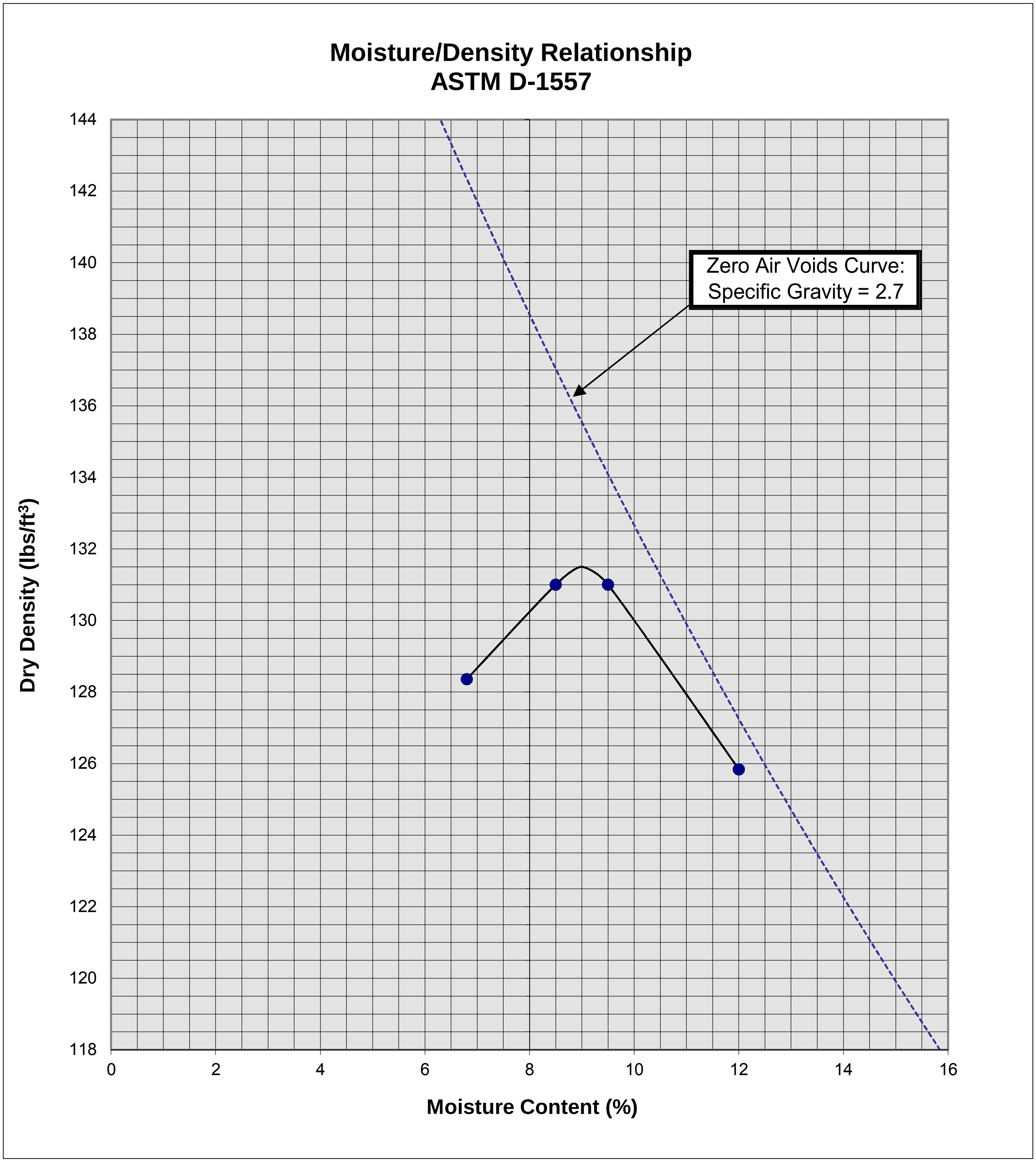

Soil ID Number		B-18 @ 0 to 5'
Optimum Moisture (%)		9
Maximum Dry Density (pcf)		131.5
Soil Classification	Light Brown Clayey fine to coarse Sand, trace Silt	

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-19

SOUTHERN CALIFORNIA GEOTECHNICAL
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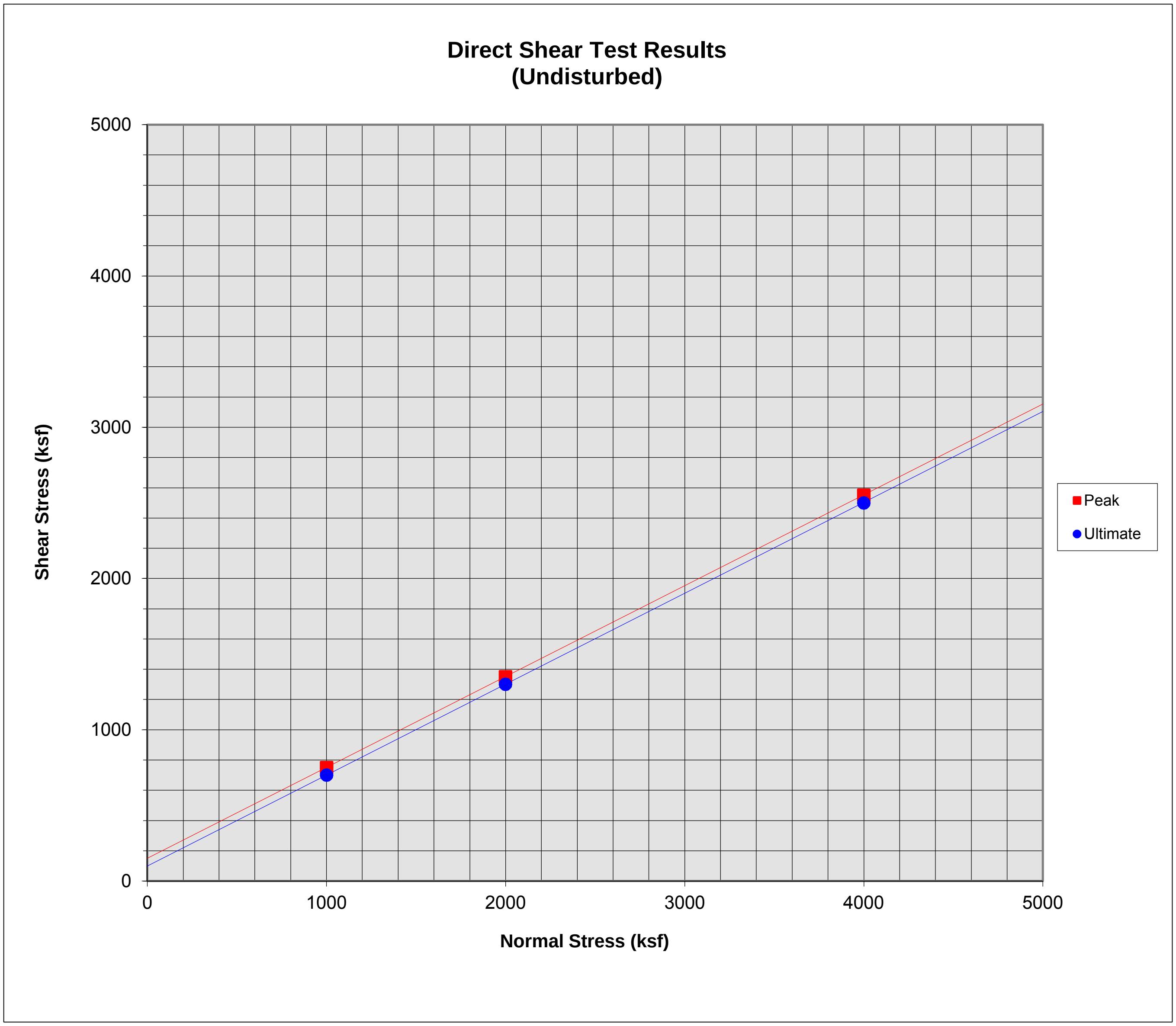

Sample Description: B-1 @ 4 to 5 feet

Classification: ALLUVIUM: Brown fine Sandy Clay, trace Silt

<u>Sample Data</u>

Initial Moisture Content	10.7
Final Moisture Content	24.3
Initial Dry Density	99.5
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

<u>Test Results</u>

	Peak	Ultimate
ϕ (°)	31.0	31.0
C (psf)	150	100

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-20

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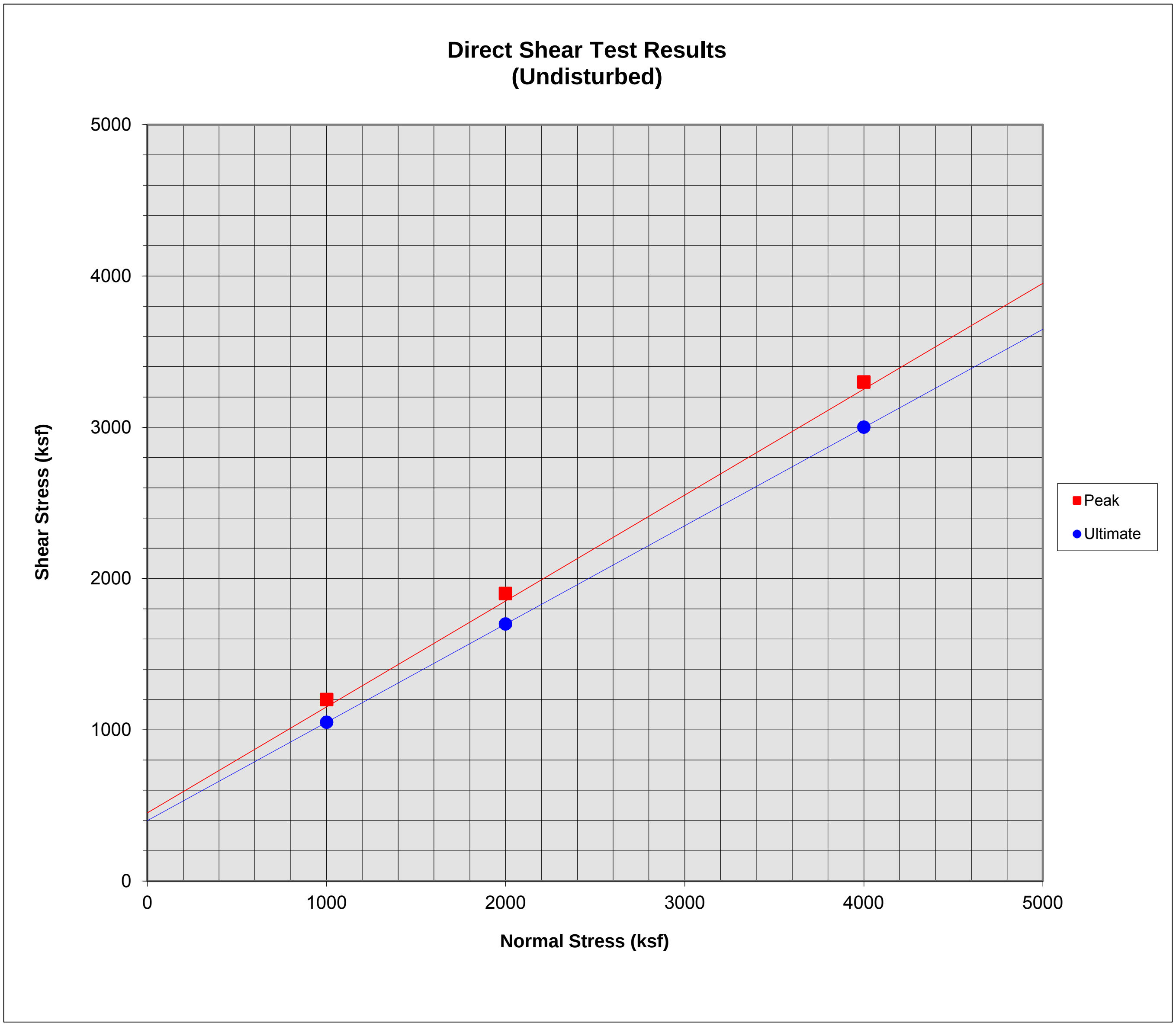

Sample Description: B-3 @ 9 to 10 feet

Classification: BEDROCK: Brown fine Sandy Siltstone, little Clay

Sample Data	
Initial Moisture Content	20.0
Final Moisture Content	34.0
Initial Dry Density	96.0
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results

	Peak	Ultimate
ϕ (°)	35.0	33.0
C (psf)	450	400

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-21

SoCalGeo
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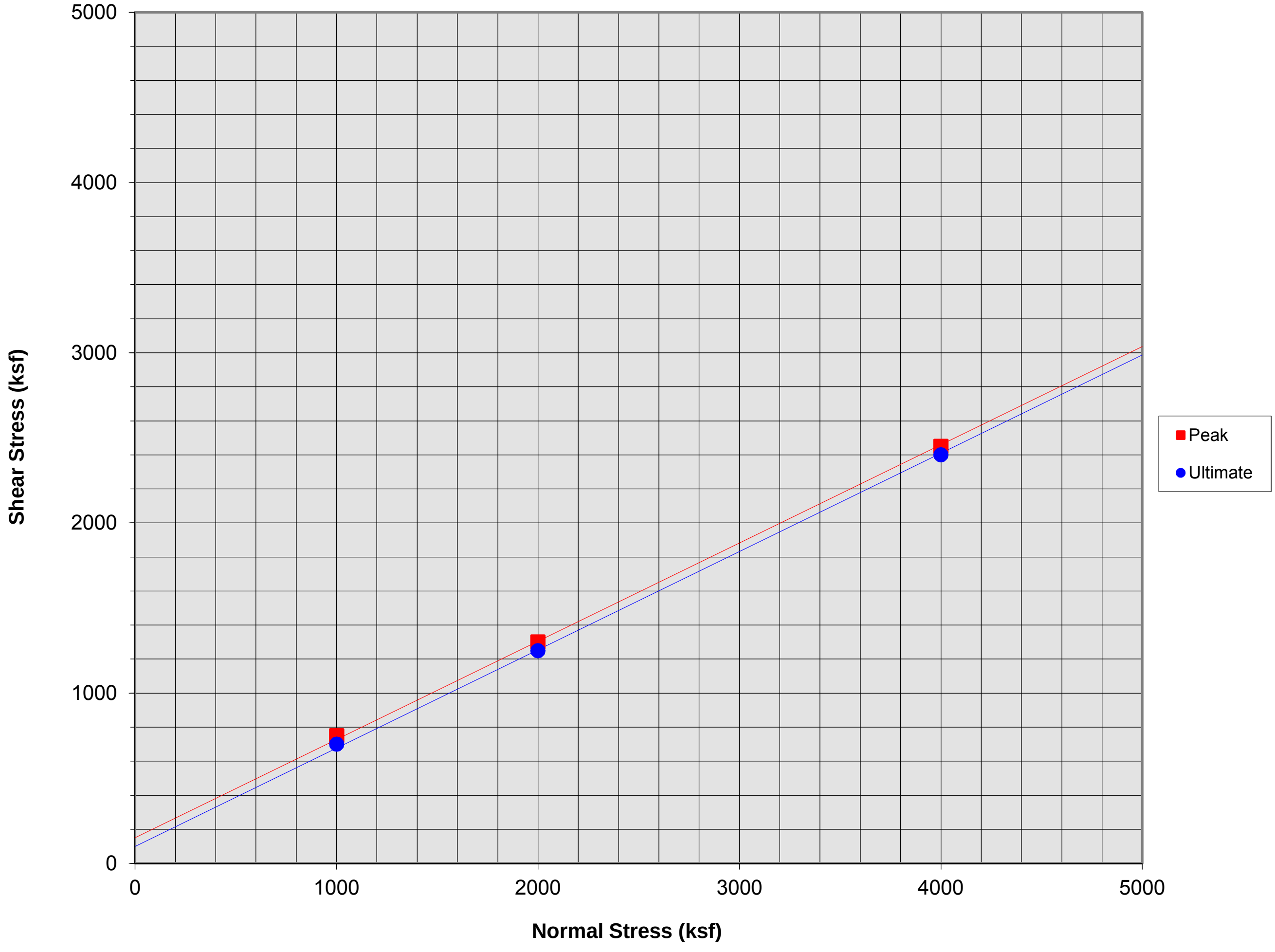
Direct Shear Test Results
(Undisturbed)



Sample Description: B-4 @ 4 to 5 feet

Classification: ALLUVIUM: Light Brown Silty fine Sand

Sample Data

Initial Moisture Content	10.2
Final Moisture Content	21.0
Initial Dry Density	104.0
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results

	Peak	Ultimate
ϕ (°)	30.0	30.0
C (psf)	150	100

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-22

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APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.
- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.
- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.
- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.
- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.
- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.
- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

<u>Compacted Fills</u>

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

  - Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

  - To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

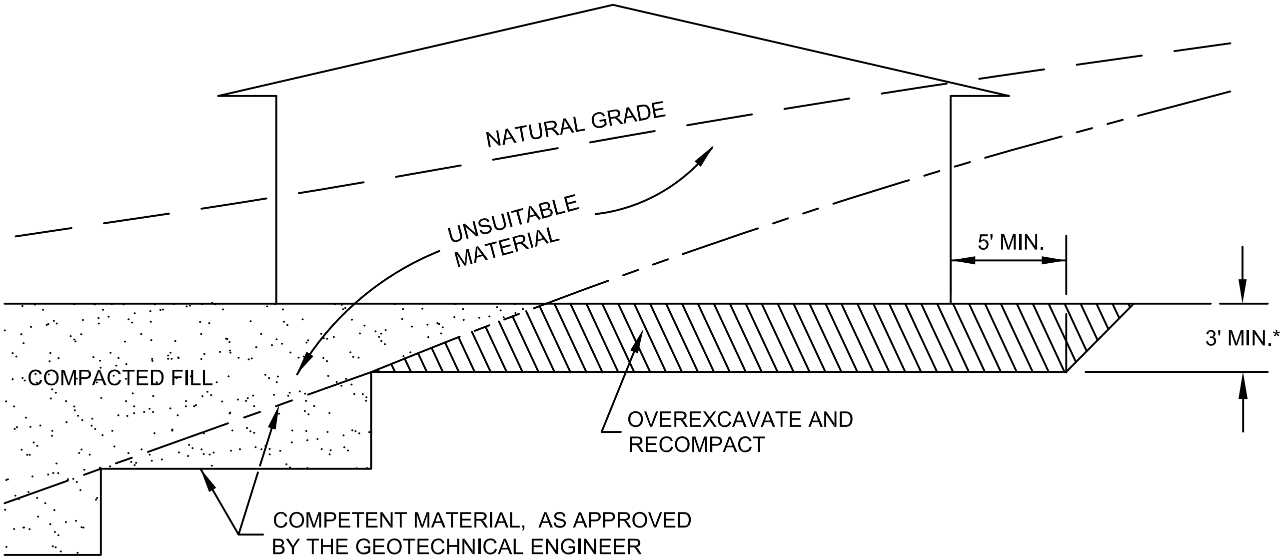
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

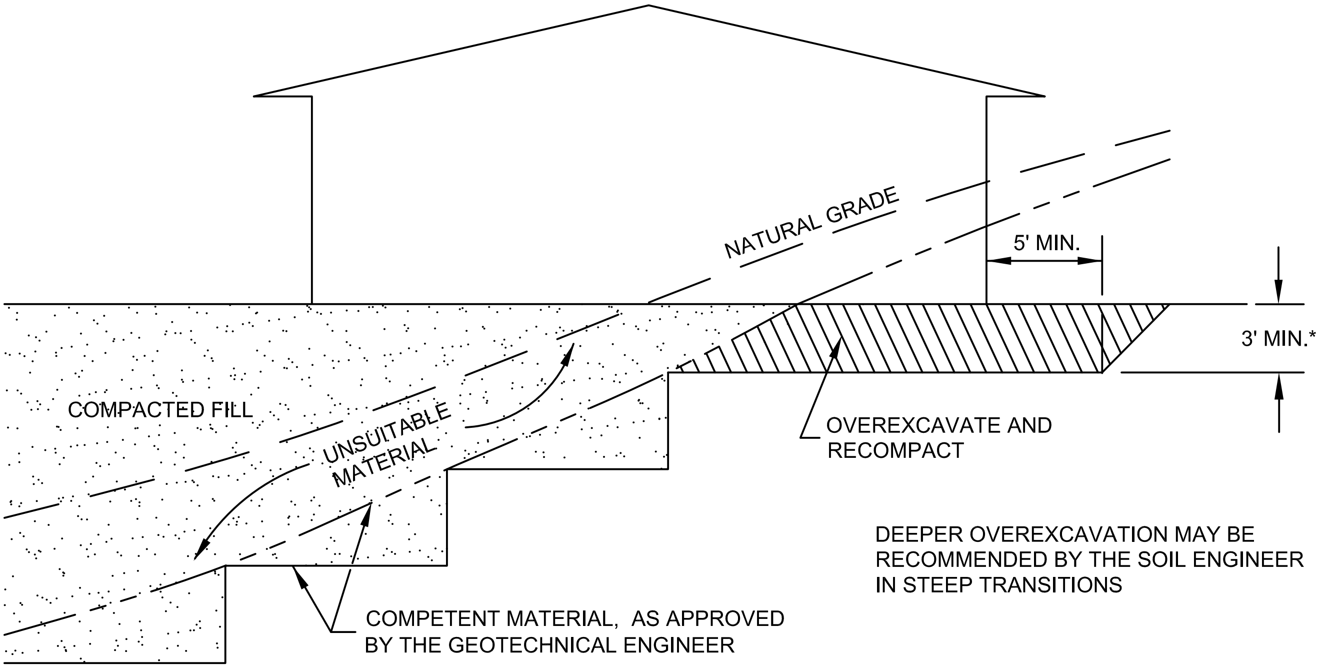
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



DEEPER OVEREXCAVATION MAY BE RECOMMENDED BY THE SOIL ENGINEER IN STEEP TRANSITIONS

*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION.
ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

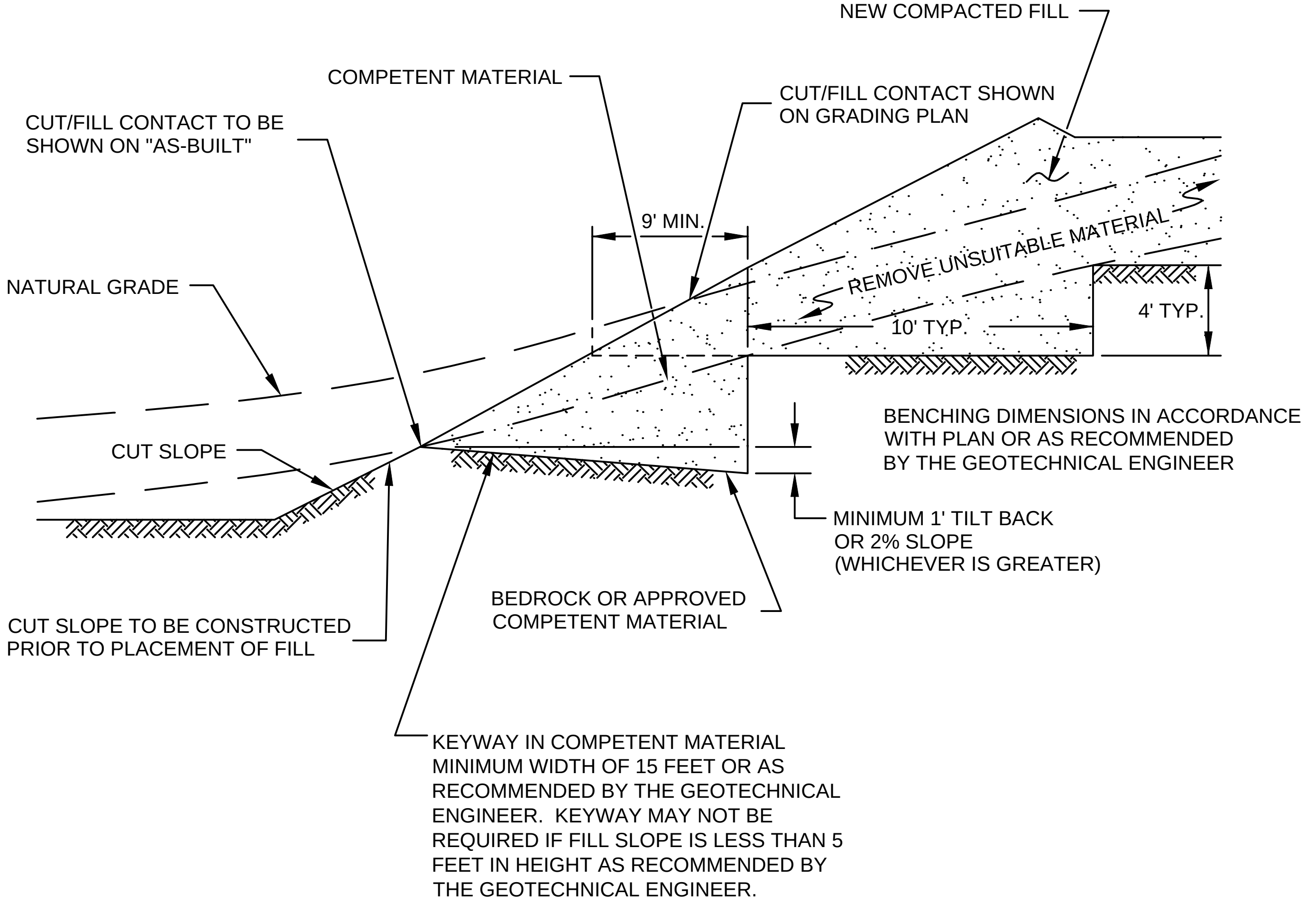
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

GRADING GUIDE SPECIFICATIONS

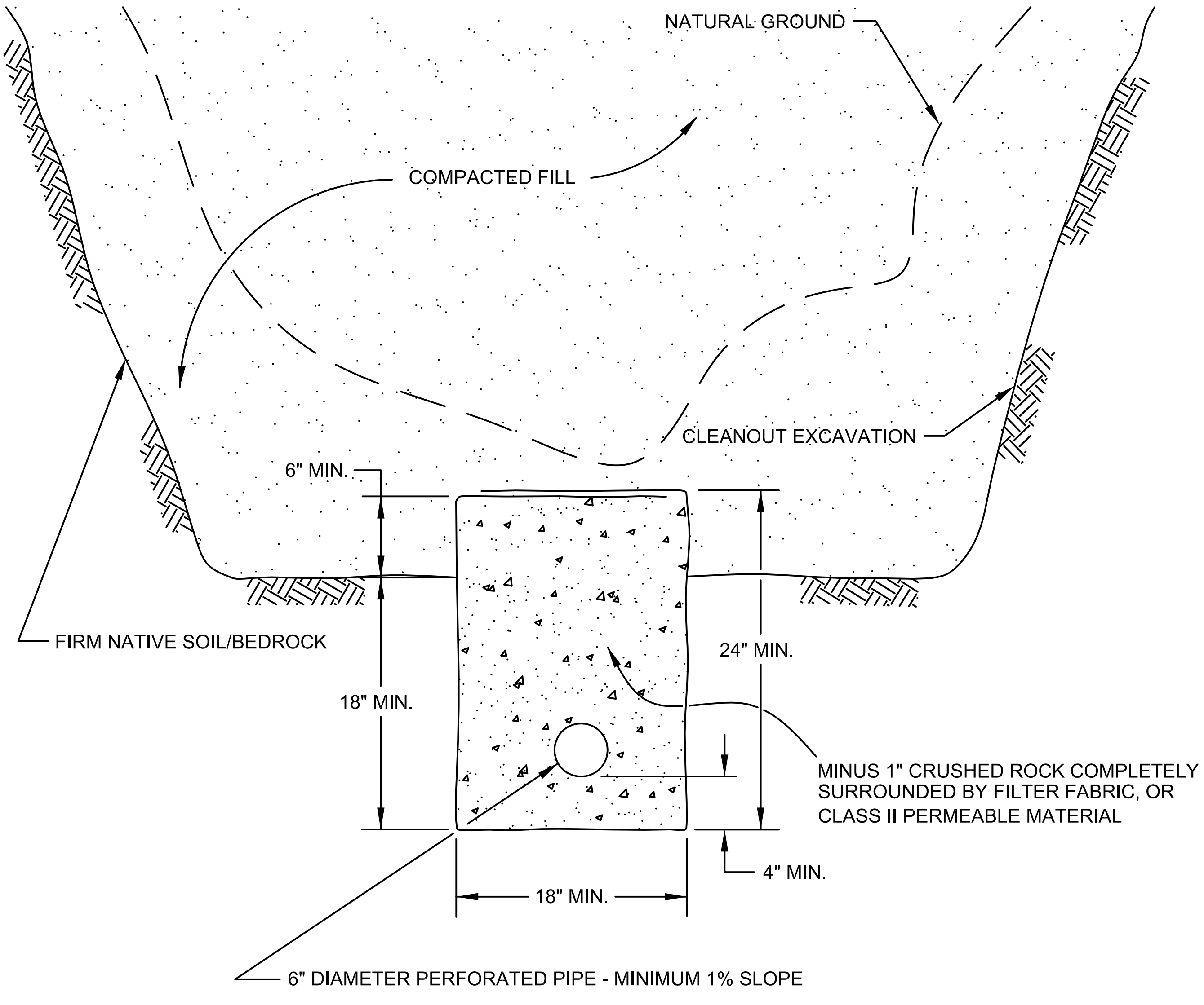
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo

SOUTHERN
CALIFORNIA
GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL

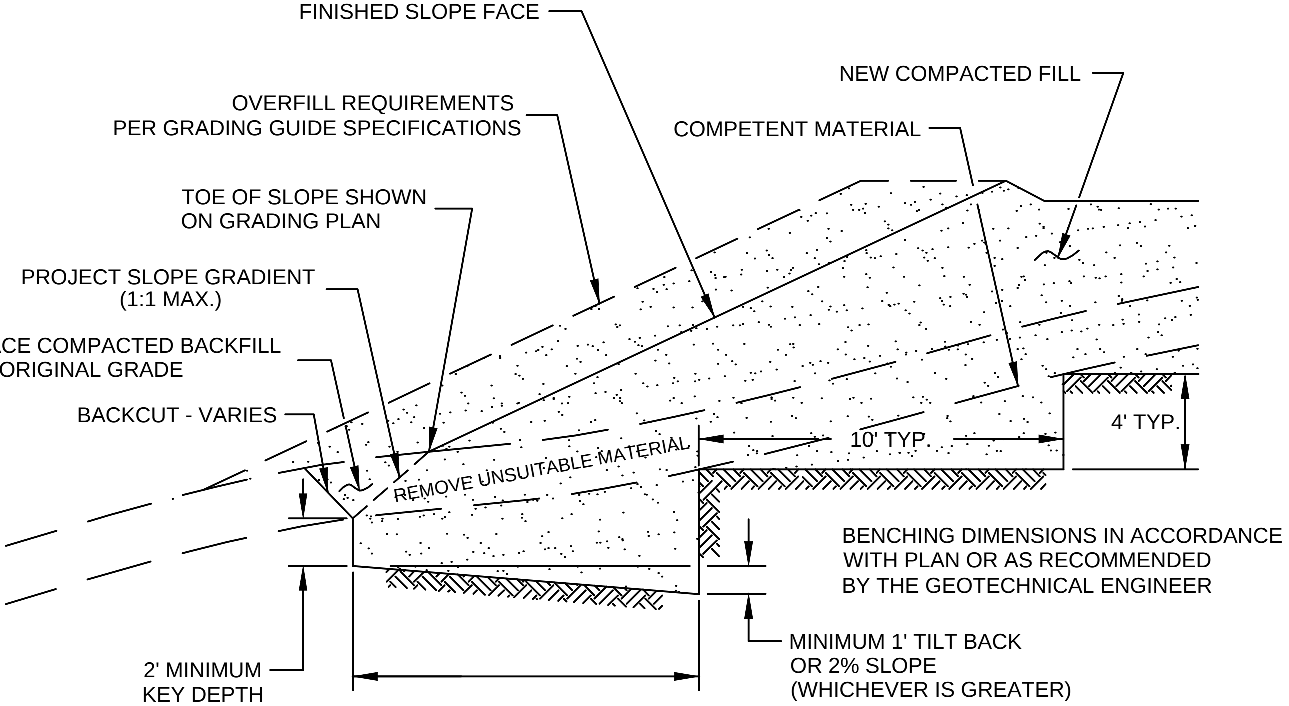
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



BENCHING DIMENSIONS IN ACCORDANCE WITH PLAN OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER

KEYWAY IN COMPETENT MATERIAL. MINIMUM WIDTH OF 15 FEET OR AS RECOMMENDED BY THE GEOTECHNIAL ENGINEER. KEYWAY MAY NOT BE REQUIRED IF FILL SLOPE IS LESS THAN 5' IN HEIGHT AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

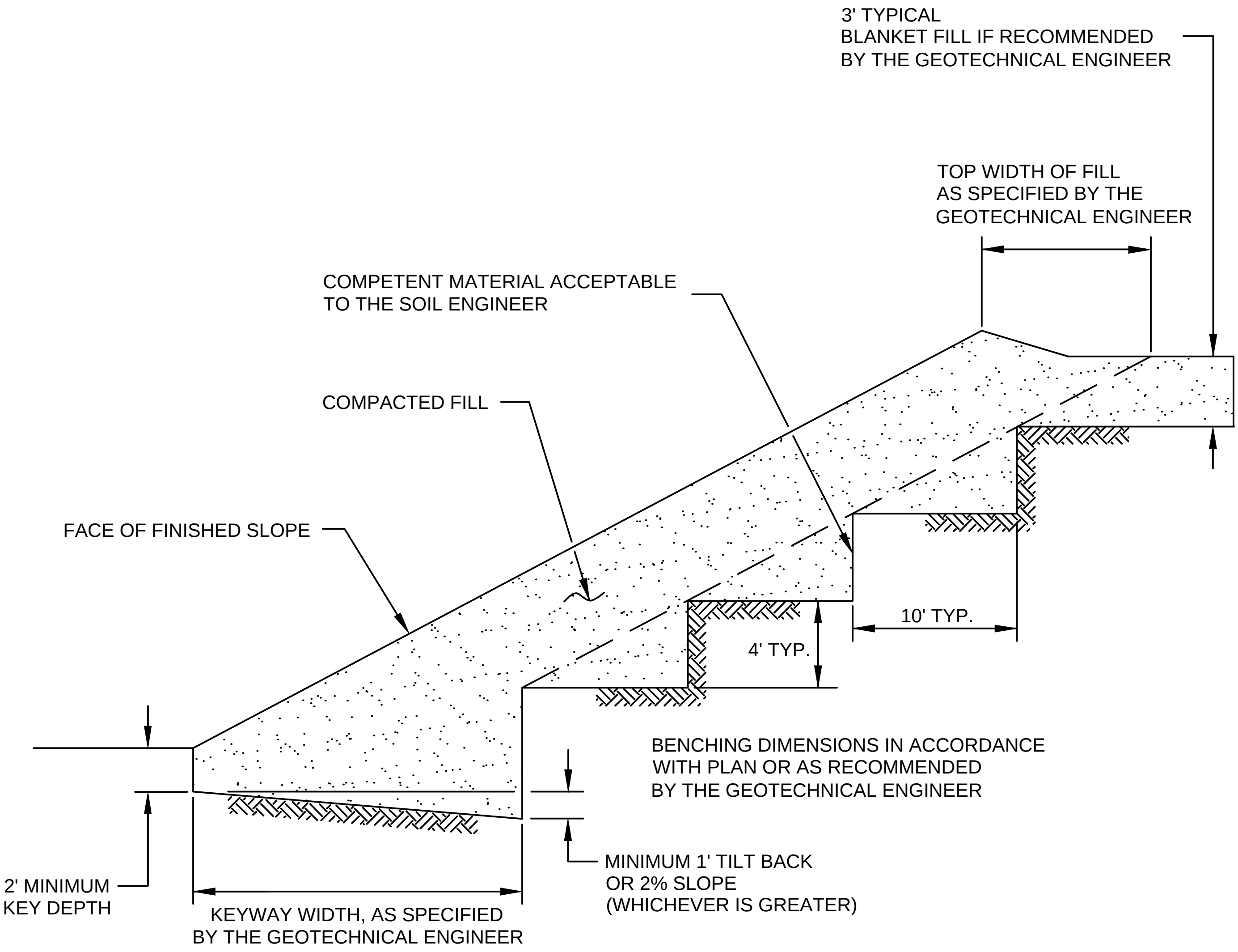
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



STABILIZATION FILL DETAIL

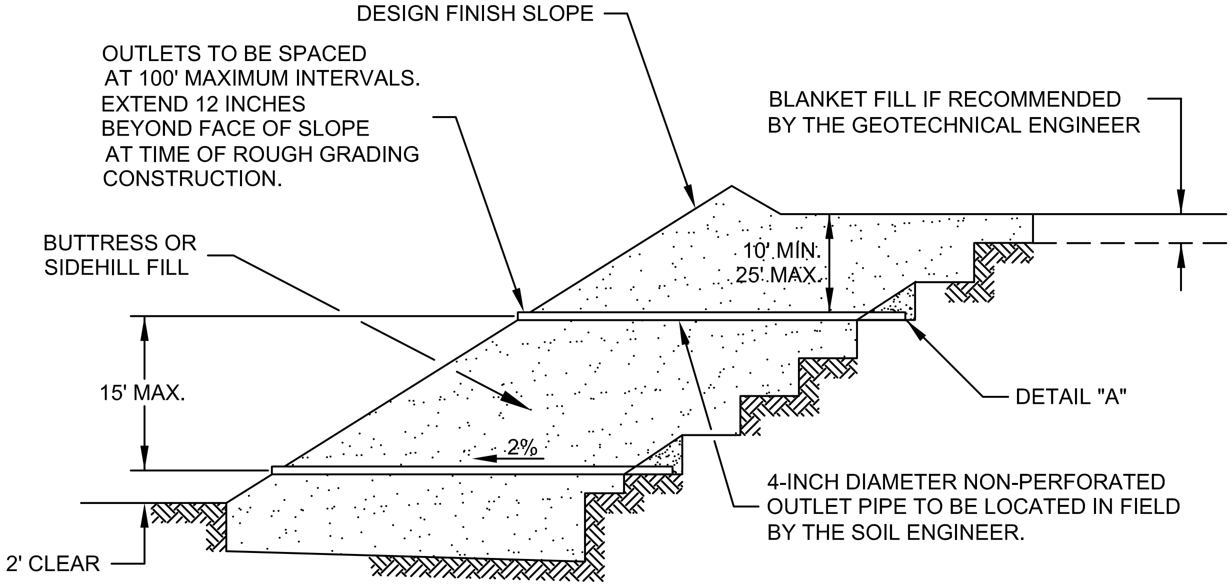
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



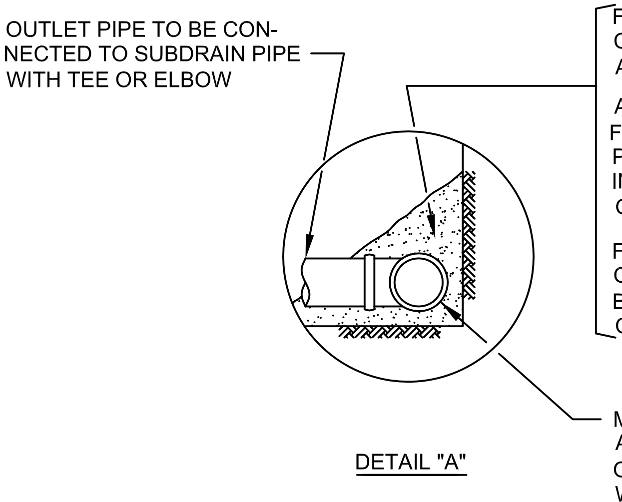
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



FILTER MATERIAL - MINIMUM OF FIVE CUBIC FEET PER FOOT OF PIPE. SEE ABOVE FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL FIVE CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE ABOVE FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 12 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

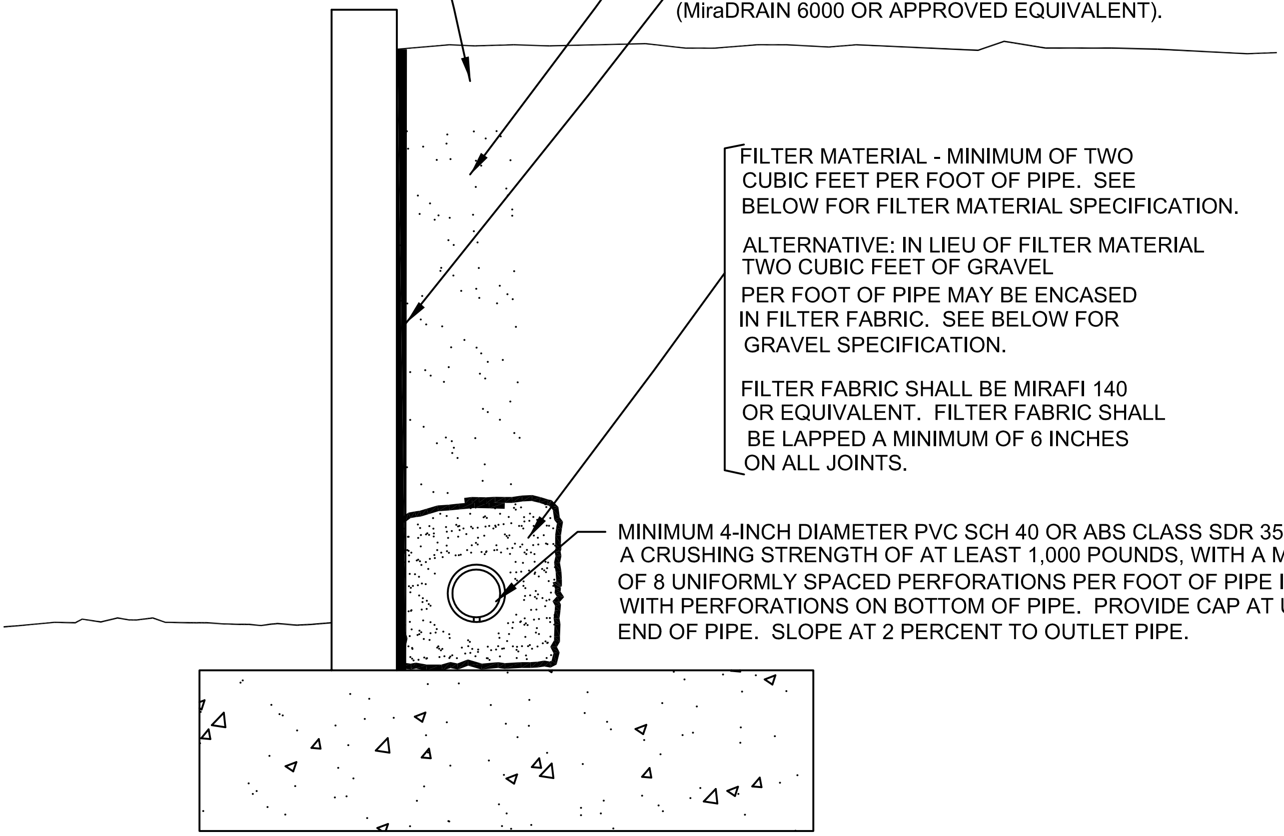
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



MINIMUM ONE FOOT THICK LAYER OF
LOW PERMEABLILITY SOIL IF NOT
COVERED WITH AN IMPERMEABLE SURFACE

MINIMUM ONE FOOT WIDE LAYER OF
FREE DRAINING MATERIAL
(LESS THAN 5% PASSING THE #200 SIEVE)
OR
PROPERLY INSTALLED PREFABRICATED DRAINAGE COMPOSITE
(MiraDRAIN 6000 OR APPROVED EQUIVALENT).

FILTER MATERIAL - MINIMUM OF TWO CUBIC FEET PER FOOT OF PIPE. SEE BELOW FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL TWO CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE BELOW FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 6 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

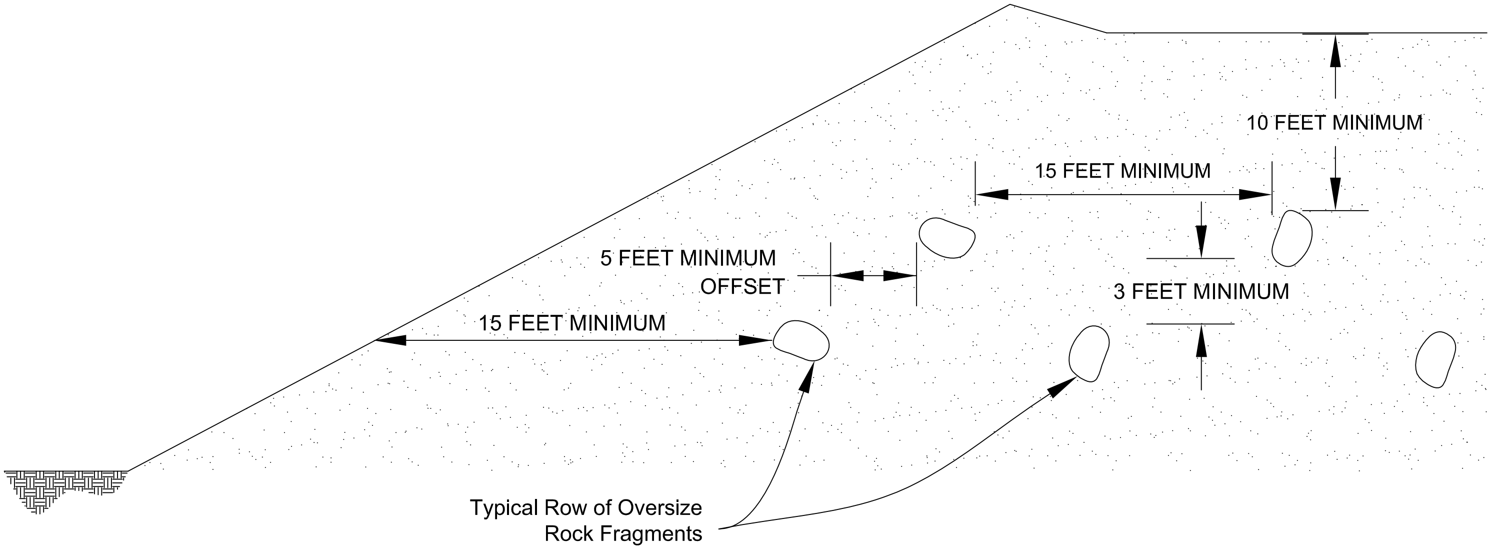
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

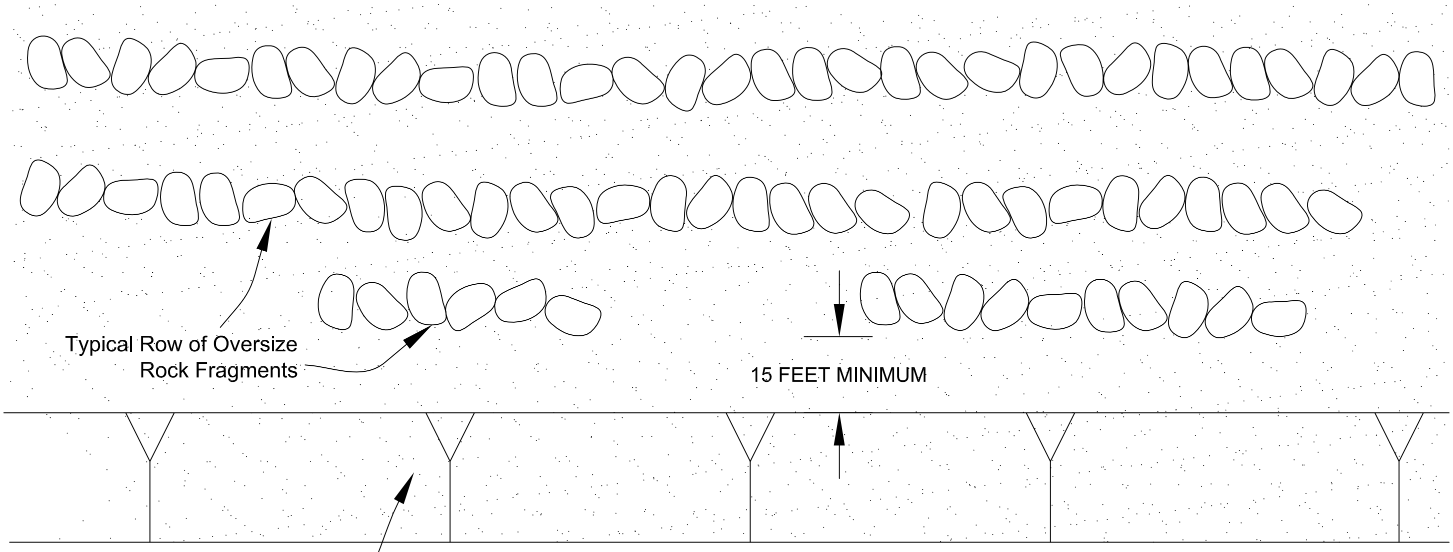
DRAWN: JAS
CHKD: GKM

PLATE D-7

SOUTHERN
CALIFORNIA
GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN
CALIFORNIA
GEOTECHNICAL

APPENDIX E

USGS Design Maps Summary Report

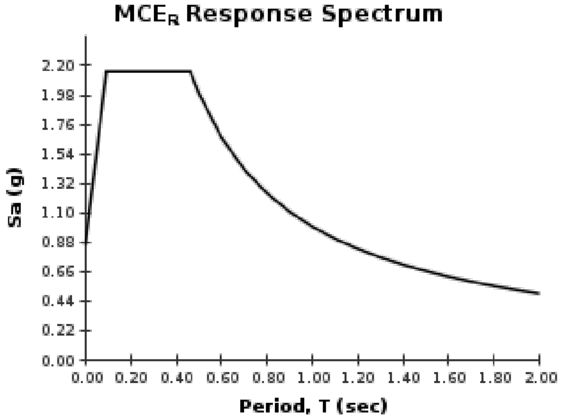
User–Specified Input

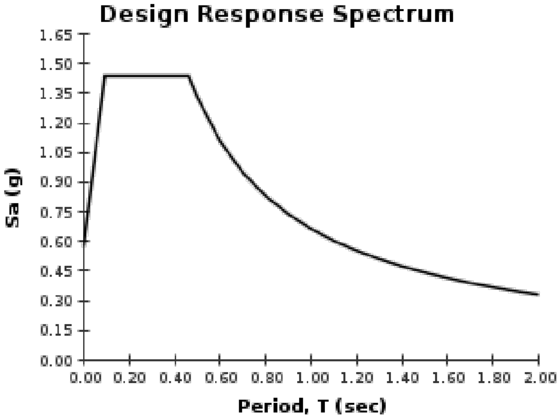
Report Title	Proposed Mixed Use Development Tue January 7, 2014 16:40:50 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.99597°N, 117.89268°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"
Risk Category	I/II/III

USGS–Provided Output

S_S = 2.155 g	S_{MS} = 2.155 g	S_{DS} = 1.437 g
S_1 = 0.766 g	S_{M1} = 0.996 g	S_{D1} = 0.664 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.


MCE_R Response Spectrum


Design Response Spectrum

SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

DRAWN: DRK
CHKD: JAS
SCG PROJECT
13G184-1
PLATE E-1

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL

Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.796

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.796 = 0.796$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = C and PGA = 0.796 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.972

From Figure 22-18 [6] C_{R1} = 0.990

SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

DRAWN: DRK
CHKD: JAS
SCG PROJECT
13G184-1
PLATE E-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX F

LIQUEFACTION EVALUATION

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN
Boring No.	B-6

MCE_G Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	25	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60-CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=6.99)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(9)	(10)	(11)	(12)	(13)		
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	N/A	N/A	0.45	N/A	Above Water Table
19.5	20	22	21	25	120	16	1.27	1.15	1.3	0.89	0.95	40.2	43.7	2520	2458	2520	0.67	0.95	2.00	2.00	0.36	5.62	Non-liquefiable
24.5	22	25	23.5	19	120	58	1.27	1.15	1.22	0.84	0.95	27.1	32.7	2820	2602	2820	0.64	0.95	0.73	0.79	0.36	2.21	Non-liquefiable
24.5	25	27	26	19	120	58	1.27	1.15	1.21	0.81	0.95	25.9	31.5	3120	2746	3058	0.61	0.94	0.59	0.64	0.36	1.79	Non-liquefiable
29.5	27	29	28	14	120	32	1.27	1.15	1.15	0.79	0.95	17.8	23.2	3360	2861	3173	0.59	0.95	0.25	0.28	0.36	0.77	**Liquefiable**
29.5	29	32	30.5	14	120	21	1.27	1.15	1.15	0.78	0.95	17.4	22.0	3660	3005	3317	0.57	0.95	0.23	0.25	0.36	0.70	**Liquefiable**
34.5	32	37	34.5	23	120	9	1.27	1.15	1.25	0.75	1	31.6	32.3	4140	3235	3547	0.55	0.9	0.68	0.70	0.37	1.91	Non-liquefiable
39.5	37	42	39.5	29	120	34	1.27	1.15	1.3	0.72	1	39.8	45.2	4740	3523	3835	0.55	0.85	2.00	1.94	0.39	5.02	Non-liquefiable
44.5	42	47	44.5	33	120		1.27	1.15	1.3	0.70	1	43.6	43.6	5340	3811	4123	0.59	0.82	2.00	1.89	0.42	4.44	Non-liquefiable
49.5	47	49	48	57	120		1.27	1.15	1.3	0.68	1	73.6	73.6	5760	4013	4325	0.62	0.81	2.00	1.85	0.46	3.99	Non-liquefiable
49.5	49	50	49.5	83	130		1.27	1.15	1.3	0.67	1	106.1	106.1	5945	4104	4416	0.64	0.8	2.00	1.84	0.48	3.80	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-6

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	40.2	3.6	43.7	5.62	0.00	3.69	0.00	2.00		0.000		0.00	Non-liquefiable
24.5	22	25	23.5	27.1	5.6	32.7	2.21	0.03	3.07	0.00	3.00		0.000		0.00	Non-liquefiable
24.5	25	27	26	25.9	5.6	31.5	1.79	0.04	2.99	0.04	2.00		0.000		0.00	Non-liquefiable
29.5	27	29	28	17.8	5.4	23.2	0.77	0.11	2.45	0.11	2.00		0.020		0.49	**Liquefiable**
29.5	29	32	30.5	17.4	4.6	22.0	0.70	0.13	2.36	0.13	3.00		0.021		0.77	**Liquefiable**
34.5	32	37	34.5	31.6	0.7	32.3	1.91	0.03	3.04	0.03	5.00		0.000		0.00	Non-liquefiable
39.5	37	42	39.5	39.8	5.5	45.2	5.02	0.00	3.76	0.00	5.00		0.000		0.00	Non-liquefiable
44.5	42	47	44.5	43.6	0.0	43.6	4.44	0.00	3.68	0.00	5.00		0.000		0.00	Non-liquefiable
49.5	47	49	48	73.6	0.0	73.6	3.99	0.00	5.04	0.00	2.00		0.000		0.00	Non-liquefiable
49.5	49	50	49.5	106.1	0.0	106.1	3.80	0.00	6.23	0.00	1.00		0.000		0.00	Non-liquefiable
											Total Deformation (in)				1.25	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

LIQUEFACTION EVALUATION

Project Name: Mixed Use Development
Project Location: Los Angeles County, California
Project Number: 13G184
Engineer: DWN

Boring No.: B-11

MCE_G Design Acceleration: 0.796 (g)
Design Magnitude: 6.99
Historic High Depth to Groundwater: 20 (ft)
Current Depth to Groundwater: 25 (ft)
Borehole Diameter: 8 (in)
Calculated Magnitude Scaling Factor (8): 1.14

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction (1)	C_B (2)	C_S (3)	C_N (4)	Rod Length Correction (5)	$(N_1)_{60}$ (6)	$(N_1)_{60CS}$ (7)	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d) (9)	Ks (10)	Cyclic Resistance Ratio (M=7.5) (11)	Cyclic Resistance Ratio (M=6.99) (12)	Cyclic Stress Ratio Induced by Design Earthquake (13)	Factor of Safety	Comments
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	0.06	0.07	0.45	N/A	Above Water Table
21	20	21	20.5	11	120	22	1.27	1.15	1.14	0.90	0.95	15.7	20.4	2460	2429	2460	0.68	0.98	0.21	0.24	0.36	0.67	**Liquefiable**
21	21	23	22	11	120	4	1.27	1.15	1.13	0.87	0.95	15.0	15.0	2640	2515	2640	0.66	0.98	0.16	0.18	0.36	0.49	**Liquefiable**
26	23	28	25.5	50	130		1.27	1.15	1.3	0.81	0.95	73.0	73.0	3085	2742	3054	0.61	0.92	2.00	2.00	0.36	5.61	Non-liquefiable
31	28	33	30.5	50	130		1.27	1.15	1.3	0.77	0.95	69.3	69.3	3735	3080	3392	0.57	0.89	2.00	2.00	0.36	5.60	Non-liquefiable
36	33	37	35	50	130		1.27	1.15	1.3	0.74	1	69.8	69.8	4320	3384	3696	0.55	0.86	2.00	1.97	0.36	5.40	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}
(2) Borehole Diameter Correction (Skempton, 1986)
(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)
(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$
(5) Rod Length Correction for Samples <10 m in depth
(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden
(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)
(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)
(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)
(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)
(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)
(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)
(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-11

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
21	20	21	20.5	15.7	4.8	20.4	0.67	0.15	2.24	0.15	1.00		0.023		0.27	**Liquefiable**
21	21	23	22	15.0	0.0	15.0	0.49	0.27	1.80	0.27	2.00		0.029		0.69	**Liquefiable**
26	23	28	25.5	73.0	0.0	73.0	5.61	0.00	5.02	0.00	5.00		0.000		0.00	Non-liquefiable
31	28	33	30.5	69.3	0.0	69.3	5.60	0.00	4.86	0.00	5.00		0.000		0.00	Non-liquefiable
36	33	37	35	69.8	0.0	69.8	5.40	0.00	4.89	0.00	4.00		0.000		0.00	Non-liquefiable

Total Deformation (in) 0.96

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

LIQUEFACTION EVALUATION

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN
Boring No.	B-17

MCE_G Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	37	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=6.99)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(9)	(10)	(11)	(12)	(13)		
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	0.06	0.07	0.45	N/A	Above Water Table
19.5	20	22	21	12	120	86	1.27	1.15	1.15	0.89	0.95	17.0	22.6	2520	2458	2520	0.67	0.98	0.24	0.27	0.36	N/A	Non-liquefiable: PI≥12
24.5	22	27	24.5	56	120		1.27	1.15	1.3	0.82	0.95	83.3	83.3	2940	2659	2940	0.62	0.93	2.00	2.00	0.36	5.60	Non-liquefiable
29.5	27	32	29.5	31	120	67	1.27	1.15	1.3	0.75	0.95	42.0	47.6	3540	2947	3540	0.58	0.9	2.00	2.00	0.36	5.59	Non-liquefiable
34.5	32	37	34.5	36	120		1.27	1.15	1.3	0.70	1	47.5	47.5	4140	3235	4140	0.55	0.87	2.00	2.00	0.37	5.46	Non-liquefiable
39.5	37	42	39.5	26	120		1.27	1.15	1.25	0.66	1	31.4	31.4	4740	3523	4584	0.55	0.89	0.59	0.60	0.39	1.54	Non-liquefiable
44.5	42	47	44.5	31	120	14	1.27	1.15	1.29	0.64	1	37.4	40.3	5340	3811	4872	0.59	0.82	2.00	1.89	0.42	4.44	Non-liquefiable
49.5	47	50	48.5	80	130		1.27	1.15	1.3	0.63	1	95.0	95.0	5835	4057	5117	0.63	0.81	2.00	1.84	0.47	3.93	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-17

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	17.0	5.5	22.6	N/A	0.12	2.40	0.00	2.00		0.000		0.00	Non-liquefiable: PI≥1
24.5	22	27	24.5	83.3	0.0	83.3	5.60	0.00	5.42	0.00	5.00		0.000		0.00	Non-liquefiable
29.5	27	32	29.5	42.0	5.6	47.6	5.59	0.00	3.88	0.00	5.00		0.000		0.00	Non-liquefiable
34.5	32	37	34.5	47.5	0.0	47.5	5.46	0.00	3.88	0.00	5.00		0.000		0.00	Non-liquefiable
39.5	37	42	39.5	31.4	0.0	31.4	1.54	0.04	2.99	0.04	5.00		0.000		0.00	Non-liquefiable
44.5	42	47	44.5	37.4	2.9	40.3	4.44	0.01	3.50	0.00	5.00		0.000		0.00	Non-liquefiable
49.5	47	50	48.5	95.0	0.0	95.0	3.93	0.00	5.85	0.00	3.00		0.000		0.00	Non-liquefiable

Total Deformation (in) 0.00

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

D-2: UPDATE OF GEOTECHNICAL REPORT AND CONCEPTUAL GRADING PLAN REVIEW

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL
A California Corporation

September 10, 2014

Parallax Corporation
26 Soho Street, Suite 205
Toronto, Ontario M5T 1Z7

Attention: Mr. Stafford Lawson

Project No.: **13G184-2**

Subject: **Update of Geotechnical Report and Conceptual Grading Plan Review**
Proposed Mixed Use Development
18800 East Gale Avenue
Los Angeles County, California

Reference: Geotechnical Investigation and Liquefaction Evaluation, Proposed Mixed Use Development, 18800 East Gale Avenue, Los Angeles County, California, prepared for Parallax Corporation, by Southern California Geotechnical, Inc. (SCG), dated February 3, 2014, SCG Project No. 13G184-1.

Gentlemen:

In accordance with your request, this report has been prepared to update the referenced geotechnical report, and to provide additional design recommendations for the proposed development. Subsequent to the issuance of the referenced geotechnical report, we have reviewed a conceptual grading plan, performed a site reconnaissance, reviewed an updated description of the proposed development and performed additional laboratory testing. Based on this review, it is our opinion that the referenced report is suitable and applicable to the proposed development from a geotechnical standpoint with the exceptions and modifications included herein.

Project Description and Conceptual Grading Plan Review

The subject site is located on the north side of East Gale Avenue, approximately 835 feet west of the intersection of East Gale Avenue and Nogales Street in the unincorporated Rowland Heights area of Los Angeles County, California. The site is bounded to the north by a Union Pacific railroad easement, to the east by a retail building, to the south by East Gale Avenue, and to the west by several commercial/industrial buildings.

The current grading plan indicates a very similar site configuration to that which was proposed at the time of the referenced report. The currently proposed site development consists of 6 buildings, located in the same general locations as the 7 buildings proposed at the time of the referenced geotechnical investigation. The borings performed at the site generally correspond well with the currently proposed development indicated on the grading plan.

Two hotel buildings are proposed in the western portion of the property. Both of these buildings will be 5 to 6 stories in height. The grading plan indicates that the finished floor grades for these buildings will be 454.10 feet msl for the northern building and 454.82 feet msl for the southern building. However, based on a discussion with the project civil engineer, both of these buildings will possess 1 level of subterranean parking with parking garage floor grades approximately 14 feet below the first story finished floor grades shown on the grading plan. Our review of the grading plan and boring logs indicates that the southern hotel parking garage will be underlain by native alluvium extending to depths of at least 18± feet in the northern portion of the building and to depths of 48± feet in the southern portion of the building. These native alluvial soils are underlain by dense to very dense, weathered bedrock of the Monterey Formation.

The northern hotel building will be constructed during a later phase of the project. The parking garage level of this building will extend through native alluvium and colluvium into the weathered Monterey Formation bedrock near the southern end of the building. The northern portion of this building will be underlain by native alluvial soils which extend to a depth of approximately 15± feet below the finished parking garage floor grade at Boring No. B-1.

The eastern portion of the site will be developed with four new retail buildings. These buildings are identified in the architectural site description as Retail Buildings 1 through 4. Retail Building 1 is located in the south-central portion of the overall site and the remaining retail buildings are numbered in a clock-wise fashion. The Building 1 footprint area is underlain by at least 20± feet of alluvium at its southern end and 8± feet of colluvium at its northern end. The colluvium is underlain by weathered Monterey formation bedrock. Cuts of up to 4 feet will generally be necessary to achieve the proposed pad grade of 454.28 feet. A minor cut-fill transition is present in the northeast building corner, where less than 1 foot of fill will be necessary to achieve the proposed pad grade.

Retail Building 2 will be an L-shaped building with a proposed pad grade of 451.65 feet msl. This building will possess 1 level of subterranean parking beneath the northern portion of the building. The building pad area is currently underlain by colluvium and alluvium extending to depths of 17 to 32± feet at the boring locations. Cuts and fill of less than 2 to 3 feet are expected in the basement areas and fills of 3 to 8± feet are expected in the southern portion of the building area in order to achieve the proposed pad grades.

Retail Building 3 will be a single story structure with a proposed pad grade of 451.65 feet msl. This building pad area is currently underlain by artificial fill soils extending to depths of 3 to 6½± feet. The fill soils are underlain by weathered Monterey Formation bedrock near the southern end and native alluvium extending to depths of 17± feet near the northern end of the proposed building footprint. Fills of 5 to 12½± feet will be necessary in order to achieve the proposed pad grades.

Retail Building 4 will be a 2-story building and will possess 1 level of subterranean parking. This building area is currently underlain by artificial fill soils extending to depths of 8± feet with underlying alluvial soils extending to depths of 17± to at least 30± feet below the existing site grades. In general, cuts of 7 to 25± feet will be necessary to achieve the proposed parking garage subgrade of 440± feet msl, which is approximately 14 feet below the finished grade shown on the conceptual plan.

Visual Site Reconnaissance

SCG personnel performed a visual reconnaissance of the site on August 26, 2014. Several observations were made during the site reconnaissance.

The most noteworthy observation is that the temporary Charlie Road Detour has been completed and is open to traffic. At the time of subsurface exploration, Charlie Road had recently been paved, but the culvert which is presently located near the north terminus of Charlie Road had not yet been constructed.

The southwest corner of the site is presently being utilized as an equipment storage/construction staging area for the improvements which are currently being constructed on Nogales Road for the Alameda Corridor project. At the time of the referenced report, this area was occupied by many soil stockpiles ranging from 5 to 8± feet in height. Presently, few of these soil stockpiles remain and the majority of the site is covered with construction materials and stockpiles of concrete demolition debris. The construction materials stored on the site include steel beams, concrete pipes, PVC pipes, and aggregate base.

At the time of subsurface exploration, several soil stockpiles were also present in the southeastern portion of the site. It appears that since the time of the referenced report that some of these stock piles have been exported from the site or combined with the remaining stockpiles. Three large soil stockpiles presently remain in this portion of the site.

Additional Laboratory Testing

Additional laboratory testing, including pH, electrical resistivity, and chloride content has been performed. These test results are used to evaluate the corrosive characteristics of the soil. The results of additional laboratory testing for two representative soil samples taken from within the proposed building area. The results of these tests are presented below.

Sample Identification	Resistivity (ohm-cm)	pH	Chlorides (ppm)
B-8 @ 0 to 5′	3,180	7.4	25.6
B-11 @ 0 to 5′	4,640	8.0	None Detected

Additional Geotechnical Considerations

Based on our review of the updated site description and the conceptual grading plan, the results of the additional laboratory testing, and our observations during the site reconnaissance, the geotechnical considerations for the site have been expanded.

Corrosivity Testing

The results of the additional laboratory testing indicate that the tested samples possess pH values of 7.4 and 8.0, and electrical resistivities of 3,180 and 4,640 ohm-cm. These test results have been evaluated in accordance with guidelines published by the Ductile Iron Pipe Research Association (DIPRA). The DIPRA guidelines consist of a point system by which characteristics of the soils are used to quantify the corrosivity characteristics of the site. Resistivity, pH, Sulfides, and redox potential are factors that enter into the evaluation procedure. Although sulfide and redox testing were not included in the scope of our additional testing, the corrosion potential has been evaluated based upon the pH, resistivity and moisture content. Relative soil moisture content is also considered. Based on these factors, and utilizing the DIPRA procedure, the on-site soils are considered to be non-corrosive to ductile iron pipe. If a more thorough evaluation is desired, a corrosion engineer may be contacted for review of laboratory test results and further testing.

The Caltrans Memo to Designers 10-5, Protection of Reinforcement Against Corrosion Due to Chlorides, Acids and Sulfates, dated June 2010, indicates that soils possessing chloride concentrations greater than 500 ppm are considered to be corrosive. Chlorides present in soils in contact with reinforced concrete can cause corrosion and weakening of steel reinforcement within reinforced concrete. The results of the additional laboratory testing indicate that chloride were not detected in one of the samples. The second sample possesses a chloride concentration of 26.6 ppm. Based on the chloride concentrations of these soils, the on-site soils are considered to be non-corrosive to reinforcing steel in structural concrete.

Cut/Fill Transitions and Geologic Contacts

Based on the conceptual grading plan, cut/fill transitions will be created beneath the proposed subterranean parking garage grades in the northern portion of the southern hotel building, in the central portion of the north hotel building, in the northwestern portion of Retail Building No. 2, and at the finished pad grade near the northeast corner of Retail Building No. 1. The differing support conditions of the native soils versus the newly compacted fill soils may result in excessive differential settlements if not mitigated. Additionally, geologic contacts between the Monterey Formation bedrock materials and the native alluvium and colluvium will be present at the proposed finished pad grades in some of the proposed building pad areas which require cuts. Similarly, the support characteristics of the weathered bedrock materials and native soils differ, and the presence of both materials at the floor slab and foundation bearing grades is expected to result in excessive differential settlements if not mitigated.

The recommended remedial grading will provide a blanket of compacted fill beneath the building foundations and floor slabs in order to soften the transition at the of the cut/fill transitions and across geologic contacts which will occur at building pad and foundation bearing grades.

Liquefaction

Potentially liquefiable soils were identified at three of the proposed building locations, near the southwest, southeast and northeast corners of the subject site. At the time of the referenced geotechnical report, no conceptual grading plan was available, and the proposed site grades were unknown. The liquefaction evaluation has been revised to account for the proposed cuts in the proposed building locations.

Liquefaction is not a design concern for the northern hotel building and Retail Building Nos. 1 and 3, at which locations subterranean bedrock is encountered at shallower depths than the historic high groundwater table for the site.

Grading and Foundation Plan Review

Foundation plans were not available at the time of this report. Additionally, the grading plans provided are conceptual and may be subject to revisions. It is therefore recommended that we be provided with copies of the plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

LA County Section 111 Statement

Based on the results of our geotechnical analysis, the proposed development will be safe with regard to landslides, settlement and/or slippage. In addition, the proposed development will not adversely affect the geologic stability of the adjacent properties. This finding is in accordance with Section 111 of the Los Angeles County Building Code.

Revised Liquefaction Evaluation

As discussed in the referenced report, the liquefaction potential of the on-site soils was evaluated at several of the boring locations. Three of the proposed building locations were found to be underlain by alluvial soils which extend to depths greater than the historic high ground water table for the site. One boring from each of these building areas, was used to evaluate the liquefaction potential of these areas of the site. The results of the original liquefaction evaluation identified potentially liquefiable soils at Boring Nos. B-6 and B-11. However, as discussed below, the results of the revised liquefaction evaluation identified liquefiable soils at all three of these borings.

The grading plan indicates proposed cuts of 11± feet, 1± foot, and 20± feet, at Boring Nos. B-6, B-11, and B-17, respectively. These cuts account for the proposed subterranean parking garage for each of these buildings, which will extend to depths of approximately 14± feet below the finished grades shown on the conceptual grading plan. The liquefaction evaluation has been updated to account for the relief of overburden pressure due to the proposed removals at these boring locations. The results of the updated liquefaction evaluation are presented on the enclosed spreadsheets. The proposed cut at each location is modeled in the analysis by reducing the overburden pressure by an amount equal to the height of the removal multiplied by the unit weight of the soil. The stress reduction factor is also reduced since this parameter is dependent upon depth. All of the liquefiable layers and sample depths are still identified with respect to the existing grade at the time of subsurface exploration, since the N-value correction factors are based on the conditions at the time of drilling, and for ease of comparison with the previous analysis.

The results of the revised liquefaction analysis have identified additional liquefiable soils and greater potential liquefaction settlements at Boring Nos. B-6, and B-17. A relatively minor cut of 1 foot is expected at Boring No. B-11, and no additional liquefiable layers were identified at this boring location, nor any increased potential settlement. Additional liquefiable soils were encountered at Boring No. B-6 between depths of 32 and 37± feet and between depths of 37 and 42± feet at Boring No. B-17. These depths are identified with respect to the existing grades at the boring locations.

The referenced report states, "liquefaction is not considered to be a design concern for most of the proposed buildings, due to the presence of very dense bedrock at depths shallower than the historic high groundwater table. However, native alluvial soils extending to depths greater than the historic high and existing groundwater table elevations were encountered at borings which were drilled near the southwest, southeast, and northeast corners of the site." Liquefaction is only considered to be a design concern for the buildings located in these three areas of the site.

The total dynamic settlements at Boring Nos. B-6, B-11, and B-17 are 1.55 inches, 0.96 inches, and 0.44 inches, respectively. Therefore, the total dynamic settlement within the southwestern hotel building is considered to be 1½ inches with an associated differential settlement of 1 inch (two thirds of the total). The total dynamic settlement within Retail Building 2 is considered to be 1 inch, with an associated differential settlement of 2/3 inches. They total dynamic settlement at Retail Building 4 is considered to be ½ inch, with an associated differential settlement of 1/3 inches.

The estimated differential settlements are considered to occur across a distance of 100 feet, indicating angular distortions of less than 0.001 inches per inch. These settlements are considered to be within the structural tolerances of typical buildings supported on shallow foundation systems. However, it should be noted that minor to moderate repairs, including repair of damaged drywall and stucco, etc., could be required after the occurrence of liquefaction-induced settlements.

Shallow foundation systems can be designed to resist the effects of the anticipated differential settlements, to the extent that the structures would not catastrophically fail. Designing the proposed structures to remain completely undamaged during a major seismic event is not considered to be economically feasible. Based on this understanding, the use of a shallow foundation system is considered to be the most economical means of supporting the majority of the proposed structures. Although shallow foundations can be designed to resist the effects of the anticipated differential settlements, it may be necessary or desirable support the two 6-story hotel buildings, on an alternative foundation system such as a mat foundation or deep foundations, as discussed in the subsequent Updated Foundation Design Recommendations section of this report and the referenced report.

In order to support the proposed buildings on shallow foundations (such as spread footings) the structural engineer should verify that the structure would not catastrophically fail due to the predicted dynamic differential settlements. Any utility connections to the structures should be designed to withstand the estimated differential settlements. It should also be noted that minor to moderate repairs, including releveling, restoration of utility connections, repair of damaged drywall and stucco, etc., would likely be required after occurrence of the liquefaction-induced settlements.

Updated Seismic Design Considerations

The seismic design parameters presented in the referenced report are based on a site classification of Site Class C, very dense soil and soft rock, due to the presence of weathered Monterey Formation bedrock within the upper 100± feet of the subsurface profile throughout the site. **However, it should be understood that southern hotel building and Retail Building Nos. 2 and 4 are Site Class F sites, due to the presence of liquefiable soils beneath these proposed structures.** Provided that the proposed structures have a fundamental period of vibration of less than 0.5 seconds, the seismic design parameters for Site Class C are considered applicable to the proposed structures, based on ASCE 7-10 Section 20.3.1. Site Class F structures with fundamental periods of vibration greater than 0.5 seconds will require a site-specific ground motion study in accordance with Chapter 21 of ACSE 7-10. However, detailed structural information is currently unavailable for the proposed structures.

Updated Remedial Grading Recommendations

The site grading recommendations provided in the referenced report are considered applicable for any proposed structures supported on conventional shallow foundation systems. Detailed structural information for the proposed buildings is currently unavailable. Based on the anticipated structural loads of the proposed 6-story hotel building, it may be necessary to support these structures on an alternative foundation system, such as mat foundations or deep foundation systems. These grading recommendations are subject to review and revision for structures that will be supported on alternative foundation systems.

Updated Foundation Design Recommendations

The foundation design recommendations presented in the referenced report are considered valid for proposed buildings which will be supported on conventional shallow foundation systems. However, as previously stated, detailed structural information is currently unavailable. If alternative foundation systems will be used, SCG should be contacted to provide additional recommendations. If deep foundations designs are required, it may be necessary to perform additional subsurface exploration.

General

The recommendations provided in Sections 6.6 through 6.9 of the referenced report are also considered valid, based on the updated project information. These sections provide recommendations for floor slab design, flatwork design, retaining wall design and construction and pavement design.

Closure

We sincerely appreciate the opportunity to be of continued service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

DANIEL W. NIELSEN
No. 77915
CIVIL

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Project Engineer

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CERTIFIED ENGINEERING GEOLOGIST

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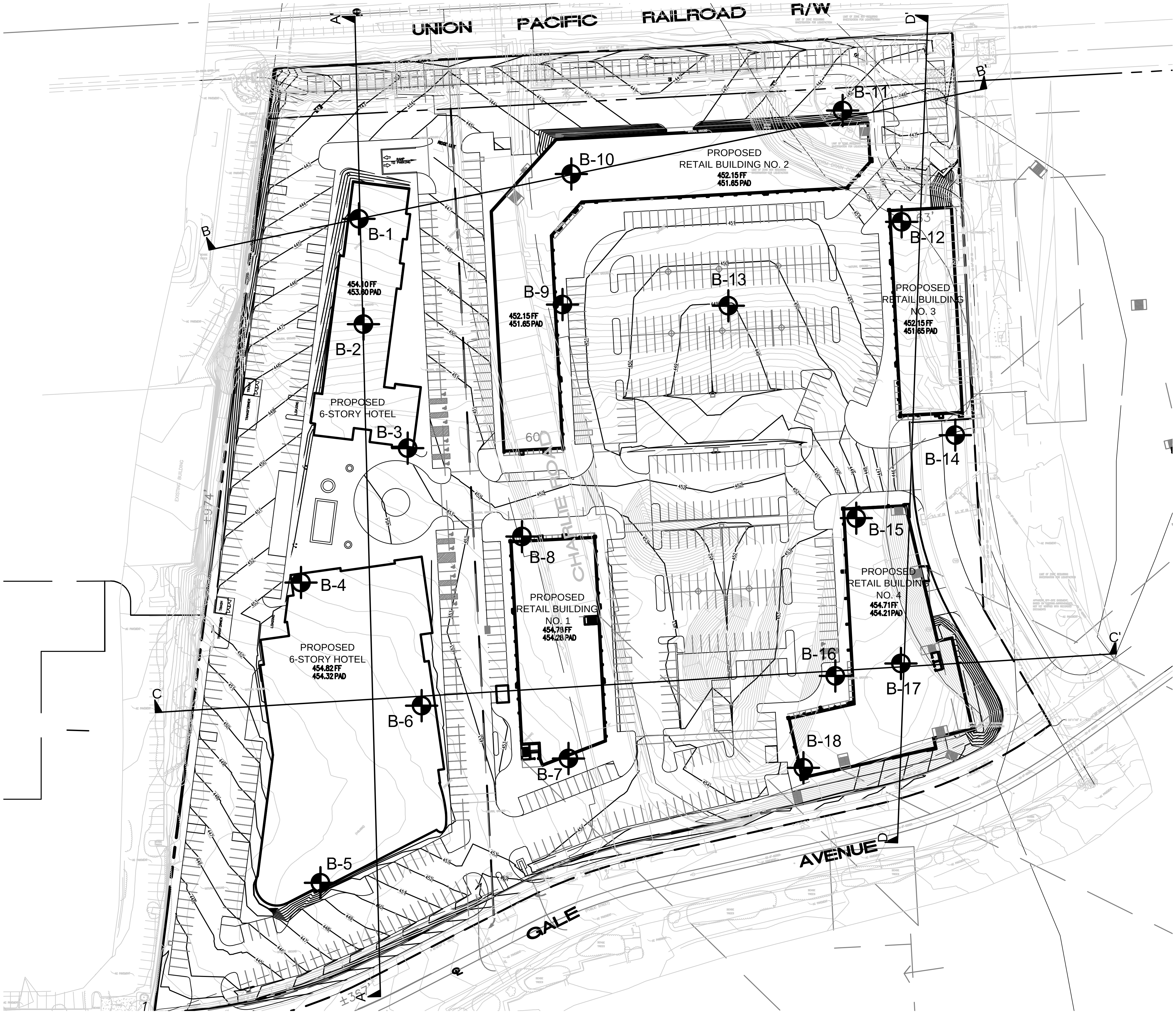
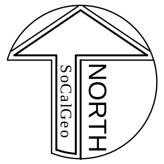
	(1) Thienes Engineering, Attention: Mr. Jeff Potter
	(1) PCR Services Corporation, Attention: Mr. Daryl Koutnik

Enclosures:
Plate 1: Geotechnical Map
Plates 2 and 3: Geologic Cross Sections
Revised Liquefaction Evaluation Spreadsheets (6 sheets)





GEOTECHNICAL LEGEND

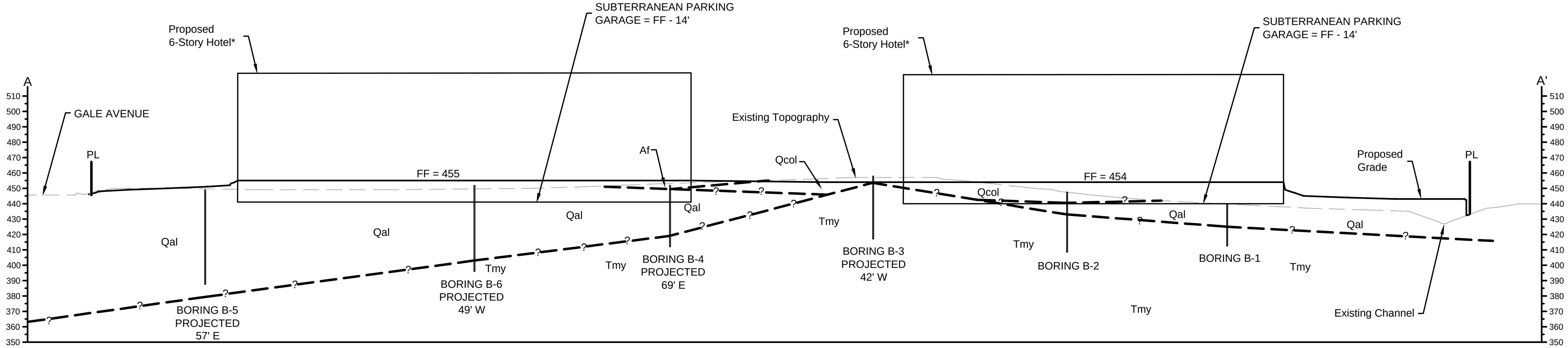
⌖ APPROXIMATE BORING LOCATION

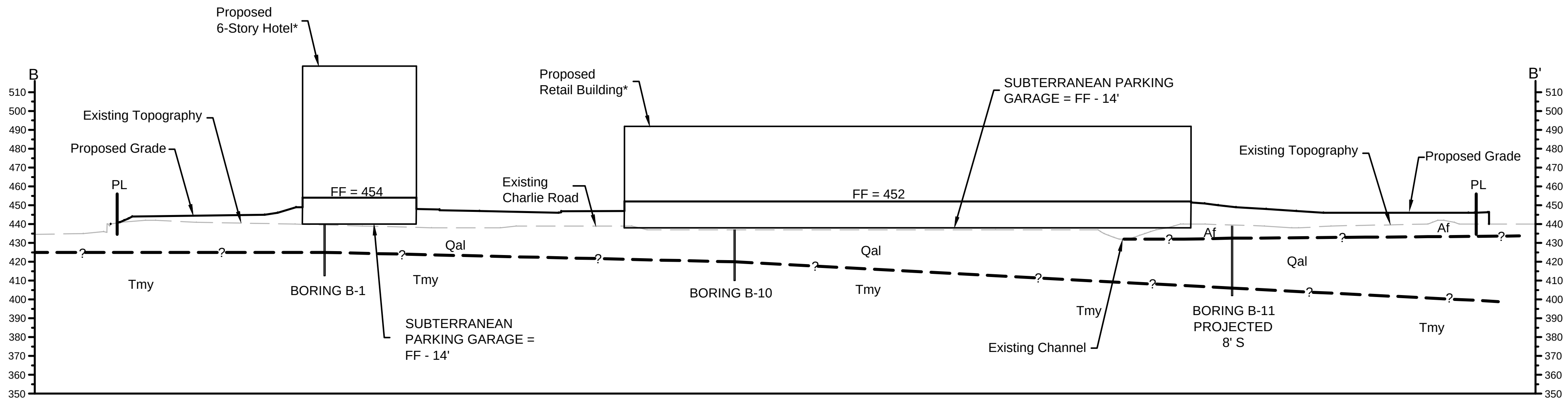
NOTE: BASE MAP PREPARED BY THIENES ENGINEERING, INC.

GEOTECHNICAL MAP
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 100'
DRAWN: PM
CHKD: JAS
SCG PROJECT
13G184-2
PLATE 1

SOUTHERN
CALIFORNIA
GEOTECHNICAL





GEOTECHNICAL LEGEND

Af - Artificial Fill
Qcol - Colluvium
Qal - Alluvium
Tmy - Monterey Formation

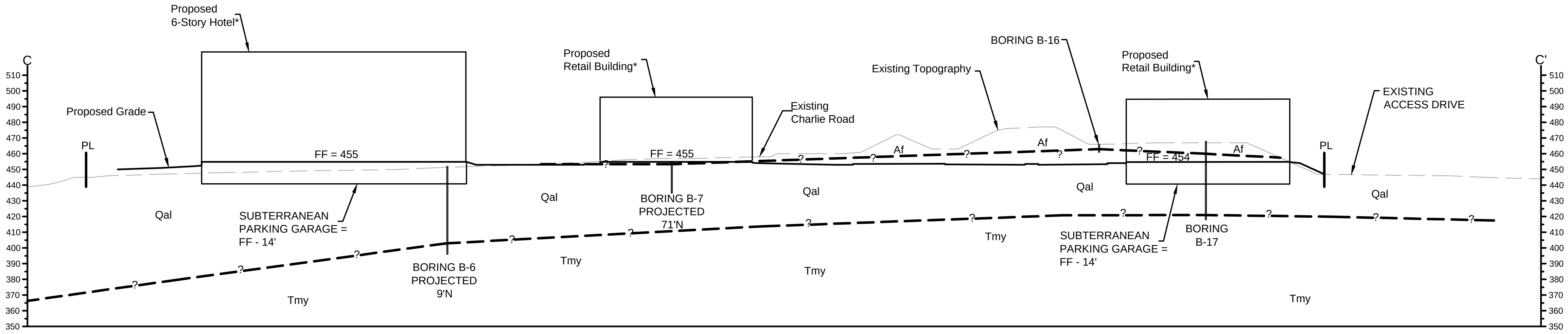
– – – – – Geologic Contact (Queried Where Uncertain)

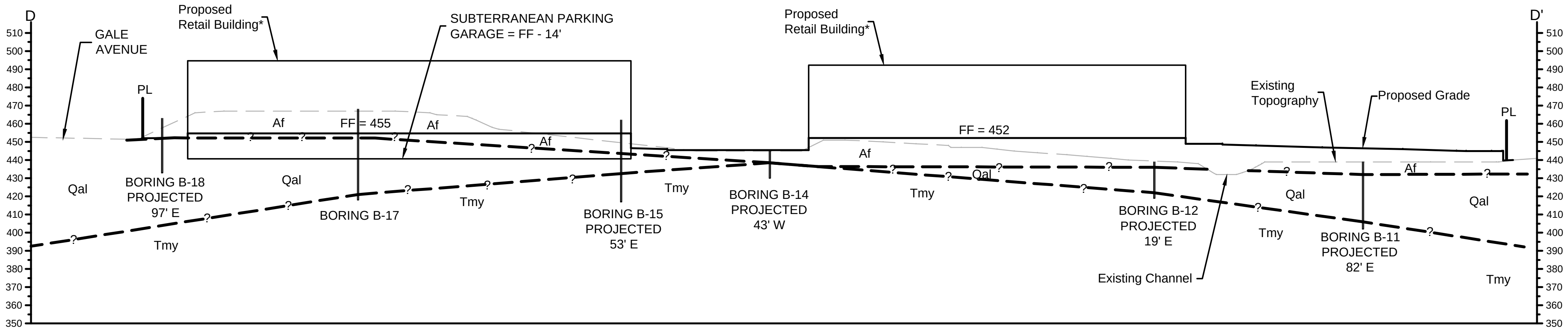
NOTE: *BUILDING HEIGHT NOT TO SCALE

CROSS SECTIONS
PROPOSED MIXED-USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 80'
DRAWN: PM
CHKD: JAS
SCG PROJECT
13G184-2
PLATE 2

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL





GEOTECHNICAL LEGEND

Af - Artificial Fill

Qal - Alluvium

Tmy - Monterey Formation

– – – – – Geologic Contact (Queried Where Uncertain)

NOTE: *BUILDING HEIGHT NOT TO SCALE

CROSS SECTIONS

PROPOSED MIXED-USE DEVELOPMENT

LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 80'

DRAWN: PM
CHKD: JAS

SCG PROJECT
13G184-2

PLATE 3

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL

REVISED LIQUEFACTION EVALUATION

Project Name	Mixed-Use Development
Project Location	Rowland Heights, CA
Project Number	13G184-2
Engineer	DWN
Boring No.	B-6

MCE_G Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	25	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Depth of Cut 11 ft

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=6.99)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(9)	(10)	(11)	(12)	(13)		
5.5	0	20	10		120		1.27	1.15	1	1.29	0.75	0.0	0.0	-120	-120	-120	1.01	N/A	N/A	N/A	0.52	N/A	Above Water Table
19.5	20	22	21	25	120	16	1.27	1.15	1.3	0.89	0.95	40.2	43.7	1200	1138	1200	0.97	1.1	2.00	2.00	0.53	3.76	Non-Liquefiable
24.5	22	25	23.5	19	120	58	1.27	1.15	1.22	0.84	0.95	27.1	32.7	1500	1282	1500	0.96	1.1	0.73	0.91	0.58	N/A	Non-Liq: PI<18
24.5	25	27	26	19	120	58	1.27	1.15	1.21	0.81	0.95	25.9	31.5	1800	1426	1738	0.95	1.08	0.59	0.74	0.62	N/A	Non-Liq: PI<18
29.5	27	29	28	14	120	32	1.27	1.15	1.15	0.79	0.95	17.8	23.2	2040	1541	1853	0.94	1.05	0.25	0.30	0.65	0.47	**Liquefiable**
29.5	29	32	30.5	14	120	21	1.27	1.15	1.15	0.78	0.95	17.4	22.0	2340	1685	1997	0.93	1.03	0.23	0.27	0.67	0.41	**Liquefiable**
34.5	32	37	34.5	23	120	9	1.27	1.15	1.25	0.75	1	31.6	32.3	2820	1915	2227	0.91	1.02	0.68	0.79	0.69	1.14	**Liquefiable**
39.5	37	42	39.5	29	120	34	1.27	1.15	1.3	0.72	1	39.8	45.2	3420	2203	2515	0.89	0.99	2.00	2.00	0.71	2.81	Non-Liquefiable
44.5	42	47	44.5	33	120		1.27	1.15	1.3	0.70	1	43.6	43.6	4020	2491	2803	0.86	0.95	2.00	2.00	0.72	2.79	Non-Liquefiable
49.5	47	49	48	57	120		1.27	1.15	1.3	0.68	1	73.6	73.6	4440	2693	3005	0.84	0.93	2.00	2.00	0.72	2.79	Non-Liquefiable
49.5	49	50	49.5	83	120		1.27	1.15	1.3	0.67	1	106.1	106.1	4620	2779	3091	0.83	0.92	2.00	2.00	0.71	2.80	Non-Liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name Mixed-Use Development
Project Location Rowland Heights, CA
Project Number 13G184-2
Engineer DWN

Boring No. B-6

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	40.2	3.6	43.7	3.76	0.00	-1.09	0.00	2.00		0.000		0.00	Non-Liquefiable
24.5	22	25	23.5	27.1	5.6	32.7	N/A	0.03	-0.28	0.00	3.00		0.000		0.00	Non-Liq: PI<18
24.5	25	27	26	25.9	5.6	31.5	N/A	0.04	-0.19	0.00	2.00		0.000		0.00	Non-Liq: PI<18
29.5	27	29	28	17.8	5.4	23.2	0.47	0.11	0.34	0.11	2.00		0.020		0.49	**Liquefiable**
29.5	29	32	30.5	17.4	4.6	22.0	0.41	0.13	0.41	0.13	3.00		0.021		0.77	**Liquefiable**
34.5	32	37	34.5	31.6	0.7	32.3	1.14	0.03	-0.25	0.03	5.00		0.005		0.30	**Liquefiable**
39.5	37	42	39.5	39.8	5.5	45.2	2.81	0.00	-1.21	0.00	5.00		0.000		0.00	Non-Liquefiable
44.5	42	47	44.5	43.6	0.0	43.6	2.79	0.00	-1.08	0.00	5.00		0.000		0.00	Non-Liquefiable
49.5	47	49	48	73.6	0.0	73.6	2.79	0.00	-3.62	0.00	2.00		0.000		0.00	Non-Liquefiable
49.5	49	50	49.5	106.1	0.0	106.1	2.80	0.00	-6.65	0.00	1.00		0.000		0.00	Non-Liquefiable
												Total Deformation (in)			1.55	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer
(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)
(3) Corrected $(N_1)_{60}$ for fines content
(4) Factor of Safety against Liquefaction, calculated previously for the individual layer
(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)
(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)
(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)
(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

REVISED LIQUEFACTION EVALUATION

Project Name: Mixed-Use Development
Project Location: Rowland Heights, CA
Project Number: 13G184-2
Engineer: DWN

Boring No.: B-11

MCE_G Design Acceleration: 0.796 (g)
Design Magnitude: 6.99
Historic High Depth to Groundwater: 20 (ft)
Current Depth to Groundwater: 25 (ft)
Borehole Diameter: 8 (in)
Calculated Magnitude Scaling Factor (8): 1.14

Depth of Cut: 1 ft

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction (1)	C_B (2)	C_S (3)	C_N (4)	Rod Length Correction (5)	$(N_1)_{60}$ (6)	$(N_1)_{60CS}$ (7)	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d) (9)	Ks (10)	Cyclic Resistance Ratio (M=7.5) (11)	Cyclic Resistance Ratio (M=6.99) (12)	Cyclic Stress Ratio Induced by Design Earthquake (13)	Factor of Safety	Comments
5.5	0	20	10		120		1.27	1.15	1	1.29	0.75	0.0	0.0	1080	1080	1080	0.98	1.04	N/A	N/A	0.51	N/A	Above Water Table
21	20	21	20.5	11	120	22	1.27	1.15	1.14	0.90	0.95	15.7	20.4	2340	2309	2340	0.93	0.99	0.21	0.24	0.49	0.49	**Liquefiable**
21	21	23	22	11	120	4	1.27	1.15	1.13	0.87	0.95	15.0	15.0	2520	2395	2520	0.92	0.99	0.16	0.18	0.50	0.35	**Liquefiable**
26	23	28	25.5	50	130		1.27	1.15	1.3	0.81	0.95	73.0	73.0	2965	2622	2934	0.91	0.93	2.00	2.00	0.53	3.77	Non-Liquefiable
31	28	33	30.5	50	130		1.27	1.15	1.3	0.77	0.95	69.3	69.3	3615	2960	3272	0.88	0.9	2.00	2.00	0.56	3.59	Non-Liquefiable
36	33	37	35	50	130		1.27	1.15	1.3	0.74	1	69.8	69.8	4200	3264	3576	0.86	0.87	2.00	1.99	0.57	3.49	Non-Liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0\ \text{ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed-Use Development
Project Location	Rowland Heights, CA
Project Number	13G184-2
Engineer	DWN

Boring No. B-11

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60-CS}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
21	20	21	20.5	15.7	4.8	20.4	0.49	0.15	0.50	0.15	1.00		0.023		0.27	**Liquefiable**
21	21	23	22	15.0	0.0	15.0	0.35	0.27	0.75	0.27	2.00		0.029		0.69	**Liquefiable**
26	23	28	25.5	73.0	0.0	73.0	3.77	0.00	-3.56	0.00	5.00		0.000		0.00	Non-Liquefiable
31	28	33	30.5	69.3	0.0	69.3	3.59	0.00	-3.23	0.00	5.00		0.000		0.00	Non-Liquefiable
36	33	37	35	69.8	0.0	69.8	3.49	0.00	-3.28	0.00	4.00		0.000		0.00	Non-Liquefiable
											Total Deformation (in)				0.96	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

REVISED LIQUEFACTION EVALUATION

Project Name	Mixed-Use Development	MCE_G Design Acceleration	0.796	(g)
Project Location	Rowland Heights, CA	Design Magnitude	6.99	
Project Number	13G184-2	Historic High Depth to Groundwater	20	(ft)
Engineer	DWN	Current Depth to Groundwater	37	(ft)
		Borehole Diameter	8	(in)
Boring No.	B-17	Calculated Magnitude Scaling Factor (8)	1.14	

Depth of Cut 20 ft

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction (1)	C_B (2)	C_S (3)	C_N (4)	Rod Length Correction (5)	$(N_1)_{60}$ (6)	$(N_1)_{60CS}$ (7)	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d) (9)	Ks (10)	Cyclic Resistance Ratio (M=7.5) (11)	Cyclic Resistance Ratio (M=6.99) (12)	Cyclic Stress Ratio Induced by Design Earthquake (13)	Factor of Safety	Comments
5.5	0	20	10		120		1.27	1.15	1	1.29	0.75	0.0	0.0	-1200	-1200	-1200	1.03	####	N/A	N/A	0.53	N/A	Above Water Table
19.5	20	22	21	12	120	86	1.27	1.15	1.15	0.89	0.95	17.0	22.6	120	58	120	1.00	1.1	0.24	0.30	1.08	N/A	Non-Liq: PI>18
24.5	22	27	24.5	56	120		1.27	1.15	1.3	0.82	0.95	83.3	83.3	540	259	540	0.99	1.1	2.00	2.00	1.07	1.87	Non-Liquefiable
29.5	27	32	29.5	31	120	67	1.27	1.15	1.3	0.75	0.95	42.0	47.6	1140	547	1140	0.98	1.1	2.00	2.00	1.05	1.90	Non-Liquefiable
34.5	32	37	34.5	36	120		1.27	1.15	1.3	0.70	1	47.5	47.5	1740	835	1740	0.95	1.1	2.00	2.00	1.03	1.94	Non-Liquefiable
39.5	37	42	39.5	26	120	5	1.27	1.15	1.25	0.66	1	31.4	31.4	2340	1123	2184	0.93	1.1	0.59	0.74	1.00	0.73	**Liquefiable**
44.5	42	47	44.5	31	120	14	1.27	1.15	1.29	0.64	1	37.4	40.3	2940	1411	2472	0.91	1.1	2.00	2.00	0.98	2.05	Non-Liquefiable
49.5	47	50	48.5	80	120		1.27	1.15	1.3	0.63	1	95.1	95.1	3420	1642	2702	0.89	1.07	2.00	2.00	0.95	2.09	Non-Liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed-Use Development
Project Location	Rowland Heights, CA
Project Number	13G184-2
Engineer	DWN

Boring No. B-17

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	17.0	5.5	22.6	N/A	0.12	0.38	0.00	2.00		0.000		0.00	Non-Liq: PI>18
24.5	22	27	24.5	83.3	0.0	83.3	1.87	0.00	-4.50	0.00	5.00		0.000		0.00	Non-Liquefiable
29.5	27	32	29.5	42.0	5.6	47.6	1.90	0.00	-1.40	0.00	5.00		0.000		0.00	Non-Liquefiable
34.5	32	37	34.5	47.5	0.0	47.5	1.94	0.00	-1.39	0.00	5.00		0.000		0.00	Non-Liquefiable
39.5	37	42	39.5	31.4	0.0	31.4	0.73	0.04	-0.18	0.04	5.00		0.007		0.44	**Liquefiable**
44.5	42	47	44.5	37.4	2.9	40.3	2.05	0.01	-0.83	0.00	5.00		0.000		0.00	Non-Liquefiable
49.5	47	50	48.5	95.1	0.0	95.1	2.09	0.00	-5.60	0.00	3.00		0.000		0.00	Non-Liquefiable

Total Deformation (in) 0.44

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

APPENDIX E

GREENHOUSE GAS EMISSIONS DATA WORKSHEETS

Rowland Heights Plaza and Hotel Project

Draft EIR

Appendix E, Greenhouse Gas Emissions Data Worksheets

CalEEMod Output Files

Appendix E-1

Construction Emissions – Phase I

Rowland Heights Mixed Use (Construction)- Phase 1

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	2.00	1000sqft	0.05	2,000.00	0
Enclosed Parking with Elevator	306.00	Space	2.75	122,400.00	0
Parking Lot	698.00	Space	6.28	279,200.00	0
High Turnover (Sit Down Restaurant)	20.06	1000sqft	0.46	20,056.00	0
Hotel	275.00	Room	9.17	189,950.00	0
Quality Restaurant	20.06	1000sqft	0.46	20,057.00	0
Strip Mall	83.77	1000sqft	1.92	83,770.70	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
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 - See Construction Assumptions

Construction Phase - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Trips and VMT - See Construction Assumptions

Grading - See Construction Assumptions

Construction Off-road Equipment Mitigation -

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumption

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	370.00	347.00
tblConstructionPhase	NumDays	35.00	109.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	130.00
tblConstructionPhase	NumDays	10.00	22.00
tblConstructionPhase	NumDays	20.00	175.00
tblConstructionPhase	PhaseEndDate	1/2/2018	8/31/2017
tblConstructionPhase	PhaseEndDate	10/3/2017	1/31/2018
tblConstructionPhase	PhaseEndDate	11/29/2019	5/31/2019
tblConstructionPhase	PhaseEndDate	1/31/2020	5/31/2019
tblConstructionPhase	PhaseStartDate	12/1/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	9/1/2017	1/1/2018
tblConstructionPhase	PhaseStartDate	6/1/2019	12/1/2018
tblConstructionPhase	PhaseStartDate	6/1/2019	10/1/2018
tblGrading	AcresOfGrading	109.00	87.50
tblGrading	MaterialExported	0.00	11,800.00
tblLandUse	LandUseSquareFeet	20,060.00	20,056.00

tblLandUse	LandUseSquareFeet	399,300.00	189,950.00
tblLandUse	LandUseSquareFeet	20,060.00	20,057.00
tblLandUse	LandUseSquareFeet	83,770.00	83,770.70
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	1,167.00	843.00

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					
2017	0.2271	2.3639	1.5929	2.4700e-003	0.1310	0.1289	0.2599	0.0464	0.1186	0.1649	0.0000	225.8184	225.8184	0.0581	0.0000	227.0383
2018	2.4254	3.2965	5.1288	0.0107	0.4931	0.1536	0.6467	0.1327	0.1448	0.2775	0.0000	856.2129	856.2129	0.0713	0.0000	857.7105
2019	3.4563	1.6257	2.6163	5.6000e-003	0.2527	0.0754	0.3281	0.0679	0.0709	0.1388	0.0000	439.7767	439.7767	0.0439	0.0000	440.6980
Total	**6.1088**	**7.2861**	**9.3379**	**0.0188**	**0.8768**	**0.3579**	**1.2346**	**0.2469**	**0.3343**	**0.5812**	**0.0000**	**1,521.8080**	**1,521.8080**	**0.1733**	**0.0000**	**1,525.4467**

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					
2017	0.2271	2.3639	1.5929	2.4700e-003	0.0623	0.1289	0.1912	0.0211	0.1186	0.1397	0.0000	225.8182	225.8182	0.0581	0.0000	227.0380
2018	2.4254	3.2965	5.1288	0.0107	0.4931	0.1536	0.6467	0.1327	0.1448	0.2775	0.0000	856.2126	856.2126	0.0713	0.0000	857.7102
2019	3.4563	1.6257	2.6162	5.6000e-003	0.2527	0.0754	0.3281	0.0679	0.0709	0.1388	0.0000	439.7765	439.7765	0.0439	0.0000	440.6978
Total	**6.1088**	**7.2860**	**9.3379**	**0.0188**	**0.8081**	**0.3579**	**1.1659**	**0.2216**	**0.3343**	**0.5559**	**0.0000**	**1,521.8073**	**1,521.8073**	**0.1733**	**0.0000**	**1,525.4461**

	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**	**7.84**	**0.00**	**5.57**	**10.23**	**0.00**	**4.35**	**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	Site Preparation	Site Preparation	6/1/2017	6/30/2017	5	22	
2	Grading	Grading	7/1/2017	11/30/2017	5	109	
3	Building Foundation	Site Preparation	8/1/2017	8/31/2017	5	23	
4	Concrete Pour (Podium)	Paving	1/1/2018	1/31/2018	5	23	
5	Building Construction	Building Construction	2/1/2018	5/31/2019	5	347	
6	Finishes	Architectural Coating	10/1/2018	5/31/2019	5	175	
7	Paving	Paving	12/1/2018	5/31/2019	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 669,915; Non-Residential Outdoor: 223,305 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	2	8.00	174	0.41
Grading	Rubber Tired Dozers	0	8.00	255	0.40
Grading	Scrapers	0	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Foundation	Bore/Drill Rigs	1	8.00	205	0.50
Building Foundation	Cranes	1	7.00	226	0.29
Building Foundation	Excavators	1	8.00	162	0.38

Building Foundation	Forklifts	0	8.00	89	0.20
Building Foundation	Generator Sets	0	8.00	84	0.74
Building Foundation	Graders	0		174	0.41
Building Foundation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Foundation	Welders	0	8.00	46	0.45
Concrete Pour (Podium)	Cement and Mortar Mixers	4	8.00	9	0.56
Concrete Pour (Podium)	Pavers	0	8.00	125	0.42
Concrete Pour (Podium)	Paving Equipment	0	8.00	130	0.36
Concrete Pour (Podium)	Pumps	4	8.00	84	0.74
Concrete Pour (Podium)	Rollers	0	8.00	80	0.38
Concrete Pour (Podium)	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Air Compressors	1	8.00	78	0.48
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Finishes	Aerial Lifts	1	8.00	62	0.31
Paving	Pavers	0	8.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Finishes	Air Compressors	1	8.00	78	0.48
Building Foundation	Rubber Tired Dozers	0	8.00	255	0.40

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
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	843.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Foundation	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete Pour (Podium)	9	23.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	293.00	118.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Finishes	2	59.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 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					0.0662	0.0000	0.0662	0.0364	0.0000	0.0364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0201	0.2121	0.1620	1.7000e-004		0.0118	0.0118		0.0108	0.0108	0.0000	15.4330	15.4330	4.7300e-003	0.0000	15.5323
Total	**0.0201**	**0.2121**	**0.1620**	**1.7000e-004**	**0.0662**	**0.0118**	**0.0780**	**0.0364**	**0.0108**	**0.0473**	**0.0000**	**15.4330**	**15.4330**	**4.7300e-003**	**0.0000**	**15.5323**

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	3.4000e-004	5.1000e-004	5.2900e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.9057	0.9057	5.0000e-005	0.0000	0.9067
Total	**3.4000e-004**	**5.1000e-004**	**5.2900e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.9057**	**0.9057**	**5.0000e-005**	**0.0000**	**0.9067**

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					0.0258	0.0000	0.0258	0.0142	0.0000	0.0142	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0201	0.2121	0.1620	1.7000e-004		0.0118	0.0118		0.0108	0.0108	0.0000	15.4329	15.4329	4.7300e-003	0.0000	15.5322
Total	**0.0201**	**0.2121**	**0.1620**	**1.7000e-004**	**0.0258**	**0.0118**	**0.0376**	**0.0142**	**0.0108**	**0.0250**	**0.0000**	**15.4329**	**15.4329**	**4.7300e-003**	**0.0000**	**15.5322**

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	3.4000e-004	5.1000e-004	5.2900e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.9057	0.9057	5.0000e-005	0.0000	0.9067
Total	**3.4000e-004**	**5.1000e-004**	**5.2900e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.9057**	**0.9057**	**5.0000e-005**	**0.0000**	**0.9067**

3.3 Grading - 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					0.0464	0.0000	0.0464	5.0100e-003	0.0000	5.0100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1778	1.8205	1.1612	1.5900e-003		0.1055	0.1055		0.0971	0.0971	0.0000	148.0407	148.0407	0.0454	0.0000	148.9933
Total	**0.1778**	**1.8205**	**1.1612**	**1.5900e-003**	**0.0464**	**0.1055**	**0.1519**	**5.0100e-003**	**0.0971**	**0.1021**	**0.0000**	**148.0407**	**148.0407**	**0.0454**	**0.0000**	**148.9933**

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	7.2800e-003	0.1143	0.0909	3.1000e-004	7.2200e-003	1.6000e-003	8.8200e-003	1.9800e-003	1.4700e-003	3.4500e-003	0.0000	28.2858	28.2858	2.1000e-004	0.0000	28.2902
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	3.2000e-003	4.7200e-003	0.0491	1.1000e-004	8.9600e-003	8.0000e-005	9.0400e-003	2.3800e-003	8.0000e-005	2.4600e-003	0.0000	8.4138	8.4138	4.6000e-004	0.0000	8.4234
Total	**0.0105**	**0.1191**	**0.1400**	**4.2000e-004**	**0.0162**	**1.6800e-003**	**0.0179**	**4.3600e-003**	**1.5500e-003**	**5.9100e-003**	**0.0000**	**36.6995**	**36.6995**	**6.7000e-004**	**0.0000**	**36.7136**

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					0.0181	0.0000	0.0181	1.9500e-003	0.0000	1.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1778	1.8205	1.1612	1.5900e-003		0.1055	0.1055		0.0971	0.0971	0.0000	148.0405	148.0405	0.0454	0.0000	148.9931
Total	**0.1778**	**1.8205**	**1.1612**	**1.5900e-003**	**0.0181**	**0.1055**	**0.1236**	**1.9500e-003**	**0.0971**	**0.0990**	**0.0000**	**148.0405**	**148.0405**	**0.0454**	**0.0000**	**148.9931**

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	7.2800e-003	0.1143	0.0909	3.1000e-004	7.2200e-003	1.6000e-003	8.8200e-003	1.9800e-003	1.4700e-003	3.4500e-003	0.0000	28.2858	28.2858	2.1000e-004	0.0000	28.2902
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	3.2000e-003	4.7200e-003	0.0491	1.1000e-004	8.9600e-003	8.0000e-005	9.0400e-003	2.3800e-003	8.0000e-005	2.4600e-003	0.0000	8.4138	8.4138	4.6000e-004	0.0000	8.4234
Total	**0.0105**	**0.1191**	**0.1400**	**4.2000e-004**	**0.0162**	**1.6800e-003**	**0.0179**	**4.3600e-003**	**1.5500e-003**	**5.9100e-003**	**0.0000**	**36.6995**	**36.6995**	**6.7000e-004**	**0.0000**	**36.7136**

3.4 Building Foundation - 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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0179	0.2110	0.1175	2.5000e-004		9.8600e-003	9.8600e-003		9.0700e-003	9.0700e-003	0.0000	23.5559	23.5559	7.2200e-003	0.0000	23.7075
Total	**0.0179**	**0.2110**	**0.1175**	**2.5000e-004**	**0.0000**	**9.8600e-003**	**9.8600e-003**	**0.0000**	**9.0700e-003**	**9.0700e-003**	**0.0000**	**23.5559**	**23.5559**	**7.2200e-003**	**0.0000**	**23.7075**

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	4.5000e-004	6.6000e-004	6.9100e-003	2.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.3000e-004	1.0000e-005	3.5000e-004	0.0000	1.1836	1.1836	6.0000e-005	0.0000	1.1849
Total	**4.5000e-004**	**6.6000e-004**	**6.9100e-003**	**2.0000e-005**	**1.2600e-003**	**1.0000e-005**	**1.2700e-003**	**3.3000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.1836**	**1.1836**	**6.0000e-005**	**0.0000**	**1.1849**

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0179	0.2110	0.1175	2.5000e-004		9.8600e-003	9.8600e-003		9.0700e-003	9.0700e-003	0.0000	23.5559	23.5559	7.2200e-003	0.0000	23.7075
Total	**0.0179**	**0.2110**	**0.1175**	**2.5000e-004**	**0.0000**	**9.8600e-003**	**9.8600e-003**	**0.0000**	**9.0700e-003**	**9.0700e-003**	**0.0000**	**23.5559**	**23.5559**	**7.2200e-003**	**0.0000**	**23.7075**

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	4.5000e-004	6.6000e-004	6.9100e-003	2.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.3000e-004	1.0000e-005	3.5000e-004	0.0000	1.1836	1.1836	6.0000e-005	0.0000	1.1849
Total	**4.5000e-004**	**6.6000e-004**	**6.9100e-003**	**2.0000e-005**	**1.2600e-003**	**1.0000e-005**	**1.2700e-003**	**3.3000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.1836**	**1.1836**	**6.0000e-005**	**0.0000**	**1.1849**

3.5 Concrete Pour (Podium) - 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	0.0302	0.2392	0.2161	3.7000e-004		0.0155	0.0155		0.0154	0.0154	0.0000	31.3707	31.3707	3.2000e-003	0.0000	31.4379
Paving	8.2300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0385**	**0.2392**	**0.2161**	**3.7000e-004**		**0.0155**	**0.0155**		**0.0154**	**0.0154**	**0.0000**	**31.3707**	**31.3707**	**3.2000e-003**	**0.0000**	**31.4379**

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	9.3000e-004	1.3900e-003	0.0144	4.0000e-005	2.9000e-003	3.0000e-005	2.9200e-003	7.7000e-004	2.0000e-005	7.9000e-004	0.0000	2.6225	2.6225	1.4000e-004	0.0000	2.6254
Total	**9.3000e-004**	**1.3900e-003**	**0.0144**	**4.0000e-005**	**2.9000e-003**	**3.0000e-005**	**2.9200e-003**	**7.7000e-004**	**2.0000e-005**	**7.9000e-004**	**0.0000**	**2.6225**	**2.6225**	**1.4000e-004**	**0.0000**	**2.6254**

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	0.0302	0.2392	0.2161	3.7000e-004		0.0155	0.0155		0.0154	0.0154	0.0000	31.3707	31.3707	3.2000e-003	0.0000	31.4379
Paving	8.2300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0385**	**0.2392**	**0.2161**	**3.7000e-004**		**0.0155**	**0.0155**		**0.0154**	**0.0154**	**0.0000**	**31.3707**	**31.3707**	**3.2000e-003**	**0.0000**	**31.4379**

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	9.3000e-004	1.3900e-003	0.0144	4.0000e-005	2.9000e-003	3.0000e-005	2.9200e-003	7.7000e-004	2.0000e-005	7.9000e-004	0.0000	2.6225	2.6225	1.4000e-004	0.0000	2.6254
Total	**9.3000e-004**	**1.3900e-003**	**0.0144**	**4.0000e-005**	**2.9000e-003**	**3.0000e-005**	**2.9200e-003**	**7.7000e-004**	**2.0000e-005**	**7.9000e-004**	**0.0000**	**2.6225**	**2.6225**	**1.4000e-004**	**0.0000**	**2.6254**

3.6 Building 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	0.1757	1.6222	1.2134	1.8200e-003		0.1078	0.1078		0.1011	0.1011	0.0000	163.6072	163.6072	0.0422	0.0000	164.4928
Total	**0.1757**	**1.6222**	**1.2134**	**1.8200e-003**		**0.1078**	**0.1078**		**0.1011**	**0.1011**	**0.0000**	**163.6072**	**163.6072**	**0.0422**	**0.0000**	**164.4928**

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	0.1081	1.0757	1.5157	3.0700e-003	0.0862	0.0162	0.1024	0.0246	0.0149	0.0395	0.0000	270.5423	270.5423	2.0100e-003	0.0000	270.5844
Worker	0.1224	0.1827	1.8971	4.8600e-003	0.3821	3.4200e-003	0.3855	0.1015	3.1600e-003	0.1046	0.0000	345.7024	345.7024	0.0182	0.0000	346.0839
Total	**0.2305**	**1.2583**	**3.4128**	**7.9300e-003**	**0.4682**	**0.0196**	**0.4879**	**0.1261**	**0.0181**	**0.1441**	**0.0000**	**616.2447**	**616.2447**	**0.0202**	**0.0000**	**616.6684**

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	0.1757	1.6222	1.2133	1.8200e-003		0.1078	0.1078		0.1011	0.1011	0.0000	163.6070	163.6070	0.0422	0.0000	164.4926
Total	**0.1757**	**1.6222**	**1.2133**	**1.8200e-003**		**0.1078**	**0.1078**		**0.1011**	**0.1011**	**0.0000**	**163.6070**	**163.6070**	**0.0422**	**0.0000**	**164.4926**

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	0.1081	1.0757	1.5157	3.0700e-003	0.0862	0.0162	0.1024	0.0246	0.0149	0.0395	0.0000	270.5423	270.5423	2.0100e-003	0.0000	270.5844
Worker	0.1224	0.1827	1.8971	4.8600e-003	0.3821	3.4200e-003	0.3855	0.1015	3.1600e-003	0.1046	0.0000	345.7024	345.7024	0.0182	0.0000	346.0839
Total	**0.2305**	**1.2583**	**3.4128**	**7.9300e-003**	**0.4682**	**0.0196**	**0.4879**	**0.1261**	**0.0181**	**0.1441**	**0.0000**	**616.2447**	**616.2447**	**0.0202**	**0.0000**	**616.6684**

3.6 Building Construction - 2019

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	0.0713	0.6651	0.5436	8.3000e-004		0.0422	0.0422		0.0396	0.0396	0.0000	74.0018	74.0018	0.0191	0.0000	74.4031
Total	**0.0713**	**0.6651**	**0.5436**	**8.3000e-004**		**0.0422**	**0.0422**		**0.0396**	**0.0396**	**0.0000**	**74.0018**	**74.0018**	**0.0191**	**0.0000**	**74.4031**

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	0.0469	0.4543	0.6713	1.4000e-003	0.0395	7.0500e-003	0.0465	0.0113	6.4800e-003	0.0177	0.0000	121.3603	121.3603	9.0000e-004	0.0000	121.3792
Worker	0.0514	0.0767	0.7961	2.2200e-003	0.1750	1.5300e-003	0.1765	0.0465	1.4200e-003	0.0479	0.0000	152.1152	152.1152	7.7800e-003	0.0000	152.2785
Total	**0.0983**	**0.5310**	**1.4673**	**3.6200e-003**	**0.2145**	**8.5800e-003**	**0.2230**	**0.0577**	**7.9000e-003**	**0.0656**	**0.0000**	**273.4755**	**273.4755**	**8.6800e-003**	**0.0000**	**273.6577**

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	0.0713	0.6651	0.5436	8.3000e-004		0.0422	0.0422		0.0396	0.0396	0.0000	74.0017	74.0017	0.0191	0.0000	74.4030
Total	**0.0713**	**0.6651**	**0.5436**	**8.3000e-004**		**0.0422**	**0.0422**		**0.0396**	**0.0396**	**0.0000**	**74.0017**	**74.0017**	**0.0191**	**0.0000**	**74.4030**

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	0.0469	0.4543	0.6713	1.4000e-003	0.0395	7.0500e-003	0.0465	0.0113	6.4800e-003	0.0177	0.0000	121.3603	121.3603	9.0000e-004	0.0000	121.3792
Worker	0.0514	0.0767	0.7961	2.2200e-003	0.1750	1.5300e-003	0.1765	0.0465	1.4200e-003	0.0479	0.0000	152.1152	152.1152	7.7800e-003	0.0000	152.2785
Total	**0.0983**	**0.5310**	**1.4673**	**3.6200e-003**	**0.2145**	**8.5800e-003**	**0.2230**	**0.0577**	**7.9000e-003**	**0.0656**	**0.0000**	**273.4755**	**273.4755**	**8.6800e-003**	**0.0000**	**273.6577**

3.7 Finishes - 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	1.9518					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0145	0.1112	0.1168	1.9000e-004		7.2600e-003	7.2600e-003		7.2100e-003	7.2100e-003	0.0000	16.1829	16.1829	2.6100e-003	0.0000	16.2376
Total	**1.9663**	**0.1112**	**0.1168**	**1.9000e-004**		**7.2600e-003**	**7.2600e-003**		**7.2100e-003**	**7.2100e-003**	**0.0000**	**16.1829**	**16.1829**	**2.6100e-003**	**0.0000**	**16.2376**

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	6.8300e-003	0.0102	0.1059	2.7000e-004	0.0213	1.9000e-004	0.0215	5.6700e-003	1.8000e-004	5.8400e-003	0.0000	19.3043	19.3043	1.0100e-003	0.0000	19.3256
Total	**6.8300e-003**	**0.0102**	**0.1059**	**2.7000e-004**	**0.0213**	**1.9000e-004**	**0.0215**	**5.6700e-003**	**1.8000e-004**	**5.8400e-003**	**0.0000**	**19.3043**	**19.3043**	**1.0100e-003**	**0.0000**	**19.3256**

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	1.9518					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0145	0.1112	0.1168	1.9000e-004		7.2600e-003	7.2600e-003		7.2100e-003	7.2100e-003	0.0000	16.1828	16.1828	2.6100e-003	0.0000	16.2376
Total	**1.9663**	**0.1112**	**0.1168**	**1.9000e-004**		**7.2600e-003**	**7.2600e-003**		**7.2100e-003**	**7.2100e-003**	**0.0000**	**16.1828**	**16.1828**	**2.6100e-003**	**0.0000**	**16.2376**

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	6.8300e-003	0.0102	0.1059	2.7000e-004	0.0213	1.9000e-004	0.0215	5.6700e-003	1.8000e-004	5.8400e-003	0.0000	19.3043	19.3043	1.0100e-003	0.0000	19.3256
Total	**6.8300e-003**	**0.0102**	**0.1059**	**2.7000e-004**	**0.0213**	**1.9000e-004**	**0.0215**	**5.6700e-003**	**1.8000e-004**	**5.8400e-003**	**0.0000**	**19.3043**	**19.3043**	**1.0100e-003**	**0.0000**	**19.3256**

3.7 Finishes - 2019

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	3.2233					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0215	0.1697	0.1921	3.1000e-004		0.0103	0.0103		0.0102	0.0102	0.0000	26.5951	26.5951	4.1100e-003	0.0000	26.6814
Total	**3.2449**	**0.1697**	**0.1921**	**3.1000e-004**		**0.0103**	**0.0103**		**0.0102**	**0.0102**	**0.0000**	**26.5951**	**26.5951**	**4.1100e-003**	**0.0000**	**26.6814**

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	0.0104	0.0155	0.1603	4.5000e-004	0.0352	3.1000e-004	0.0355	9.3600e-003	2.9000e-004	9.6400e-003	0.0000	30.6307	30.6307	1.5700e-003	0.0000	30.6636

Total	**0.0104**	**0.0155**	**0.1603**	**4.5000e-004**	**0.0352**	**3.1000e-004**	**0.0355**	**9.3600e-003**	**2.9000e-004**	**9.6400e-003**	**0.0000**	**30.6307**	**30.6307**	**1.5700e-003**	**0.0000**	**30.6636**

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	3.2233					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0215	0.1697	0.1921	3.1000e-004		0.0103	0.0103		0.0102	0.0102	0.0000	26.5950	26.5950	4.1100e-003	0.0000	26.6814
Total	**3.2449**	**0.1697**	**0.1921**	**3.1000e-004**		**0.0103**	**0.0103**		**0.0102**	**0.0102**	**0.0000**	**26.5950**	**26.5950**	**4.1100e-003**	**0.0000**	**26.6814**

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	0.0104	0.0155	0.1603	4.5000e-004	0.0352	3.1000e-004	0.0355	9.3600e-003	2.9000e-004	9.6400e-003	0.0000	30.6307	30.6307	1.5700e-003	0.0000	30.6636
Total	**0.0104**	**0.0155**	**0.1603**	**4.5000e-004**	**0.0352**	**3.1000e-004**	**0.0355**	**9.3600e-003**	**2.9000e-004**	**9.6400e-003**	**0.0000**	**30.6307**	**30.6307**	**1.5700e-003**	**0.0000**	**30.6636**

3.8 Paving - 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	5.1700e-003	0.0537	0.0466	7.0000e-005		3.1500e-003	3.1500e-003		2.9000e-003	2.9000e-003	0.0000	6.3601	6.3601	1.9800e-003	0.0000	6.4017
Paving	1.3300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.5000e-003**	**0.0537**	**0.0466**	**7.0000e-005**		**3.1500e-003**	**3.1500e-003**		**2.9000e-003**	**2.9000e-003**	**0.0000**	**6.3601**	**6.3601**	**1.9800e-003**	**0.0000**	**6.4017**

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	1.8000e-004	2.8000e-004	2.8600e-003	1.0000e-005	5.8000e-004	1.0000e-005	5.8000e-004	1.5000e-004	0.0000	1.6000e-004	0.0000	0.5205	0.5205	3.0000e-005	0.0000	0.5211
Total	**1.8000e-004**	**2.8000e-004**	**2.8600e-003**	**1.0000e-005**	**5.8000e-004**	**1.0000e-005**	**5.8000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5205**	**0.5205**	**3.0000e-005**	**0.0000**	**0.5211**

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	5.1700e-003	0.0537	0.0466	7.0000e-005		3.1500e-003	3.1500e-003		2.9000e-003	2.9000e-003	0.0000	6.3601	6.3601	1.9800e-003	0.0000	6.4017
Paving	1.3300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.5000e-003**	**0.0537**	**0.0466**	**7.0000e-005**		**3.1500e-003**	**3.1500e-003**		**2.9000e-003**	**2.9000e-003**	**0.0000**	**6.3601**	**6.3601**	**1.9800e-003**	**0.0000**	**6.4017**

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	1.8000e-004	2.8000e-004	2.8600e-003	1.0000e-005	5.8000e-004	1.0000e-005	5.8000e-004	1.5000e-004	0.0000	1.6000e-004	0.0000	0.5205	0.5205	3.0000e-005	0.0000	0.5211
Total	**1.8000e-004**	**2.8000e-004**	**2.8600e-003**	**1.0000e-005**	**5.8000e-004**	**1.0000e-005**	**5.8000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5205**	**0.5205**	**3.0000e-005**	**0.0000**	**0.5211**

3.8 Paving - 2019

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	0.0238	0.2433	0.2394	3.6000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	32.4778	32.4778	0.0103	0.0000	32.6936
Paving	6.9000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0307**	**0.2433**	**0.2394**	**3.6000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**32.4778**	**32.4778**	**0.0103**	**0.0000**	**32.6936**

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	8.8000e-004	1.3100e-003	0.0136	4.0000e-005	2.9900e-003	3.0000e-005	3.0100e-003	7.9000e-004	2.0000e-005	8.2000e-004	0.0000	2.5958	2.5958	1.3000e-004	0.0000	2.5986
Total	**8.8000e-004**	**1.3100e-003**	**0.0136**	**4.0000e-005**	**2.9900e-003**	**3.0000e-005**	**3.0100e-003**	**7.9000e-004**	**2.0000e-005**	**8.2000e-004**	**0.0000**	**2.5958**	**2.5958**	**1.3000e-004**	**0.0000**	**2.5986**

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	0.0238	0.2433	0.2394	3.6000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	32.4777	32.4777	0.0103	0.0000	32.6935
Paving	6.9000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0307**	**0.2433**	**0.2394**	**3.6000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**32.4777**	**32.4777**	**0.0103**	**0.0000**	**32.6935**

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	8.8000e-004	1.3100e-003	0.0136	4.0000e-005	2.9900e-003	3.0000e-005	3.0100e-003	7.9000e-004	2.0000e-005	8.2000e-004	0.0000	2.5958	2.5958	1.3000e-004	0.0000	2.5986
Total	**8.8000e-004**	**1.3100e-003**	**0.0136**	**4.0000e-005**	**2.9900e-003**	**3.0000e-005**	**3.0100e-003**	**7.9000e-004**	**2.0000e-005**	**8.2000e-004**	**0.0000**	**2.5958**	**2.5958**	**1.3000e-004**	**0.0000**	**2.5986**

Appendix E-2

Construction Emissions – Phase II

Rowland Heights Mixed Use (Construction)- Phase 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
Motel	202.00	Room	9.09	130,930.00	0
Parking Lot	94.00	Space	0.85	37,600.00	0
Enclosed Parking with Elevator	63.00	Space	0.57	25,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
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 - See Construction Assumptions

Construction Phase - See Construction Assumptions

Off-road Equipment -

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Off-road Equipment - See Construction Assumptions

Grading -

Trips and VMT - See Construction Assumptions

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	0
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	0
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	50	0
tblConstructionPhase	NumDays	300.00	283.00
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	NumDays	10.00	65.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	PhaseEndDate	3/30/2021	11/30/2020
tblConstructionPhase	PhaseEndDate	3/30/2021	11/30/2020
tblConstructionPhase	PhaseStartDate	12/1/2020	8/1/2020
tblConstructionPhase	PhaseStartDate	12/1/2020	8/1/2020
tblGrading	MaterialExported	0.00	36,500.00
tblLandUse	LandUseSquareFeet	395,960.40	130,930.00
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes

tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripNumber	4,563.00	2,608.00

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					
2019	0.1224	1.2718	1.2054	2.8500e-003	0.0590	0.0530	0.1121	0.0157	0.0491	0.0648	0.0000	244.8574	244.8574	0.0386	0.0000	245.6683
2020	2.0918	2.2696	2.7671	5.2700e-003	0.1442	0.1212	0.2654	0.0388	0.1133	0.1521	0.0000	426.1100	426.1100	0.0753	0.0000	427.6919
Total	**2.2142**	**3.5413**	**3.9724**	**8.1200e-003**	**0.2032**	**0.1743**	**0.3774**	**0.0545**	**0.1624**	**0.2169**	**0.0000**	**670.9673**	**670.9673**	**0.1140**	**0.0000**	**673.3602**

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					
2019	0.1224	1.2718	1.2054	2.8500e-003	0.0577	0.0530	0.1108	0.0155	0.0491	0.0646	0.0000	244.8572	244.8572	0.0386	0.0000	245.6682
2020	2.0918	2.2696	2.7671	5.2700e-003	0.1442	0.1212	0.2654	0.0388	0.1133	0.1521	0.0000	426.1097	426.1097	0.0753	0.0000	427.6916
Total	**2.2142**	**3.5413**	**3.9724**	**8.1200e-003**	**0.2019**	**0.1743**	**0.3762**	**0.0543**	**0.1624**	**0.2167**	**0.0000**	**670.9669**	**670.9669**	**0.1140**	**0.0000**	**673.3597**

	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**	**0.62**	**0.00**	**0.33**	**0.37**	**0.00**	**0.09**	**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	Building Foundation	Site Preparation	6/1/2019	8/30/2019	5	65	
2	Concrete Pour (Podium)	Paving	8/31/2019	10/30/2019	5	43	
3	Building Construction	Building Construction	10/31/2019	11/30/2020	5	283	
4	Paving	Paving	8/1/2020	11/30/2020	5	86	
5	Finishes	Architectural Coating	8/1/2020	11/30/2020	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 235,887; Non-Residential Outdoor: 78,629 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Finishes	Air Compressors	1	6.00	78	0.48
Concrete Pour (Podium)	Pavers	0	8.00	125	0.42
Concrete Pour (Podium)	Paving Equipment	0	8.00	130	0.36
Concrete Pour (Podium)	Rollers	0	8.00	80	0.38
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Paving	Pavers	2	8.00	125	0.42
Paving	Rollers	2	8.00	80	0.38
Building Foundation	Bore/Drill Rigs	1	8.00	205	0.50
Building Foundation	Cranes	1	8.00	226	0.29
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Foundation	Excavators	2	8.00	162	0.38
Concrete Pour (Podium)	Pumps	4		84	0.74
Paving	Paving Equipment	2	8.00	130	0.36
Building Foundation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Foundation	Rubber Tired Dozers	0	8.00	255	0.40
Concrete Pour (Podium)	Cement and Mortar Mixers	4		9	0.56
Building Construction	Welders	0	8.00	46	0.45
Concrete Pour (Podium)	Tractors/Loaders/Backhoes	1		97	0.37
Building Construction	Air Compressors	1	8.00	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
Finishes	1	16.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Foundation	6	15.00	0.00	2,608.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete Pour (Podium)	9	23.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	81.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Building Foundation - 2019

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					2.0600e-003	0.0000	2.0600e-003	3.1000e-004	0.0000	3.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0570	0.6332	0.5033	1.0100e-003		0.0300	0.0300		0.0276	0.0276	0.0000	91.0471	91.0471	0.0288	0.0000	91.6520
Total	**0.0570**	**0.6332**	**0.5033**	**1.0100e-003**	**2.0600e-003**	**0.0300**	**0.0321**	**3.1000e-004**	**0.0276**	**0.0279**	**0.0000**	**91.0471**	**91.0471**	**0.0288**	**0.0000**	**91.6520**

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	0.0215	0.3071	0.2714	9.7000e-004	0.0223	4.9500e-003	0.0273	6.1300e-003	4.5600e-003	0.0107	0.0000	84.3230	84.3230	6.5000e-004	0.0000	84.3367
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	1.5700e-003	2.3400e-003	0.0243	7.0000e-005	5.3400e-003	5.0000e-005	5.3900e-003	1.4200e-003	4.0000e-005	1.4600e-003	0.0000	4.6439	4.6439	2.4000e-004	0.0000	4.6489
Total	**0.0231**	**0.3095**	**0.2957**	**1.0400e-003**	**0.0277**	**5.0000e-003**	**0.0327**	**7.5500e-003**	**4.6000e-003**	**0.0121**	**0.0000**	**88.9669**	**88.9669**	**8.9000e-004**	**0.0000**	**88.9856**

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					8.0000e-004	0.0000	8.0000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0570	0.6332	0.5033	1.0100e-003		0.0300	0.0300		0.0276	0.0276	0.0000	91.0470	91.0470	0.0288	0.0000	91.6519
Total	**0.0570**	**0.6332**	**0.5033**	**1.0100e-003**	**8.0000e-004**	**0.0300**	**0.0308**	**1.2000e-004**	**0.0276**	**0.0277**	**0.0000**	**91.0470**	**91.0470**	**0.0288**	**0.0000**	**91.6519**

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	0.0215	0.3071	0.2714	9.7000e-004	0.0223	4.9500e-003	0.0273	6.1300e-003	4.5600e-003	0.0107	0.0000	84.3230	84.3230	6.5000e-004	0.0000	84.3367
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	1.5700e-003	2.3400e-003	0.0243	7.0000e-005	5.3400e-003	5.0000e-005	5.3900e-003	1.4200e-003	4.0000e-005	1.4600e-003	0.0000	4.6439	4.6439	2.4000e-004	0.0000	4.6489
Total	**0.0231**	**0.3095**	**0.2957**	**1.0400e-003**	**0.0277**	**5.0000e-003**	**0.0327**	**7.5500e-003**	**4.6000e-003**	**0.0121**	**0.0000**	**88.9669**	**88.9669**	**8.9000e-004**	**0.0000**	**88.9856**

3.3 Concrete Pour (Podium) - 2019

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	0.0000	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
Paving	1.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.1100e-003**	**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**

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	1.5900e-003	2.3800e-003	0.0247	7.0000e-005	5.4200e-003	5.0000e-005	5.4700e-003	1.4400e-003	4.0000e-005	1.4800e-003	0.0000	4.7106	4.7106	2.4000e-004	0.0000	4.7156
Total	**1.5900e-003**	**2.3800e-003**	**0.0247**	**7.0000e-005**	**5.4200e-003**	**5.0000e-005**	**5.4700e-003**	**1.4400e-003**	**4.0000e-005**	**1.4800e-003**	**0.0000**	**4.7106**	**4.7106**	**2.4000e-004**	**0.0000**	**4.7156**

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	0.0000	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
Paving	1.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.1100e-003**	**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**

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	1.5900e-003	2.3800e-003	0.0247	7.0000e-005	5.4200e-003	5.0000e-005	5.4700e-003	1.4400e-003	4.0000e-005	1.4800e-003	0.0000	4.7106	4.7106	2.4000e-004	0.0000	4.7156
Total	**1.5900e-003**	**2.3800e-003**	**0.0247**	**7.0000e-005**	**5.4200e-003**	**5.0000e-005**	**5.4700e-003**	**1.4400e-003**	**4.0000e-005**	**1.4800e-003**	**0.0000**	**4.7106**	**4.7106**	**2.4000e-004**	**0.0000**	**4.7156**

3.4 Building Construction - 2019

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	0.0288	0.2685	0.2194	3.4000e-004		0.0170	0.0170		0.0160	0.0160	0.0000	29.8723	29.8723	7.7100e-003	0.0000	30.0343
Total	**0.0288**	**0.2685**	**0.2194**	**3.4000e-004**		**0.0170**	**0.0170**		**0.0160**	**0.0160**	**0.0000**	**29.8723**	**29.8723**	**7.7100e-003**	**0.0000**	**30.0343**

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	5.1400e-003	0.0497	0.0735	1.5000e-004	4.3200e-003	7.7000e-004	5.0900e-003	1.2300e-003	7.1000e-004	1.9400e-003	0.0000	13.2853	13.2853	1.0000e-004	0.0000	13.2874
Worker	5.7300e-003	8.5600e-003	0.0888	2.5000e-004	0.0195	1.7000e-004	0.0197	5.1900e-003	1.6000e-004	5.3400e-003	0.0000	16.9753	16.9753	8.7000e-004	0.0000	16.9935
Total	**0.0109**	**0.0583**	**0.1623**	**4.0000e-004**	**0.0239**	**9.4000e-004**	**0.0248**	**6.4200e-003**	**8.7000e-004**	**7.2800e-003**	**0.0000**	**30.2605**	**30.2605**	**9.7000e-004**	**0.0000**	**30.2808**

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	0.0288	0.2685	0.2194	3.4000e-004		0.0170	0.0170		0.0160	0.0160	0.0000	29.8722	29.8722	7.7100e-003	0.0000	30.0342
Total	**0.0288**	**0.2685**	**0.2194**	**3.4000e-004**		**0.0170**	**0.0170**		**0.0160**	**0.0160**	**0.0000**	**29.8722**	**29.8722**	**7.7100e-003**	**0.0000**	**30.0342**

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	5.1400e-003	0.0497	0.0735	1.5000e-004	4.3200e-003	7.7000e-004	5.0900e-003	1.2300e-003	7.1000e-004	1.9400e-003	0.0000	13.2853	13.2853	1.0000e-004	0.0000	13.2874
Worker	5.7300e-003	8.5600e-003	0.0888	2.5000e-004	0.0195	1.7000e-004	0.0197	5.1900e-003	1.6000e-004	5.3400e-003	0.0000	16.9753	16.9753	8.7000e-004	0.0000	16.9935
Total	**0.0109**	**0.0583**	**0.1623**	**4.0000e-004**	**0.0239**	**9.4000e-004**	**0.0248**	**6.4200e-003**	**8.7000e-004**	**7.2800e-003**	**0.0000**	**30.2605**	**30.2605**	**9.7000e-004**	**0.0000**	**30.2808**

3.4 Building Construction - 2020

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	0.1410	1.3192	1.1719	1.8300e-003		0.0798	0.0798		0.0748	0.0748	0.0000	159.5985	159.5985	0.0416	0.0000	160.4723
Total	**0.1410**	**1.3192**	**1.1719**	**1.8300e-003**		**0.0798**	**0.0798**		**0.0748**	**0.0748**	**0.0000**	**159.5985**	**159.5985**	**0.0416**	**0.0000**	**160.4723**

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	0.0267	0.2362	0.3883	8.3000e-004	0.0235	3.8300e-003	0.0273	6.7000e-003	3.5200e-003	0.0102	0.0000	70.5555	70.5555	5.2000e-004	0.0000	70.5665
Worker	0.0292	0.0431	0.4491	1.3400e-003	0.1061	9.2000e-004	0.1070	0.0282	8.5000e-004	0.0290	0.0000	88.5004	88.5004	4.4700e-003	0.0000	88.5942
Total	**0.0558**	**0.2793**	**0.8374**	**2.1700e-003**	**0.1296**	**4.7500e-003**	**0.1343**	**0.0349**	**4.3700e-003**	**0.0392**	**0.0000**	**159.0559**	**159.0559**	**4.9900e-003**	**0.0000**	**159.1607**

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	0.1410	1.3192	1.1719	1.8300e-003		0.0798	0.0798		0.0748	0.0748	0.0000	159.5983	159.5983	0.0416	0.0000	160.4721
Total	**0.1410**	**1.3192**	**1.1719**	**1.8300e-003**		**0.0798**	**0.0798**		**0.0748**	**0.0748**	**0.0000**	**159.5983**	**159.5983**	**0.0416**	**0.0000**	**160.4721**

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	0.0267	0.2362	0.3883	8.3000e-004	0.0235	3.8300e-003	0.0273	6.7000e-003	3.5200e-003	0.0102	0.0000	70.5555	70.5555	5.2000e-004	0.0000	70.5665
Worker	0.0292	0.0431	0.4491	1.3400e-003	0.1061	9.2000e-004	0.1070	0.0282	8.5000e-004	0.0290	0.0000	88.5004	88.5004	4.4700e-003	0.0000	88.5942
Total	**0.0558**	**0.2793**	**0.8374**	**2.1700e-003**	**0.1296**	**4.7500e-003**	**0.1343**	**0.0349**	**4.3700e-003**	**0.0392**	**0.0000**	**159.0559**	**159.0559**	**4.9900e-003**	**0.0000**	**159.1607**

3.5 Paving - 2020

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	0.0572	0.5927	0.6172	9.6000e-004		0.0318	0.0318		0.0292	0.0292	0.0000	84.2889	84.2889	0.0273	0.0000	84.8613
Paving	1.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0583**	**0.5927**	**0.6172**	**9.6000e-004**		**0.0318**	**0.0318**		**0.0292**	**0.0292**	**0.0000**	**84.2889**	**84.2889**	**0.0273**	**0.0000**	**84.8613**

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	1.9400e-003	2.8700e-003	0.0299	9.0000e-005	7.0700e-003	6.0000e-005	7.1300e-003	1.8800e-003	6.0000e-005	1.9300e-003	0.0000	5.8973	5.8973	3.0000e-004	0.0000	5.9035
Total	**1.9400e-003**	**2.8700e-003**	**0.0299**	**9.0000e-005**	**7.0700e-003**	**6.0000e-005**	**7.1300e-003**	**1.8800e-003**	**6.0000e-005**	**1.9300e-003**	**0.0000**	**5.8973**	**5.8973**	**3.0000e-004**	**0.0000**	**5.9035**

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	0.0572	0.5927	0.6172	9.6000e-004		0.0318	0.0318		0.0292	0.0292	0.0000	84.2888	84.2888	0.0273	0.0000	84.8612
Paving	1.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0583**	**0.5927**	**0.6172**	**9.6000e-004**		**0.0318**	**0.0318**		**0.0292**	**0.0292**	**0.0000**	**84.2888**	**84.2888**	**0.0273**	**0.0000**	**84.8612**

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	1.9400e-003	2.8700e-003	0.0299	9.0000e-005	7.0700e-003	6.0000e-005	7.1300e-003	1.8800e-003	6.0000e-005	1.9300e-003	0.0000	5.8973	5.8973	3.0000e-004	0.0000	5.9035
Total	**1.9400e-003**	**2.8700e-003**	**0.0299**	**9.0000e-005**	**7.0700e-003**	**6.0000e-005**	**7.1300e-003**	**1.8800e-003**	**6.0000e-005**	**1.9300e-003**	**0.0000**	**5.8973**	**5.8973**	**3.0000e-004**	**0.0000**	**5.9035**

3.6 Finishes - 2020

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	1.8222					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0104	0.0724	0.0788	1.3000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	10.9790	10.9790	8.5000e-004	0.0000	10.9968
Total	**1.8326**	**0.0724**	**0.0788**	**1.3000e-004**		**4.7700e-003**	**4.7700e-003**		**4.7700e-003**	**4.7700e-003**	**0.0000**	**10.9790**	**10.9790**	**8.5000e-004**	**0.0000**	**10.9968**

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	2.0700e-003	3.0600e-003	0.0319	1.0000e-004	7.5400e-003	7.0000e-005	7.6000e-003	2.0000e-003	6.0000e-005	2.0600e-003	0.0000	6.2904	6.2904	3.2000e-004	0.0000	6.2971
Total	**2.0700e-003**	**3.0600e-003**	**0.0319**	**1.0000e-004**	**7.5400e-003**	**7.0000e-005**	**7.6000e-003**	**2.0000e-003**	**6.0000e-005**	**2.0600e-003**	**0.0000**	**6.2904**	**6.2904**	**3.2000e-004**	**0.0000**	**6.2971**

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	1.8222					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0104	0.0724	0.0788	1.3000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	10.9790	10.9790	8.5000e-004	0.0000	10.9968

Total	**1.8326**	**0.0724**	**0.0788**	**1.3000e-004**		**4.7700e-003**	**4.7700e-003**		**4.7700e-003**	**4.7700e-003**	**0.0000**	**10.9790**	**10.9790**	**8.5000e-004**	**0.0000**	**10.9968**

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	2.0700e-003	3.0600e-003	0.0319	1.0000e-004	7.5400e-003	7.0000e-005	7.6000e-003	2.0000e-003	6.0000e-005	2.0600e-003	0.0000	6.2904	6.2904	3.2000e-004	0.0000	6.2971
Total	**2.0700e-003**	**3.0600e-003**	**0.0319**	**1.0000e-004**	**7.5400e-003**	**7.0000e-005**	**7.6000e-003**	**2.0000e-003**	**6.0000e-005**	**2.0600e-003**	**0.0000**	**6.2904**	**6.2904**	**3.2000e-004**	**0.0000**	**6.2971**

Appendix E-3

Operational Emissions – Business As Usual

Rowland Heights Mixed Use (Operations)- Full Buildout

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	2.00	1000sqft	0.05	2,000.00	0
Enclosed Parking with Elevator	369.00	Space	3.32	147,600.00	0
Parking Lot	792.00	Space	7.13	316,800.00	0
High Turnover (Sit Down Restaurant)	20.06	1000sqft	0.46	20,056.00	0
Hotel	477.00	Room	15.90	320,880.00	0
Quality Restaurant	20.06	1000sqft	0.46	20,057.00	0
Strip Mall	83.71	1000sqft	1.92	83,707.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2020
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 - See Construction Model Inputs.

Vehicle Trips - See Traffic Analysis

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	20,060.00	20,056.00
tblLandUse	LandUseSquareFeet	692,604.00	320,880.00
tblLandUse	LandUseSquareFeet	20,060.00	20,057.00
tblLandUse	LandUseSquareFeet	83,710.00	83,707.00
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	ST_TR	158.37	158.36
tblVehicleTrips	ST_TR	8.19	10.50
tblVehicleTrips	ST_TR	1.64	0.50
tblVehicleTrips	ST_TR	94.36	94.38
tblVehicleTrips	ST_TR	42.04	49.69
tblVehicleTrips	SU_TR	131.84	131.83
tblVehicleTrips	SU_TR	5.95	8.48
tblVehicleTrips	SU_TR	0.76	0.50
tblVehicleTrips	SU_TR	72.16	72.14
tblVehicleTrips	SU_TR	20.43	25.10
tblVehicleTrips	WD_TR	8.17	8.92
tblVehicleTrips	WD_TR	11.42	3.50
tblVehicleTrips	WD_TR	89.95	89.94
tblVehicleTrips	WD_TR	44.32	42.70

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	tons/yr										MT/yr					
Area	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Energy	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	2,991.8403	2,991.8403	0.1124	0.0367	3,005.5820
Mobile	5.5801	12.5659	52.9643	0.1340	8.7380	0.1904	8.9284	2.3406	0.1756	2.5162	0.0000	9,444.8723	9,444.8723	0.3635	0.0000	9,452.5053
Waste						0.0000	0.0000		0.0000	0.0000	123.4043	0.0000	123.4043	7.2930	0.0000	276.5570
Water						0.0000	0.0000		0.0000	0.0000	9.7821	134.4132	144.1953	1.0109	0.0250	173.1748
Total	**9.6687**	**13.4258**	**53.7091**	**0.1392**	**8.7380**	**0.2558**	**8.9938**	**2.3406**	**0.2410**	**2.5816**	**133.1864**	**12,571.1696**	**12,704.3560**	**8.7799**	**0.0617**	**12,907.8653**

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	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Energy	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	2,991.8403	2,991.8403	0.1124	0.0367	3,005.5820
Mobile	5.5801	12.5659	52.9643	0.1340	8.7380	0.1904	8.9284	2.3406	0.1756	2.5162	0.0000	9,444.8723	9,444.8723	0.3635	0.0000	9,452.5053
Waste						0.0000	0.0000		0.0000	0.0000	123.4043	0.0000	123.4043	7.2930	0.0000	276.5570
Water						0.0000	0.0000		0.0000	0.0000	9.7821	134.4132	144.1953	1.0107	0.0250	173.1592
Total	**9.6687**	**13.4258**	**53.7091**	**0.1392**	**8.7380**	**0.2558**	**8.9938**	**2.3406**	**0.2410**	**2.5816**	**133.1864**	**12,571.1696**	**12,704.3560**	**8.7797**	**0.0617**	**12,907.8497**

	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**

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	5.5801	12.5659	52.9643	0.1340	8.7380	0.1904	8.9284	2.3406	0.1756	2.5162	0.0000	9,444.8723	9,444.8723	0.3635	0.0000	9,452.5053
Unmitigated	5.5801	12.5659	52.9643	0.1340	8.7380	0.1904	8.9284	2.3406	0.1756	2.5162	0.0000	9,444.8723	9,444.8723	0.3635	0.0000	9,452.5053

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	2,550.63	3,176.70	2644.51	3,616,243	3,616,243
Hotel	4,254.84	5,008.50	4044.96	10,338,141	10,338,141
Office Park	7.00	1.00	1.00	17,859	17,859
Parking Lot	0.00	0.00	0.00		
Quality Restaurant	1,804.20	1,893.26	1447.13	2,514,005	2,514,005
Strip Mall	3,574.42	4,159.55	2101.12	6,559,267	6,559,267
Total	12,191.08	14,239.01	10,238.72	23,045,514	23,045,514

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-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Office Park	16.60	8.40	6.90	33.00	48.00	19.00	82	15	3
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Quality Restaurant	16.60	8.40	6.90	12.00	69.00	19.00	38	18	44
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
0.530094	0.057664	0.178835	0.124843	0.039181	0.006319	0.017052	0.034445	0.002509	0.003148	0.003693	0.000531	0.001685

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	2,055.9443	2,055.9443	0.0945	0.0196	2,063.9903
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,055.9443	2,055.9443	0.0945	0.0196	2,063.9903
NaturalGas Mitigated	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	935.8961	935.8961	0.0179	0.0172	941.5918
NaturalGas Unmitigated	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	935.8961	935.8961	0.0179	0.0172	941.5918

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					
Hotel	8.02842e+006	0.0433	0.3936	0.3306	2.3600e-003		0.0299	0.0299		0.0299	0.0299	0.0000	428.4269	428.4269	8.2100e-003	7.8500e-003	431.0343
Office Park	20580	1.1000e-004	1.0100e-003	8.5000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	1.0982	1.0982	2.0000e-005	2.0000e-005	1.1049
Parking Lot	0	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
Quality Restaurant	4.67348e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3948	249.3948	4.7800e-003	4.5700e-003	250.9126
Strip Mall	142302	7.7000e-004	6.9800e-003	5.8600e-003	4.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	7.5938	7.5938	1.5000e-004	1.4000e-004	7.6400
Enclosed Parking with Elevator	0	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
High Turnover (Sit Down Restaurant)	4.67325e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3823	249.3823	4.7800e-003	4.5700e-003	250.9000
Total		**0.0946**	**0.8597**	**0.7222**	**5.1500e-003**		**0.0653**	**0.0653**		**0.0653**	**0.0653**	**0.0000**	**935.8961**	**935.8961**	**0.0179**	**0.0172**	**941.5918**

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					
Hotel	8.02842e+006	0.0433	0.3936	0.3306	2.3600e-003		0.0299	0.0299		0.0299	0.0299	0.0000	428.4269	428.4269	8.2100e-003	7.8500e-003	431.0343
Office Park	20580	1.1000e-004	1.0100e-003	8.5000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	1.0982	1.0982	2.0000e-005	2.0000e-005	1.1049
Parking Lot	0	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
Quality Restaurant	4.67348e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3948	249.3948	4.7800e-003	4.5700e-003	250.9126
Strip Mall	142302	7.7000e-004	6.9800e-003	5.8600e-003	4.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	7.5938	7.5938	1.5000e-004	1.4000e-004	7.6400
Enclosed Parking with Elevator	0	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
High Turnover (Sit Down Restaurant)	4.67325e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3823	249.3823	4.7800e-003	4.5700e-003	250.9000
Total		**0.0946**	**0.8597**	**0.7222**	**5.1500e-003**		**0.0653**	**0.0653**		**0.0653**	**0.0653**	**0.0000**	**935.8961**	**935.8961**	**0.0179**	**0.0172**	**941.5918**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	994824	284.6857	0.0131	2.7100e-003	285.7998
High Turnover (Sit Down Restaurant)	940827	269.2335	0.0124	2.5600e-003	270.2872
Hotel	2.72748e+006	780.5145	0.0359	7.4200e-003	783.5690
Office Park	31800	9.1001	4.2000e-004	9.0000e-005	9.1357
Parking Lot	278784	79.7788	3.6700e-003	7.6000e-004	80.0910
Quality Restaurant	940874	269.2470	0.0124	2.5600e-003	270.3007
Strip Mall	1.26984e+006	363.3848	0.0167	3.4600e-003	364.8069
Total		**2,055.9443**	**0.0945**	**0.0196**	**2,063.9903**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	994824	284.6857	0.0131	2.7100e-003	285.7998
High Turnover (Sit Down Restaurant)	940827	269.2335	0.0124	2.5600e-003	270.2872
Hotel	2.72748e+006	780.5145	0.0359	7.4200e-003	783.5690
Office Park	31800	9.1001	4.2000e-004	9.0000e-005	9.1357
Parking Lot	278784	79.7788	3.6700e-003	7.6000e-004	80.0910
Quality Restaurant	940874	269.2470	0.0124	2.5600e-003	270.3007
Strip Mall	1.26984e+006	363.3848	0.0167	3.4600e-003	364.8069
Total		**2,055.9443**	**0.0945**	**0.0196**	**2,063.9903**

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	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Unmitigated	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462

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	0.6997					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2923					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Total	**3.9941**	**2.1000e-004**	**0.0227**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0438**	**0.0438**	**1.2000e-004**	**0.0000**	**0.0462**

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	0.6997					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2923					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Total	**3.9941**	**2.1000e-004**	**0.0227**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0438**	**0.0438**	**1.2000e-004**	**0.0000**	**0.0462**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	144.1953	1.0107	0.0250	173.1592
Unmitigated	144.1953	1.0109	0.0250	173.1748

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	6.08889 / 0.388652	25.8557	0.1995	4.9100e-003	31.5681
Hotel	12.0999 / 1.34444	53.1997	0.3966	9.7800e-003	64.5587
Office Park	0.355467 / 0.217867	2.1300	0.0117	2.9000e-004	2.4659
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	6.08889 / 0.388652	25.8557	0.1995	4.9100e-003	31.5681
Strip Mall	6.20061 / 3.80037	37.1543	0.2037	5.1100e-003	43.0140
Total		**144.1954**	**1.0109**	**0.0250**	**173.1748**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	6.08889 / 0.388652	25.8557	0.1995	4.9000e-003	31.5650
Hotel	12.0999 / 1.34444	53.1997	0.3965	9.7600e-003	64.5526
Office Park	0.355467 / 0.217867	2.1300	0.0117	2.9000e-004	2.4657
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	6.08889 / 0.388652	25.8557	0.1995	4.9000e-003	31.5650
Strip Mall	6.20061 / 3.80037	37.1543	0.2036	5.1000e-003	43.0108
Total		**144.1954**	**1.0107**	**0.0250**	**173.1592**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	123.4043	7.2930	0.0000	276.5570
Unmitigated	123.4043	7.2930	0.0000	276.5570

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	238.71	48.4560	2.8637	0.0000	108.5930
Hotel	261.16	53.0131	3.1330	0.0000	118.8058
Office Park	1.86	0.3776	0.0223	0.0000	0.8461
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	18.3	3.7147	0.2195	0.0000	8.3250
Strip Mall	87.9	17.8429	1.0545	0.0000	39.9871
Total		**123.4043**	**7.2930**	**0.0000**	**276.5570**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	238.71	48.4560	2.8637	0.0000	108.5930
Hotel	261.16	53.0131	3.1330	0.0000	118.8058
Office Park	1.86	0.3776	0.0223	0.0000	0.8461
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	18.3	3.7147	0.2195	0.0000	8.3250
Strip Mall	87.9	17.8429	1.0545	0.0000	39.9871
Total		**123.4043**	**7.2930**	**0.0000**	**276.5570**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix E-4

Operational Emissions – Project

Rowland Heights Mixed Use (Operations)- Full Buildout- Project

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	2.00	1000sqft	0.05	2,000.00	0
Enclosed Parking with Elevator	369.00	Space	3.32	147,600.00	0
Parking Lot	792.00	Space	7.13	316,800.00	0
High Turnover (Sit Down Restaurant)	20.06	1000sqft	0.46	20,056.00	0
Hotel	477.00	Room	15.90	320,880.00	0
Quality Restaurant	20.06	1000sqft	0.46	20,057.00	0
Strip Mall	83.71	1000sqft	1.92	83,707.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	595	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - California Air Resources Board, Statewide Emission Factors (EF) For Use With AB 900 Projects, March 2014. The emission factor of 595 lbs CO2/MWh is from the California LEV III Initial Statement Of Reasons (ISOR, Dec. 7, 2011), http://www.arb.ca.gov/regact/2012/leviiighg2012/leviiighg2012.htm, based on analysis with CA-GREET model.

Land Use - See Construction Model Inputs.

Vehicle Trips - See Traffic Analysis

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	20,060.00	20,056.00
tblLandUse	LandUseSquareFeet	692,604.00	320,880.00
tblLandUse	LandUseSquareFeet	20,060.00	20,057.00
tblLandUse	LandUseSquareFeet	83,710.00	83,707.00
tblProjectCharacteristics	CO2IntensityFactor	630.89	595
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	ST_TR	158.37	131.39
tblVehicleTrips	ST_TR	8.19	8.71
tblVehicleTrips	ST_TR	1.64	0.46
tblVehicleTrips	ST_TR	94.36	78.33
tblVehicleTrips	ST_TR	42.04	41.23
tblVehicleTrips	SU_TR	131.84	109.41
tblVehicleTrips	SU_TR	5.95	7.04
tblVehicleTrips	SU_TR	0.76	0.46
tblVehicleTrips	SU_TR	72.16	59.85
tblVehicleTrips	SU_TR	20.43	20.83
tblVehicleTrips	WD_TR	127.15	105.50
tblVehicleTrips	WD_TR	8.17	7.40
tblVehicleTrips	WD_TR	11.42	2.77
tblVehicleTrips	WD_TR	89.95	74.65
tblVehicleTrips	WD_TR	44.32	35.43

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	tons/yr										MT/yr					
Area	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Energy	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	2,874.8820	2,874.8820	0.1124	0.0367	2,888.6237
Mobile	4.6301	10.4265	43.9471	0.1112	7.2503	0.1580	7.4082	1.9421	0.1457	2.0878	0.0000	7,836.7913	7,836.7913	0.3016	0.0000	7,843.1248
Waste						0.0000	0.0000		0.0000	0.0000	123.4043	0.0000	123.4043	7.2930	0.0000	276.5570
Water						0.0000	0.0000		0.0000	0.0000	9.7821	126.7667	136.5489	1.0109	0.0250	165.5283
Total	**8.7188**	**11.2864**	**44.6919**	**0.1164**	**7.2503**	**0.2234**	**7.4737**	**1.9421**	**0.2111**	**2.1532**	**133.1864**	**10,838.4838**	**10,971.6703**	**8.7180**	**0.0617**	**11,173.8800**

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	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Energy	0.0782	0.7111	0.5973	4.2700e-003		0.0540	0.0540		0.0540	0.0540	0.0000	2,466.1198	2,466.1198	0.0973	0.0313	2,477.8520
Mobile	4.6301	10.4265	43.9471	0.1112	7.2503	0.1580	7.4082	1.9421	0.1457	2.0878	0.0000	7,836.7913	7,836.7913	0.3016	0.0000	7,843.1248
Waste						0.0000	0.0000		0.0000	0.0000	123.4043	0.0000	123.4043	7.2930	0.0000	276.5570
Water						0.0000	0.0000		0.0000	0.0000	6.8475	91.6272	98.4747	0.7078	0.0175	118.7724
Total	**8.7024**	**11.1378**	**44.5671**	**0.1155**	**7.2503**	**0.2121**	**7.4624**	**1.9421**	**0.1998**	**2.1419**	**130.2518**	**10,394.5821**	**10,524.8339**	**8.3998**	**0.0488**	**10,716.3523**

	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	**0.19**	**1.32**	**0.28**	**0.76**	**0.00**	**5.06**	**0.15**	**0.00**	**5.35**	**0.52**	**2.20**	**4.10**	**4.07**	**3.65**	**20.95**	**4.09**

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	4.6301	10.4265	43.9471	0.1112	7.2503	0.1580	7.4082	1.9421	0.1457	2.0878	0.0000	7,836.7913	7,836.7913	0.3016	0.0000	7,843.1248
Unmitigated	4.6301	10.4265	43.9471	0.1112	7.2503	0.1580	7.4082	1.9421	0.1457	2.0878	0.0000	7,836.7913	7,836.7913	0.3016	0.0000	7,843.1248

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	2,116.33	2,635.68	2194.76	3,000,583	3,000,583
Hotel	3,529.80	4,156.39	3356.98	8,577,388	8,577,388
Office Park	5.53	0.92	0.92	14,241	14,241
Parking Lot	0.00	0.00	0.00		
Quality Restaurant	1,497.56	1,571.32	1200.63	2,086,585	2,086,585
Strip Mall	2,966.18	3,451.20	1743.60	5,442,970	5,442,970
Total	10,115.40	11,815.51	8,496.90	19,121,766	19,121,766

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-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Office Park	16.60	8.40	6.90	33.00	48.00	19.00	82	15	3
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Quality Restaurant	16.60	8.40	6.90	12.00	69.00	19.00	38	18	44
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
0.530094	0.057664	0.178835	0.124843	0.039181	0.006319	0.017052	0.034445	0.002509	0.003148	0.003693	0.000531	0.001685

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

	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	1,691.9963	1,691.9963	0.0825	0.0171	1,699.0174
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,938.9860	1,938.9860	0.0945	0.0196	1,947.0319
NaturalGas Mitigated	0.0782	0.7111	0.5973	4.2700e-003		0.0540	0.0540		0.0540	0.0540	0.0000	774.1234	774.1234	0.0148	0.0142	778.8346
NaturalGas Unmitigated	0.0946	0.8597	0.7222	5.1600e-003		0.0653	0.0653		0.0653	0.0653	0.0000	935.8961	935.8961	0.0179	0.0172	941.5918

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					
Hotel	8.02842e+006	0.0433	0.3936	0.3306	2.3600e-003		0.0299	0.0299		0.0299	0.0299	0.0000	428.4269	428.4269	8.2100e-003	7.8500e-003	431.0343
Office Park	20580	1.1000e-004	1.0100e-003	8.5000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	1.0982	1.0982	2.0000e-005	2.0000e-005	1.1049
Parking Lot	0	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
Quality Restaurant	4.67348e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3948	249.3948	4.7800e-003	4.5700e-003	250.9126
Strip Mall	142302	7.7000e-004	6.9800e-003	5.8600e-003	4.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	7.5938	7.5938	1.5000e-004	1.4000e-004	7.6400
Enclosed Parking with Elevator	0	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
High Turnover (Sit Down Restaurant)	4.67325e+006	0.0252	0.2291	0.1924	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	249.3823	249.3823	4.7800e-003	4.5700e-003	250.9000
Total		**0.0946**	**0.8597**	**0.7222**	**5.1500e-003**		**0.0653**	**0.0653**		**0.0653**	**0.0653**	**0.0000**	**935.8961**	**935.8961**	**0.0179**	**0.0172**	**941.5918**

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					
Hotel	5.67444e+006	0.0306	0.2782	0.2337	1.6700e-003		0.0211	0.0211		0.0211	0.0211	0.0000	302.8098	302.8098	5.8000e-003	5.5500e-003	304.6527
Office Park	13510	7.0000e-005	6.6000e-004	5.6000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.7210	0.7210	1.0000e-005	1.0000e-005	0.7253
Parking Lot	0	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
Quality Restaurant	4.35597e+006	0.0235	0.2135	0.1794	1.2800e-003		0.0162	0.0162		0.0162	0.0162	0.0000	232.4511	232.4511	4.4600e-003	4.2600e-003	233.8658
Strip Mall	106852	5.8000e-004	5.2400e-003	4.4000e-003	3.0000e-005		4.0000e-004	4.0000e-004		4.0000e-004	4.0000e-004	0.0000	5.7020	5.7020	1.1000e-004	1.0000e-004	5.7367
Enclosed Parking with Elevator	0	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
High Turnover (Sit Down Restaurant)	4.35575e+006	0.0235	0.2135	0.1794	1.2800e-003		0.0162	0.0162		0.0162	0.0162	0.0000	232.4395	232.4395	4.4600e-003	4.2600e-003	233.8541
Total		**0.0782**	**0.7111**	**0.5973**	**4.2600e-003**		**0.0541**	**0.0541**		**0.0541**	**0.0541**	**0.0000**	**774.1234**	**774.1234**	**0.0148**	**0.0142**	**778.8346**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	994824	268.4905	0.0131	2.7100e-003	269.6047
High Turnover (Sit Down Restaurant)	940827	253.9174	0.0124	2.5600e-003	254.9711
Hotel	2.72748e+006	736.1127	0.0359	7.4200e-003	739.1672
Office Park	31800	8.5824	4.2000e-004	9.0000e-005	8.6180
Parking Lot	278784	75.2403	3.6700e-003	7.6000e-004	75.5525
Quality Restaurant	940874	253.9301	0.0124	2.5600e-003	254.9838
Strip Mall	1.26984e+006	342.7126	0.0167	3.4600e-003	344.1347
Total		**1,938.9860**	**0.0945**	**0.0196**	**1,947.0319**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	792317	213.8364	0.0104	2.1600e-003	214.7237
High Turnover (Sit Down Restaurant)	871263	235.1429	0.0115	2.3700e-003	236.1186
Hotel	2.33472e+006	630.1124	0.0307	6.3500e-003	632.7271
Office Park	26998	7.2864	3.6000e-004	7.0000e-005	7.3167
Parking Lot	278784	75.2403	3.6700e-003	7.6000e-004	75.5525
Quality Restaurant	838904	226.4097	0.0110	2.2800e-003	227.3492
Strip Mall	1.12628e+006	303.9682	0.0148	3.0700e-003	305.2296
Total		**1,691.9963**	**0.0825**	**0.0171**	**1,699.0174**

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	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Unmitigated	3.9941	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462

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	0.6997					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2923					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Total	**3.9941**	**2.1000e-004**	**0.0227**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0438**	**0.0438**	**1.2000e-004**	**0.0000**	**0.0462**

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	0.6997					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2923					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0227	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0438	0.0438	1.2000e-004	0.0000	0.0462
Total	**3.9941**	**2.1000e-004**	**0.0227**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0438**	**0.0438**	**1.2000e-004**	**0.0000**	**0.0462**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	98.4747	0.7078	0.0175	118.7724
Unmitigated	136.5489	1.0109	0.0250	165.5283

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	6.08889 / 0.388652	24.4947	0.1995	4.9100e-003	30.2071
Hotel	12.0999 / 1.34444	50.3917	0.3966	9.7800e-003	61.7507
Office Park	0.355467 / 0.217867	2.0152	0.0117	2.9000e-004	2.3511
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	6.08889 / 0.388652	24.4947	0.1995	4.9100e-003	30.2071
Strip Mall	6.20061 / 3.80037	35.1526	0.2037	5.1100e-003	41.0122
Total		**136.5489**	**1.0109**	**0.0250**	**165.5283**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	4.26222 / 0.388652	16.9760	0.1397	3.4400e-003	20.9740
Hotel	8.46996 / 1.34444	35.4505	0.2776	6.8500e-003	43.4025
Office Park	0.248827 / 0.217867	1.5763	8.1800e-003	2.1000e-004	1.8121
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	4.26222 / 0.388652	16.9760	0.1397	3.4400e-003	20.9740
Strip Mall	4.34043 / 3.80037	27.4960	0.1427	3.6000e-003	31.6097
Total		**98.4747**	**0.7078**	**0.0175**	**118.7724**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	123.4043	7.2930	0.0000	276.5570
Unmitigated	123.4043	7.2930	0.0000	276.5570

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	238.71	48.4560	2.8637	0.0000	108.5930
Hotel	261.16	53.0131	3.1330	0.0000	118.8058
Office Park	1.86	0.3776	0.0223	0.0000	0.8461
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	18.3	3.7147	0.2195	0.0000	8.3250
Strip Mall	87.9	17.8429	1.0545	0.0000	39.9871
Total		**123.4043**	**7.2930**	**0.0000**	**276.5570**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	238.71	48.4560	2.8637	0.0000	108.5930
Hotel	261.16	53.0131	3.1330	0.0000	118.8058
Office Park	1.86	0.3776	0.0223	0.0000	0.8461
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Quality Restaurant	18.3	3.7147	0.2195	0.0000	8.3250
Strip Mall	87.9	17.8429	1.0545	0.0000	39.9871
Total		**123.4043**	**7.2930**	**0.0000**	**276.5570**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix E-5

Project Trip and VMT Reductions

Rowland Heights Plaza and Hotel Project
Draft EIR
Quantifying Greenhouse Gas Mitigation Measures - Transportation (Based on CAPCOA Guidance (August 2010))

Purpose:

This section provides calculations for vehicle miles traveled (VMT) reductions from BAU characteristics based on guidance contained in the California Air Pollution Control Officers Association (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures* (August 2010).

Notes on Calculations:

1. Percent VMT reduced is calculated individually for each measure based on the formulas for each measure.
2. Certain individual measures or groups of measures have VMT reduction caps, as indicated in the calculations.
3. The location type determines the VMT reduction caps for LUT-2 as well as the global transportation VMT reduction cap.
4. The VMT reduction cap for the LUT/SDT/PDT/TST group of measures is 5% less than the global transportation cap.
5. When summing the total VMT reductions from multiple measures, a double counting correction is applied as follows.
    a. The total percent reductions from the different measures are NOT added together to avoid double counting. VMT reductions for each successive measure are applied only to the "remaining" VMT after the reductions from the previous measure have been taken out.
    b. In order to calculate the "effective" VMT reduction percent due to multiple measures, the following formula is applied:

Total Percent VMT Reduction % =
= 100% - [(100% - Measure 1 Reduction %) × (100% - Measure Reduction 2 %) × (100% - Measure Reduction 3 %) × ...]

Example:
Measure 1 VMT Reduction = 1%
Measure 2 VMT Reduction = 14%
Measure 3 VMT Reduction = 7%
Total Percent VMT Reduction % = 100% - [(100% - 1%) × (100% - 14%) × (100% - 7%)]
= 100% - [(99%) × (86%) × (93%)]
= 100% - 79.18%
= 20.82% (this is less than 1% + 14% + 7% = 22%, due to the double counting correction)

Note: Values in the above example are in percent format and 95% is equivalent to 0.95 in decimal format.
Multiplying values that are less than 1 in decimal format results in a smaller number.

PROPOSED PROJECT: Rowland Heights Plaza and Hotel Project
Draft Environmental Impact Report
Quantifying Greenhouse Gas Mitigation Measures - Transportation (Based on CAPCOA Guidance (August 2010))

PROPOSED PROJECT

Location Type	Global % VMT Reduction Cap
Urban:	75%

Less than 5 miles from central business district
Jobs-rich (jobs/housing ratio greater than 1.5)
Typical buildings are 6 stories or higher
Grid street pattern
Minimal setbacks
Parking constrained on- and off-street
Parking prices high/highest in the region
High-quality rail; bus service at 10 min or less in peak hours

Compact Infill:	40%

Typically 5 - 15 miles from central business district
Balanced jobs-housing (jobs/housing ratio from 0.9 to 1.2)
Typical buildings are 2 - 4 stories
Grid street pattern
Setbacks 0 - 20 feet
Parking constrained
Parking prices low/moderate
Rail w/in 2 miles; bus service at 15 min or less in peak hours

Location Type	Global % VMT Reduction Cap
Suburban Center:	20%

Typically 20 miles or more from central business district
Balanced jobs-housing
Typical buildings are 2 stories
Grid street pattern
Setbacks 0 - 20 feet
Parking somewhat constrained on-street; ample off-street
Parking prices low (if priced at all)
Bus service at 20 - 30 min and/or commuter rail station

Suburban:	15%

Typically 20 miles or more from central business district
Housing-rich
Typical buildings are 1 - 2 stories
Curvilinear street pattern (cul-de-sac based)
Parking between street and buildings; large lot residential
Parking ample; largely surface lot-based
No parking prices
Limited bus service at 30 minute headways or more

Total Global Transportation VMT Reduction =	7.80%	Cap:	15%
Total LUT/SDT/PDT/TST VMT Reduction =	7.80%	Cap:	10%

Land Use/Location Transportation Measures (65% Reduction Cap)

Total LUT % VMT Reduction =	7.80%	Cap:	65%

LUT-1 Increase Density

% VMT Reduction = A × B [not to exceed 30%]

A (housing) = (Number of DU/acre - 7.6) / 7.6
A (jobs) = (Number of Jobs/acre - 20) / 20
B = 0.07%

% VMT Reduction =	0.18%	Cap:	30%
Number of DU/acre:	-	A =	0%
Number of Jobs/acre:	71.0	A =	255%

LUT-2 Increase Location Efficiency

% VMT Reduction Cap for all LUT measures

Urban LUT % VMT Reduction Cap:	65%
Compact Infill LUT % VMT Reduction Cap:	30%
Suburban Center LUT % VMT Reduction Cap:	10%

LUT-3 Increase Diversity of Urban and Suburban Developments (Mixed Use)

Urban: The urban project will be predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential, are combined in a single building or on a single site in an integrated development project with functional interrelationships and a coherent physical design.

Suburban: The suburban project will have at least three uses of the following on site and/or offsite within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office.

% VMT Reduction = Land Use × B [not to exceed 30%]
Land Use = % increase in land use index vs. single use
= (Land Use Index - 0.15) / 0.15
Land Use Index = -a / ln(6)
a = $\sum a_i \times \ln(a_i)$
a_i = building floor area / total square feet of area considered
a_1 = single family
a_2 = multi-family
a_3 = commercial B = 0.09
a_4 = industrial
a_5 = institutional
a_6 = park

% VMT Reduction =	0.00%	Cap:	30%
Single family sqft:	-	a_1 =	-
Multi-family sqft:		a_2 =	-
Commercial sqft:		a_3 =	-
Industrial sqft:	-	a_4 =	-
Institutional sqft:	-	a_5 =	-
Park sqft:	-	a_6 =	-
Total sqft:	-		

(Note: If a_i = 0, then set a_i = 0.0000001)

LUT-4 Increase Destination Accessibility

% VMT Reduction = Center Distance × B [not to exceed 20%]
Center Distance = (12 - Miles to downtown or job center) / 12
B = 0.20

% VMT Reduction =	0.00%	Cap:	20%
Miles to downtown or job center:	50.0		

(Note: Only effective for 8 miles or less)

LUT-5 Increase Transit Accessibility

% VMT Reduction = Transit × B [not to exceed 30%]
Transit = % project transit - % typical ITE transit
% project transit = -50x + 38 [where x = 0 - 0.5 miles to transit]
-4.4x + 15.2 [where x = 0.5 - 3 miles to transit]
% typical ITE transit = 1.3%
B = 0.67

% VMT Reduction = 7.63% Cap: 30%
Miles to transit: 0.57 to Bus
Bus line is 0.1 miles adjacent
(Note: Only effective for 3 miles or less)

LUT-6 Integrated Affordable and Below Market Rate Housing

% VMT Reduction = 4% × % units BMR

% VMT Reduction = 0.00%
% of units below market rate: 0.0%
(Note: Only effective up to 30%)

LUT-7 Orient Project Toward Non-Auto Corridor

Not quantified separately; Assumed to be included in LUT-3
(If included in LUT-3, VMT reduction should be at least 0.5% per 1% inprovement in transit frequency and 0.5% per 10% increase in transit ridership)

LUT-8 Locate Project near Bike Path/Bike Lanes

Not quantified separately; Assumed to be included in LUT-4
(If included in LUT-4, VMT reduction should be at least 0.625%)

LUT-9 Improve Design of Development

% VMT Reduction = Intersections × B
Intersections = % increase vs. typical ITE suburban
= (Intersections per square mile of project - 36) / 36
B = 0.12

% VMT Reduction = 0.00%
Intersections per square mile: -
(Note: Only effective up to 100)

Neighborhood/Site Enhancement Measures (5% Reduction Cap without NEV; 15% Reduction Cap with NEV)

Total SDT % VMT Reduction = 0.00%
Cap: 5% without NEV
Cap: 15% With NEV

SDT-1 Provide Pedestrian Network Improvements

VMT reduction based on urban/rural context and pedestrian accomodations

% VMT Reduction = 0.00%
Pedestrian network on-site and connecting off-site (urban/suburban): 2%
Pedestrian network on-site (urban/suburban): 1%
(Mark an "X" in one of the above)

SDT-2 Provide Traffic Calming Measures

Marked crosswalks, count-down signal timers, curb extensions, speed tables, rasied crosswalks, raised intersections, median islands, tight corner radii, roundabouts, on-street parking, planter strips with trees, chicanes/chokers, and others.

% VMT Reduction = 0.00%

25% of streets with improvements: A
50% of streets with improvements: B
75% of streets with improvements: C
100% of streets with improvements: D

25% of intersctions with improvements: W
50% of intersctions with improvements: X
75% of intersctions with improvements: Y
100% of intersctions with improvements: Z

(Mark an "X" in one of the above for each group)

% of intersections with improvements		% of streets with improvements			
		A	B	C	D
	W	0.25%	0.25%	0.50%	0.50%
	X	0.25%	0.50%	0.50%	0.75%
	Y	0.50%	0.50%	0.75%	0.75%
	Z	0.50%	0.75%	0.75%	1.00%

SDT-3	Neighborhood Electric Vehicle Network	% VMT Reduction = Pop × Number × NEV Pop × Number = NEVs per household [0.04 to 1.0] NEV = VMT reduction rate per household [12.7%]	% VMT Reduction = 0.00% Low NEVs per Household: 🟩 0.04 High NEVs per Household: 🟩 1.0 (Mark an "X" in one of the above)	
SDT-4	Create Urban Non-Motorized Zones	Not quantified separately; Assumed to be included in SDT-1 (If included in SDT-1, VMT reduction should be at least 0.01% to 0.2%)		
SDT-5	Incorporate Bike Lane Street Design	Not quantified separately; Assumed to be included in LUT-9 (If included in LUT-9, VMT reduction should be at least 1% of worker commute per additional mile of bike lanes per square mile)		
SDT-6	Provide Bike Parking in Non-Residential Projects	Not quantified separately; Assumed to be included in LUT-9 (If included in LUT-9, VMT reduction should be at least 0.625%)		
SDT-7	Provide Bike Parking in Multi-Unit Residential Projects	Not quantified separately; Assumed to be included in LUT-9		
SDT-8	Provide Electric Vehicle Parking	Not quantified separately; Assumed to be included in SDT-3		
SDT-9	Dedicated Land for Bike Trails	Not quantified separately; Assumed to be included in LUT-9		
Parking Policy/Pricing (20% Reduction Cap)			**Total PDT % VMT Reduction = 0.00%**	Cap: 20%
PDT-1	Limit Parking Supply	% VMT Reduction = = (Actual Parking - ITE Parking) / ITE Parking × 0.5	% VMT Reduction = 0.00% Actual Parking Spaces: - ITE Parking Spaces: -	Cap: 12.50%
PDT-2	Unbunble Parking Costs from Property	% VMT Reduction = Change in vehicle cost × elasticity × A Change in vehicle cost = Monthly parking cost × (12/$4000) Elasticity = 0.4 A = 85%	% VMT Reduction = 0.00% Monthly parking cost: $ -	Cap: 13%
PDT-3	Implement Market Price Public Parking (On-Street)	% VMT Reduction = Park$ × B Park$ = Percent increase in on-street parking prices [minimum of 25%] B = 0.11	% VMT Reduction = 0.00% Actual On-Street Parking Price: $ - Baseline On-Street Parking Price: $ -	Cap: 5.5%
PDT-4	Require Residential Area Parking Permits	Not quantified separately; Assumed to be included in PDT-1, -2-, and -3 (If included in LUT-9, VMT reduction should be at least 0.09% to 0.36% depending on land use)		

Transit System Improvements (10% Reduction Cap)

Total TST % VMT Reduction = **0.00%** Cap: 10%

TST-1 Provide a Bus Rapid Transit System

% VMT Reduction = Riders × Mode × Lines × D
Riders = 28%
Mode = 17% Urban Center
4% Urban
1.30% Suburban
Lines = Percent of lines serving project converting to BRT
D = 0.67

% VMT Reduction = 0.00% Cap: 3.2%

Urban Center:		17%
Urban:		4%
Suburban:		1.30%

(Mark an "X" in one of the above)

Lines Converting to BRT:		0%
Total Baseline Lines:		

TST-2 Implement Transit Access Improvements

Not quantified separately; Assumed to be included in TST-3 and -4

TST-3 Expand Transit Network

% VMT Reduction = Coverage × B × Mode × D
Coverage = % increase in transit network coverage
B = 0.65 Urban Center
0.72 Urban
1.01 Suburban
Mode = 17% Urban Center
4% Urban
1.30% Suburban
D = 0.67

% VMT Reduction = 0.00% Cap: 8.2%

Urban Center:		17%	0.65
Urban:		4%	0.72
Suburban:		1.30%	1.01

(Mark an "X" in one of the above)

Coverage:

TST-4 Increase Transit Service Frequency/Speed

% VMT Reduction = Headway × B × C × Mode × E
Headway = % reduction in headways [15% - 80%]
B = 0.32 Urban
0.36 Suburban
C = 50% < 50% lines improved
85% >= 50% lines improved
Mode = 17% Urban Center
4% Urban
1.30% Suburban
E = 0.67

% VMT Reduction = 0.00% Cap: 2.5%

Urban Center:		17%	0.32
Urban:		4%	0.32
Suburban:		1.30%	0.36

(Mark an "X" in one of the above)

Headway:
Percent of Lines Improved:

TST-5 Provide Bike Parking Near Transit

Not quantified separately; Assumed to be included in TST-3 and -4

TST-6 Provide Local Shuttles

Not quantified separately; Assumed to be included in TST-3 and -4

Commute Trip Reduction (25% Reduction Cap - WORK VMT ONLY)

Total TRT % Work VMT Reduction = **0.00%** Cap: 25%
% Work VMT of Total VMT: **2.5%**
Total TRT % Overall VMT Reduction = **0.00%** Cap: 15%

TRT-1 Implement Voluntary Commute Trip Reduction Program

% Work VMT Reduction = A × B
A = 6.2% Urban
5.4% Suburban Center
5.2% Suburban
B = % employees eligible

% Work VMT Reduction = 0.00% Cap: 6.2%

Urban:		6.2%
Suburban Center:		5.4%
Suburban:		5.2%

(Mark an "X" in one of the above)

% Employees Eligible:

TRT-2 Implement Required Commute Trip Reduction Program

% Work VMT Reduction = A × B
A = 21%
B = % employees eligible

% Work VMT Reduction = 0.00% Cap: 21.0%
% Employees Eligible:

TRT-3 Provide Ride-Sharing Programs

% Work VMT Reduction = Commute × Employee
Commute = 15% Urban
10% Suburban Center
5% Suburban
Employee = % employees eligible

% Work VMT Reduction = 0.00% Cap: 15.0%

Urban:	15%
Suburban Center:	10%
Suburban:	5%

(Mark an "X" in one of the above)

% Employees Eligible:

TRT-4 Implement Subsidized or Discounted Transit Program

% Work VMT Reduction = A × B × C
A = % reduction in commute vehicle trips
B = % employees eligible
C = Adjustment from VT to VMT [1.0]

% Work VMT Reduction = 0.00% Cap: 20.0%

Urban:	A
Suburban Center:	B
Suburban:	C

Transit Subsidy: $0.75	W
Transit Subsidy: $1.49	X
Transit Subsidy: $2.98	Y
Transit Subsidy: $5.96	Z

(Mark an "X" in one of the above for each group)

% Employees Eligible:

Daily Transit Subsidy

Setting		W	X	Y	Z
	A	6.2%	12.9%	20%	20%
	B	3.4%	7.3%	16.4%	20%
	C	1.5%	3.3%	7.9%	20%

TRT-5 Provide End of Trip Facilities

Not quantified separately; Assumed to be included in TRT-1 through -3
(If included, Work VMT reduction should be 2% to 5%, or total VMT reduction should be 0.02% to 0.625%)

TRT-6 Encourage Telecommuting and Alternate Work Schedules

% Reduction in Commute VMT

% Work VMT Reduction = 0.00% Cap: 5.5%

9-day/80-hour Work Week:	A
4-day/40-hour Work Week:	B
Telecommuting 1.5 Days:	C

Employee Participation: 1%	V
Employee Participation: 3%	W
Employee Participation: 5%	X
Employee Participation: 10%	Y
Employee Participation: 25%	Z

(Mark an "X" in one of the above for each group)

Employee Participation

Schedule		V	W	X	Y	Z
	A	0.07%	0.21%	0.35%	0.70%	1.75%
	B	0.15%	0.45%	0.75%	1.50%	3.75%
	C	0.22%	0.66%	1.10%	2.20%	5.50%

TRT-7 Implement Commute Trip Reduction Marketing

% Work VMT Reduction = A × B × C
A = % reduction in commute vehicle trips [4%]
B = % employees eligible
C = Adjustment from VT to VMT [1.0]

% Work VMT Reduction = 0.00% Cap: 4.0%
% Employees Eligible:

TRT-8 Implement Preferential Permit Parking Program

Not quantified separately; Assumed to be included in TRT-1 through -3

TRT-9 Implement Car-Sharing Program

% Work VMT Reduction = A × B / C
A = % reduction in car-share member annual VMT [37%]
B = number of car share members per shared car [20]
C = 1,000 Urban
2,000 Suburban

% Work VMT Reduction = 0.00% Cap: 0.74%

Urban: 🟩 1,000
Suburban: 🟩 2,000

(Mark an "X" in one of the above)

TRT-10 Implement a School Pool Program

Not applicable.

TRT-11 Provide Employer-Sponsored Vanpool/Shuttle

% Work VMT Reduction = A × B × C
A = % shift in vanpool mode share of commute trips
= 2% to 20%
B = % employees eligible
C = 0.67

% Work VMT Reduction = 0.00% Cap: 13.4%

A: Shift in Vanpool Mode Share: 🟩
B: Employees Eligible: 🟩

TRT-12 Implement Bike Sharing Program

Not quantified separately; Assumed to be included in LUT-9 and SDT-5
(If included, total VMT reduction should be at least 0.03%)

TRT-13 Implement School Bus Program

Not applicable.

TRT-14 Price Workplace Parking

% Work VMT Reduction = A × B
A = % reduction in commute VMT
B = % employees subject to priced parking

% Work VMT Reduction = 0.00% Cap: 19.7%

Urban: 🟩 A
Suburban Center: 🟩 B
Suburban: 🟩 C

Daily Parking Charge: $1 🟩 W
Daily Parking Charge: $2 🟩 X
Daily Parking Charge: $3 🟩 Y
Daily Parking Charge: $6 🟩 Z

(Mark an "X" in one of the above for each group)

% Employees Subject to Priced Parking: 🟩

Daily Parking Charge

Setting	W	X	Y	Z
A	6.9%	12.5%	16.8%	19.7%
B	1.8%	3.7%	5.4%	6.8%
C	0.5%	1.2%	1.9%	2.8%

TRT-15 Implement Employee Parking Cash-Out

% Work VMT Reduction = A × B

A = 7.7% Urban
4.5% Suburban Center
3.0% Suburban
B = % employees eligible

% Work VMT Reduction = 0.00% Cap: 7.7%

Urban: 🟩 7.7%
Suburban Center: 🟩 4.5%
Suburban: 🟩 3.0%

(Mark an "X" in one of the above)

% Employees Eligible: 🟩

APPENDIX F

HYDROLOGY STUDY

F-1: HYDROLOGY STUDY

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
HYDROLOGY UNIT

TO: Thienes Engineering, Inc.
14349 Firestone Blvd
La Mirada, CA 90638

Date: 01/13/16

REVIEW OF HYDROLOGY STUDY

PM NO. **072916**

THOMAS GUIDE **679 B3&B4**

We have reviewed your Hydrology Study.

[X] The Hydrology Study has been approved.

REVIEWED BY ____________________
VILONG TRUONG (626) 458-4921

VILONG TRUONG
NO. C82680

APPROVED BY: ____________________

HYDROLOGY STUDY
APPROVED

CHECKED BY: RCE NO. 82680 DATE 01/13/16

APPROVED BY: DATE 01/13/16

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

HYDROLOGY STUDY

FOR

ROWLAND HEIGHTS PLAZA AND HOTEL
PM 072916
18800 GALE AVENUE
LOS ANGELES COUNTY, CALIFORNIA

PREPARED FOR

PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944-0968
FAX: (416) 944-0914

AUGUST 15, 2014
REVISED OCTOBER 31, 2014
REVISED MAY 21, 2015
REVISED SEPTEMBER 3, 2015

JOB NO. 3090

PREPARED BY

THIENES ENGINEERING
14349 FIRESTONE BLVD.
LA MIRADA, CALIFORNIA 90638
(714) 521-4811

HYDROLOGY STUDY

FOR

ROWLAND HEIGHTS PLAZA AND HOTEL
PM 072916

PREPARED BY BRIAN WEIL
UNDER THE SUPERVISION OF

REGISTERED PROFESSIONAL ENGINEER
REINHARD STENZEL
No. 56155
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA

8/21/15

REINHARD STENZEL DATE:
R.C.E. 56155
EXP. 12/31/16

INTRODUCTION

A: PROJECT LOCATION

The project site is located on the north side of Gale Avenue, south of Railroad Street, west of Nogales Street, east of Fullerton Road in unincorporated Los Angeles County. Please see next page for Vicinity Map.

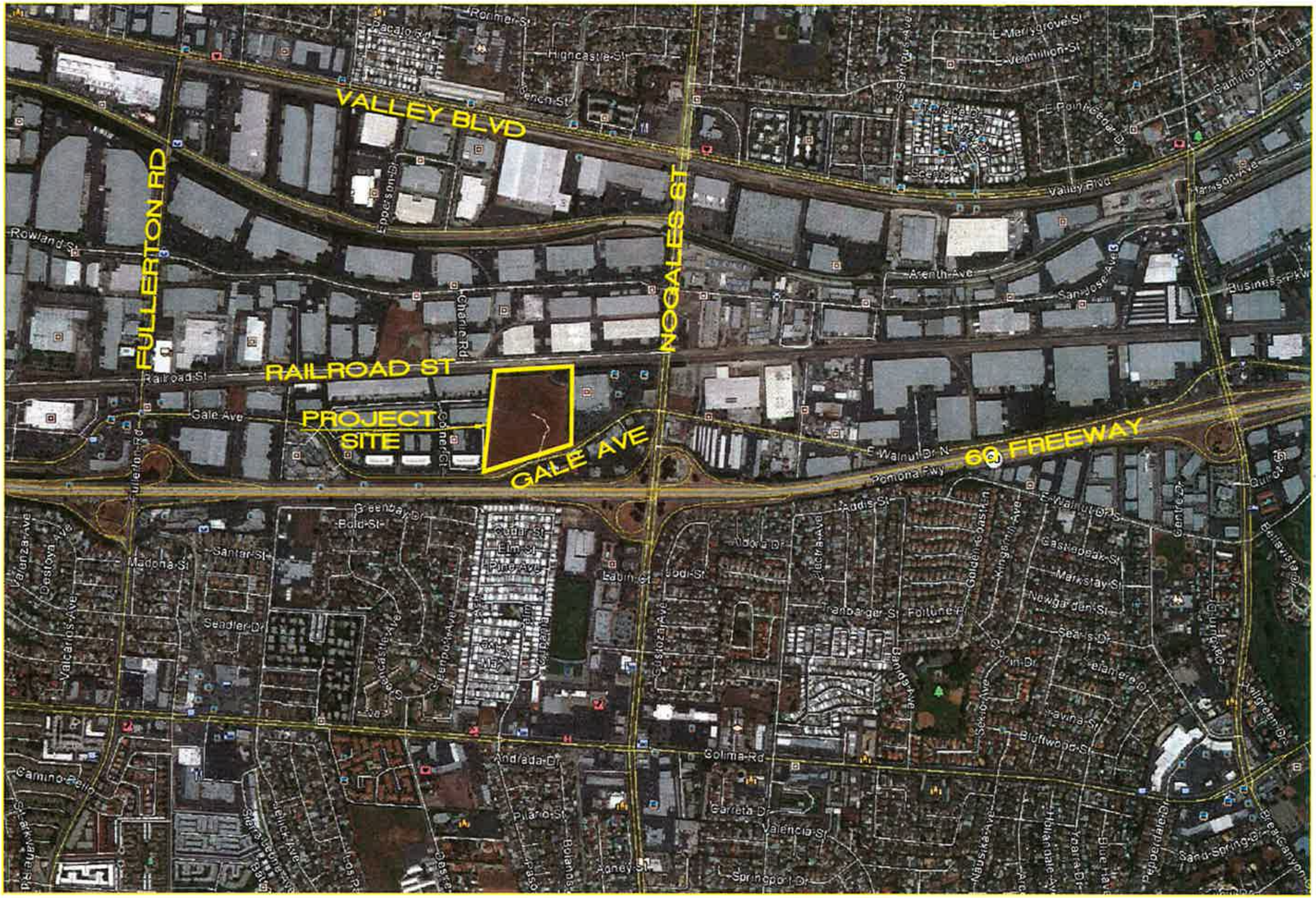
B: STUDY PURPOSE

The purpose of this study is to describe existing surface hydrology, proposed storm drain improvements and determine the existing and proposed condition 50-year peak flow rate from the project site. All runoff from the site ultimately drains to San Jose Creek via existing County storm drain systems.

C: PROJECT STAFF:

Thienes Engineering staff involved in this study include:

Reinhard Stenzel
Brian Weil
Ricky Hwa



T.G. PAGE 679
GRID B3 & B4

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

FOR

GALE AVE AND RAILROAD ST, LOS ANGELES COUNTY

DISCUSSION

Site Description

The project site consists of three parcels. The easterly parcel (Parcel 1) will be used for commercial purposes. The westerly parcels (Parcel 2 to the south and Parcel 3 to the north) will be used for two hotels (Hotel "A" on Parcel 2 and Hotel "B" on Parcel 3). Parking lots are located throughout the site. The remainder of the site will be developed for surface parking, other hardscaped areas and landscaping. An additional 50' wide vacated street north of Parcels 1 and 3, in the City of Industry, will be used as additional site area for the respective Parcels. Each Parcel and portion of City of Industry vacation used for site purposes is described as follows:

Parcel 1 (Commercial Parcel)

Parcel 1 encompasses 8.75 acres (gross) with 0.57 acres to be dedicated to street right-of-way yielding a net area of 8.18 acres. An additional 0.57 acres north of Parcel 1, located in the City of Industry, is a portion of vacated Railroad Street that will be used for site improvements. The total net site associated with Parcel 1 is 8.76 acres.

Proposed improvements to Parcel 1 include commercial condominium units to accommodate retail and restaurant uses. A total of four buildings will be arrayed around the perimeter of the Parcel, surrounding a central surface parking lot and open space. Buildings 1 and 4 are each two stories. The ground floor of Building 1 is 18,054 square feet (29,518 square feet including 2nd story) while the ground floor of Building 4 is 26,275 square feet (46,124 square feet including 2nd story). Buildings 2 and 3 are one story and encompass 37,430 square feet and 13,041 square feet respectively.

The Commercial Parcel will include outdoor restaurant seating, bench seating and landscaped planters throughout. Traffic islands within the parking areas and planters adjacent to drive aisles will be planted with trees, shrubs and groundcover.

Parcel 2 (Hotel "A" Parcel)

Parcel 2 encompasses 3.38 acres (gross) with 0.16 acres to be dedicated to street right-of-way yielding a net area of 3.22 acres.

The Hotel "A" will be developed with Phase I development. This hotel will be a full-service hotel generally intended for business travelers and families. There will be a total of 275 guest rooms with approximately 189,950 square feet.

Parcel 3 (Hotel "B" Parcel)

Parcel 3 encompasses 1.93 acres (gross). Similar to Parcel 1, there is additional area north of Parcel 2, in the City of Industry, that will be used for site improvements. This area is 0.20 acres yielding a total net site area associated with Parcel 2 of 2.13 acres.

Hotel "B" will be part of the Phase II development. Hotel "B" would be an extended stay hotel, generally intended for travelers and families expecting longer stays, totaling 202 guest rooms and approximately 130,930 square feet.

Existing Storm Drains

There is an existing 84" storm drain system (L.A.C.D.P.W. P.D. No. 1732) that traverses from south to north adjacent to the easterly property line of Parcel 1. This storm drain currently daylights into an existing partially channelized storm drain near the northeast corner of Parcel 1. The 50-year peak flow rate indicated on the plans at the point of discharge is approximately 515.5 cfs. This storm drain system has been transferred and maintained by Los Angeles County.

The existing partially channelized storm drain continues westerly, within the City of Industry portion north of the project site, to an existing headwall located on the adjacent property at the northwest corner of vacated Railroad Street. The headwall and downstream storm drain system are part of M.T.D. No. 1000 (Line "B"). M.T.D. 1000 appears to be approved by Los Angeles County but not yet transferred to the County, so it is therefore maintained by the City of Industry. The 50-year peak flow rate shown on this plan is 520 cfs. Overall, the existing partially channelized storm drain conveys runoff from P.D. No. 1732 to M.T.D. No. 1000, Line "B".

M.T.D. 1000 also includes the 10' wide by 12' high box storm drain system (Line "A") located at the corner of Gale Avenue and Coiner Court. M.T.D. 1000 connects with M.T.D. No. 465 (at the Railroad tracks) and continues northerly ultimately to San Jose Creek.

Recent private common driveway improvements at the southeast corner of the Parcel 1 include catch basins that intercept runoff from the portion of the driveway within the project site. An existing storm drain conveys this runoff to the existing 84" storm drain (P.D. No. 1732).

Master Plan Drainage

Los Angeles County Department of Public Works provided hydrology calculations for the existing area storm drain systems. From provided information, the project site is a portion of subarea 76B, which is part of the San Jose Creek watershed. Allowable discharge from the site to the County storm drain system is 2.12 cfs/acre. From the County drainage map, subarea 76B appears to drain entirely to the north, but topography clearly shows a ridge line through the site. However, all runoff from the site ultimately drains to the downstream storm drain system shown on the county drainage map, so the drainage is accurately tabled.

Additional information was requested for MTD 1000, but no calculations were provided to accurately estimate the allowable peak flow pertaining to the project site. Only storm drain plans were provided for the previously mentioned drains. The difference in peak flow rates from the plans is 5.0 cfs. However, no drainage area or peak flow rate associated with a drainage area was given. The City of Industry has indicated that connecting to MTD 1000 will be allowed provided all necessary permits are obtained and that this process will be done with final design.

Please see Appendix "A" for master plan drainage, allowable discharge rates, as-built storm drain plans and other pertinent reference materials for this project.

Existing Condition

The project site exhibits gently rolling topography and a maximum elevation differential of approximately 42 feet between its high point near the southeast corner at Gale Avenue and its low point in the northwest corner within the storm drain channel.

The project site was previously used for agricultural cultivation and was undeveloped. A temporary detour road between Railroad Street and Gale Avenue, related construction access road and construction staging area, and temporary surface parking have been constructed on the project site by the Alameda Corridor-East Authority (ACE) for use during construction of the nearby Nogales Street Grade Separation Project. Portions of the eastern edge of the project site have also been paved and striped to provide temporary parking for the Rowland Heights Plaza Shopping Center, replacing stalls displaced by construction of the Grade Separation Project.

The temporary detour road required some drainage features to be constructed. At the northerly portion of the road, two 36" pipes, headwalls and concrete transitions were placed at the existing earthen channel to convey runoff under the new road.

Currently, approximately 6.90 acres of the northerly portion of the site, including vacated Railroad Street, (Area 1A on Existing Condition Hydrology map) surface drains to the existing partially channelized storm drain that traverses through the northerly portion of the project site. The drainage area includes a portion of the detour road and parking located along the easterly property line. The 50-year peak flow rate for this area is approximately 10.5 cfs.

Approximately 6.95 acres of the southerly portion of the site (Areas 2B and 3B) currently surface flows to Gale Avenue. Runoff in Gale Avenue continues westerly in existing curb and gutter to curb opening catch basins located at the northeast corner of Gale Avenue and Coiner Court. Catch basins connect to the previously mentioned storm drain system

(M.T.D. 1000). The 50-year peak flow rate for this portion of the site is approximately 8.9 cfs.

The paved common driveway at the southeast portion of the site (Area 4C) drains to existing catch basins in common driveway. This area includes a small portion of the common driveway that is not included in Parcel 1. Existing storm drain laterals connect to County facility P.D. No. 1732. The 50-year peak flow rate for this area is approximately 2.2 cfs.

Proposed Condition

The project would be constructed in two phases. Phase 1 encompasses the easterly commercial use developments (Parcel 1) and the southerly Hotel "A" (Parcel 2) while Phase II consists of the northerly Hotel "B" (Parcel 3).

Storm drain improvements will be required with the proposed developments. The existing channel along the northerly side of both Parcels will be replaced with an underground storm drain system. This storm drain will connect to the existing 84" County maintained storm drain (L.A.C.D.P.W. P.D. No. 1732) at the northeast corner of the site. The proposed 90" storm drain will continue westerly around the proposed buildings and connect to the existing 90" City of Industry storm drain near the northwest corner or the project site. The City has been contacted about the proposed storm drain and will review final storm drain plans. All necessary permits will be obtained prior to construction. Only surface parking will be located above the top of the proposed 90" storm drain.

The existing headwalls at the County facilities will be removed along with the pipes and concrete headwalls at the detour road. The 90" storm drain system will replace the existing channel within the project site. Conveying the offsite stormwater underground will provide additional area for parking in the respective parcels. The proposed system will ultimately be transferred to Los Angeles County for ongoing maintenance. Appropriate easements and access are included in the Parcel Map.

In general, the majority of runoff from Parcels 1 and 3 will drain northerly to the existing storm drain near the northwest corner of the site while Parcel 2 will discharge to Gale Avenue described as follows:

Other privately maintained storm drain systems will be constructed with the proposed improvements to the project site. For the commercial parcel (Parcel 1), catch basins will be located in the center parking areas. A storm drain system will convey runoff westerly between Buildings 1 and 2 then northerly in the parking area ultimately connecting to the proposed 90" storm drain system. Areas tributary to this storm drain system include the central parking lot, Buildings 1, 3 and 4 and a portion of Building 2 (Areas 2B-6B on proposed condition hydrology map). An additional catch basin and storm drain is located at the northerly parking area. Here, runoff from a portion of Building 2 and the northerly parking area (Area 1A) are intercepted and conveyed to the 90" storm drain system. The total 50-year peak flow rate from these areas is approximately 22.8 cfs (3.8 cfs from Area 1A + 19.0 cfs from areas 2B-6B).

A small portion of the proposed driveway at the southeast corner of Parcel 1 will surface drain to the existing catch basin in the common driveway via existing curb and gutter. The 50-year peak flow rate for this area (Area 10E) is approximately 2.7 cfs. This area includes a small portion of the existing street that is not included in Parcel 1.

For the northerly hotel parcel, Parcel 3, storm drain systems will be located at the northerly portion of the Parcel. A catch basin will be located at the northeast corner of the parking area. A storm drain will convey runoff to the proposed 90" storm drain system. Area tributary to this system consists of the northerly hotel and westerly parking area (Area 7C). The 50-year peak flow rate for this area is approximately 6.1 cfs.

The southerly hotel parcel, Parcel 2, (Areas 8D-9D) will drain southerly to proposed catch basins in the parking lot. A proposed on-site storm drain will discharge runoff to Gale Avenue via a proposed parkway culvert. The total 50-year peak flow rate for these areas is approximately 8.4 cfs, including small portions of driveways that surface drain to Gale Avenue. This flow continues westerly in Gale Avenue via curb and gutter to existing catch basins at the corner of Gale Avenue and Coiner Street. The existing catch basins drain to M.T.D. No. 1000, Line “A”.

Please see Appendix “B” for existing and proposed hydrology calculations and Appendix “E” for hydrology maps.

Detention

The proposed 90" storm drain connecting the two existing facilities will also be a public facility that could ultimately by transferred to the County. Therefore, the proposed connections to 90" storm drain will need to be limited to peak flow rates allocated to the downstream facilities. The total overall area from the project site tributary to the 90" storm drain is approximately 11.20 acres. Multiplying by the allowable cfs/acre (2.12 cfs/acre) yields an allowable peak flow rate of approximately 23.7 cfs.

The proposed condition 50-year peak flow rate for areas tributary to the 90" storm drain is approximately 28.9 cfs (direct sum of Areas 1A, 2B-6B and 7C). This is slightly higher than the allowable discharge rate of 23.7 cfs. The difference of 5.2 cfs will be stored onsite.

Hydrograph volume was determined from the hydrograph portion of the HydroCalc spreadsheet. The County's 2006 Hydrology Manual uses storm duration of 4 days, where days 1-3 are a portion of the day 4 storm, where day 4 yields the largest volumes and peak flow rates. The 50-year rainfall intensities in the Hydrology Manual represent the values for the day 4 storm event. The HydroCalc spreadsheet creates a hydrograph over 24-hours broken down into intervals of 0.2 minutes giving an interval and cumulative volumes based on the input parameters such as rainfall intensity, soil type, imperviousness, etc. Cumulative volumes are shown up to the allowable peak flow rate before and after the peak occur. The difference in the volume before and after the peak (along with the volume of the allowable peak flow rate) is the volume to be temporarily detained. With a constant 23.7 cfs discharged, only about 2,041 cubic feet needs to be stored.

Since the required storage is relatively small, storage volume is proposed in the on-site storm drain pipes within Areas 2B-6B. The pipe connecting to the 90" storm drain will be sized to only discharge the required flow, regardless of the design day of the storm event. Other pipes can be sized larger than generally required to provide additional storage. The smaller downstream pipe will force water not allowed into the system to back up into the larger pipes for storage. Exact pipe sizes and locations of the storage pipes will be part of final grading and storm drain plans that will be required for construction purposes.

Runoff from Areas 1A and 7C will enter the system undetained. Flow discharging to the Gale Avenue will not require detention since this area was intended for commercial use and expected to discharge into the street.

Please see Appendix “D” for detention analysis.

Hydraulics

Hydraulic calculations are provided for the proposed 90" storm drain system that will connect the existing two County storm drains. Some additional flow will be added to M.T.D. 1000, Line "B" due to the proposed improvements (consequently, some flow will be removed from Line "A"). Hydraulic calculations for M.T.D. No. 1000, Line “B” were incorporated into the hydraulic model for the proposed 90” storm drain system that includes site discharges. The upstream flow is that shown on the County storm drain plan (515 cfs).

The downstream hydraulic control is taken from the County plan at the point of connection between Lines "A" and "B". Since the entire site is tabled to M.T.D. 1000 (and downstream facilities) this is the location where all runoff from the project site ultimately joins. Downstream peak flow rates would be unaffected after the confluence of Lines "A" and "B".

Runoff from the project site is added at three locations. Site discharges are added to the 90” storm drain at proposed stations as follows:

6.1 cfs at station 6+63.40 (Area 7C)
13.8 cfs at station 8+35.29 (Areas 2B-6B), includes some onsite detention
3.8 cfs at station 10+30.41 (Area 1A)

Calculations show that with the proposed site discharges, the hydraulic grade line (water surface elevation) at the upstream end of the 90” storm drain (where it joins P.D. No. 1732) is 435.22. This is below the hydraulic grade line shown on the County plans

(436.18). Therefore, proposed site discharges impose no adverse effect on the existing pipe network.

Please see Appendix “C” for hydraulic calculations and proposed storm drain plan.

Water Quality

Water quality features are incorporated into the project site to meet Los Angeles County Low Impact Development (LID) requirements. A geotechnical investigation found subsurface layers to be cobbles, bedrock, and that liquefiable areas surround the project site. Therefore, the geotechnical engineer prohibits infiltration at the project site (see page 24 of the Geotechnical Investigation and Liquefaction Evaluation, Proposed Mixed Use Development prepared February 2014 by Southern California Geotechnical).

Initial runoff is treated through several devices. Filter inserts are provided at all catch basins to capture larger pollutants such as trash and leaves. Additionally, underground storage chambers are provided to store the required design capture volume. The storage chambers have an isolator row to trap additional pollutants. After storage and settling in the underground chamber system, 1.5 times the design capture volume is passed through a manufactured bio-retention device.

The underground storage will utilize an impermeable liner to store 1.5 times the design capture volume. The manufacturer has set up a proprietary biofiltration system that will limit discharge rates from the unit but will drawdown the underground storage within 48 hours. This minimizes the filtration rate through the engineered media to provide treatment to the maximum extent practicable. Once 1.5 times the design capture volume has been met (underground storage is completely full), the higher flows can discharge into the storm drain facilities. The treated runoff is then discharged back into the proposed storm drain system. The biofiltration system will meet the design parameters as described in Appendix E, BIO-1 section of the 2014 County LID Manual.

Other non-structural and site designs are incorporated into the project site to meet LID requirements. All proposed Best Management Practices, design capture volumes, LID guidelines and reference materials are provided in a separate Low Impact Development report prepared for the project site.

Methodology

Hydrology and hydrograph calculations were computed using Los Angeles County’s Tc Calculator Excel spreadsheet. Per the Los Angeles County Hydrology Manual (January 2006), the project site consists of Soil Types 003 (northerly three-quarters of the site) and 017 (southerly quarter of the site) which are Chino Silt Loam and Yolo Clay Loam, respectively. The isohyet is 6.5 per the Los Angeles County Hydrology Manual. WSPG was used for hydraulic calculations.

Summary

The following table compares existing and proposed condition 50-year peak flow rates:

Discharge Location	Exist. Q50	Prop. Q50	Difference
Existing Channel	10.5 cfs	23.7 cfs*	+13.2 cfs
Gale Avenue	8.9	8.4 cfs	-0.5 cfs
Common Drive	2.2 cfs	2.7 cfs	+0.5 cfs
Total	21.6 cfs	34.8 cfs	+13.2 cfs

*Proposed Q50 discharged at this location, includes onsite detention.

The increases in peak flow rates from existing condition are due to the increased imperviousness of the site. In addition, the commercial development generally provides shorter times of concentration compared to existing conditions which increases peak flow rates. While the overall runoff from the site is higher than existing conditions in the 50-year event, the 50-year peak flow rates discharged are within the parameters of the County calculations for areas tributary to existing M.T.D. 1000. The highest overall increase between existing and proposed conditions is at the proposed 90" storm drain system. Hydraulic calculations for the proposed 90" storm drain system show there is capacity for the proposed flows without adversely affecting upstream or downstream facilities.

APPENDIX A

REFERENCE MATERIALS

REQUEST FORMS/COUNTY CORRESPONDENCE

Office Use Only
☐ Sent Initials:
☐ Fax ☐ Email ☐ Other:
Date: Time:

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION – HYDRAULIC ANALYSIS UNIT

DESIGN DIVISION
Hydraulic Analysis Unit
OFFICIAL
RECORD DOCUMENT
Issued By: NOLI LASAO
Date: 7/25/11
Public Service That Works

INFORMATION REQUEST SUMMARY

INFORMATION REQUESTED BY
Requester's Name: JILL WINTON
Company: THIENES ENGIN.
Phone Number: 714 521 4811 Fax Number: 714 521 4173
Email: JILL@THIENESENG.COM

Method of Contact: ☒ Walk-in ☐ Phone ☐ Fax ☐ Email ☐ Prelim. Mtg. Date: 7.14.11

Intended Use: DEVELOPMENT

Proposed Project Type: INDUSTRIAL Acreage Involved: 14.7

Will information be used in any litigation? ☐ YES ☒ NO
Case Info Name: No: Location:

Requester's Signature:

INFORMATION REQUESTED (Attach site map if available)
LACFCD Facility: Name: PD 1732
Unit: NEAR Line: Station:
City: L.A.Co. (INDUSTRY)
Street/Cross-street: GALE & NOGALES
Thomas Guide: Page: 679 Grid: B4 ☒ Site Map/Plans Submitted
Info. Requested: HYDROLOGY MAP & ALLOWABLE "Q"

BELOW SECTION TO BE COMPLETED BY THE HYDRAULIC ANALYSIS UNIT

INFORMATION PROVIDED: Allowable Discharge Q for Project site (Subarea No 76B ; = 2.12 cfs/acre

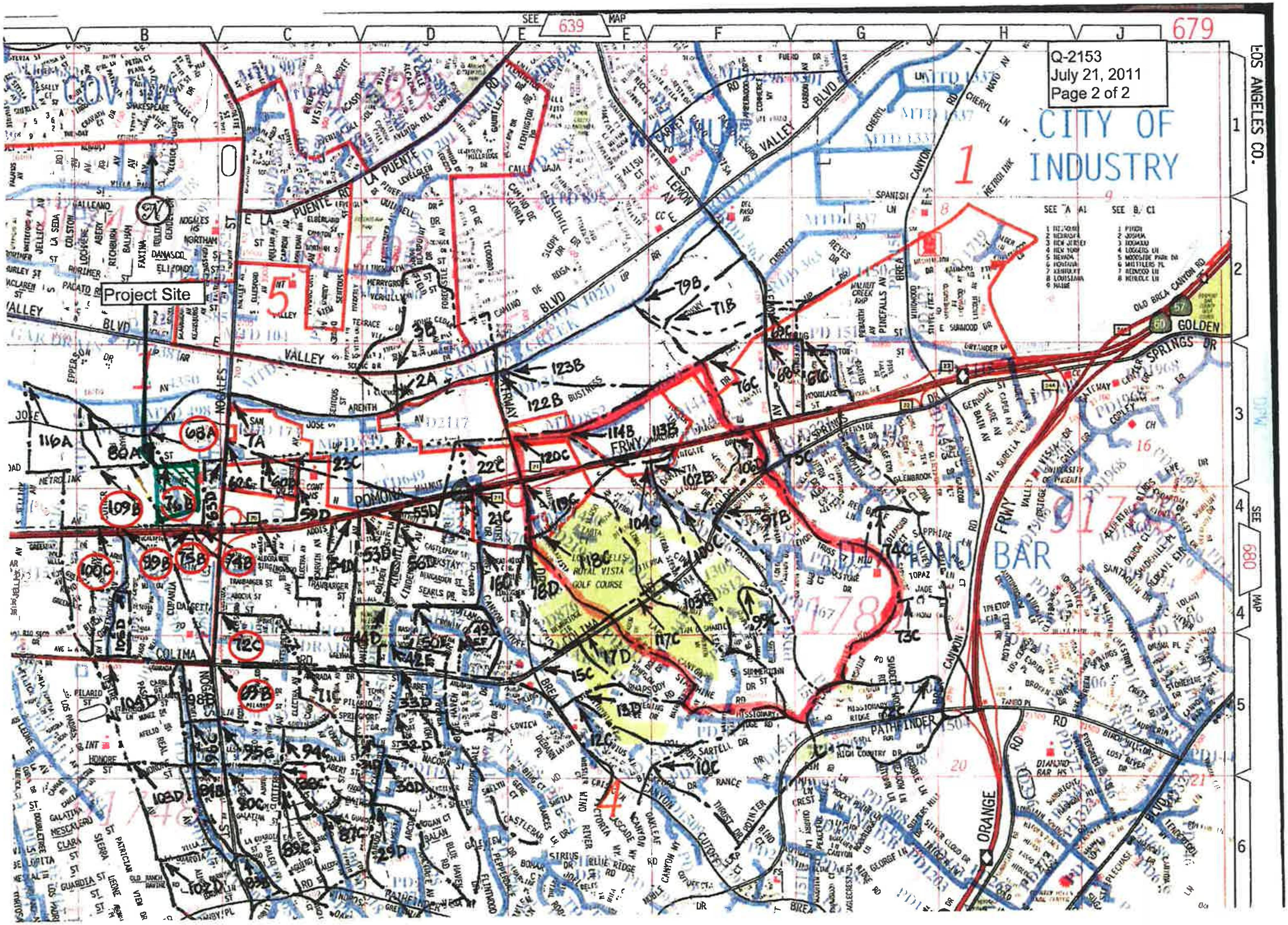
REFERENCES SEARCHED: San Jose Creek & PD 1732 Files

COMMENTS, ETC: Allowable Discharge $Q = \frac{61}{28} \times \frac{501.6}{514} = 2.12$ cfs/acre

FOLLOW-UP REQUIRED: No

INFORMATION PROVIDED BY: George K. Archibald Date: 7/25/2011
INFORMATION REVIEWED BY: NOLI LASAO Date: 7/28/2011
Tel. 1-626-458 7959

Q-2153
July 21, 2011
Page 2 of 2



COUNTY DRAINAGE MAP

WATER RESOURCES DIVISION
Hydrology Section

Q-2153

INFORMATION REQUEST SUMMARY

Date. 07/21/2011

Project Name. **San Jose Creek @ Nogales Street**

Project Location. TG 679 B4

Project Engineer Miguel Osorio

Technical Review by: Peter Imaa PI

Information Requested: Capital Flood Q's

Information Requested By: George Aintablian, (626)458-7959, gaintabl@dpw.lacounty.gov

Information To Be Used For Planning

Will Information Be Used In Any Litigation? *Yes* ☐ *No* ☒

Information Provided:
Drainage map (attachment) and the following hydrologic data.

Location	Subarea (acres)	Subarea Q_{50} (cfs)	Total Area (acres)	Total Q_{50} (cfs)
68A	35.0	76.0	28,981.0	28,805.0
69B	44.0	111.0	44.0	111.0
73BC	-		114.0	296.0
71C	24.0	78.0	24.0	78 0
72C	46.0	127.0	70.0	187.0
74B	57.0	140.0	171.0	413.0
75B	27.0	75.0	198.0	480.0
76B	28.0	61.0	226.0	514.0
99B	58.0	149.0	535.0	1,208 0
100C	35.0	90.0	35.0	90 0
107CD	-		221.0	467.0
108BC	-		756.0	1,674.0
109B	37.0	76.0	793.0	1,697 0

Date Provided: 07/21/2011

References.
San Jose Creek, 50-year Frequency Design Storm, 1972 Capital Flood Study

Calculations, Comments, Etc...: The flow rates listed herein are calculated based on Los Angeles County Public Works ***Modified Rational Method*** *hydrology standards and procedures. The information provided above should be used for planning purposes.*

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION
Hydraulic Analysis Unit
OFFICIAL
RECORD DOCUMENT
Issued By: S. KHALIL
Date: 10/27/11
Public Service That Works

Office Use Only
☐ Sent Initials: ____
☐ Fax ☐ Email ☐ Other: ____
Date: ____ Time: ____

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
DESIGN DIVISION – HYDRAULIC ANALYSIS UNIT

INFORMATION REQUEST SUMMARY

INFORMATION REQUESTED BY
Requester's Name: JILL WINTON
Company: THIENES ENGIN
Phone Number: 714-521-4811 Fax Number: ____
Email: JILL@THIENESENG.COM

Method of Contact: ☒ Walk-in ☐ Phone ☐ Fax ☒ Email ☐ Prelim. Mtg. Date: ~~9/6/11~~ 10/27/11

Intended Use: DEVELOPMENT

Proposed Project Type: INDUSTRIAL Acreage Involved: ____

Will information be used in any litigation? ☐ YES ☒ NO
Case Info Name: ____ No: ____ Location: ____

Requester's Signature: ____

INFORMATION REQUESTED (Attach site map if available)
LACFCD Facility: Name: MTD 1000
Unit: ____ Line: ____ Station: 6+18.04
City: UNINC LA Co. / INDUSTRY
Street/Cross-street: GRACE & / COINER
Thomas Guide: Page: 679 Grid: B3 ☒ Site Map/Plans Submitted
Info. Requested: HYDROLOGY MAP & ALLOWABLE "Q"

BELOW SECTION TO BE COMPLETED BY THE HYDRAULIC ANALYSIS UNIT

INFORMATION PROVIDED: See Attachments.

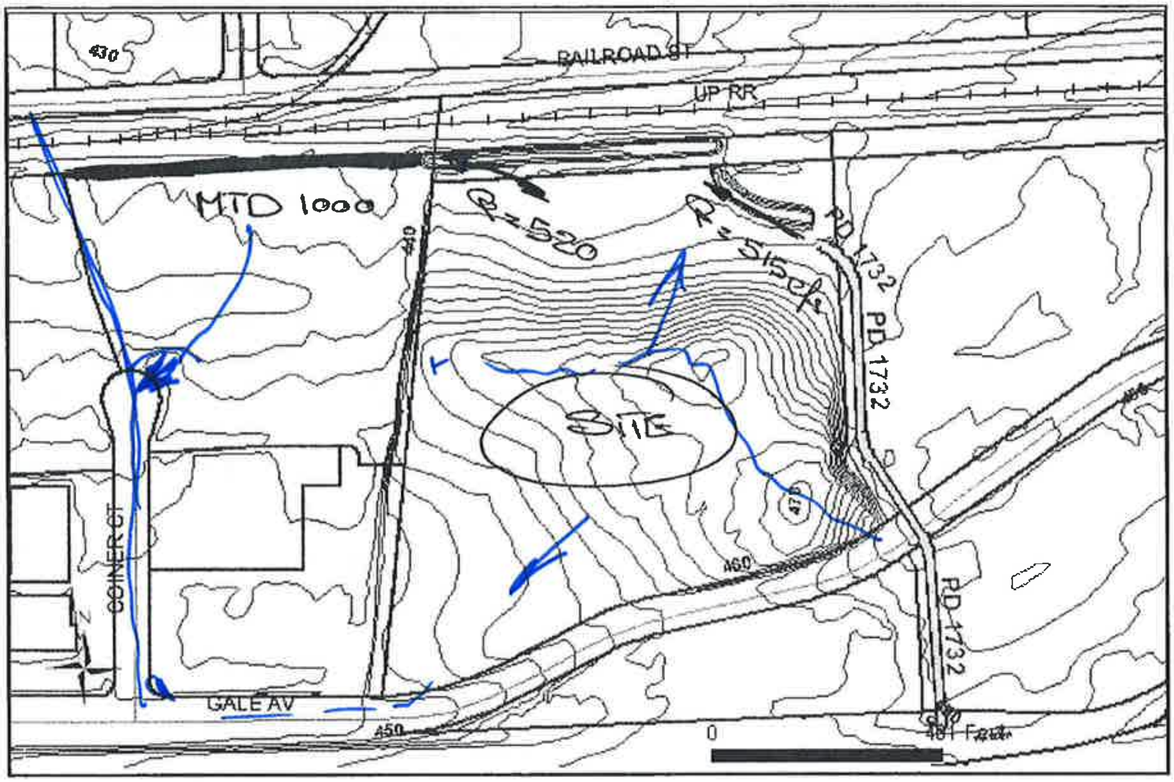
REFERENCES SEARCHED: ____

COMMENTS, ETC: ____

FOLLOW-UP REQUIRED: ____

INFORMATION PROVIDED BY: S. KHALIL Date: 10/27/11
INFORMATION REVIEWED BY: ____ Date: ____

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS



NOTES:

Enter Your Notes Here Jill, your site is between the outlet of PD 1732 Q_{50} = 515 cfs x MTD 1000 inlet Q_{50} = 520 cfs

See attached sh's 2 of 3 PD 1732 x 3 of 6 MTD 1000

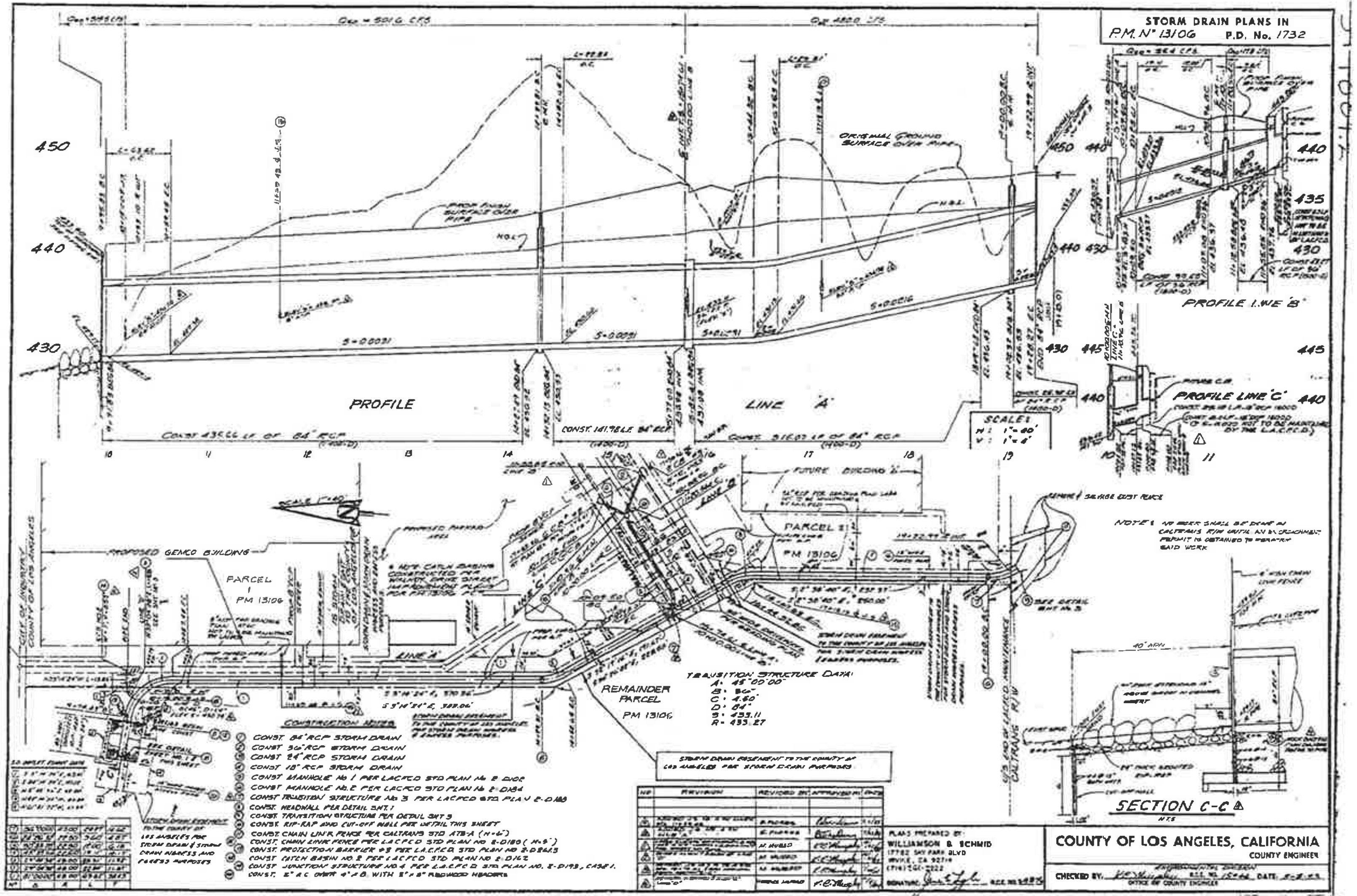
LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
900 S. Fremont Ave.
Alhambra, CA 91803

Enter Title Here

(Printed using View LA 27-Oct-11)

N

STORM DRAIN PLANS IN
P.M. N° 13106 P.D. No. 1732



CONSTRUCTION NOTES

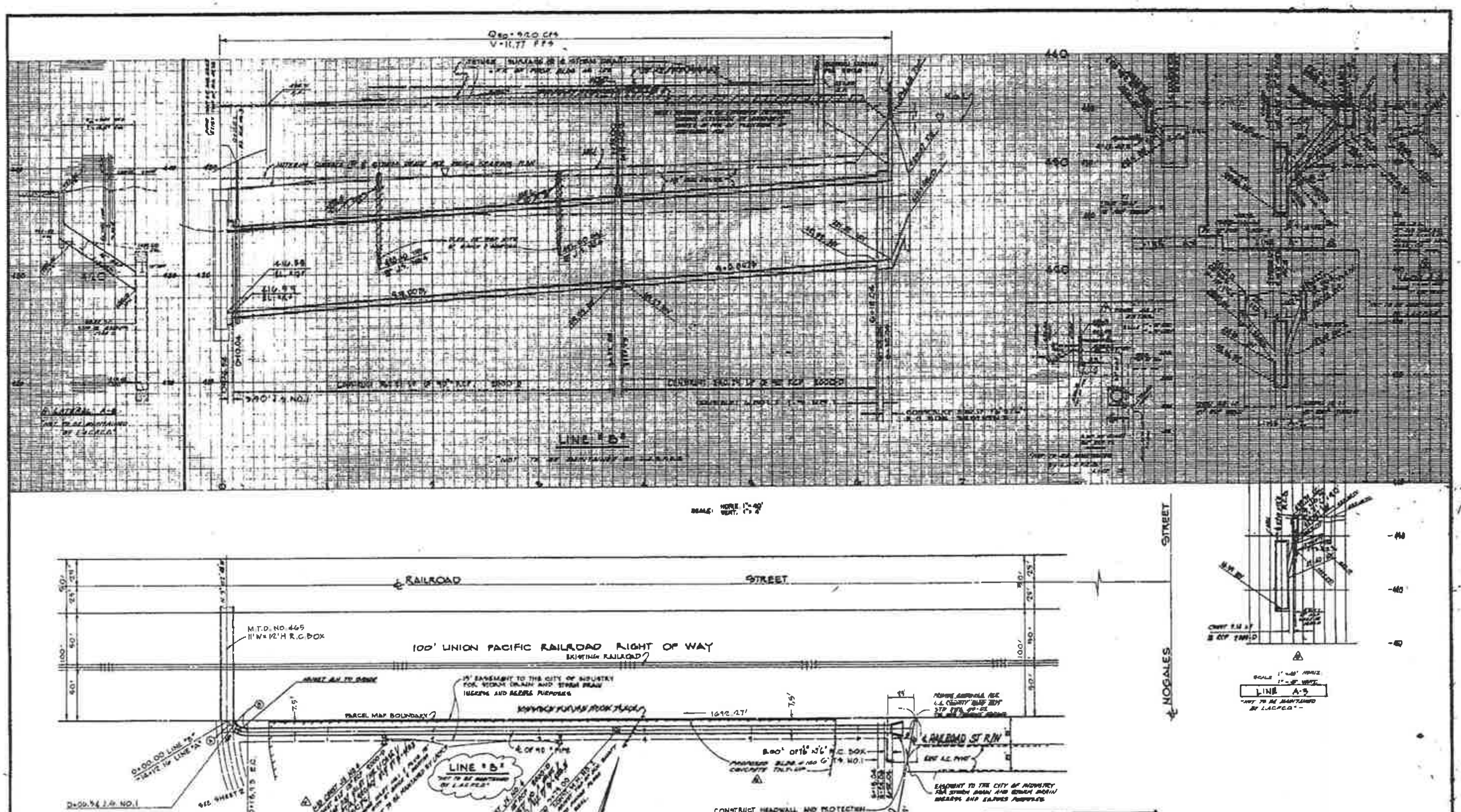
① CONST. 84" RCP STORM DRAIN
② CONST 36" RCP STORM DRAIN
③ CONST 24" RCP STORM DRAIN
④ CONST 18" RCP STORM DRAIN
⑤ CONST MANHOLE No 1 PER LACFCD STD PLAN No 2-D102
⑥ CONST MANHOLE No. 2 PER LACFCD STD PLAN No 2-D184
⑦ CONST TRANSITION STRUCTURE No 3 PER LACFCD STD PLAN 2-D183
⑧ CONST. HEADWALL PER DETAIL SHT. 1
⑨ CONST. TRANSITION STRUCTURE PER DETAIL SHT 3
⑩ CONST. RIP-RAP AND CUT-OFF WALL PER DETAIL THIS SHEET
⑪ CONST. CHAIN LINK FENCE PER CALTRANS STD A78-A (H=6')
⑫ CONST. CHAIN LINK FENCE PER L.A.C.F.C.D. STD PLAN NO 2-D180 (H=5')
⑬ CONST. PROTECTION BARRIER #3 PER L.A.C.F.C.D. STD PLAN NO 2-D86.3
⑭ CONST CATCH BASIN NO. 2 PER LACFCD STD PLAN NO 2-D162
⑮ CONST JUNCTION STRUCTURE NO. 4 PER L.A.C.F.C.D. STD PLAN NO. 2-D193, CASE 1.
⑯ CONST. 2" A.C. OVER 4" A.B. WITH 2"x 8" REDWOOD HEADERS

PLANS PREPARED BY:
WILLIAMSON & SCHMID
17782 SKY PARK BLVD
IRVINE, CA 92714
(714) 261-2222

COUNTY OF LOS ANGELES, CALIFORNIA
COUNTY ENGINEER

CHECKED BY: OFFICE OF COUNTY ENGINEER

SHT 2 OF 3 SHTS



CONSTRUCT HEADWALL AND PROTECTION BARRIER NO. 3 PER LINE "B" HEADWALL DETAILS ON SHEET 6

CURVE DATA				
NO.	Δ	R	L	T
①	10°55'45"	52.50'	9.54	4.94'
②	41°45'48"	52.50	12.99'	6.55'

B.M. C. OF I. 9-7 **ELEV.** 433.96
BRASS CAP AT S.E. CORNER JELLICK AVENUE AND RAILROAD STREET ON NORTHWEST CORNER OF 6'x22' CONC. GAS CO METER PIT.

REVISIONS

NO.	DATE	DESCRIPTION	APP'D
△	[illegible]	REVISED PROFILE A-3	[illegible]
△	[illegible]	REVISED PROFILE A-1 & A-4	[illegible]
△	[illegible]	[illegible]	[illegible]
△	[illegible]	"NOT TO BE MAINTAINED BY L.A.C.F.C.D."	[illegible]

REVISIONS PREPARED BY:
THOMSEN ENGINEERING, INC.
16163 E. WHITTIER BLVD.
WHITTIER, CA. 90603 (213) 691-0838
Hans C. Thomsen 10-21-87
HANS C. THOMSEN RCE 8344 DATE

PLANS PREPARED BY:
WALDEN & ASSOCIATES, INC.
4000 W. GARRY AVENUE, SUITE "D"
SANTA ANA, CALIFORNIA 92704
(714) 549-0647
David L. Walden
DAVID L. WALDEN, R.C.E. 19402 DATE

CITY OF INDUSTRY

APPROVED BY: John J. Radecki Jr.

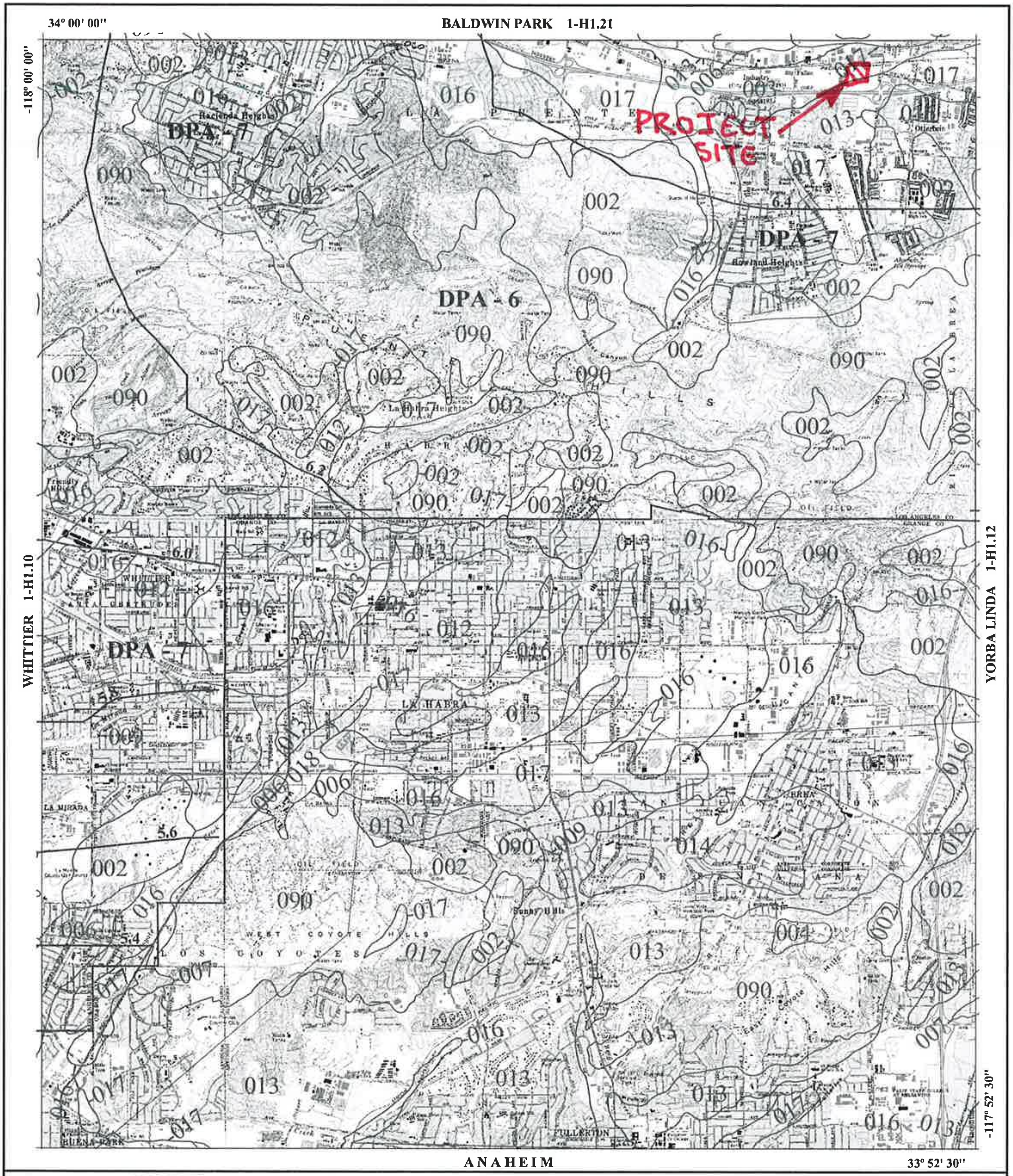
INDUSTRY PRIVATE DRAIN NO. 182
M.T.D. NO. 1000
LINE "B"
MEYER INDUSTRIAL DEVELOPMENT

DESIGNED BY: S.E.D. CHECKED BY:
DRAFTED BY: C.E.H. DATE:
JOB NO. 4785
SHT. 3 OF 6

[redacted]

DUPLICATE
ORIGINAL

HYDROLOGY MANUAL REFERENCES



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

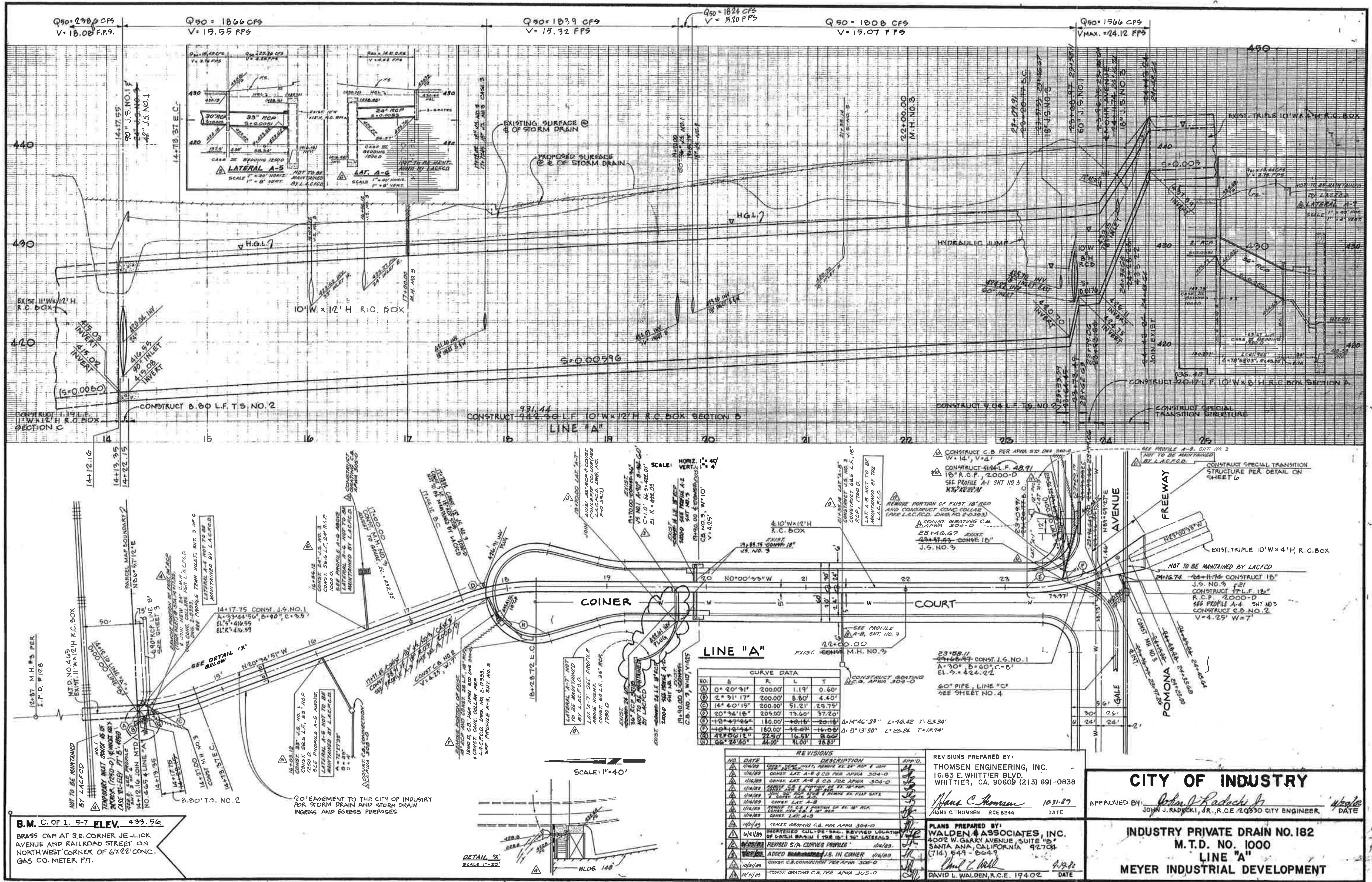
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

L A H A B R A
50-YEAR 24-HOUR ISOHYET

1-H1.11

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

EXISTING STORM DRAIN PLANS



LINE "A"

CURVE DATA				
NO.	Δ	R	L	T
Ⓐ	0° 20' 31"	200.00'	1.19'	0.60'
Ⓑ	2° 31' 17"	200.00'	8.80'	4.40'
Ⓒ	14° 40' 19"	200.00'	51.21'	25.79'
Ⓓ	20° 34' 18"	205.00'	73.60'	37.20'
Ⓔ	~~12° 47' 26"~~	180.00'	~~40.18'~~	~~20.18'~~
Ⓕ	~~10° 12' 44"~~	180.00'	~~32.07'~~	~~16.08'~~
Ⓖ	42°06'12"	22.50'	16.53'	8.66'
Ⓗ	66° 24' 40"	44.00'	51.00'	28.80'

Δ = 14°46'33" L = 46.42 T = 23.34'
Δ = 8° 13' 30" L = 25.84 T = 12.94'

B.M. C. OF I. 5-7 **ELEV.** 433.56

BRASS CAP AT S.E. CORNER JELLICK
AVENUE AND RAILROAD STREET ON
NORTHWEST CORNER OF 6'x22' CONC.
GAS CO. METER PIT.

REVISIONS			
NO.	DATE	DESCRIPTION	APP'D.
4	1/16/89	CONST. TEMP. INLET, REMOVE EX. 24" RCP & JOIN NEW 24" RCP.	
5	1/16/89	CONST. LAT. A-5 & CB PER APWA 304-0	
6	1/16/89	CONST. LAT. A-6 & CB PER APWA 304-0	
7	1/16/89	REMOVE C.B. & PORTION OF EX. 18" RCP. CONST. NEW C.B. & 18" RCP.	
8	1/16/89	JOIN 36" RCP STUB & REMOVE EX. FLAP GATE & CONST. LAT. A-7.	
9	1/16/89	CONST. LAT. A-8	
10	1/16/89	REMOVE EX. C.B. & PORTION OF EX. 18" RCP. CONST. NEW C.B. & 18" RCP	
11	1/16/89	CONST. LAT. A-9	
14	10/31/89	CONST. GRATING C.B. PER APWA 304-0	
1	6/21/89	SHORTENED CUL-DE-SAC. REVISED LOCATION OF CATCH BASIN & THE 18" & 36" LATERALS	
2	[illegible]	REVISED STA. CURVES PROFILES" 1/14/89	
3	[illegible]	ADDED [illegible] J.S. IN CONER 1/16/89	
12	10/31/89	CONST. C.B. CONNECTION PER APWA 308-0	
13	10/31/89	CONST. GRATING C.B. PER APWA 305-0	

REVISIONS PREPARED BY:
THOMSEN ENGINEERING, INC.
16163 E. WHITTIER BLVD.
WHITTIER, CA. 90609 (213) 691-0838

Hans C. Thomsen 10-31-89
HANS C. THOMSEN RCE 8244 DATE

PLANS PREPARED BY:
WALDEN & ASSOCIATES, INC.
4002 W. GARRY AVENUE, SUITE "B"
SANTA ANA, CALIFORNIA 92704
(714) 549-8649

9-17-82
DAVID L. WALDEN, R.C.E. 19402 DATE

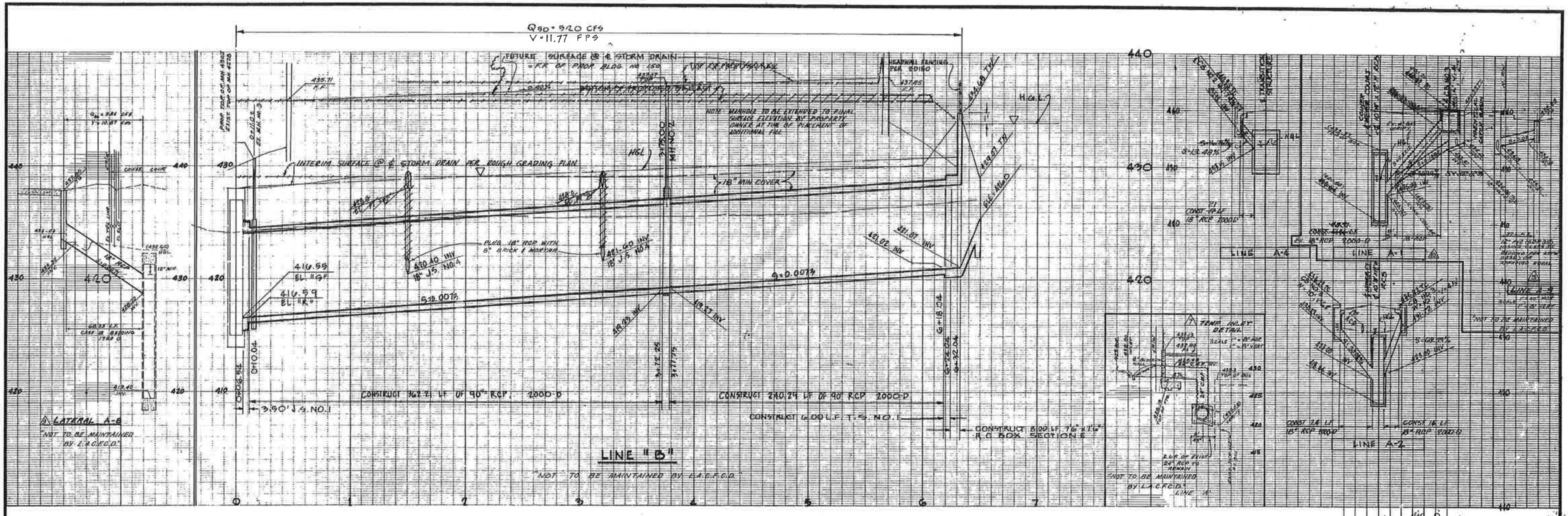
CITY OF INDUSTRY

APPROVED BY: John J. Radecki Jr. 4/20/82
JOHN J. RADECKI, JR., R.C.E. 20330 CITY ENGINEER DATE

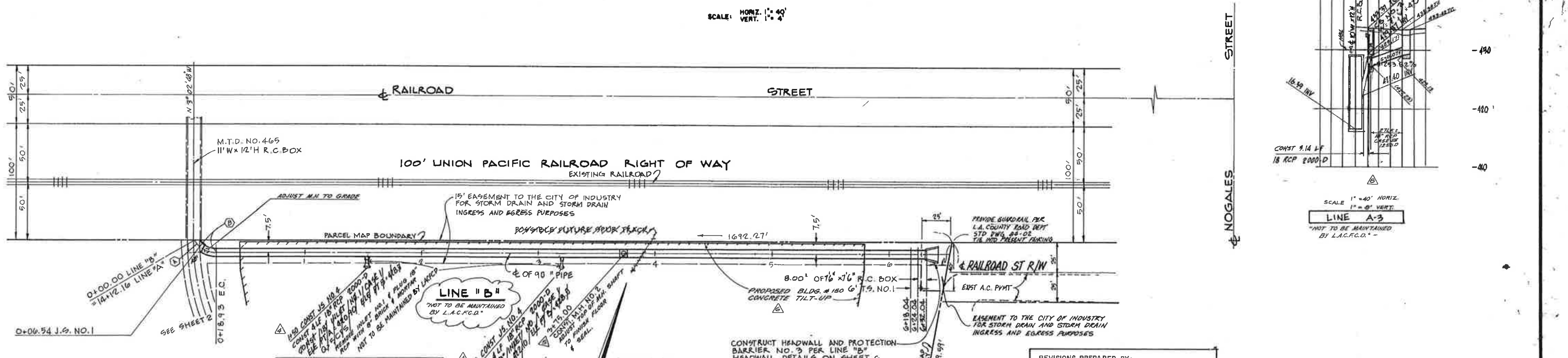
INDUSTRY PRIVATE DRAIN NO. 182
M.T.D. NO. 1000
LINE "A"
MEYER INDUSTRIAL DEVELOPMENT

DESIGNED BY: R.E.D.
DRAFTED BY: C.E.M.
CHECKED BY:
DATE:
JOB NO. 6765
SHT. 2 OF 6

DUPLICATE ORIGINAL



SCALE: HORIZ. 1" = 40' VERT. 1" = 4'



CURVE DATA				
NO.	Δ	R	L	T
Ⓐ	16°38'55"	22.50'	6.54	3.29'
Ⓑ	31°32'28"	22.50'	12.39'	6.35'

B.M. C. OF I. 5-7 **ELEV.** 433.56
BRASS CAP AT S.E. CORNER JELLICK AVENUE AND RAILROAD STREET ON NORTHWEST CORNER OF 6'x22' CONC. GAS CO. METER PIT.

REVISIONS

NO.	DATE	DESCRIPTION		APP'D
△4	1/16/89	REMOVE & PLUG INLET ,	(LINE 'B')	
△5	1/16/89	RAISE M.H. TO F.F. & SEAL ,	(LINE 'B')	
△6	1/16/89	CONST. BLDG. OVER 90" RCP ,	(LINE 'B')	
△7	1/16/89	CONST. TEMP. INLET, REMOVE EX. 24" RCP & JOIN NEW 24" RCP	(LINE 'A')	
△8	1/16/89	REMOVE C.B. & PORTION OF EX. 18" RCP. CONST. NEW C.B. & 18" RCP	(LINE 'A')	
△9	1/16/89	CONST. LAT. A-6	(LINE 'A')	
△10	1/16/89	REMOVE EX. C.B. & 18" RCP CONST C.B. & 18" RCP	(LINE 'A')	

REVISIONS

NO.	DATE	DESCRIPTION		APP'D
△1	6/21/83	REVISED PROFILE A-2		
△2	~~8/25/83~~	REVISED PROFILE A-1 & A-4	1/16/89	
△3	1/16/89	CONST. LAT. A-9	(LINE 'A')	
△11	1/16/89	"NOT TO BE MAINTAINED BY L.A.C.F.C.D."		

REVISIONS PREPARED BY:
THOMSEN ENGINEERING, INC.
16163 E. WHITTIER BLVD.
WHITTIER, CA. 90609 (213) 691-0838

Hans C. Thomsen 10-31-89
HANS C. THOMSEN RCE 8244 DATE

PLANS PREPARED BY:
WALDEN & ASSOCIATES, INC.
4002 W. GARRY AVENUE, SUITE "B"
SANTA ANA, CALIFORNIA 92704
(714) 549-8649

David L. Walden 9-19-82
DAVID L. WALDEN, R.C.E. 19402 DATE

CITY OF INDUSTRY

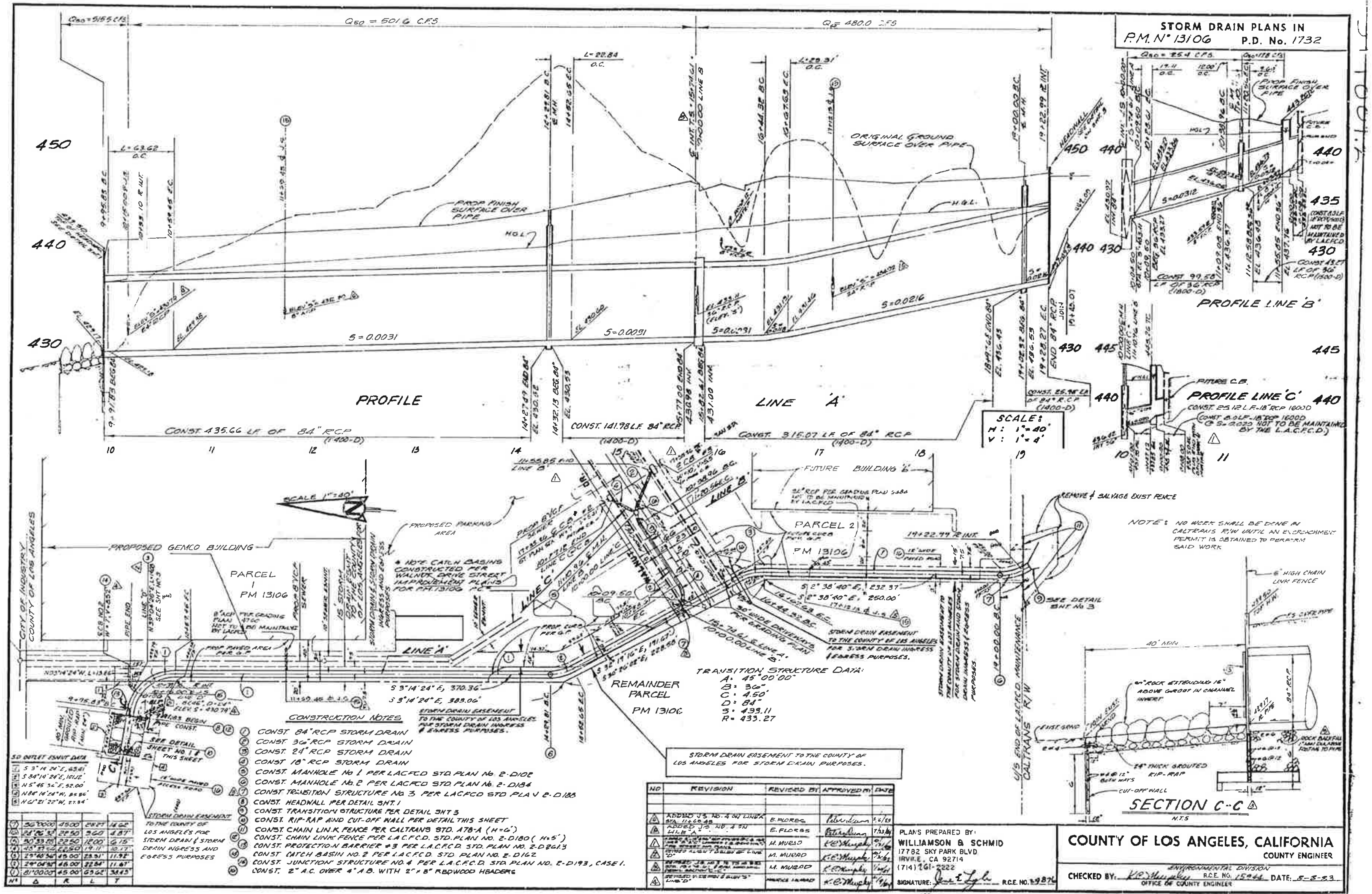
APPROVED BY: John J. Radecki Jr. 10/20/82
JOHN J. RADECKI, J.R., R.C.E. 20330 CITY ENGINEER DATE

INDUSTRY PRIVATE DRAIN NO. 182
M.T.D. NO. 1000
LINE "B"
MEYER INDUSTRIAL DEVELOPMENT

DESIGNED BY: R.E.B.
DRAFTED BY: C.E.M.
CHECKED BY:
DATE:
JOB NO. 6765
SHT. 3 OF 6

DUPLICATE
ORIGINAL

STORM DRAIN PLANS IN
P.M. N° 13106 P.D. No. 1732



NOTE: NO WORK SHALL BE DONE IN CALTRANS R/W UNTIL AN ENCROACHMENT PERMIT IS OBTAINED TO PERFORM SAID WORK

* NOTE: CATCH BASINS CONSTRUCTED PER WALNUT DRIVE STREET IMPROVEMENT PLANS FOR P.M. 13106

TRANSITION STRUCTURE DATA:
A = 45°00'00"
B = 36"
C = 4.50'
D = 84"
S = 433.11
R = 433.27

STORM DRAIN EASEMENT TO THE COUNTY OF LOS ANGELES FOR STORM DRAIN INGRESS & EGRESS PURPOSES.

STORM DRAIN EASEMENT TO THE COUNTY OF LOS ANGELES FOR STORM DRAIN PURPOSES.

STORM DRAIN EASEMENT TO THE COUNTY OF LOS ANGELES FOR STORM DRAIN & STORM DRAIN INGRESS AND EGRESS PURPOSES

S.D. OUTLET ESMNT DATA
1. S 3° 14' 24" E, 65.41'
2. S 84° 14' 24" E, 101.12'
3. N 5° 45' 36" E, 52.00'
4. N 84° 14' 24" W, 85.85'
5. N 61° 21' 22" W, 27.34'

N°	Δ	R	L	T
7	36°00'00"	45.00'	28.27'	14.62'
10	24°26'32"	22.50'	9.60'	4.87'
6	30°33'29"	22.50'	12.00'	6.15'
4	48°39'[illegible]	22.50'	19.11'	10.17'
3	29°48'36"	45.00'	23.31'	11.98'
2	29°04'35"	45.00'	22.84'	11.67'
1	81°00'00"	45.00'	63.62'	38.43'

CONSTRUCTION NOTES
① CONST. 84" RCP STORM DRAIN
② CONST. 36" RCP STORM DRAIN
③ CONST. 24" RCP STORM DRAIN
④ CONST 18" RCP STORM DRAIN
⑤ CONST. MANHOLE No 1 PER LACFCD STD PLAN No 2-D102
⑥ CONST. MANHOLE No. 2 PER LACFCD STD. PLAN No. 2-D184
⑦ CONST TRANSITION STRUCTURE No 3 PER LACFCD STD PLAN 2-D188
⑧ CONST. HEADWALL PER DETAIL SHT. 1
⑨ CONST. TRANSITION STRUCTURE PER DETAIL SHT 3
⑩ CONST. RIP-RAP AND CUT-OFF WALL PER DETAIL THIS SHEET
⑪ CONST. CHAIN LINK FENCE PER CALTRANS STD. A78-A (H=6')
⑫ CONST. CHAIN LINK FENCE PER L.A.C.F.C.D. STD. PLAN NO. 2-D180 (H=5')
⑬ CONST. PROTECTION BARRIER #3 PER L.A.C.F.C.D. STD. PLAN NO. 2-D261.3
⑭ CONST CATCH BASIN NO. 2 PER L.A.C.F.C.D. STD PLAN NO. 2-D162
⑮ CONST. JUNCTION STRUCTURE NO. 4 PER L.A.C.F.C.D. STD PLAN NO. 2-D193, CASE 1.
⑯ CONST. 2" A.C. OVER 4" A.B. WITH 2" x 8" REDWOOD HEADERS

NO	REVISION	REVISED BY	APPROVED BY	DATE
6	ADDED J.S. NO. 4 ON LINE A STA. 11+60.45	E. FLORES	Peter Dunn	8/6/[illegible]
5	ADDED J.S. NO. 4 ON LINE "A"	E. FLORES	Peter Dunn	7/23/[illegible]
1	[illegible]	M. MURAD	K.C. Murphy	[illegible]
2	[illegible] LINE "D"	M. MURAD	K.C. Murphy	[illegible]
3	[illegible]	M. MURAD	K.C. Murphy	[illegible]
4	REVISED [illegible] LINE "D"	[illegible]	K.C. Murphy	[illegible]

PLANS PREPARED BY:
WILLIAMSON & SCHMID
17782 SKY PARK BLVD
IRVINE, CA 92714
(714) 261-2222
SIGNATURE: Jane E. Lyle R.C.E. NO. 19876

COUNTY OF LOS ANGELES, CALIFORNIA
COUNTY ENGINEER

ENVIRONMENTAL DIVISION
CHECKED BY: K.C. Murphy R.C.E. NO. 15944 DATE: 5-3-83
OFFICE OF COUNTY ENGINEER

SHT 2 OF 3 SHTS

PF516166

APPENDIX B

HYDROLOGY CALCULATIONS

EXISTING CONDITION

EXISTING CONDITION

Peak Flow Hydrologic Analysis

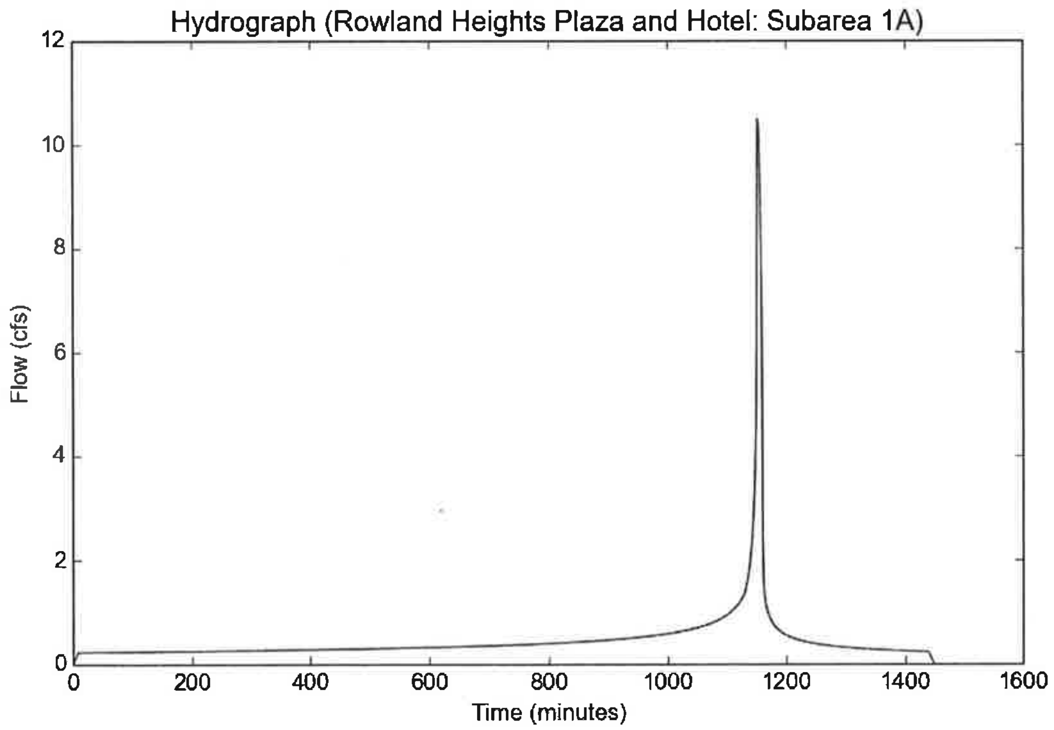
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-EX1A.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Rowland Heights Plaza and Hotel
Subarea ID	Subarea 1A
Area (ac)	6.9
Flow Path Length (ft)	745.0
Flow Path Slope (vft/hft)	0.055
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.16
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.942
Undeveloped Runoff Coefficient (Cu)	0.444
Developed Runoff Coefficient (Cd)	0.517
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	10.4941
Burned Peak Flow Rate (cfs)	10.4941
24-Hr Clear Runoff Volume (ac-ft)	0.925
24-Hr Clear Runoff Volume (cu-ft)	40291.9342



EXISTING CONDITION

Peak Flow Hydrologic Analysis

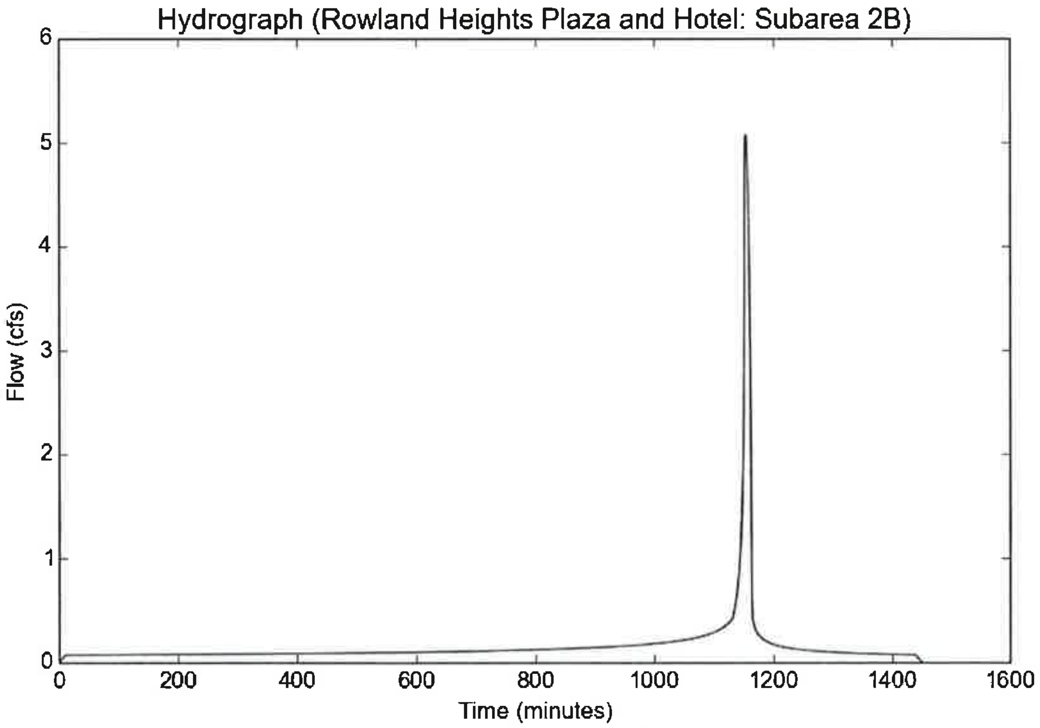
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-EX2B.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Rowland Heights Plaza and Hotel
Subarea ID	Subarea 2B
Area (ac)	4.5
Flow Path Length (ft)	665.0
Flow Path Slope (vft/hft)	0.026
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.01
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.6772
Undeveloped Runoff Coefficient (Cu)	0.4162
Developed Runoff Coefficient (Cd)	0.421
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	5.0722
Burned Peak Flow Rate (cfs)	5.0722
24-Hr Clear Runoff Volume (ac-ft)	0.3205
24-Hr Clear Runoff Volume (cu-ft)	13960.4763



EXISTING CONDITION

Peak Flow Hydrologic Analysis

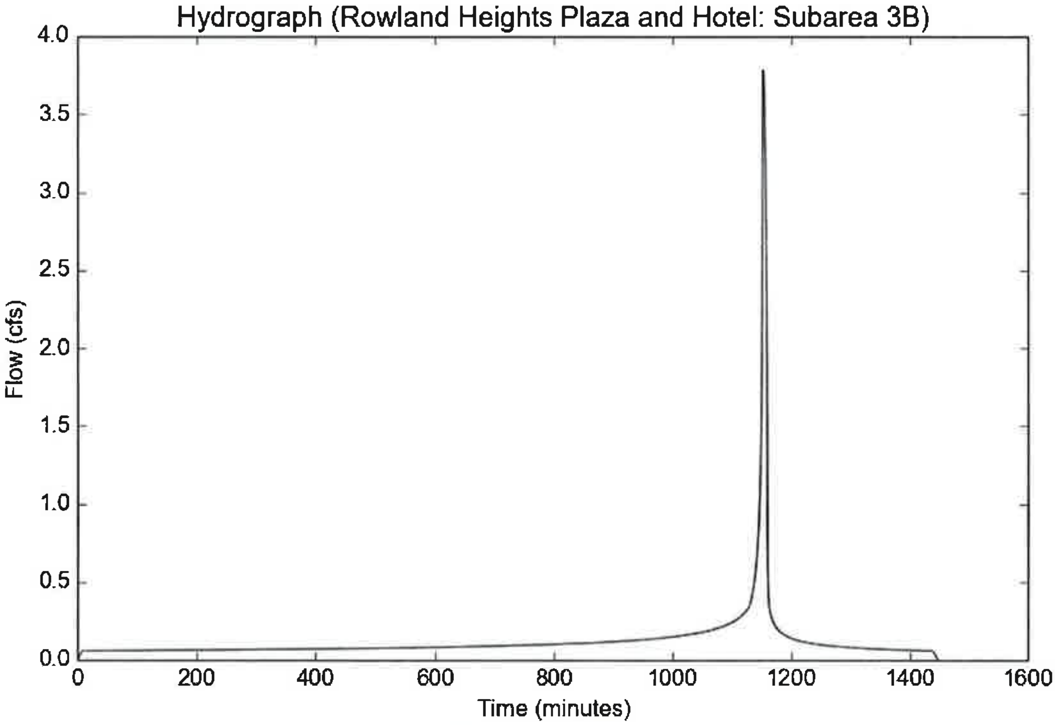
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-EX3B.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Rowland Heights Plaza and Hotel
Subarea ID	Subarea 3B
Area (ac)	2.45
Flow Path Length (ft)	485.0
Flow Path Slope (vft/hft)	0.026
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.08
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.1094
Undeveloped Runoff Coefficient (Cu)	0.4616
Developed Runoff Coefficient (Cd)	0.4967
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	3.7836
Burned Peak Flow Rate (cfs)	3.7836
24-Hr Clear Runoff Volume (ac-ft)	0.2475
24-Hr Clear Runoff Volume (cu-ft)	10779.3705



EXISTING CONDITION

Peak Flow Hydrologic Analysis

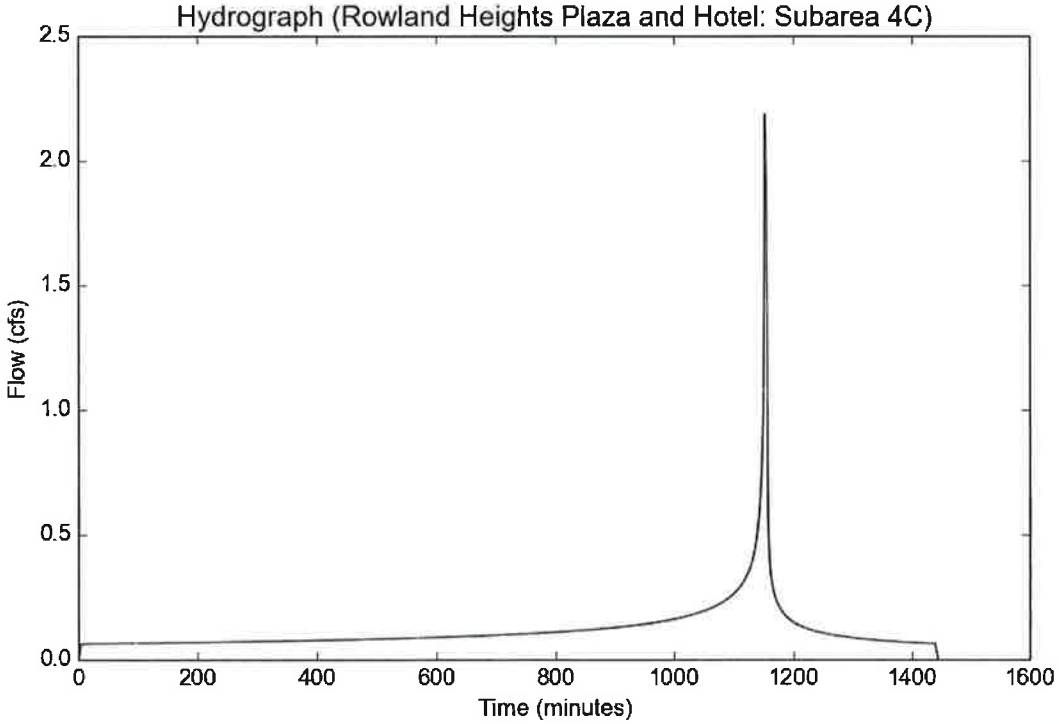
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-EX4C.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Rowland Heights Plaza and Hotel
Subarea ID	Subarea 4C
Area (ac)	0.75
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.013
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.6
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.8781
Undeveloped Runoff Coefficient (Cu)	0.5302
Developed Runoff Coefficient (Cd)	0.7521
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.1875
Burned Peak Flow Rate (cfs)	2.1875
24-Hr Clear Runoff Volume (ac-ft)	0.2381
24-Hr Clear Runoff Volume (cu-ft)	10373.4447



PROPOSED CONDITION

PROPOSED CONDITION

Peak Flow Hydrologic Analysis

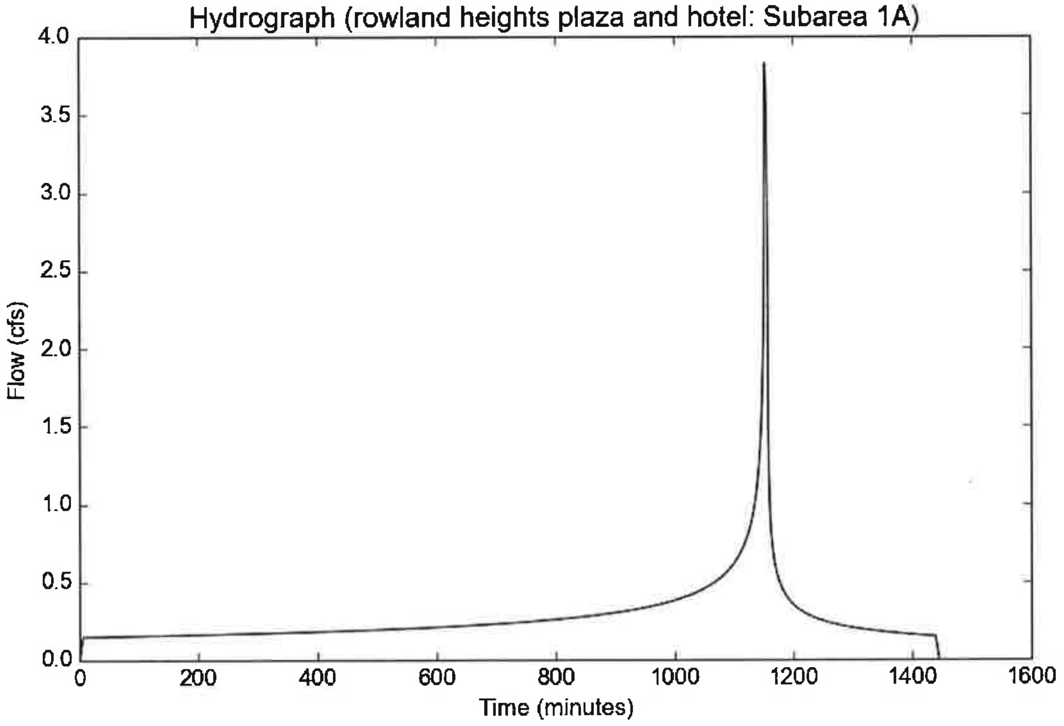
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR1A.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	rowland heights plaza and hotel
Subarea ID	Subarea 1A
Area (ac)	1.25
Flow Path Length (ft)	510.0
Flow Path Slope (vft/hft)	0.022
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.9
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.5596
Undeveloped Runoff Coefficient (Cu)	0.507
Developed Runoff Coefficient (Cd)	0.8607
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.8297
Burned Peak Flow Rate (cfs)	3.8297
24-Hr Clear Runoff Volume (ac-ft)	0.5524
24-Hr Clear Runoff Volume (cu-ft)	24064.6136



PROPOSED CONDITION

Peak Flow Hydrologic Analysis

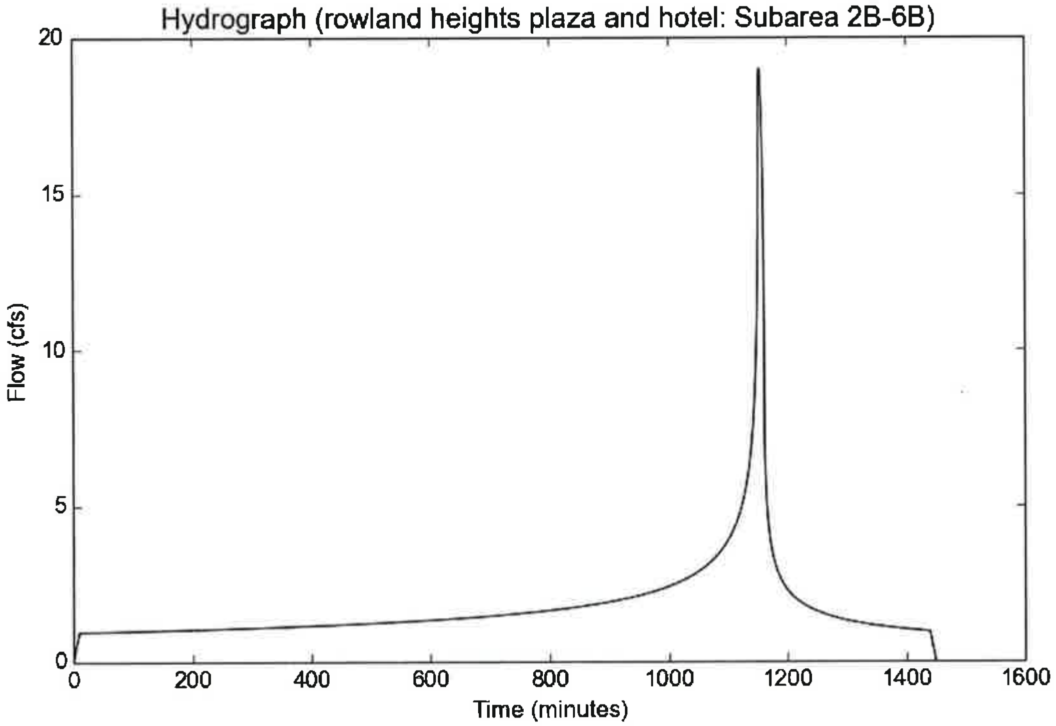
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR2B.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	rowland heights plaza and hotel
Subarea ID	Subarea 2B-6B
Area (ac)	7.95
Flow Path Length (ft)	1050.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.9
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.7998
Undeveloped Runoff Coefficient (Cu)	0.4291
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	18.9846
Burned Peak Flow Rate (cfs)	18.9846
24-Hr Clear Runoff Volume (ac-ft)	3.5127
24-Hr Clear Runoff Volume (cu-ft)	153014.1539



Peak Flow Hydrologic Analysis

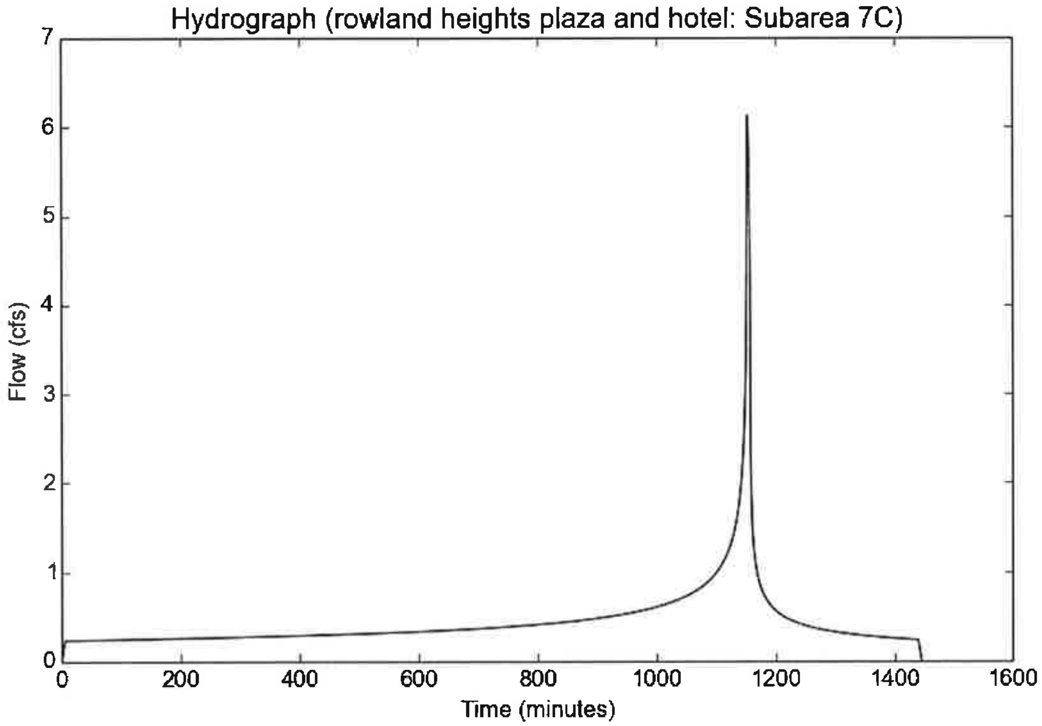
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR7C.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	rowland heights plaza and hotel
Subarea ID	Subarea 7C
Area (ac)	2.0
Flow Path Length (ft)	525.0
Flow Path Slope (vft/hft)	0.024
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.9
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.5596
Undeveloped Runoff Coefficient (Cu)	0.507
Developed Runoff Coefficient (Cd)	0.8607
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	6.1275
Burned Peak Flow Rate (cfs)	6.1275
24-Hr Clear Runoff Volume (ac-ft)	0.8839
24-Hr Clear Runoff Volume (cu-ft)	38503.3818



PROPOSED CONDITION

Peak Flow Hydrologic Analysis

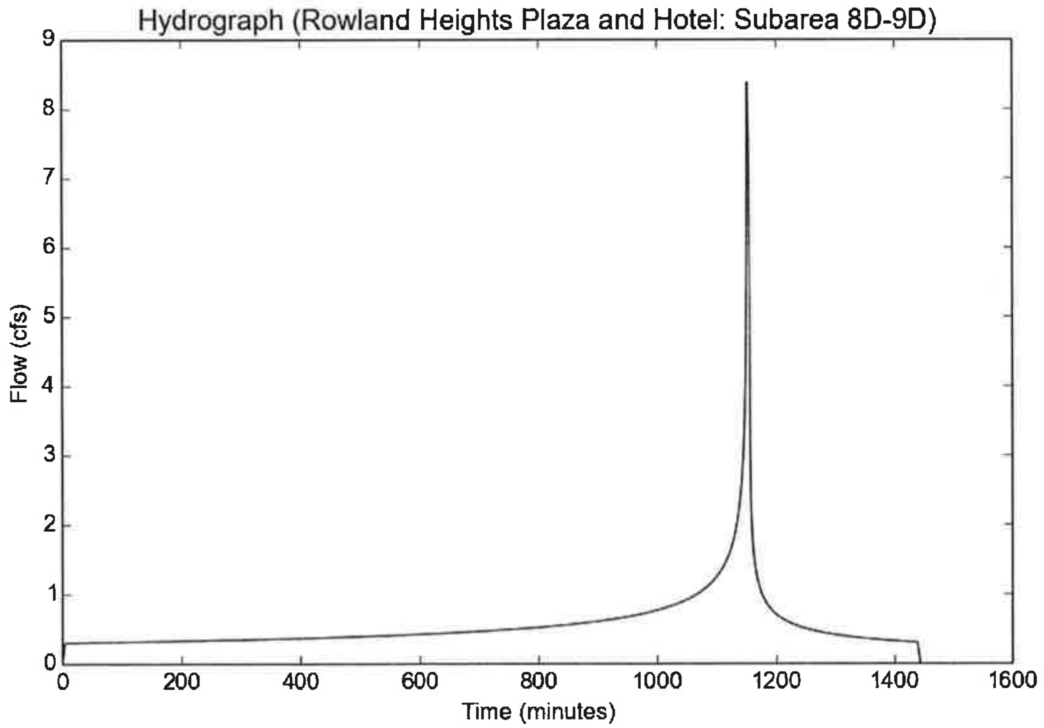
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR8D.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Rowland Heights Plaza and Hotel
Subarea ID	Subarea 8D-9D
Area (ac)	2.5
Flow Path Length (ft)	445.0
Flow Path Slope (vft/hft)	0.027
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.9
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.8781
Undeveloped Runoff Coefficient (Cu)	0.5302
Developed Runoff Coefficient (Cd)	0.863
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.3672
Burned Peak Flow Rate (cfs)	8.3672
24-Hr Clear Runoff Volume (ac-ft)	1.105
24-Hr Clear Runoff Volume (cu-ft)	48132.0496



PROPOSED CONDITION

Peak Flow Hydrologic Analysis

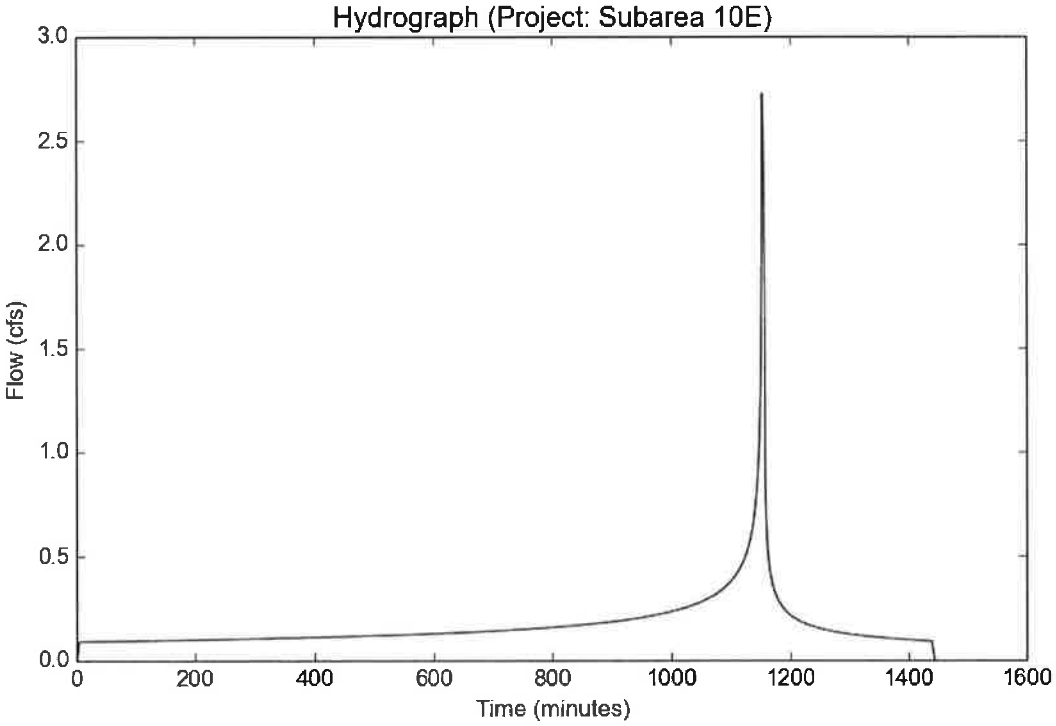
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR10E.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	Project
Subarea ID	Subarea 10E
Area (ac)	0.85
Flow Path Length (ft)	220.0
Flow Path Slope (vft/hft)	0.013
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.8
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	3.8781
Undeveloped Runoff Coefficient (Cu)	0.5302
Developed Runoff Coefficient (Cd)	0.826
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.723
Burned Peak Flow Rate (cfs)	2.723
24-Hr Clear Runoff Volume (ac-ft)	0.3404
24-Hr Clear Runoff Volume (cu-ft)	14828.7881



APPENDIX C

HYDRAULIC CALCULATIONS

```
                                                  F 0 5 1 5 P

                               WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

                                 PARALLAX - GALE AVE & NOGALES ST, L.A. COUNTY

HEADING LINE NO 2 IS -

                                 PUBLIC S.D.

HEADING LINE NO 3 IS -
```

```
DATE:  9/ 3/2015
TIME: 11: 2
                                                                      F0515P
                                            WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                               PAGE     1

 CARD   SECT   CHN    NO OF  AVE PIER   HEIGHT 1  BASE     ZL     ZR    INV    Y(1)   Y(2)   Y(3)   Y(4)   Y(5)   Y(6)   Y(7)   Y(8)   Y(9)   Y(10)
 CODE    NO    TYPE   PIERS   WIDTH     DIAMETER  WIDTH                 DROP

 CD       1     3       0       0.00       7.50    7.50   0.00   0.00   0.00
 CD      18     4                          1.50
 CD      24     4                          2.00
 CD      84     4                          7.00
 CD      90     4                          7.50
```

```
                                  WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO    1 IS A SYSTEM OUTLET     *         *     *
                    U/S DATA   STATION    INVERT  SECT                                          W S ELEV
                                  10.04  416.59   90                                              428.25

ELEMENT NO    2 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 372.25  419.23   90             0.013                                                  0.00   0.00    0.00     0

ELEMENT NO    3 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 377.75  419.27   90             0.013                                                  0.00   0.00    0.00     1

ELEMENT NO    4 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 618.04  421.02   90             0.013                                                  0.00   0.00    0.00     0

ELEMENT NO    5 IS A TRANSITION        *         *     *
                    U/S DATA   STATION    INVERT  SECT             N
                                 624.04  421.04    1             0.013

ELEMENT NO    6 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 632.04  421.07    1             0.013                                                  0.00   0.00    0.00     0

ELEMENT NO    7 IS A TRANSITION        *         *     *
                    U/S DATA   STATION    INVERT  SECT             N
                                 636.04  421.72   90             0.013

ELEMENT NO    8 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 653.71  424.59   90             0.013                                                 45.00  22.50    0.00     0

ELEMENT NO    9 IS A TRANSITION        *         *     *
                    U/S DATA   STATION    INVERT  SECT             N
                                 655.71  424.61   90             0.013

ELEMENT NO   10 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 663.40  424.66   90             0.013                                                  0.00   0.00    0.00     0

ELEMENT NO   11 IS A JUNCTION          *         *     *     *                *                 *                *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2  N      Q3        Q4    INVERT-3 INVERT-4  PHI 3    PHI 4
                                 663.40  424.66   90    18     0  0.013     6.1      0.0   427.66     0.00  90.00     0.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO   12 IS A REACH             *         *     *
                    U/S DATA   STATION    INVERT  SECT             N                                                  RADIUS  ANGLE  ANG PT  MAN H
                                 682.97  424.80   90             0.013                                                  0.00   0.00    0.00     0
```

```
                              WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO  13 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                  700.66  424.92   90                0.013                                              45.00  22.50    0.00     0

ELEMENT NO  14 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                  773.69  425.44   90                0.013                                               0.00   0.00    0.00     0

ELEMENT NO  15 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                  778.35  425.46   90                0.013                                               0.00   0.00    0.00     1

ELEMENT NO  16 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                  835.29  425.86   90                0.013                                               0.00   0.00    0.00     0

ELEMENT NO  17 IS A JUNCTION        *          *     *     *                 *                 *              *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N       Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                  835.29  425.86   90    24     0  0.013     13.8       0.0   428.61     0.00  90.00    0.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO  18 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1030.41  427.25   90                0.013                                               0.00   0.00    0.00     0

ELEMENT NO  19 IS A JUNCTION        *          *     *     *                 *                 *
                    U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N       Q3        Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                                 1030.41  427.25   90    18     0  0.013      3.8       0.0   430.25     0.00  90.00    0.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO  20 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1220.03  428.59   90                0.013                                               0.00   0.00    0.00     0

ELEMENT NO  21 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1290.73  428.73   90                0.013                                              45.00  90.00    0.00     0

ELEMENT NO  22 IS A REACH           *          *     *
                    U/S DATA   STATION    INVERT  SECT                 N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1295.40  428.75   90                0.013                                               0.00   0.00    0.00     1
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                          WATER SURFACE PROFILE - ELEMENT CARD LISTING

 ELEMENT NO   23 IS A REACH           *          *     *
                     U/S DATA   STATION    INVERT  SECT                N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1326.79  428.81    90               0.013                                                0.00   0.00    0.00      0

 ELEMENT NO   24 IS A REACH           *          *     *
                     U/S DATA   STATION    INVERT  SECT                N                                                RADIUS  ANGLE  ANG PT  MAN H
                                 1390.33  428.94    90               0.013                                               45.00  80.90    0.00      0

 ELEMENT NO   25 IS A TRANSITION      *          *     *
                     U/S DATA   STATION    INVERT  SECT                N
                                 1392.33  428.95    84               0.013

 ELEMENT NO   26 IS A SYSTEM HEADWORKS                 *                           *
                     U/S DATA   STATION    INVERT  SECT                                       W S ELEV
                                 1392.33  428.95    84                                            0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
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                                      WATER SURFACE PROFILE LISTING
                          PARALLAX - GALE AVE & NOGALES ST, L.A. COUNTY
                          PUBLIC S.D.

 STATION    INVERT   DEPTH     W.S.       Q       VEL      VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL    NO  AVBPR
            ELEV    OF FLOW    ELEV                        HEAD    GRD.EL.  ELEV    DEPTH            DIA    ID NO.        PIER

 L/ELEM      SO                                           SF AVE    HF                    NORM DEPTH                ZR
*****************************************************************************************************************************************

    10.04   416.59   11.660   428.250    538.7   12.19    2.309   430.559   0.00    5.993              7.50    0.00  0.00    0    0.00

   362.21  0.00729                                       .004922    1.78                     5.176                  0.00

   372.25   419.23   10.803   430.033    538.7   12.19    2.309   432.342   0.00    5.993              7.50    0.00  0.00    0    0.00

     5.50  0.00727                                       .004922    0.03                     5.180                  0.00

   377.75   419.27   10.905   430.175    538.7   12.19    2.309   432.484   0.00    5.993              7.50    0.00  0.00    0    0.00

   240.29  0.00728                                       .004922    1.18                     5.178                  0.00

   618.04   421.02   10.338   431.358    538.7   12.19    2.309   433.667   0.00    5.993              7.50    0.00  0.00    0    0.00

TRANS STR  0.00333                                       .004001    0.02                                            0.00

   624.04   421.04   11.301   432.341    538.7    9.62    1.437   433.778   0.00    5.433              7.50    7.50  0.00    0    0.00

     8.00  0.00375                                       .003081    0.02                     5.901                  0.00

   632.04   421.07   11.296   432.366    538.7    9.62    1.437   433.803   0.00    5.433              7.50    7.50  0.00    0    0.00

TRANS STR  0.16250                                       .004001    0.02                                            0.00

   636.04   421.72    9.964   431.684    538.7   12.19    2.309   433.993   0.00    5.993              7.50    0.00  0.00    0    0.00

    17.09  0.16242                                       .004898    0.08                     2.118                  0.00

   653.13   424.50    7.500   431.995    538.7   12.19    2.309   434.304   0.00    5.993              7.50    0.00  0.00    0    0.00

     0.58  0.16242                                       .004673    0.00                     2.118                  0.00

   653.71   424.59    7.394   431.984    538.7   12.23    2.322   434.306   0.00    5.993              7.50    0.00  0.00    0    0.00

TRANS STR  0.01000                                       .004462    0.01                                            0.00

   655.71   424.61    7.381   431.991    538.7   12.24    2.325   434.316   0.00    5.993              7.50    0.00  0.00    0    0.00

     7.69  0.00650                                       .004436    0.03                     5.410                  0.00

   663.40   424.66    7.361   432.021    538.7   12.25    2.329   434.350   0.00    5.993              7.50    0.00  0.00    0    0.00

JUNCT STR  0.00000                                       .004524    0.00                                            0.00
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                                              WATER SURFACE PROFILE LISTING
                          PARALLAX - GALE AVE & NOGALES ST, L.A. COUNTY
                          PUBLIC S.D.

 STATION    INVERT   DEPTH     W.S.       Q       VEL     VEL     ENERGY    SUPER  CRITICAL         HGT/   BASE/    ZL    NO  AVBPR
             ELEV   OF FLOW    ELEV                       HEAD    GRD.EL.   ELEV    DEPTH           DIA    ID NO.        PIER

 L/ELEM      SO                                           SF AVE    HF                   NORM DEPTH                 ZR
***********************************************************************************************************************************

  663.40   424.66    7.484   432.144    532.6   12.06    2.258   434.402   0.00    5.962            7.50     0.00  0.00    0   0.00

   19.57  0.00715                                       .004530    0.09                    5.168                     0.00

  682.97   424.80    7.426   432.226    532.6   12.08    2.264   434.490   0.00    5.962            7.50     0.00  0.00    0   0.00

   17.69  0.00678                                       .004388    0.08                    5.273                     0.00

  700.66   424.92    7.375   432.295    532.6   12.10    2.273   434.568   0.00    5.962            7.50     0.00  0.00    0   0.00

   73.03  0.00712                                       .004251    0.31                    5.177                     0.00

  773.69   425.44    7.078   432.518    532.6   12.33    2.361   434.879   0.00    5.962            7.50     0.00  0.00    0   0.00

    4.66  0.00429                                       .004159    0.02                    6.653                     0.00

  778.35   425.46    7.077   432.537    532.6   12.33    2.361   434.898   0.00    5.962            7.50     0.00  0.00    0   0.00

   56.94  0.00702                                       .004189    0.24                    5.204                     0.00

  835.29   425.86    6.783   432.643    532.6   12.67    2.494   435.137   0.00    5.962            7.50     0.00  0.00    0   0.00

JUNCT STR 0.00000                                       .004098    0.00                                              0.00

  835.29   425.86    7.199   433.059    518.8   11.90    2.200   435.259   0.00    5.889            7.50     0.00  0.00    0   0.00

   96.57  0.00712                                       .004016    0.39                    5.076                     0.00

  931.86   426.55    6.679   433.227    518.8   12.48    2.420   435.647   0.00    5.889            7.50     0.00  0.00    0   0.00

   22.05  0.00712                                       .004108    0.09                    5.076                     0.00

  953.91   426.70    6.531   433.236    518.8   12.70    2.506   435.742   0.00    5.889            7.50     0.00  0.00    0   0.00

HYDRAULIC JUMP                                                                                                       0.00

  953.91   426.70    5.297   432.002    518.8   15.55    3.757   435.759   0.00    5.889            7.50     0.00  0.00    0   0.00

   76.50  0.00712                                       .006192    0.47                    5.076                     0.00

 1030.41   427.25    5.414   432.664    518.8   15.19    3.585   436.249   0.00    5.889            7.50     0.00  0.00    0   0.00

JUNCT STR 0.00000                                       .006297    0.00                                              0.00
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                                                  WATER SURFACE PROFILE LISTING
                           PARALLAX - GALE AVE & NOGALES ST, L.A. COUNTY
                           PUBLIC S.D.

 STATION    INVERT   DEPTH     W.S.        Q       VEL      VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL    NO  AVBPR
            ELEV    OF FLOW    ELEV                         HEAD    GRD.EL.  ELEV    DEPTH            DIA    ID NO.        PIER

 L/ELEM     SO                                             SF AVE    HF                      NORM DEPTH                ZR
**********************************************************************************************************************************

  1030.41   427.25    5.202   432.452    515.0   15.75    3.851   436.303   0.00     5.869           7.50    0.00  0.00    0   0.00

   110.18  0.00707                                      .006343     0.70                   5.064                     0.00

  1140.59   428.03    5.349   433.378    515.0   15.28    3.624   437.002   0.00     5.869           7.50    0.00  0.00    0   0.00

    64.68  0.00707                                      .005792     0.37                   5.064                     0.00

  1205.27   428.49    5.596   434.082    515.0   14.57    3.294   437.376   0.00     5.869           7.50    0.00  0.00    0   0.00

    14.76  0.00707                                      .005198     0.08                   5.064                     0.00

  1220.03   428.59    5.869   434.459    515.0   13.89    2.994   437.453   0.00     5.869           7.50    0.00  0.00    0   0.00

    11.40  0.00198                                      .004695     0.05                   7.500                     0.00

  1231.43   428.61    6.172   434.785    515.0   13.24    2.722   437.507   0.00     5.869           7.50    0.00  0.00    0   0.00

    45.38  0.00198                                      .004285     0.19                   7.500                     0.00

  1276.81   428.70    6.524   435.226    515.0   12.62    2.474   437.700   0.00     5.869           7.50    0.00  0.00    0   0.00

    13.92  0.00198                                      .004077     0.06                   7.500                     0.00

  1290.73   428.73    6.596   435.326    515.0   12.51    2.431   437.757   0.00     5.869           7.50    0.00  0.00    0   0.00

     4.67  0.00428                                      .004051     0.02                   6.330                     0.00

  1295.40   428.75    6.594   435.344    515.0   12.52    2.433   437.777   0.00     5.869           7.50    0.00  0.00    0   0.00

    31.39  0.00191                                      .004008     0.13                   7.500                     0.00

  1326.79   428.81    6.739   435.549    515.0   12.31    2.354   437.903   0.00     5.869           7.50    0.00  0.00    0   0.00

    63.54  0.00205                                      .003929     0.25                   7.500                     0.00

  1390.33   428.94    6.960   435.900    515.0   12.04    2.252   438.152   0.00     5.869           7.50    0.00  0.00    0   0.00

TRANS STR  0.00500                                      .004819     0.01                                             0.00

  1392.33   428.95    6.268   435.218    515.0   14.17    3.118   438.336   0.00     5.916           7.00    0.00  0.00    0   0.00
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                         PARALLAX - GALE AVE & NOGALES ST, L.A. COUNTY
                         PUBLIC S.D.


                .         .         .         .         .         .         .         .         .         .         .
      10.04    .I                          C      H                  W          E                                    .    R
      31.31    .                                                                                                     .
      52.57    .                                                                                                     .
      73.84    .                                                                                                     .
      95.10    .                                                                                                     .
     116.37    .                                                                                                     .
     137.64    .                                                                                                     .
     158.90    .                                                                                                     .
     180.17    .                                                                                                     .
     201.43    .                                                                                                     .
     222.70    .                                                                                                     .
     243.97    .                                                                                                     .
     265.23    .                                                                                                     .
     286.50    .                                                                                                     .
     307.76    .                                                                                                     .
     329.03    .                                                                                                     .
     350.30    .                                                                                                     .
     371.56    .                                                                                                     .
     392.83    .            I                          C      H              W          E                            .    R
     414.09    .            I                          C      H               W          E                           .    R
     435.36    .                                                                                                     .
     456.63    .                                                                                                     .
     477.89    .                                                                                                     .
     499.16    .                                                                                                     .
     520.42    .                                                                                                     .
     541.69    .                                                                                                     .
     562.96    .                                                                                                     .
     584.22    .                                                                                                     .
     605.49    .                                                                                                     .
     626.75    .                    I                          C      H            W          E                      .    TX
     648.02    .                    I                        C        H                 W      E                     .    R
     669.29    .                    I                        C         H                W      E                     .    TX
     690.55    .                       I                           C      H          W          E                    .    R
     711.82    .                                    I                          C      X          E                   .    R
     733.08    .                                    I                           C     WH         E                   .    TX
     754.35    .                                    I                           C     WH         E                   .    R
     775.62    .                                     I                          C     WH         E                   .    JX
     796.88    .                                     I                          C      X         E                   .    R
     818.15    .                                     I                           C     WH         E                  .    R
     839.41    .                                      I                          C      X         E                  .    R
     860.68    .                                        I                           C    W H        E                .    R
     881.95    .                                        I                           C    W H        E                .    R
     903.21    .                                          I                           C  W   H       E               .    JX
     924.48    .                                          I                          C     W H       E               .    R
     945.74    .                                             I                          C   W   H      E             .    R
     967.01    .                                              I                          C  W   H       E            .    R
     988.28    .                                              I                       W  C      H       E            .    R
    1009.54    .                                                                                                     .
    1030.81    .                                                 I                       W  C      H      E          .    JX
    1052.07    .                                                 I                      W   C      H      E          .    R
    1073.34    .                                                                                                     .
    1094.61    .                                                                                                     .
    1115.87    .                                                                                                     .
    1137.14    .                                                                                                     .
    1158.40    .                                                    I                        W C       H     E       .    R
    1179.67    .                                                                                                     .
    1200.94    .                                                                                                     .
    1222.20    .                                                      I                          WC      H     E     .    R
    1243.47    .                                                       I                          X      H     E     .    R
    1264.73    .                                                       I                           CW    H      E    .    R
    1286.00    .                                                       I                          C  W    H      E   .    R
    1307.27    .                                                       I                          C   W   H      E   .    R
    1328.53    .                                                       I                          C   W   H      E   .    R
    1349.80    .                                                        I                          C   W  H       E  .    R
    1371.06    .                                                                                                     .
    1392.33    .                                                        I                          C    W  H       E .    TX
                .         .         .         .         .         .         .         .         .         .         .

               416.59    418.76    420.94    423.11    425.29    427.46    429.64    431.81    433.99    436.16    438.34

N O T E S
1. GLOSSARY
```
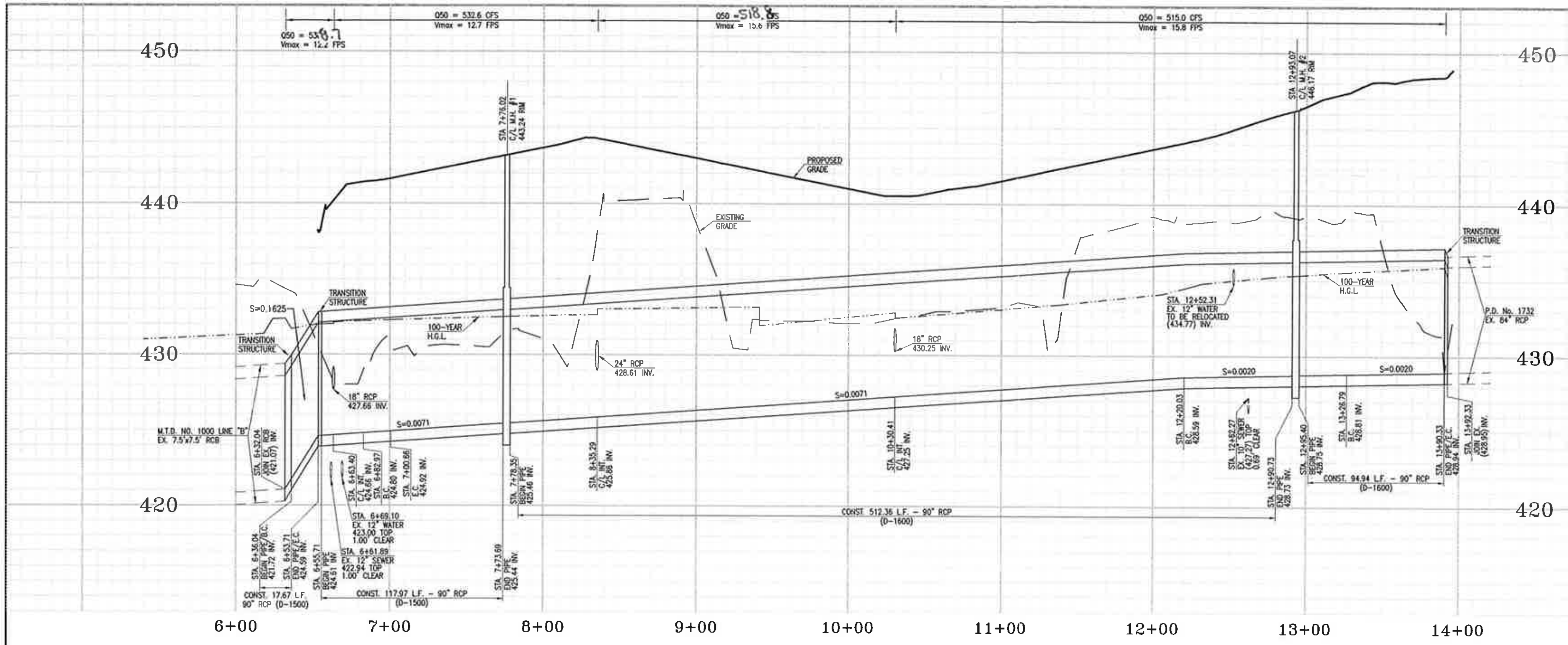
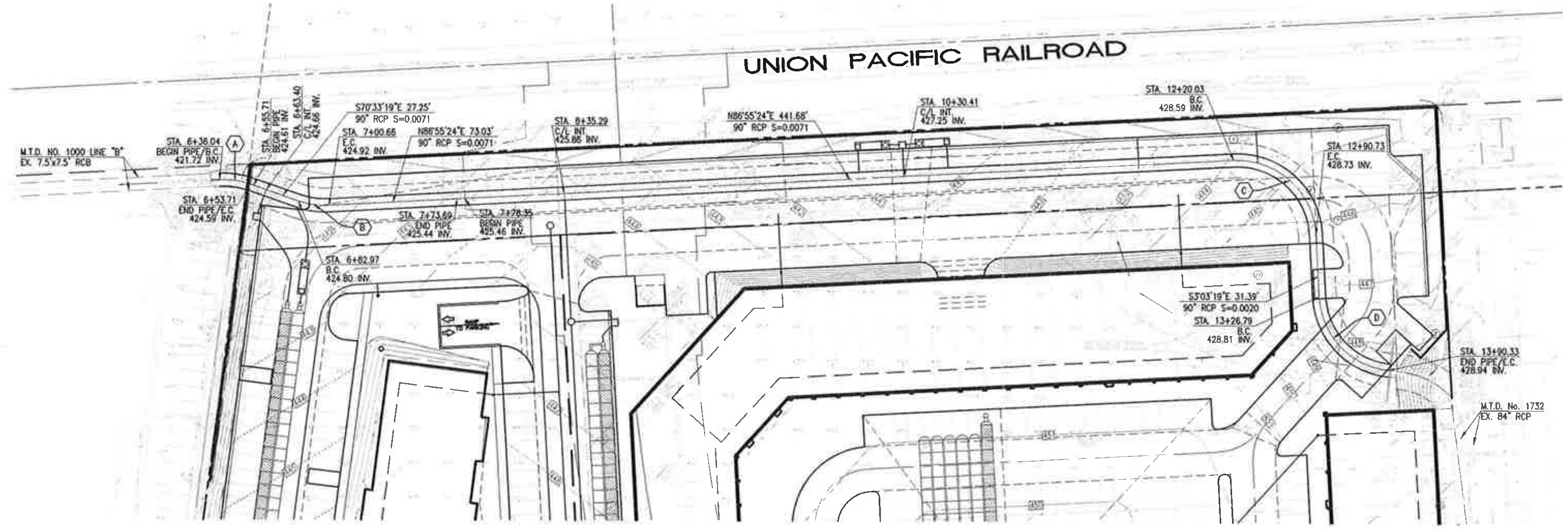
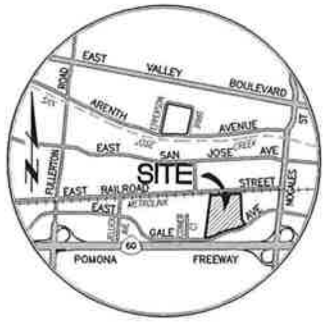

```
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY
```

PROFILE SCALE:
HORIZ. - 1" = 40'
VERT. - 1" = 4'

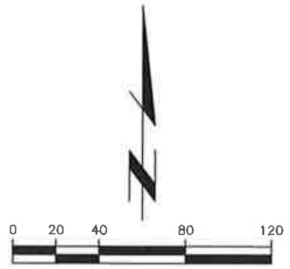






VICINITY MAP
N.T.S.

STORM DRAIN CURVE DATA				
INDEX	DELTA	RADIUS	TANGENT	LENGTH
A	22°30'13"	45.00'	8.95'	17.67'
B	22°31'17"	45.00'	8.96'	17.69'
C	90°00'49"	45.00'	45.01'	70.70'
D	80°54'30"	45.00'	38.37'	63.55'



SCALE:1"=40'

Last Update: 8/15/14
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LOS ANGELES COUNTY
PUBLIC WORKS DEPARTMENT

STORM DRAIN PLAN
ROWLAND HEIGHTS HOTEL DEVELOPMENT GALE AVENUE

PREPARED FOR:
PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944-0968
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CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by ____
Date ____
Checked by ____
Date ____
Designed by ____
Date ____
Checked by ____
Date ____

Approved by Date ____

Public Works Director R.C.E. XXXXX

Sheet 1 of 1 Sheets

3090/1 OF 1 SHEET

APPENDIX D

DETENTION ANALYSIS

Peak Flow Hydrologic Analysis

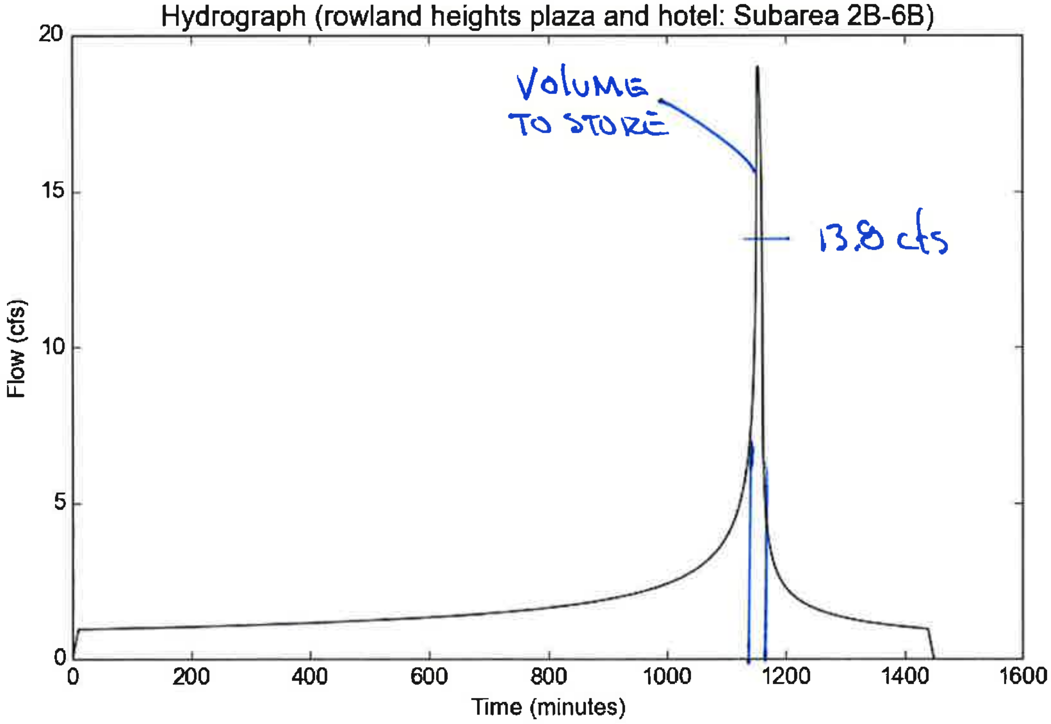
File location: O:/3000-3099/3090/PDF/hydrology report/HydroCalc-PR2B.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	rowland heights plaza and hotel
Subarea ID	Subarea 2B-6B
Area (ac)	7.95
Flow Path Length (ft)	1050.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	6.5
Percent Impervious	0.9
Soil Type	3
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	6.5
Peak Intensity (in/hr)	2.7998
Undeveloped Runoff Coefficient (Cu)	0.4291
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	18.9846
Burned Peak Flow Rate (cfs)	18.9846
24-Hr Clear Runoff Volume (ac-ft)	3.5127
24-Hr Clear Runoff Volume (cu-ft)	153014.1539



VOLUME TO STORE

13.8 cfs

						Q		Σ Volume	
1150	0.772454	5.020948	1.702527	0.276707	0.837671	11.33795	134.7601	114135.7	
1150.2	0.77395	5.030672	1.736248	0.281818	0.838182	11.56957	137.4451	114273.1	
1150.4	0.775526	5.040919	1.772908	0.287375	0.838737	11.82169	140.3475	114413.5	
1150.6	0.777198	5.051789	1.813099	0.293466	0.839347	12.09846	143.5209	114557	
1150.8	0.778987	5.063416	1.857632	0.300216	0.840022	12.40558	147.0243	114704	
1151	0.780923	5.075997	1.907671	0.3078	0.84078	12.75125	150.941	114855	
1151.2	0.78305	5.089828	1.964996	0.316488	0.841649	13.148	155.3955	115010.4	
1151.4	0.785447	5.105408	2.03259	0.326733	0.842673	13.61683	160.589	115171	←
1151.6	0.788262	5.1237	2.116222	0.339409	0.843941	14.19843	166.8916	115337.8	
1151.8	0.79187	5.147158	2.230616	0.356747	0.845675	14.99669	175.1707	115513	
1152	0.8	5.2	2.521069	0.399788	0.849979	17.0357	192.1943	115705.2	
1152.2	0.804237	5.227543	2.659477	0.414326	0.851433	18.00171	210.2244	115915.4	
1152.4	0.806118	5.23977	2.705731	0.419184	0.851918	18.32524	217.9617	116133.4	
1152.6	0.807585	5.249304	2.735561	0.422318	0.852232	18.53409	221.156	116354.6	
1152.8	0.808835	5.257425	2.756635	0.424531	0.852453	18.68172	223.2949	116577.9	
1153	0.809944	5.264635	2.771956	0.426141	0.852614	18.7891	224.8249	116802.7	
1153.2	0.810953	5.271192	2.783073	0.427308	0.852731	18.86703	225.9368	117028.6	
1153.4	0.811885	5.277253	2.790905	0.428131	0.852813	18.92195	226.7339	117255.3	
1153.6	0.812757	5.282918	2.796052	0.428671	0.852867	18.95805	227.28	117482.6	
1153.8	0.813578	5.288259	2.798929	0.428974	0.852897	18.97823	227.6177	117710.2	
1154	0.814358	5.293328	2.799835	0.429069	0.852907	18.98459	227.7769	117938	
1154.2	0.815102	5.298163	2.798994	0.42898	0.852898	18.97869	227.7797	118165.8	
1154.4	0.815815	5.302796	2.796574	0.428726	0.852873	18.96172	227.6424	118393.4	
1154.6	0.8165	5.307251	2.79271	0.42832	0.852832	18.93461	227.378	118620.8	
1154.8	0.817161	5.311547	2.787504	0.427774	0.852777	18.8981	226.9963	118847.8	
1155	0.8178	5.315702	2.781038	0.427094	0.852709	18.85277	226.5052	119074.3	
1155.2	0.81842	5.319728	2.773379	0.42629	0.852629	18.79907	225.9111	119300.2	
1155.4	0.819021	5.323637	2.764577	0.425365	0.852537	18.73738	225.2187	119525.5	
1155.6	0.819606	5.32744	2.754672	0.424325	0.852433	18.66797	224.4321	119749.9	
1155.8	0.820176	5.331145	2.743695	0.423172	0.852317	18.59106	223.5542	119973.4	
1156	0.820732	5.334759	2.731666	0.421909	0.852191	18.50681	222.5873	120196	
1156.2	0.821275	5.338289	2.718602	0.420536	0.852054	18.41534	221.5329	120417.6	
1156.4	0.821806	5.341741	2.704508	0.419056	0.851906	18.31669	220.3921	120638	
1156.6	0.822326	5.34512	2.689388	0.417468	0.851747	18.21088	219.1654	120857.1	
1156.8	0.822835	5.348431	2.673235	0.415771	0.851577	18.0979	217.8527	121075	
1157	0.823335	5.351677	2.65604	0.413965	0.851397	17.97768	216.4535	121291.4	
1157.2	0.823825	5.354863	2.637786	0.412048	0.851205	17.8501	214.9667	121506.4	
1157.4	0.824306	5.357992	2.618449	0.410017	0.851002	17.71502	213.3907	121719.8	
1157.6	0.824779	5.361066	2.598002	0.407869	0.850787	17.57225	211.7237	121931.5	
1157.8	0.825245	5.36409	2.576408	0.405601	0.85056	17.42155	209.9628	122141.5	
1158	0.825702	5.367065	2.553621	0.403208	0.850321	17.26261	208.1049	122349.6	
1158.2	0.826153	5.369994	2.529591	0.400683	0.850068	17.09509	206.1462	122555.7	
1158.4	0.826597	5.372878	2.504253	0.398022	0.849802	16.91855	204.0818	122759.8	
1158.6	0.827034	5.375721	2.477535	0.39417	0.849417	16.73046	201.8941	122961.7	
1158.8	0.827465	5.378523	2.449347	0.389898	0.84899	16.53179	199.5735	123161.3	
1159	0.82789	5.381287	2.419585	0.385387	0.848539	16.32224	197.1242	123358.4	
1159.2	0.82831	5.384014	2.388126	0.380619	0.848062	16.10096	194.5392	123552.9	

						Q		ΣVolume
1159.4	0.828724	5.386706	2.35482	0.375571	0.847557	15.86696	191.8076	123744.7
1159.6	0.829133	5.389364	2.319487	0.370216	0.847022	15.61901	188.9158	123933.7
1159.8	0.829537	5.391989	2.281907	0.36452	0.846452	15.35562	185.8478	124119.5
1160	0.829936	5.394582	2.241806	0.358442	0.845844	15.07494	182.5833	124302.1
1160.2	0.83033	5.397145	2.198839	0.35193	0.845193	14.77462	179.0973	124481.2
1160.4	0.83072	5.399679	2.15256	0.344916	0.844492	14.45166	175.3577	124656.5
1160.6	0.831105	5.402185	2.10238	0.337311	0.843731	14.10205	171.3223	124827.9
1160.8	0.831487	5.404664	2.047487	0.328991	0.842899	13.72031	166.9341	124994.8
1161	0.831864	5.407116	1.986717	0.31978	0.841978	13.29854	162.1131	125156.9
1161.2	0.832237	5.409543	1.918289	0.309409	0.840941	12.82468	156.7393	125313.6
1161.4	0.832607	5.411945	1.839221	0.297425	0.839743	12.27855	150.6194	125464.3
1161.6	0.832973	5.414323	1.74374	0.282954	0.838295	11.62106	143.3977	125607.7
1161.8	0.833335	5.416678	1.617121	0.260217	0.836022	10.74799	134.2143	125741.9
1162	0.833694	5.419011	1.314064	0.201319	0.830132	8.672231	116.5213	125858.4
1162.2	0.834049	5.421321	1.16267	0.167816	0.826782	7.642132	97.88618	125956.3
1162.4	0.834402	5.423611	1.103045	0.154456	0.825446	7.238502	89.28381	126045.6
1162.6	0.834751	5.42588	1.059453	0.144689	0.824469	6.944212	85.09628	126130.7
1162.8	0.835097	5.428129	1.024221	0.136795	0.823679	6.706855	81.9064	126212.6
1163	0.83544	5.430358	0.994341	0.1301	0.82301	6.505901	79.27653	126291.9
1163.2	0.83578	5.432568	0.968259	0.124256	0.822426	6.330751	77.01991	126368.9
1163.4	0.836117	5.43476	0.945047	0.119055	0.821906	6.175077	75.03497	126443.9
1163.6	0.836451	5.436934	0.924098	0.114362	0.821436	6.034747	73.25894	126517.2
1163.8	0.836783	5.439091	0.90499	0.11008	0.821008	5.90688	71.64976	126588.8
1164	0.837112	5.44123	0.887413	0.106142	0.820614	5.78938	70.17756	126659
1164.2	0.837439	5.443353	0.871136	0.102495	0.82025	5.680662	68.82025	126727.8
1164.4	0.837763	5.445459	0.855976	0.1	0.82	5.580108	67.56462	126795.4
1164.6	0.838085	5.447549	0.84179	0.1	0.82	5.48763	66.40642	126861.8
1164.8	0.838404	5.449624	0.828461	0.1	0.82	5.400738	65.33021	126927.1
1165	0.838721	5.451684	0.815893	0.1	0.82	5.318806	64.31727	126991.4

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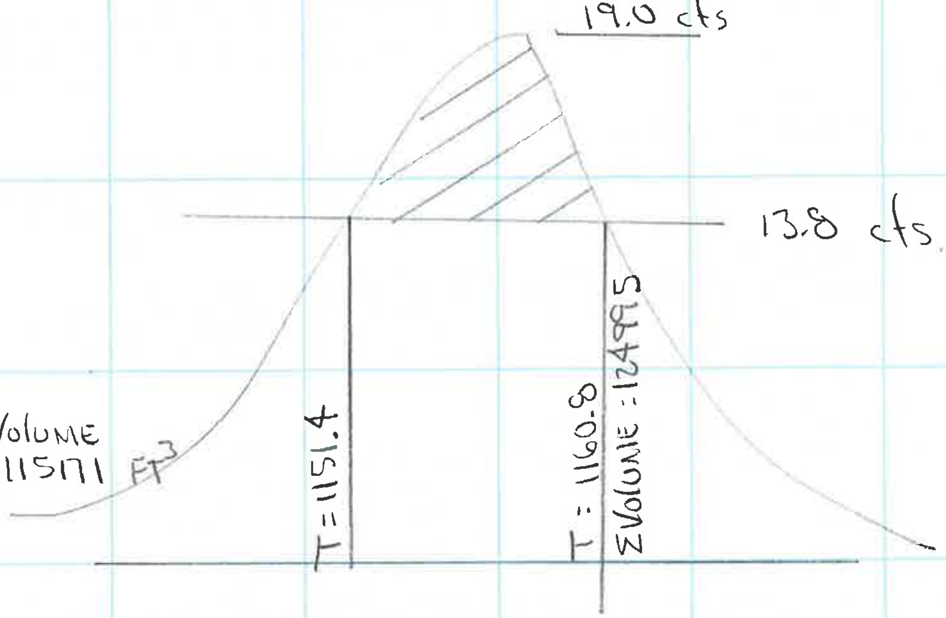


Volume to store : 124995 FT³ − 115171 FT³

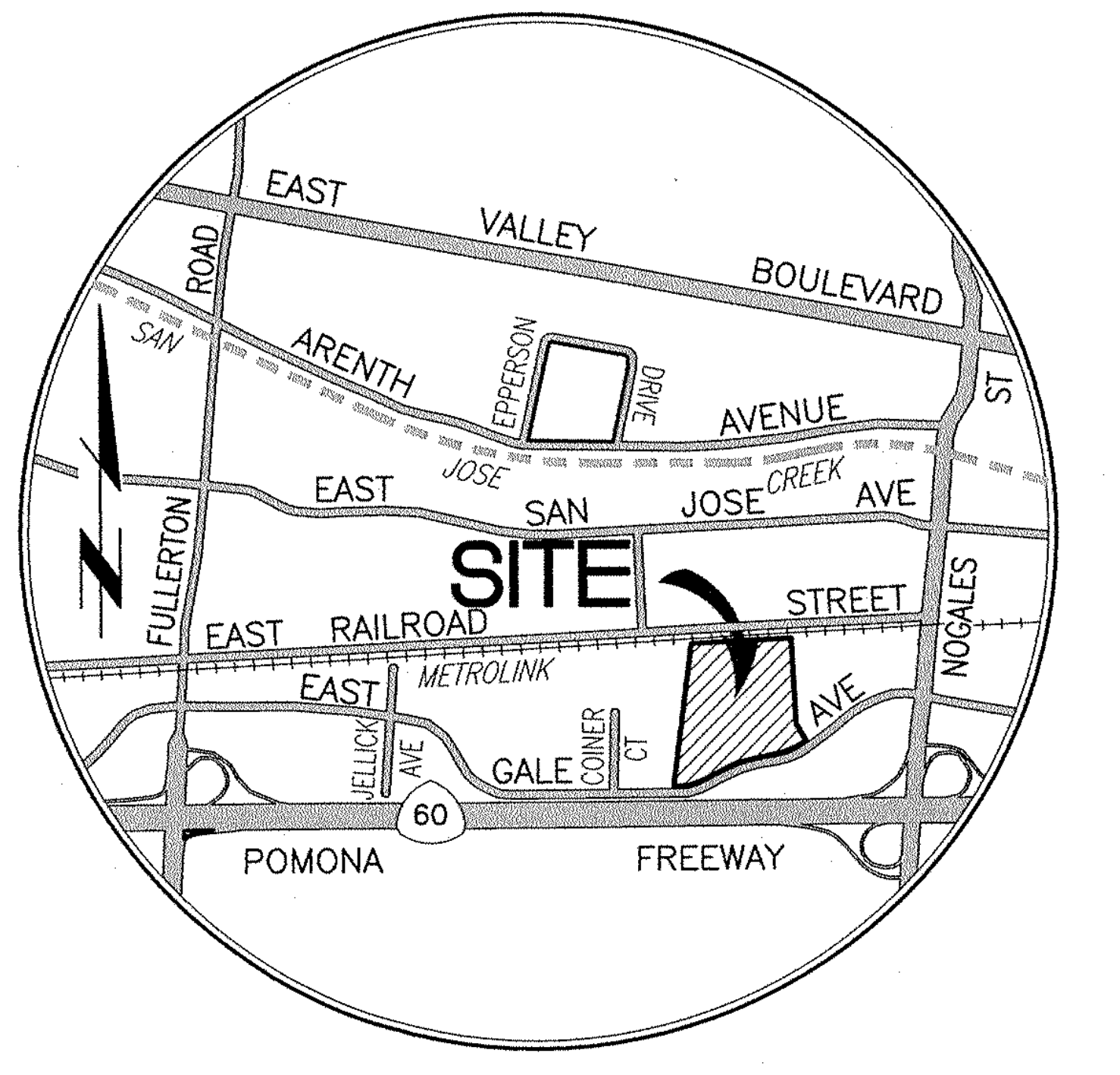
= 9824

subtract out $\frac{13.8 \text{ FT}^3}{\text{SEC}} \times (1160.8 - 1151.4) \text{ MIN} \times \frac{60 \text{ SEC}}{\text{MIN}}$

9824 FT³ − 7783 FT³ = 2041 FT³

APPENDIX E

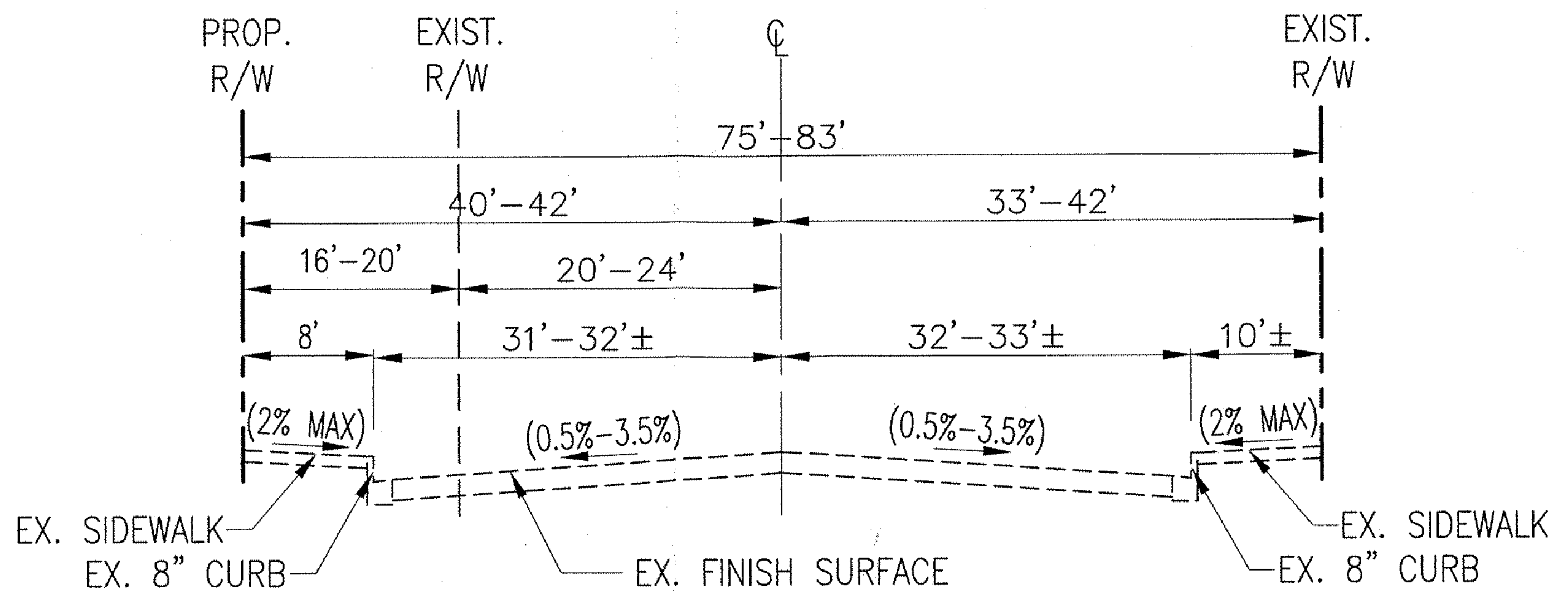
HYDROLOGY MAP



VICINITY MAP

N.T.S.

T.G. PAGE 679
GRID B3 & B4



GALE AVENUE TYPICAL SECTION

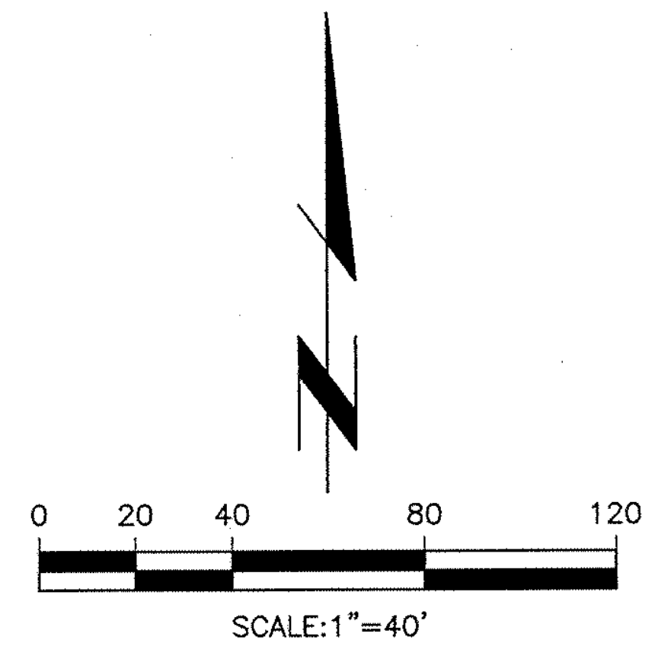
N.T.S.

LEGEND	
▬▬▬	PROJECT BOUNDARY
▬ ▬ ▬	SUBAREA BOUNDARY
—·—·—	FLOW PATH
9.1 AC.	SUBAREA AREA
① 1A	NODE NUMBER
Tc	TIME OF CONCENTRATION
Q50	DISCHARGE (CUBIC FEET PER SECOND) NUMBER DESIGNATE YEAR OF FREQUENCY

SUBAREA DATA SUMMARY

SUBAREA	AREA (ACRES)	LENGTH (FEET)	SLOPE	IMPERVIOUS (%)	Tc (MINUTES)	Q50 (CFS)
1A	6.90	745	0.0550	16	9.0	10.5
2B	4.50	665	0.0260	1	11.0	5.1
3B	2.45	485	0.0260	8	8.0	3.8
4C	0.75	220	0.0130	60	5.0	2.2

50–YEAR FREQUENCY
SOIL TYPE 3
ISOHYET 6.5
BURN FACTOR 0
BULKING FACTOR 0
DPA ZONE 7



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Last Update: 5/22/15
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HYDROLOGY STUDY APPROVED

CHECKED BY: RCE NO. 82680 DATE 01/13/16
APPROVED BY: DATE 01/13/16

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

HYDROLOGY STUDY
FOR
PM 072916

LOS ANGELES COUNTY
PUBLIC WORKS DEPARTMENT

EXISTING CONDITION HYDROLOGY MAP

ROWLAND HEIGHTS PLAZA
AND HOTEL
18800 GALE AVENUE

R.C.E. NO. 56155
Exp. 12-31-16

PREPARED UNDER THE DIRECTION OF:

8/21/15
REINHARD STENZEL DATE
R.C.E. 56155 – EXP. 12/31/16

PREPARED FOR:

PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944–0968
FAX: (416) 944–0914

PREPARED BY:

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521–4811 FAX(714)521–4173

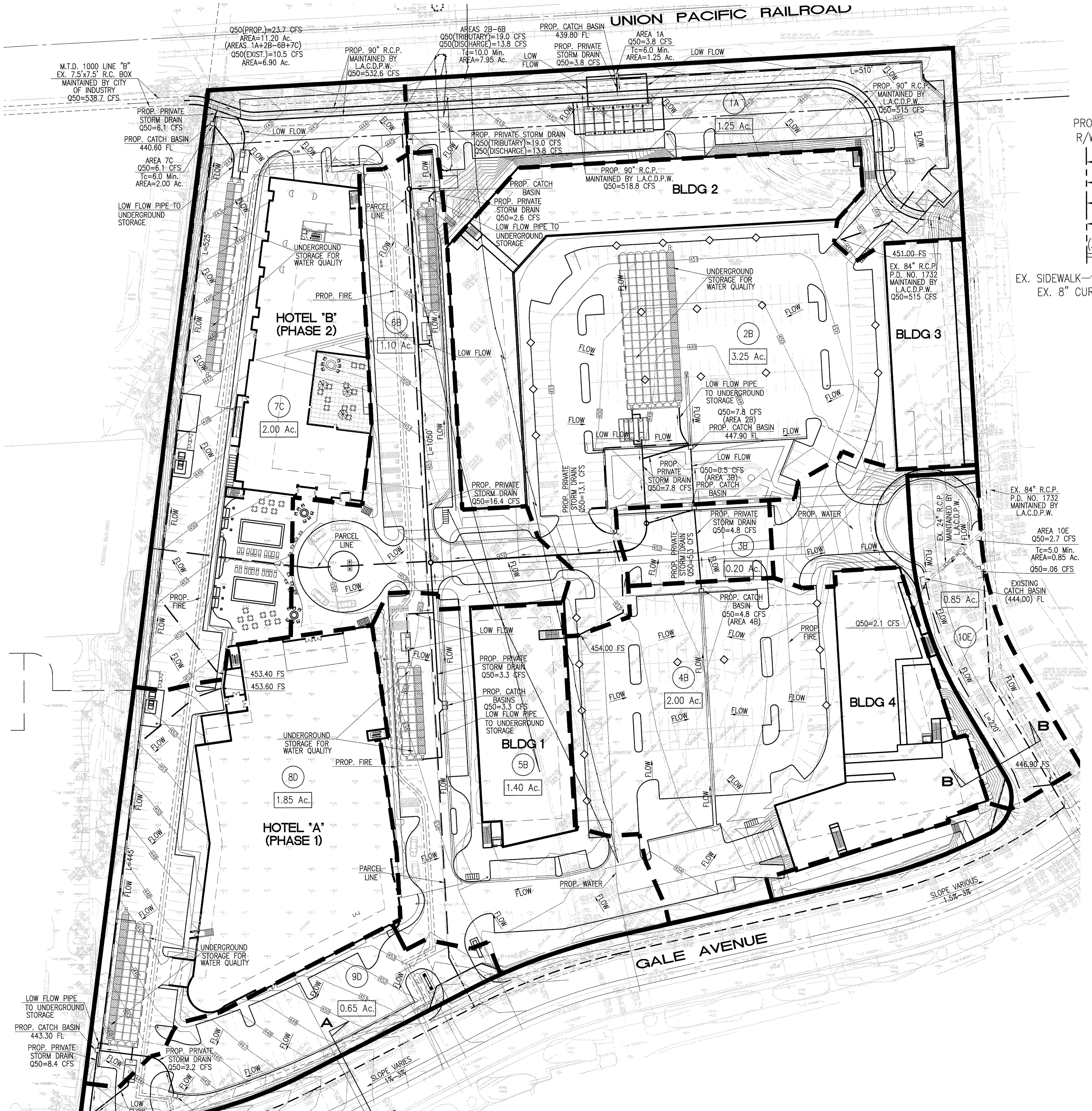
Designed by ______
Date ______
Checked by ______
Date ______
Designed by ______
Date ______
Checked by ______
Date ______

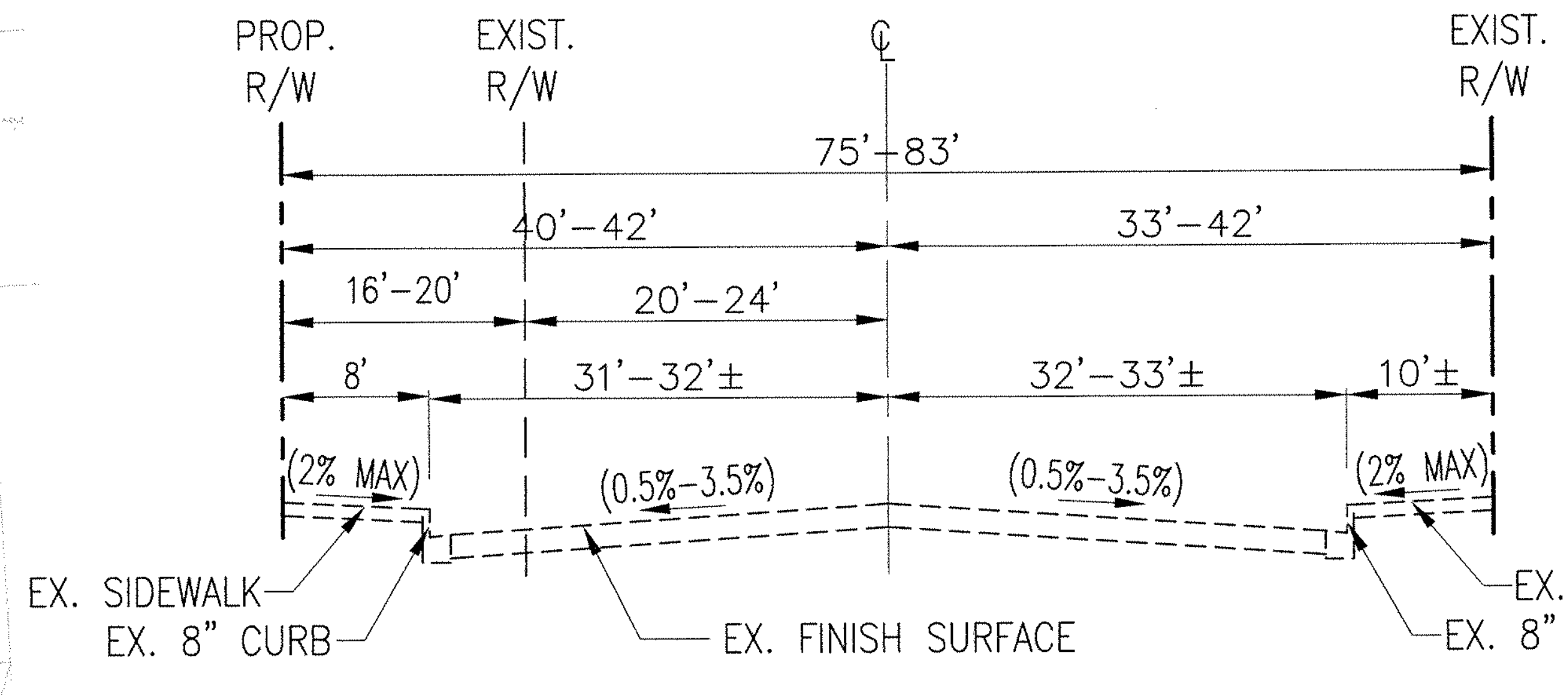
Approved by Date ______

Public Works Director R.C.E. XXXXX

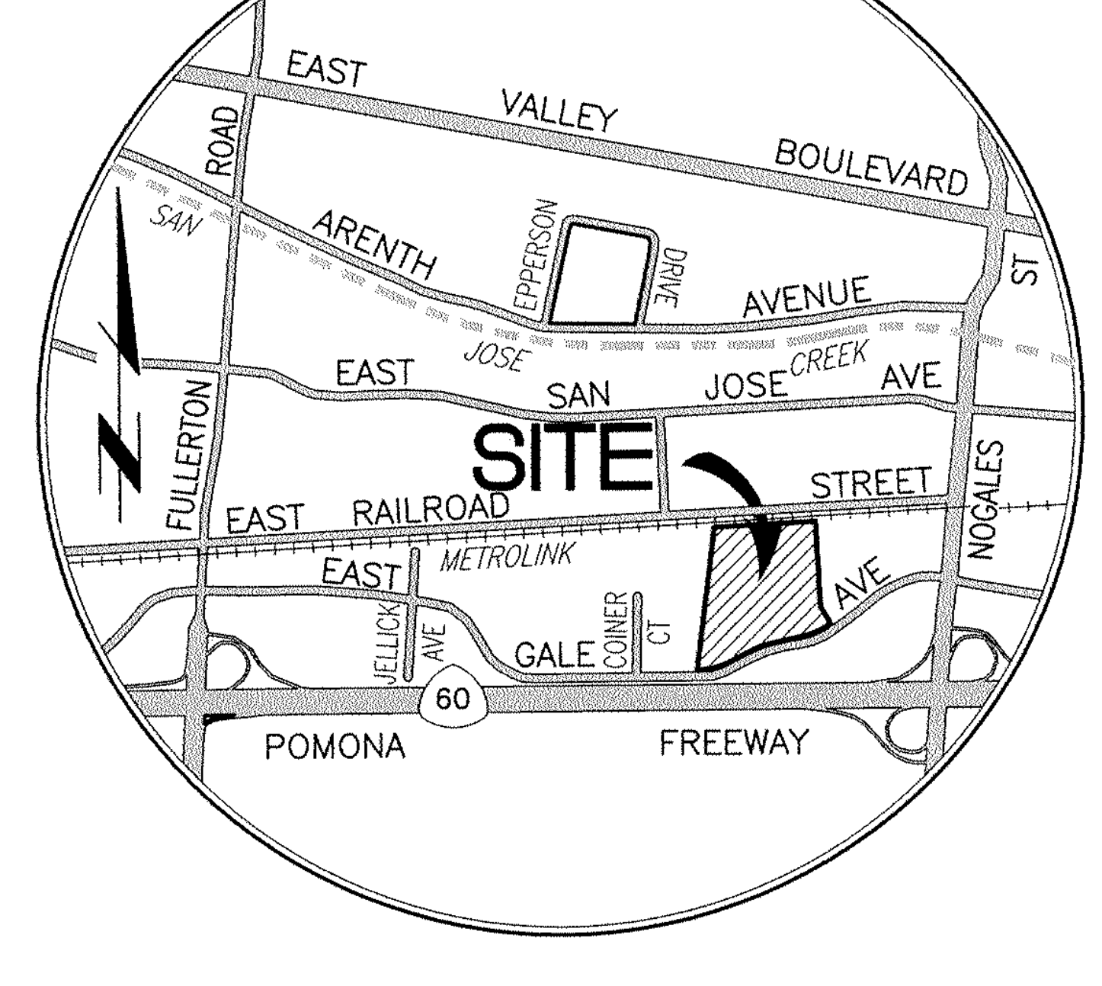
Sheet 1 of 1 Sheets

3090/1 OF 1 SHEET



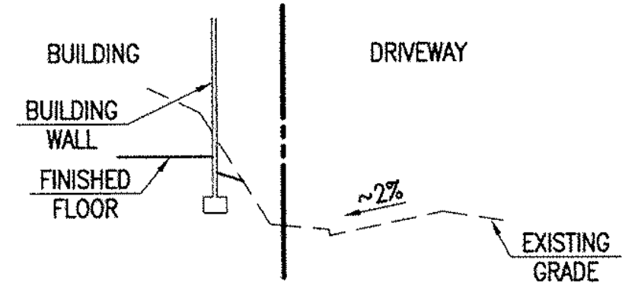


GALE AVENUE TYPICAL SECTION
N.T.S.



VICINITY MAP
N.T.S.
T.G. PAGE 679
GRID B3 & B4

85th Percentile BMP Volume and Flowrate Design							
85th Percentile Design Storm (in): 1.05			1-yr, 1-hr Storm (in/hr): 0.34				
	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	TOTAL
Design Flowrate (cfs)	0.38	-	-	-	-	-	0.38
Provided BMP Flowrate (cfs)	0.38	-	-	-	-	-	0.38
Design Storm Volume (cu-ft)	-	25,483	6,534	5,228	9,148	11,761	58,154
Provided Chamber Volume (cu-ft)	-	24,450	6,185	4,839	8,596	11,288	55,358
Provided MWS Volume (cu-ft)	-	1,190	510	510	586	640	3,436
Total BMP Volume (cu-ft)	-	25,640	6,695	5,349	9,182	11,928	58,794
Percent of Design Storm Retained On-site	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	



SECTION B-B
ENTRY DRIVEWAY
N.T.S.

LEGEND

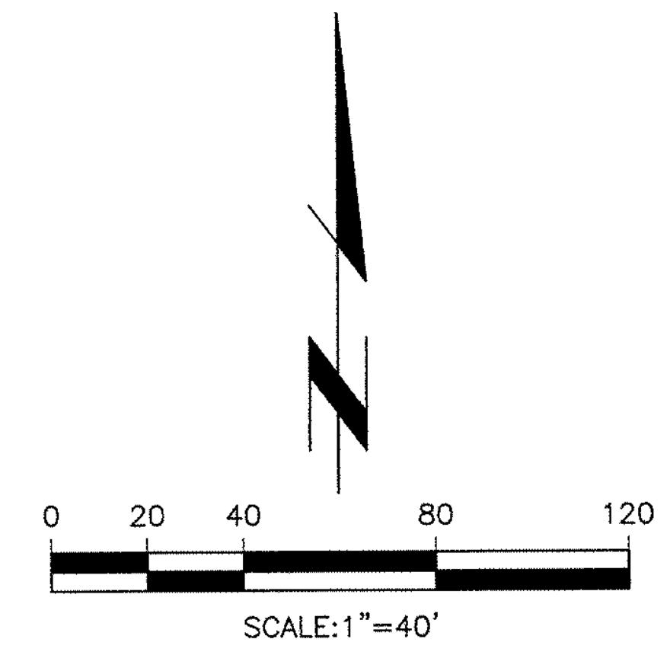
▬▬▬	PROJECT BOUNDARY
▬ ▬ ▬	SUBAREA BOUNDARY
—— · · · ——	FLOW PATH
—— ——	PARCEL LINE
◇	PARKING DIAMOND
9.1 AC.	SUBAREA AREA
1A	NODE NUMBER
Tc	TIME OF CONCENTRATION
Q50	DISCHARGE (CUBIC FEET PER SECOND) NUMBER DESIGNATE YEAR OF FREQUENCY

SUBAREA DATA SUMMARY

SUBAREA	AREA (ACRES)	LENGTH (FEET)	SLOPE	IMPERVIOUS (%)	Tc (MINUTES)	Q50 (CFS)
1A	1.25	510	0.022	90	6.0	3.8
2B-6B	7.95	1050	0.020	90	10.0	19.0
7C	2.00	525	0.024	90	6.0	6.1
8D-9D	2.50	445	0.027	90	5.0	8.4
10E	0.85	220	0.013	80	5.0	2.7

50-YEAR FREQUENCY
SOIL TYPE 3
ISOHYET 6.5
BURN FACTOR 0
BULKING FACTOR 0
DPA ZONE 7

THE MAINTENANCE OF "PRIVATE" DRAINAGE FACILITIES ARE THE RESPONSIBILITY OF THE DEVELOPER.



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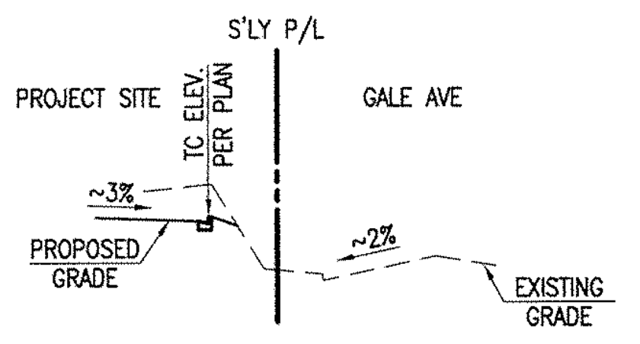


SECTION A-A
GALE AVE
N.T.S.

HYDROLOGY STUDY APPROVED
CHECKED BY: RCE NO. 82680 DATE 01/13/16
APPROVED BY: DATE 01/13/16
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

HYDROLOGY STUDY
FOR
PM 072916

LOS ANGELES COUNTY
PUBLIC WORKS DEPARTMENT

HYDROLOGY MAP
ROWLAND HEIGHTS PLAZA
AND HOTEL
18800 GALE AVENUE

R.C.E. NO. 56155
Exp. 12-31-16
CIVIL

PREPARED UNDER THE DIRECTION OF:
8/21/15
REINHARD STENZEL DATE
R.C.E. 56155 - EXP. 12/31/16

PREPARED FOR:
PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944-0968
FAX: (416) 944-0914

PREPARED BY:
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Designed by ______
Date ______
Checked by ______
Date ______
Designed by ______
Date ______
Checked by ______
Date ______

Approved by ______ Date ______
Public Works Director R.C.E. XXXXX
Sheet 1 of 1 Sheets

3090/1 OF 1 SHEET

CITY OF INDUSTRY
Incorporated June 18, 1957

January 8, 2016

Mr. Jeff Potter
Thienes Engineering, Inc.
14349 Firestone Boulevard
La Mirada, CA 90638

Subject: Hydrology Study for Hotel/Retail Site on Gale Avenue, Rowland Heights (JN-6205)

Dear Mr. Potter:

Please be informed that the City is aware of the proposed drainage design to eliminate the existing open channel and proposed storm drain pipe and connection to the existing downstream facility (MTD 1000) currently maintained by the City. This review of the preliminary plan did not identify any required mitigation and the City does not have any objections.

Should you have any questions, please contact me at (626) 333-2211.

Sincerely,

John Ballas

John D. Ballas
City Engineer/Director of Public Works

JDB/ER:af

c: Joshua Nelson, CNC Engineering

P.O. Box 3366, City of industry, California 91744-0366 • Administrative Offices: 15625 E. Stafford St. • (626) 333-2211 • Fax (626) 961-6795

F-2: LOW IMPACT DEVELOPMENT

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING

LOW IMPACT DEVELOPMENT (LID)

FOR:
ROWLAND HEIGHTS HOTEL DEVELOPMENT
GALE AVENUE AND NOGALES STREET
LOS ANGELES COUNTY, CALIFORNIA 91748
APNs: 8264-021-20
PM NO. 072916

OWNER:
PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944-0968
CONTACT: STAFFORD LAWSON

AUGUST 20, 2014 r1
MAY 22, 2015 r2
SEPTEMBER 2, 2015 r3
DECEMBER 9, 2015 r4

JOB NO. 3090

PREPARED BY:
THIENES ENGINEERING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PHONE: (714) 521-4811
FAX: (714) 521-4173
CONTACT: VICKY LI (vicky@thieneseng.com)

LOW IMPACT DEVELOPMENT (LID)

FOR

"ROWLAND HEIGHTS HOTEL DEVELOPMENT"

PREPARED BY VICKY LI
UNDER THE SUPERVISION OF

REGISTERED PROFESSIONAL ENGINEER
REINHARD STENZEL
No. 56155
Exp. 12-31-16
CIVIL
STATE OF CALIFORNIA

12/11/15

REINHARD STENZEL DATE
R.C.E. 56155
EXP. 12/31/16

TABLE OF CONTENTS

APPENDICES

Appendix A	Stormwater Quality Design Calculations
Appendix B	LID Site Plan
Appendix C	BMP Operation and Maintenance
Appendix D	Covenant and Agreement
Appendix E	Infiltration Feasibility

1.0 Project Description

The project site is located within Unincorporated Los Angeles County (Figure 1.1 - Vicinity Map), at APN: 8264-021-20. It's for commercial use with a lot size of approximately 14.15 acres. It's located along Gale Avenue just west of Nogales Street.

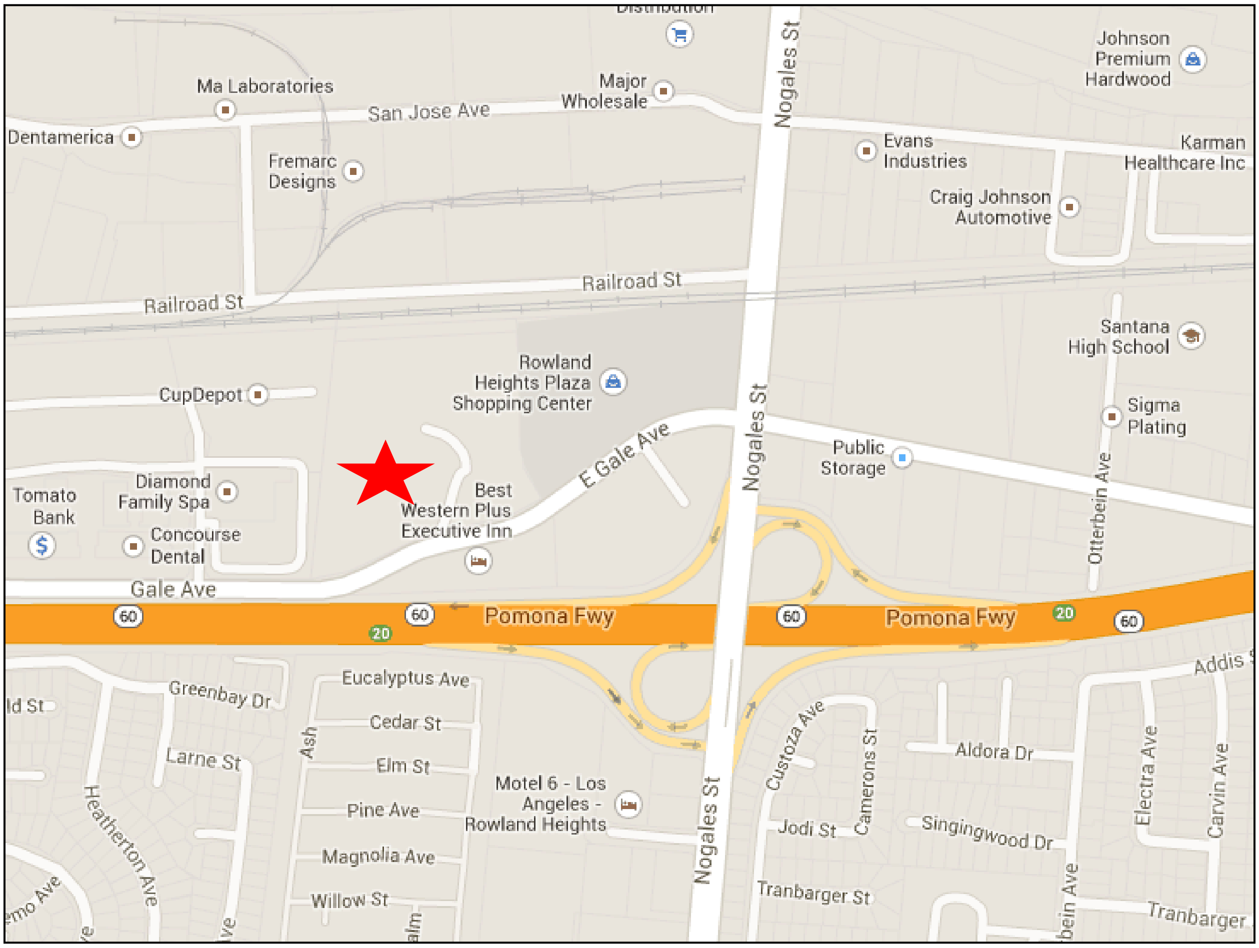


Figure 1.1 - Vicinity Map (North↑)

The project site consists of two parcels. The easterly side will be used for commercial purposes (four buildings). The westerly side will be used for two hotels. Parking lots are located throughout the site and underground. The remainder of the site will be developed for surface parking, other hardscaped areas and landscaping.

The proposed project is a new development project disturbing 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area. The entire project site is required to incorporate appropriate LID measures into the design plan, specifically for commercial malls and parking lots. The project will treat stormwater runoff generated by the project through the use of a biofiltration system sized to treat 1.5x the Stormwater Quality Design volume (SWQDv) due to the project site located in the center of liquefiable areas and bedrock was encountered during boring activities. Infiltration and Harvest and Use feasibility are discussed in detail in Sections 1.3 and 1.4, respectively.

1.1 Existing Site Description

The project site exhibits gently rolling topography and a maximum elevation differential of approximately 42 feet between its high point near the southeast corner at Gale Avenue and its low point in the northwest corner within the storm drain channel.

The project site was previously used for agricultural cultivation and was undeveloped. A temporary detour road between Railroad Street and Gale Avenue, related construction access road and construction staging area, and temporary surface parking have been constructed on the project site by the Alameda Corridor-East Authority (ACE) for use during construction of the nearby Nogales Street Grade Separation Project. Portions of the eastern edge of the project site have also been paved and striped to provide temporary parking for the Rowland Heights Plaza Shopping Center, replacing stalls displaced by construction of the Grade Separation Project.

The temporary detour road required some drainage features to be constructed. At the northerly portion of the road, two 36" pipes, headwalls and concrete transitions were placed at the existing earthen channel to convey runoff under the new road.

Currently, approximately 6.90 acres of the northerly portion of the site, including vacated Railroad Street, (Area 1A on Existing Condition Hydrology map, a separate report) surface drains to the existing earthen channel that traverses through the northerly portion of the project site. The drainage area includes a portion of the detour road and parking located along the easterly property line.

Approximately 6.95 acres of the southerly portion of the site (Areas 2B and 3B of separate hydrology report) currently surface flows to the Gale Avenue. Runoff in Gale Avenue continues westerly in existing curb and gutter to curb opening catch basins located at the northeast corner of Gale Avenue and Coiner Court. Catch basins connect to the previously mentioned County storm drain system (M.T.D. 1000).

The paved common driveway at the southeast portion of the site (Area 4C of separate hydrology report) drains to existing catch basins in the street. This area includes a small portion of the existing street that is not included in Parcel 1. Existing storm drain laterals connect to County facility P.D. No. 1732.

1.2 Proposed Site Description

A storm drain system will convey runoff westerly between Buildings 1 and 2 then northerly in the parking area ultimately connecting to the proposed 90" storm drain system. Areas tributary to this storm drain system include the central parking lot, Buildings 1, 3 and 4 and a portion of Building 2. An additional catch basin and storm drain is located at the northerly parking area.

Here, runoff from a portion of Building 2 and the northerly parking area are intercepted and conveyed to the 90" storm drain system.

For the Hotel Parcel, storm drain systems will be located at the northerly and southeasterly portions of the site. A catch basin will be located at the northeast corner of the parking area. A storm drain will convey runoff to the proposed 90" storm drain system. Area tributary to this system consists of the northerly hotel and westerly parking area. The southerly portion of the Hotel will drain southerly to proposed catch basins in the parking lot. A proposed on-site storm drain will discharge runoff to Gale Avenue via a proposed parkway culvert.

All the aforementioned SWQDv runoff will be stored in underground chambers then treated through proprietary biofiltration units before slowly discharging onto the proposed 90” storm drain.

A small portion of the proposed driveway at the southeast corner will sheet flow and get intercepted by a trench drain equipped with filter insert. This will discharge into nearby landscaping and sheet flow into the street.

Please see the hydrology report for this project, a separate document.

1.3 Geological Investigation/Infiltration Feasibility

Per the Los Angeles County Hydrology Manual (January 2006), the project site consists of Soil Types 003 (northerly three-quarters of the site) and 017 (southerly quarter of the site) which are Chino Silt Loam and Yolo Clay Loam, respectively. A geotechnical investigation found subsurface layers to be cobbles, bedrock, and that liquefiable areas surround the project site. Therefore, the geotechnical engineer prohibits infiltration at the project site (see Appendix F of this report for more details).

1.4 Harvest and Use Feasibility

Per City of Los Angeles Infiltration Guidelines (Local Implementation of AB 1881):

Based on the local infiltration rate of 0.0 in/hr (bedrock) and that 10-20% of the project is landscaped; the project has a landscaped area categorization of 3 (Table 4.3 of City of Los Angeles’ LID Manual).

ETWU = $(ETo)(0.62)(\frac{PF\ x\ HA}{IE}+SLA)$, where:

ETo = 22.0 (from October 1 through April 30)
PF = 0.3 (Native Drought Tolerant Plants)
HA = 60,984 square-feet (~1.4 acres)
IE = 0.71
SLA = 0

ETWU = 351,473 gallons per year

SWQDv = ∑SWQDv
SWQDv = (2,662 + 13,939 + 4,356 + 4,356 + 5,662 + 7,840)(7.48)
SWQDv = 290,336 gallons <u>per storm event</u>

We have determined that capture and use is infeasible based on the following:

- Site’s landscape categorization of 3.
- The above analysis showing that the ∑SWQDv is nearly 80% of the <u>annual</u> ETWU and the fact that the ∑SWQDv will need to drawdown within 48 hours to provide 100% containment for the next storm event.

2.0 Project Specific Requirements

The project is a new development project disturbing 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area. It also has provisions applicable to individual priority project categories for commercial malls and parking lots.

2.1 Peak Storm Water Runoff Discharge Rates

Post-development peak stormwater runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak stormwater discharge rate will result in increased potential for downstream erosion.

The proposed project will not create any additional hydrologic conditions of concerns. The San Gabriel River is engineered and regularly maintained to ensure design flow capacity. Discharge from the project will be in full compliance with agency requirements for connections and discharges to the MS4, including both quality and quantity requirements.

2.2 Conserve Natural Areas

During the subdivision design and approval process, the site layout must be consistent with the applicable General Plan and Local Area Plan policies and implement the following:

- *Concentrate or cluster development on portions of the site while leaving the remaining land in a natural undisturbed condition;*
- *Limit clearing and grading of native vegetation at the site to the minimum amount needed to build lots, allow access, and provide fire protection;*
- *Maximize trees and other vegetation at the site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants;*
- *Promote natural vegetation by using parking lot islands and other landscaped areas;*
- *Preserve riparian areas and wetlands.*

The property was previously mass-graded with no natural areas to conserve.

2.3 Minimize Storm Water Pollutants of Concern

Stormwater runoff from a site has the potential to contribute oil and grease, suspended solids, metals, gasoline, pesticides, and pathogens to the stormwater conveyance system. The development must be designed so as to minimize, to the maximum extent practicable, the introduction of pollutants of concern that may result in significant impacts, generated from site runoff of directly connected impervious areas (DCIA), to the stormwater conveyance system as approved by the building official. Pollutants of concern, consist of any pollutants that exhibit one or more of the following characteristics: current loadings or historic deposits of the pollutant are impacting the beneficial uses of a receiving water, elevated levels of the pollutant are found in sediments of a receiving water and/or have the potential to bioaccumulate in *organisms therein, or the detectable inputs of the pollutant are at concentrations or loads considered potentially toxic to humans and/or flora and fauna.*

In meeting this specific requirement, "minimization of the pollutants of concern" will require the incorporation of a BMP or combination of BMPs best suited to maximize the reduction of pollutant loadings in that runoff to the Maximum Extent Practicable.

Anticipated pollutants generated from the proposed development are:

- Heavy Metals
- Nutrients
- Pesticides
- Organic Compounds
- Sediments
- Trash & Debris
- Oxygen Demanding Substances
- Oil and Grease

The receiving waters and their impairments are:

- San Jose Creek (Reach 2): Coliform Bacteria
- San Jose Creek (Reach 1): Ammonia, pH, Total Dissolved Solids, Toxicity
- San Gabriel River (Reach 3): Indicator Bacteria
- San Gabriel River (Reach 2): Cyanide, Lead
- San Gabriel River (Reach 1): Copper, Dioxin, Nickel, Dissolved Oxygen
- San Gabriel River Estuary: Copper, Dioxin, Nickel, Dissolved Oxygen
- San Pedro Bay Near/Off Shore Zones: Chlordane
- Pacific Ocean: None

The pollutants of concern of the project site are:

- Heavy Metals
- Trash & Debris
- Oil and Grease

The proposed project will treat stormwater runoff and disconnect runoff from impervious areas by means of biofiltration facilities.

2.4 Protect Slopes and Channels

Project plans must include BMPs consistent with local codes and ordinances and the LID to decrease the potential of slopes and/or channels from eroding and impacting stormwater runoff:

- *Convey runoff safely from the tops of slopes and stabilize disturbed slopes.*
- *Utilize natural drainage systems to the maximum extent practicable.*

- *Control or reduce or eliminate flow to natural drainage systems to the maximum extent practicable.*
- *Stabilize permanent channel crossings.*
- *Vegetate slopes with native or drought tolerant vegetation.*
- *Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion, with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers and the California Department of Fish and Game.*

The proposed project site is located on a flat terrain. There are no slopes, natural drainage systems, or channel crossings to protect.

2.5 Provide Storm Drain System Stenciling and Signage

Storm drain stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets. The stencil contains a brief statement that prohibits the dumping of improper materials into the stormwater conveyance system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna, are effective supplements to the anti-dumping message.

- *All storm drain inlets and catch basins within the project area must be stenciled with prohibitive language (such as: "NO DUMPING – DRAINS TO OCEAN") and/or graphical icons to discourage illegal dumping.*
- *Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area.*
- *Legibility of stencils and signs must be maintained.*

All proposed inlets and existing inlets that remain will be stenciled with prohibitive language and/or graphical icons to prevent dumping. Legibility of the stencils/markers will be maintained on a yearly basis, or as needed.

2.6 Properly Design Outdoor Material Storage Areas

Outdoor material storage areas refer to storage areas or storage facilities solely for the storage of materials. Improper storage of materials outdoors may provide an opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the stormwater conveyance system. Where proposed project plans include outdoor areas for storage of materials that may contribute pollutants to the stormwater conveyance system, the following Structural or Treatment BMPs are required:

- *Materials with the potential to contaminate stormwater must be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the stormwater conveyance system; or (2) protected by secondary containment structures such as berms, dikes, or curbs.*
- *The storage area must be paved and sufficiently impervious to contain leaks and spills.*

- *The storage area must have a roof or awning to minimize collection of stormwater within the secondary containment area.*

There are no proposed outdoor material storage areas for this project. Any and all materials will be stored indoors.

2.7 Properly Design Trash Storage Areas

A trash storage area refers to an area where a trash receptacle or receptacles are located for use as a repository for solid wastes. Loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. All trash container areas must meet the following Structural or Treatment Control BMP requirements (individual single family residences are exempt from these requirements):

- *Trash container areas must have drainage from adjoining roofs and pavement diverted around the area(s).*
- *Trash container areas must be screened or walled to prevent off-site transport of trash.*

Roof drainage will not come into contact with the proposed trash bins. Lids will remain close when not in use to prevent transport by wind and contact with rainfall.

2.8 Provide Proof of Ongoing BMP Maintenance

Improper maintenance is one of the most common reasons why water quality controls will not function as designed or which may cause the system to fail entirely. It is important to consider who will be responsible for maintenance of a permanent BMP, and what equipment is required to perform the maintenance properly. If Structural or Treatment Control BMPs are required or included in project plans, the applicant must provide verification of maintenance provisions through such means as may be appropriate, including, but not limited to legal agreements, covenants, CEQA mitigation requirements and/or Conditional Use Permits.

The verification will include the developer's signed statement, as part of the project application, accepting responsibility for all Structural and Treatment Control BMP maintenance until the time the property is transferred and, where applicable, a signed agreement from the public entity assuming responsibility for Structural or Treatment Control BMP maintenance. The transfer of property to a private or public owner must have conditions requiring the recipient to assume responsibility for maintenance of any Structural or Treatment Control BMP to be included in the sales or lease agreement for that property, and will be the owner's responsibility. The condition of transfer shall include a provision that the property owners conduct maintenance inspection of all Structural or Treatment Control BMPs at least once a year and retain proof of inspection. For residential properties where the Structural or Treatment Control BMPs are located within a common area, which will be maintained by a homeowner's association, language regarding the responsibility for maintenance must be included in the project's conditions, covenants and restrictions (CC&Rs). Printed educational materials will be required to accompany the first deed transfer to highlight the existence of the requirement and to provide information on what *stormwater management facilities are present, signs that maintenance is needed, how the necessary maintenance can be performed, and assistance that the Permittee can provide. The transfer of this information shall also be required with any subsequent sale of the property.*

Structural or Treatment Control BMPs located within a public area proposed for transfer will be the responsibility of the developer until accepted for transfer by the appropriate public agency. Structural or Treatment Control BMPs proposed for transfer must meet design standards adopted by the public entity for the BMP installed and should be approved by the appropriate public agency prior to its installation.

The property owner/operator will maintain proof of ongoing maintenance at the site as recorded in the covenant and agreement (see Appendix D).

2.9 Design Standards for Structural or Treatment Controls BMPs

The following categories of Planning Priority Projects are required to design and implement post-construction treatment controls to mitigate stormwater pollution:

a) All development projects equal to 1 acre or greater of disturbed area <u>and</u> adding more than 10,000 square feet of impervious surface area;
b) Industrial parks 10,000 square feet or more of surface area
c) Commercial malls 10,000 square feet or more surface area
d) Retail gasoline outlets 5,000 square feet or more of surface area
e) Restaurants (SIC 5812) 5,000 square feet or more of surface area;
f) Parking lots 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces;
g) Street and road construction of 10,000 square feet or more of impervious surface area shall follow USPEA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets (December 2008 EPA-833-F-08-009) to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects;
h) Automotive service facilities (SIC 5013, 5014, 5511, 5541, 7532-7534, and 7536-7539) 5,000 square feet or more of surface area;
i) Redevelopment projects in subject categories that consist of land-disturbing activities that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site;
j) Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will:
    (1) Discharge storm water runoff that is likely to impact a sensitive biological species or habitat; and
    (2) Create 2,500 square feet or more of impervious surface area;
k) Single-family hillside homes must:
    (1) Conserve natural areas
    (2) Protect slopes and channels
    (3) Provide storm drain system stenciling and signage

(4) Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability
(5) Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability

The proposed project is a new development project disturbing 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area. The entire project site is required to incorporate appropriate LID measures into the design plan, specifically for commercial malls and parking lots. The proposed project will treat and mitigate flows per LID guidelines by effectively treating the pollutants of concern by means of biofiltration.

2.10 Parking Lots

2.10.1 Properly Design Parking Area

Parking lots contain pollutants such as heavy metals, oil and grease, and polycyclic aromatic hydrocarbons that are deposited on parking lot surfaces by motor-vehicles. These pollutants are directly transported to surface waters. To minimize the offsite transport of pollutants, the following design criteria are required:

- *Reduce impervious land coverage of parking areas.*
- *Infiltrate runoff before it reaches storm drain system.*
- *Treat runoff before it reaches storm drain system.*

The proposed project is designed so that pollutants from the impervious surfaces are disconnected prior to discharging offsite. The first flush from parking lots will be treated by biofiltration facilities, whereas larger/cleaner stormwater will discharge offsite.

2.10.2 Properly Design to Limit Oil Contamination and Perform Maintenance

Parking lots may accumulate oil, grease, and water insoluble hydrocarbons from vehicle drippings and engine system leaks.

- *Treat to remove oil and petroleum hydrocarbons at parking lots that are heavily used (e.g. fast food outlets, lots with 25 or more parking spaces, sports event parking lots, shopping malls, grocery stores, discount warehouse stores).*
- *Ensure adequate operation and maintenance of treatment systems particularly sludge and oil removal, and system fouling and plugging prevention control.*

The project owner will ensure that grease and oil are contained. The parking lot will be swept on a monthly basis, minimum, and before any rain events. Absorbent materials will be used to collect any spilled oil, and disposed of properly, to ensure they do not contaminate stormwater. The proposed drain inserts with hydrocarbon booms are highly effective in the removal of hydrocarbons.

2.11 Alternative Certification for Storm Water Treatment Mitigation

In lieu of conducting detailed BMP review to verify Structural or Treatment Control BMPs adequacy, a Permittee may elect to accept a signed certification from a Civil Engineer or a Licensed Architect registered in the State of California, that the plan meets the criteria established herein. The Permittee is encouraged to verify that certifying person(s) have been trained on BMP design for water quality, not more than two years prior to the signature date. Training conducted by an organization with storm water BMP design expertise (e.g., a University, American Society of Civil Engineers, American Society of Landscape Architects, American Public Works Association, or the California Water Environment Association) may be considered qualifying.

A California licensed civil engineer has provided a detailed BMP review of this report.

2.12 Resources and Reference

California Storm Water Best Management Practices Handbooks for Construction Activity (2009), Municipal (2003), and Industrial/Commercial (2003).

3.0 Low Impact Development

BMPs shall be implemented in the following order of preference:

1) BMPs that promote infiltration
    a) Infiltration is not feasible due to bedrock and liquefiable areas at the project site.

2) BMPs that store and beneficially use stormwater runoff
    a) Stormwater is detained for biofiltration prior to discharging into the storm drain system.

3) **BMPs that utilize the runoff for 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.**
    a) Due to bedrock and the liquefiable areas onsite, infiltration of stormwater is prohibited. Underground storage will utilize an impermeable liner to store 1.5 times the design capture volume. The manufacturer has set up a biofiltration system that will limit discharge rates from the unit but will drawdown the underground storage within 48 hours. This minimizes the filtration rate through the engineered media to provide treatment to the maximum extent practicable. Once 1.5 times the design capture volume has been met (underground storage is completely full), the higher flows can discharge into the storm drain facilities. The treated runoff is then discharged back into the proposed storm drain system.

APPENDIX A

Stormwater Quality Design Calculations

Department of Public Works
dpw.lacounty.gov

search our site... Su

Hydrology Map

A GIS viewer application to view the data for the hydrology manual.

LAYERS

☐ 🟥 50yr Two Tenths (Rainfall)
☐ 🟦 DPA Zones
☐ 🟩 Soils 2004
☐ TG Page
☑ Final 85th Percentile, 24-hr Rainfall
☑ 1-year, 1-hour Rainfall Intensity

SEARCH

Zoom to TG Page:

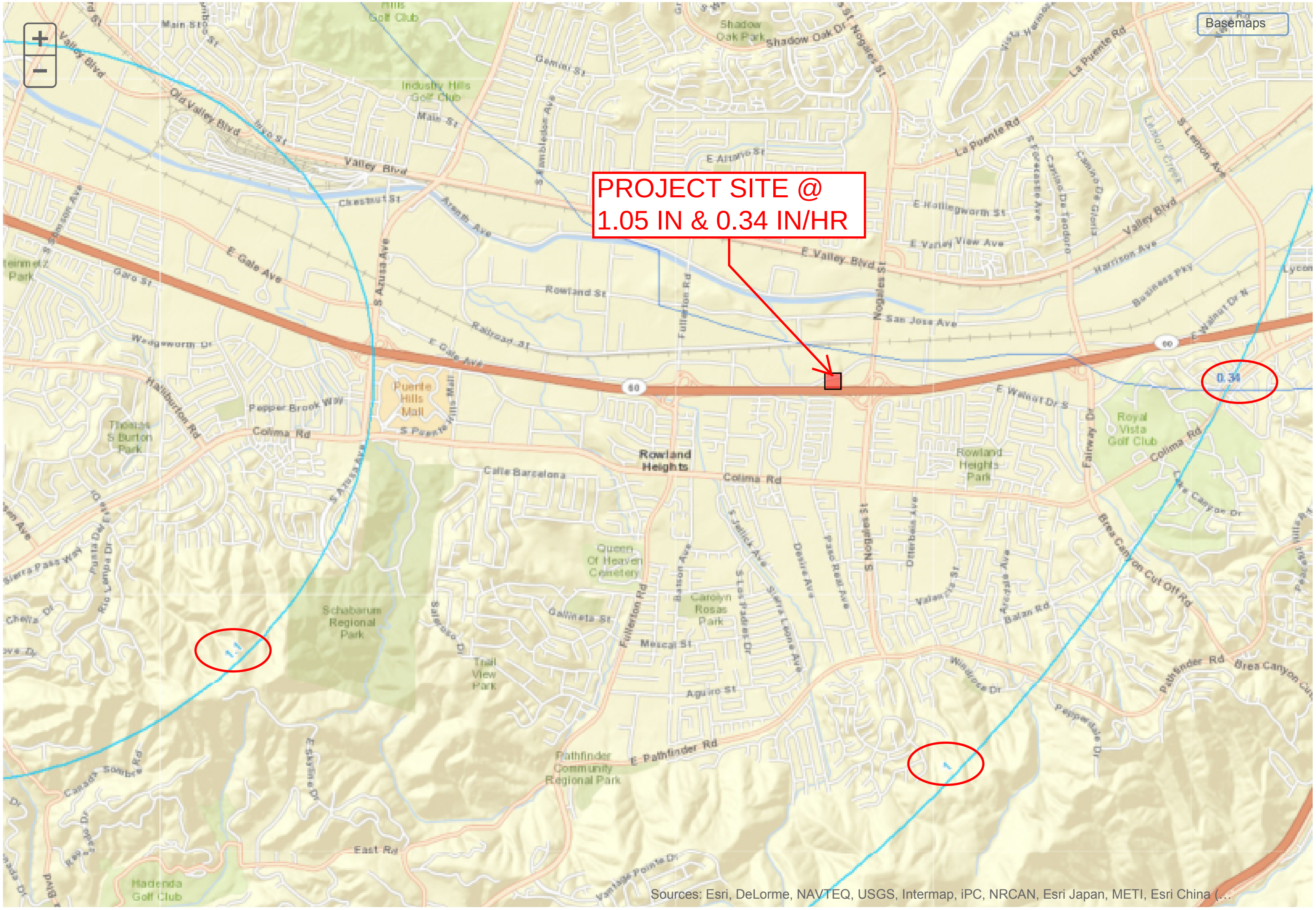
Enter Address, Cross Street, or Parcel No.:
(ex: 900 S. Fremont Ave., Fremont@Valley, 5342005904)

18880 gale ave, rowland heights,ca

Search

Address Search Results:

18880 gale ave rowland heightsca



PROJECT SITE @ 1.05 IN & 0.34 IN/HR

Map Tips

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Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Tc Equation	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)	Vol. (ft^3)	1.5X Vol.
3090	Area 1	1.25	0.9	85th %ile	3	510	0.022	1.05	21	0.32	0.1	0.82	0.33	Tc=(10)^-0.507*	1	n/a	0.09	3920.4	--
3090	Area 2	5.45	0.9	85th %ile	3	415	0.015	1.05	20	0.33	0.1	0.82	1.47	Tc=(10)^-0.507*	1	n/a	0.39	16988.4	25482.6
3090	Area 3	1.4	0.9	85th %ile	3	380	0.0064	1.05	22	0.31	0.1	0.82	0.36	Tc=(10)^-0.507*	1	n/a	0.1	4356	6534
3090	Area 4	1.1	0.9	85th %ile	3	590	0.0161	1.05	24	0.3	0.1	0.82	0.27	Tc=(10)^-0.507*	1	n/a	0.08	3484.8	5227.2
3090	Area 5	2	0.9	85th %ile	3	525	0.024	1.05	21	0.32	0.1	0.82	0.52	Tc=(10)^-0.507*	1	n/a	0.14	6098.4	9147.6
3090	Area 6	2.5	0.9	86th %ile	3	445	0.027	1.05	19	0.33	0.1	0.82	0.68	Tc=(10)^-0.507*	1	n/a	0.18	7840.8	11761.2

Area 1
Q = 0.38 cfs
where, C = 0.9
i = 0.34 in/hr
A = 1.25 ac
Use seven (7) WETLANDMod-8-26-UG-V for a total treatment rate of 0.38 cfs (see email from vendor).
Low flow pipes at the same elevation will take stormwater through WETLANDMods on either side of the curbside catch basin for treatment.
Higher flows will directly connect into the 90-inch storm drain.

From:	John Hayden [john@biocleanenvironmental.com]
Sent:	Wednesday, September 02, 2015 1:29 PM
To:	Vicky Li
Cc:	Brian Weil-
Subject:	RE: Rowland Heights Hotel Development / LA County
Attachments:	WM-8-26.pdf

Vicky,

At 0.38cfs you need to treat 170.544 gpm / 5"per hour or 0.05 = 3,411sf of media

Our standard 4x4 wetland cells have 50.32sf of surface area each

That is 68 of our 4x4 cells will be needed
Or
About 7 of the 8-26 WetlandMOD Units

Let me know if you have any further questions.

John Hayden
Stormwater Engineer
Bio Clean Environmental & Modular Wetlands
www.BioCleanEnvironmental.com
www.ModularWetlands.com

P.O. Box 869, Oceanside, CA 92049
Phone: 760.433.7640
Fax: 760.433.3176

From: Vicky Li [mailto:vicky@thieneseng.com]
Sent: Wednesday, September 02, 2015 1:20 PM
To: 'John Hayden'
Cc: 'Brian Weil-'
Subject: RE: Rowland Heights Hotel Development / LA County

John,

We're diverting some drainage elsewhere (roof going southerly) and we have about 1.25 acres to treat.. this will need a treatment flow rate of 0.38 cfs. How many units will we need?

Thanks,

Vicky Li
vicky@thieneseng.com
THIENES ENGINEERING, INC.

From: John Hayden [mailto:john@biocleanenvironmental.com]
Sent: Wednesday, August 26, 2015 5:56 PM
To: Vicky Li
Cc: Brian Weil-
Subject: RE: Rowland Heights Hotel Development / LA County

Vicky,

As usual I know you needed by tomorrow so here it is, same day as usual.

You better hold on to your seats you are going to need 11 each of the attached WM-8-26 units. We could most likely get away with 10 units but I rounded up to play it safe.

Using the LA 5 inch per hour infiltration rate in order to treat 0.57cfs or 255.82 gpm you will need about 5,117sf of media. Each of these 8-26 units houses about 503.20sf of media.

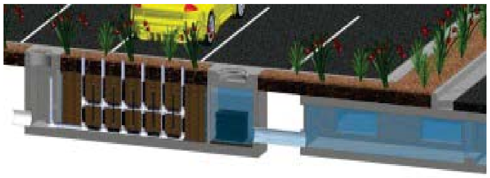
Let me know if this will work and if you have enough land to house this many units (2,500 sf footprint spaced need for all of the units installed). Over half what it would be needed to do a typical downward flow planter box type system.

Let me know if you want me to look into some other options before tomorrow morning.

Thanks,

John Hayden
Stormwater Engineer
Bio Clean Environmental & Modular Wetlands
www.BioCleanEnvironmental.com
www.ModularWetlands.com

WetlandMOD VOLUME BASED SIZING SHEET



Horizontal Flow Biofiltration System

Project Location

Project Name Rowland Heights Hotel Development (Area 2)
City/Town Los Angeles County
State CA
Zip Code

SIZING CALCULATIONS

	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)	5.45	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)	0.9		Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	25483	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	3	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	MWS-L-8-20	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	3	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	12.58	gallons/minute	Loading Rate of 0.050 gpm/sq ft or 5.0 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	905.8	cubic feet	**37.74 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	284	cubic feet	
Volume Needed in *Pre-Storage*	24293	cubic feet	Set at zero to start. Size pre-storage system to hold this volume Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**25483**	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	**81.40**	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

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Fax: 760.433.3176
Email: Info@modularwetlands.com

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MC-3500 Site Calculator

Project Information:

Project Name: 3090 (Area 2)
Location: Unincorp. LA County
Date: 2-Sep
Engineer:
StormTech RPM:

System Requirements

Units		Imperial	
Required Storage Volume		24293	CF
Stone Porosity (Industry Standard = 40%)		40	%
Stone Above Chambers	(12 inch min.)	12	inches
Stone Foundation Depth	(9 inch min.)	9	inches
Average Cover over Chambers	(24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?		WIDTH	
Limiting WIDTH or LENGTH dimension		55	feet
Storage Volume per Chamber		178.9	CF
Storage Volume per End Cap		46.9	CF

System Sizing

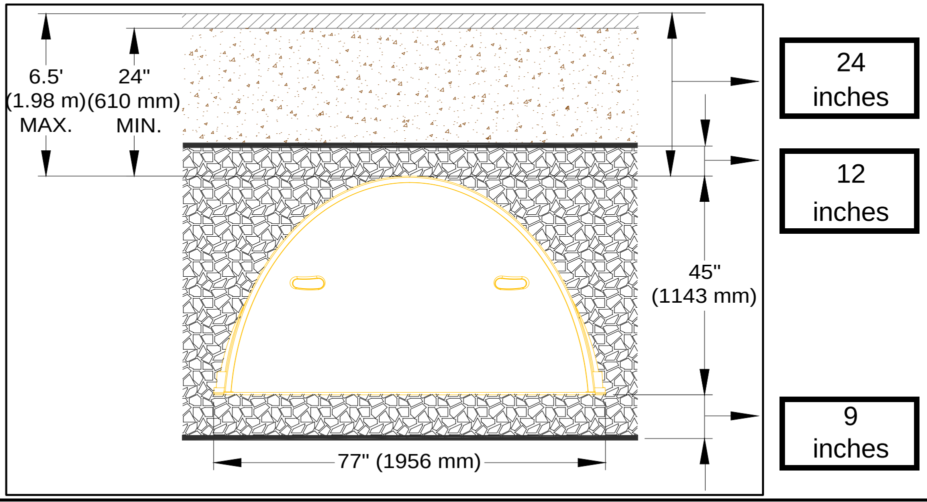
Number of Chambers Required	133	each
Number of End Caps Required	14	each
Bed Size (including perimeter stone)	7,247	square feet
Stone Required (including perimeter stone)	1292	tons
Volume of Excavation	1745	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	2215	square yards
Length of Isolator Row	140.9	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	244	square yards
Woven Isolator Row Fabric (20% Safety Factor)	310	square yards
Installed Storage Volume	24,450	cubic feet

Controlled by Width (Rows)

Maximum Width =	55	feet

7 rows of 19 chambers

Maximum Length =	140.9	feet
Maximum Width =	51.4	feet



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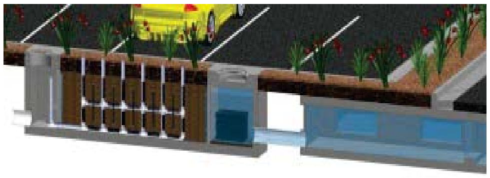
WetlandMOD VOLUME BASED SIZING SHEET



Horizontal Flow Biofiltration System

Project Location

Project Name Rowland Heights Hotel Development (Area 3)
City/Town Los Angeles County
State CA
Zip Code

SIZING CALCULATIONS

	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)	1.4	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)	0.9		Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	6534	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	3	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	MWS-L-8-16	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	10.06	gallons/minute	Loading Rate of 0.050 gpm/sq ft or 5.0 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	241.5	cubic feet	**10.06 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	268	cubic feet	
Volume Needed in *Pre-Storage*	6025	cubic feet	Set at zero to start. Size pre-storage system to hold this volume Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**6534**	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	**78.16**	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

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Fax: 760.433.3176
Email: Info@modularwetlands.com

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MC-3500 Site Calculator

Project Information:

Project Name: 3090 (Area 3)
Location: Unincorp. LA County
Date: 2-Sep
Engineer:
StormTech RPM:

System Requirements

Units	Imperial	
Required Storage Volume	6025	CF
Stone Porosity (Industry Standard = 40%)	40	%
Stone Above Chambers (12 inch min.)	12	inches
Stone Foundation Depth (9 inch min.)	9	inches
Average Cover over Chambers (24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?	WIDTH	
Limiting WIDTH or LENGTH dimension	25	feet
Storage Volume per Chamber	178.9	CF
Storage Volume per End Cap	46.9	CF

System Sizing

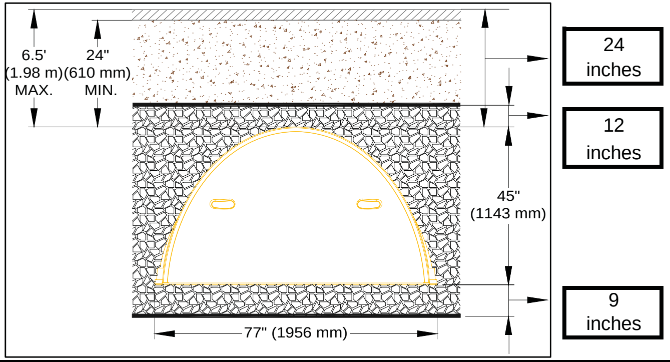
Number of Chambers Required	33	each
Number of End Caps Required	6	each
Bed Size (including perimeter stone)	1,902	square feet
Stone Required (including perimeter stone)	349	tons
Volume of Excavation	458	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	663	square yards
Length of Isolator Row	83.6	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	145	square yards
Woven Isolator Row Fabric (20% Safety Factor)	184	square yards
Installed Storage Volume	6,185	cubic feet

Controlled by Width (Rows)

Maximum Width = 25 feet

3 rows of 11 chambers

Maximum Length = 83.6 feet
Maximum Width = 22.8 feet



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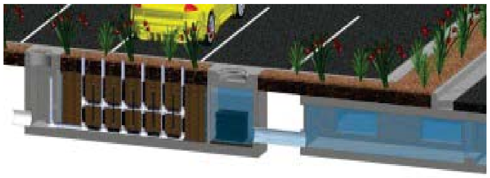
WetlandMOD VOLUME BASED SIZING SHEET



Horizontal Flow Biofiltration System

Project Location

Project Name Rowland Heights Hotel Development (Area 4)
City/Town Los Angeles County
State CA
Zip Code

SIZING CALCULATIONS

	Inputs	Units	Notes/References

Impervious Area

BMP Drainage Area (not required - manual entry - not part of formula)	1.1	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)	0.9		Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	5228	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	3	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.

MWS - Linear Sizing

MWS - Linear Model Number (from matrix)	MWS-L-8-16	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	10.06	gallons/minute	Loading Rate of 0.050 gpm/sq ft or 5.0 in/hr. Field Verified.

Volume Treated During Event

Processed through MWS - Linear	241.5	cubic feet	**10.06 gals/minute**

Volume Treated Following Event

MWS - Linear Static Capacity (from matrix)	268	cubic feet	
Volume Needed in *Pre-Storage*	4719	cubic feet	Set at zero to start. Size pre-storage system to hold this volume Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**5228**	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	61.93	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

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MC-3500 Site Calculator

Project Information:
Project Name: 3090 (Area 4)
Location: Unincorp. LA County
Date: 2-Sep
Engineer:
StormTech RPM:

System Requirements

Units		Imperial	
Required Storage Volume		4719	CF
Stone Porosity (Industry Standard = 40%)		40	%
Stone Above Chambers	(12 inch min.)	12	inches
Stone Foundation Depth	(9 inch min.)	9	inches
Average Cover over Chambers	(24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?		WIDTH	
Limiting WIDTH or LENGTH dimension		20	feet
Storage Volume per Chamber		178.9	CF
Storage Volume per End Cap		46.9	CF

System Sizing

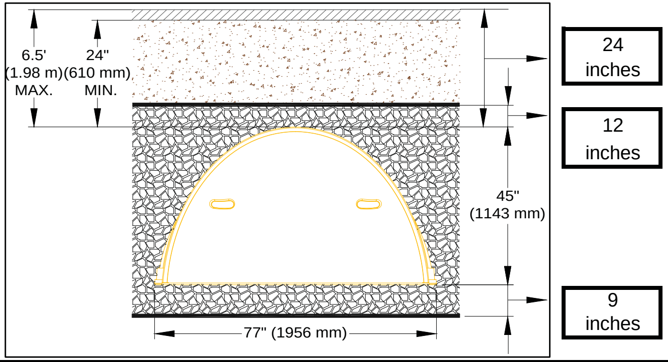
Number of Chambers Required	26	each
Number of End Caps Required	4	each
Bed Size (including perimeter stone)	1,526	square feet
Stone Required (including perimeter stone)	283	tons
Volume of Excavation	367	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	573	square yards
Length of Isolator Row	97.9	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	170	square yards
Woven Isolator Row Fabric (20% Safety Factor)	215	square yards
Installed Storage Volume	4,839	cubic feet

Controlled by Width (Rows)

Maximum Width =	20	feet

2 rows of 13 chambers

Maximum Length =	97.9	feet
Maximum Width =	15.6	feet



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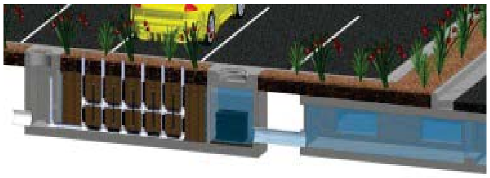
WetlandMOD VOLUME BASED SIZING SHEET



Horizontal Flow Biofiltration System

Project Location

Project Name	Rowland Heights Hotel Development (Area 5)
City/Town	Los Angeles County
State	CA
Zip Code	

SIZING CALCULATIONS

	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)	2	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)	0.9		Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	9148	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	3	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	MWS-L-8-20	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	12.58	gallons/minute	Loading Rate of 0.050 gpm/sq ft or 5.0 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	301.9	cubic feet	**12.58 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	284	cubic feet	
Volume Needed in *Pre-Storage*	8562	cubic feet	Set at zero to start. Size pre-storage system to hold this volume Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**9148**	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	**87.90**	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

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Fax: 760.433.3176
Email: Info@modularwetlands.com

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MC-3500 Site Calculator

Project Information:

Project Name: 3090 (Area 5)
Location: Unincorp. LA County
Date: 2-Sep
Engineer:
StormTech RPM:

System Requirements

Units		Imperial	
Required Storage Volume		8562	CF
Stone Porosity (Industry Standard = 40%)		40	%
Stone Above Chambers	(12 inch min.)	12	inches
Stone Foundation Depth	(9 inch min.)	9	inches
Average Cover over Chambers	(24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?		WIDTH	
Limiting WIDTH or LENGTH dimension		20	feet
Storage Volume per Chamber		178.9	CF
Storage Volume per End Cap		46.9	CF

System Sizing

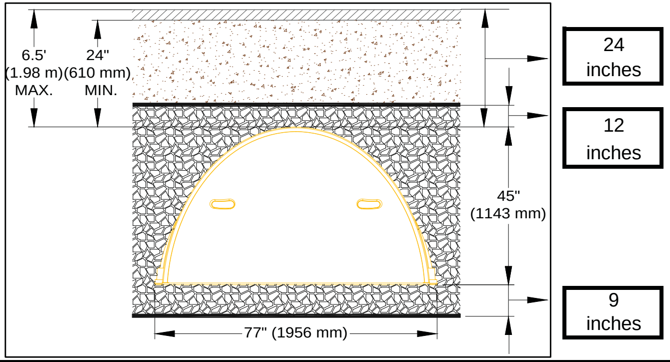
Number of Chambers Required	47	each
Number of End Caps Required	4	each
Bed Size (including perimeter stone)	2,703	square feet
Stone Required (including perimeter stone)	499	tons
Volume of Excavation	651	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	1003	square yards
Length of Isolator Row	176.8	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	306	square yards
Woven Isolator Row Fabric (20% Safety Factor)	389	square yards
Installed Storage Volume	8,596	cubic feet

Controlled by Width (Rows)

Maximum Width = 20 feet

1 row of 24 chambers
1 row of 23 chambers

Maximum Length = 176.8 feet
Maximum Width = 15.6 feet



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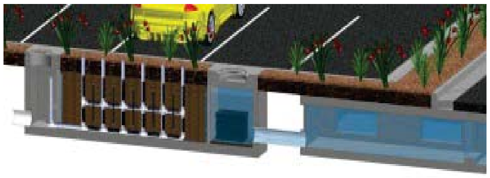
WetlandMOD VOLUME BASED SIZING SHEET



Horizontal Flow Biofiltration System

Project Location

Project Name Rowland Heights Hotel Development (Area 6)
City/Town Los Angeles County
State CA
Zip Code

SIZING CALCULATIONS	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)	2.5	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)	0.9		Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	11761	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	3	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	MWS-L-10-20	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	15.10	gallons/minute	Loading Rate of 0.050 gpm/sq ft or 5.0 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	362.3	cubic feet	**15.10 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	278	cubic feet	
Volume Needed in *Pre-Storage*	11121	cubic feet	Set at zero to start. Size pre-storage system to hold this volume Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**11761**	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	94.39	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

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Fax: 760.433.3176
Email: Info@modularwetlands.com

StormTech

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MC-3500 Site Calculator

Project Information:

Project Name: 3090 (Area 6)
Location: Unincorp. LA County
Date: 2-Sep
Engineer:
StormTech RPM:

System Requirements

Units		Imperial	
Required Storage Volume		11121	CF
Stone Porosity (Industry Standard = 40%)		40	%
Stone Above Chambers	(12 inch min.)	12	inches
Stone Foundation Depth	(9 inch min.)	9	inches
Average Cover over Chambers	(24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?		WIDTH	
Limiting WIDTH or LENGTH dimension		30	feet
Storage Volume per Chamber		178.9	CF
Storage Volume per End Cap		46.9	CF

System Sizing

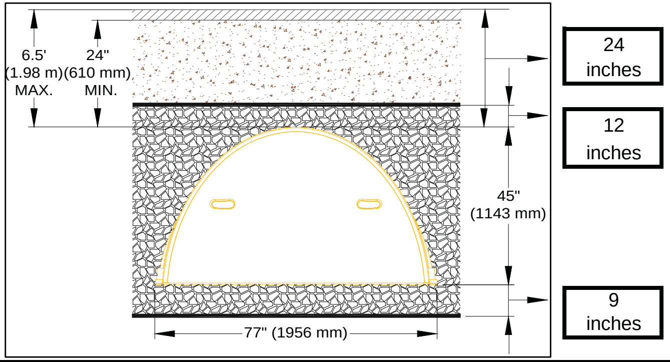
Number of Chambers Required	61	each
Number of End Caps Required	8	each
Bed Size (including perimeter stone)	3,419	square feet
Stone Required (including perimeter stone)	619	tons
Volume of Excavation	823	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	1131	square yards
Length of Isolator Row	119.4	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	207	square yards
Woven Isolator Row Fabric (20% Safety Factor)	263	square yards
Installed Storage Volume	11,288	cubic feet

Controlled by Width (Rows)

Maximum Width = 30 feet

1	row of	16	chambers
3	row of	15	chambers

Maximum Length = 119.4 feet
Maximum Width = 29.9 feet



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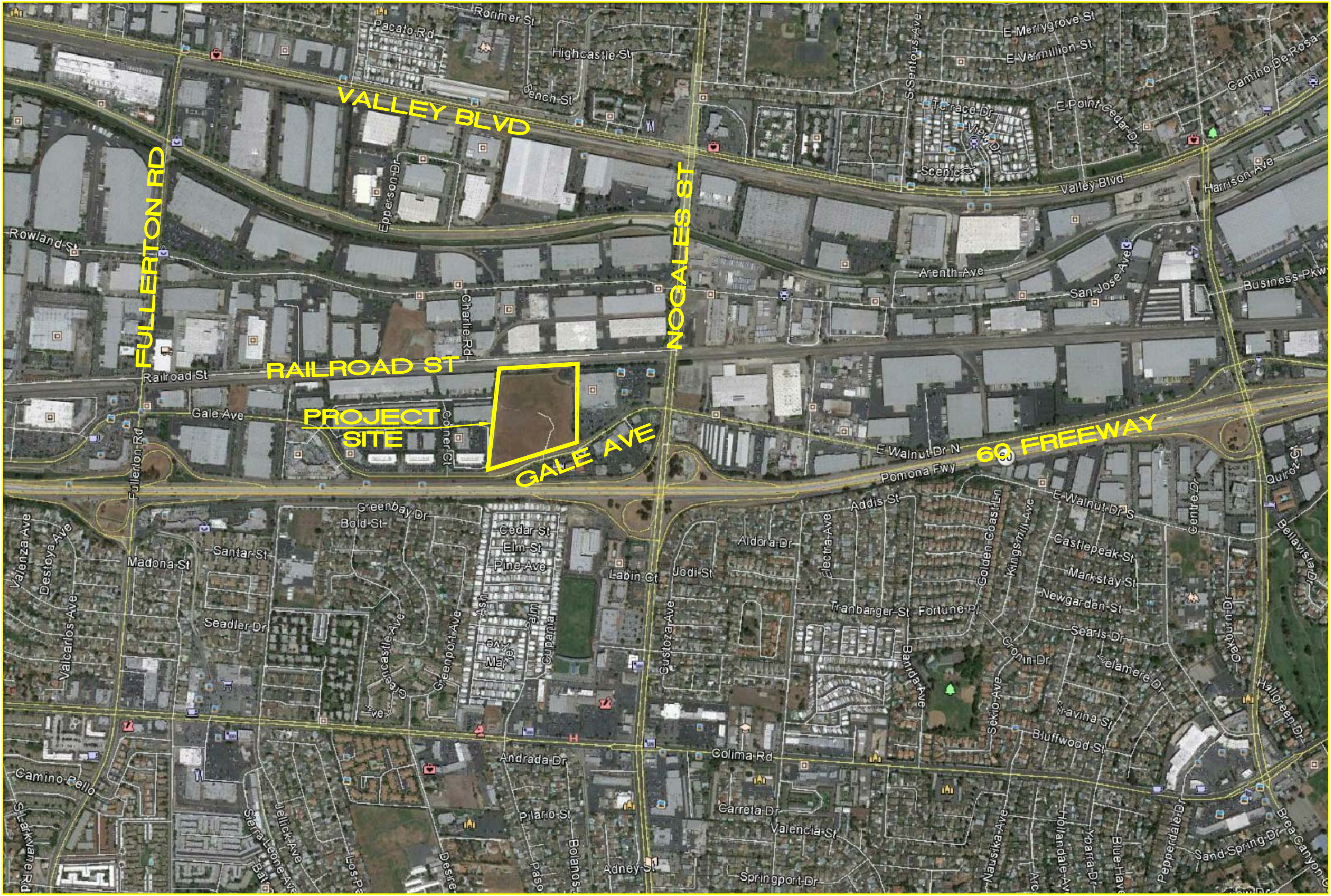
APPENDIX B

LID Site Plan

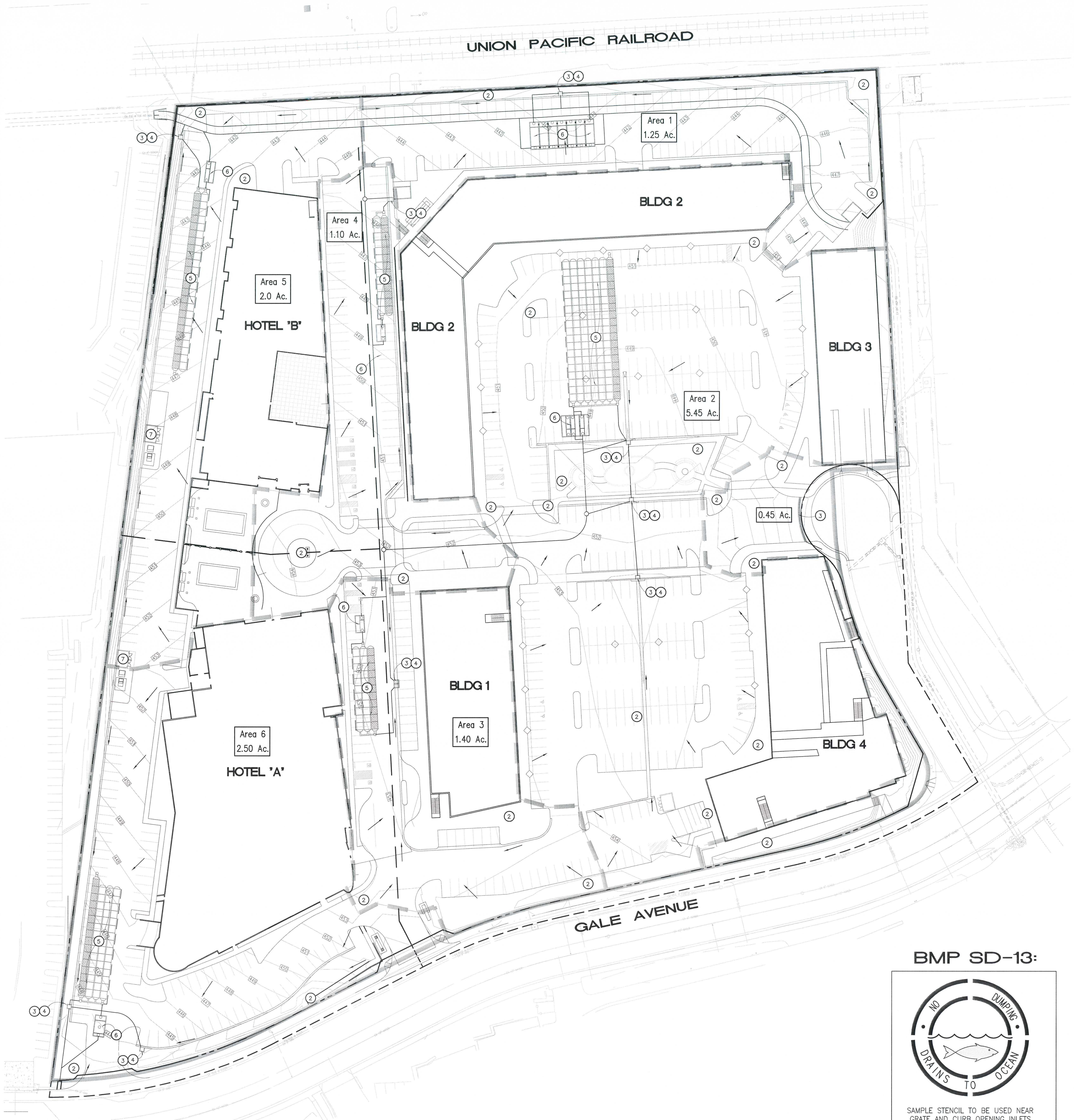


Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

"VICINITY MAP"

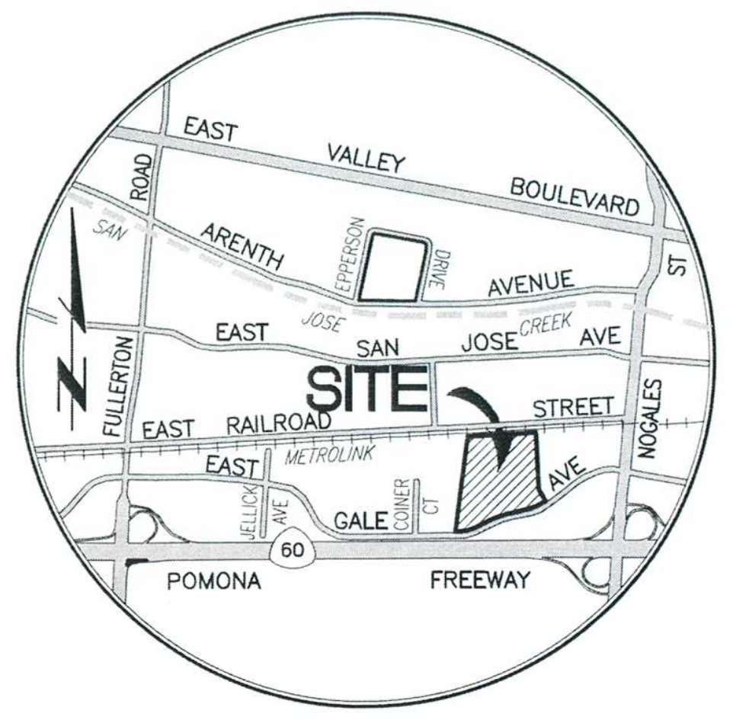
FOR

GALE AVE AND RAILROAD ST, LOS ANGELES COUNTY



LEGEND

①	NOT USED
②	LANDSCAPE/EFFICIENT IRRIGATION
③	DRAIN INSERTS
④	DRAIN SYSTEM SIGNS "NO DUMPING–DRAINS TO OCEAN"
⑤	STORMTECH MC–3500 CHAMBERS WITH AN IMPERVIOUS LINER AND SUB–DRAIN
⑥	PROPRIETARY BIOFILTRATION UNIT
⑦	TRASH ENCLOSURE
RD	ROOF DRAIN
▬▬	BOUNDARY
▬ ▬	DRAINAGE AREAS
←	FLOW LINE



VICINITY MAP

N.T.S.

BMP SD-13:

SAMPLE STENCIL TO BE USED NEAR GRATE AND CURB OPENING INLETS

SAMPLE CATCH BASIN STENCIL

HYDROLOGY STUDY APPROVED

CHECKED BY: RCE NO. 82680 DATE 01/13/16

APPROVED BY: DATE 01/13/16

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

Last Update: 12/9/15
O:\3000–3099\3090\3090BMPSITEMAP.dwg

REINHARD STENZEL
No. 56155
Exp. 12-31-16
CIVIL
12/11/15

0 20 40 80 120
SCALE:1"=40'

LOS ANGELES COUNTY

PUBLIC WORKS DEPARTMENT

LID SITE MAP

ROWLAND HEIGHTS HOTEL DEVELOPMENT
GALE AVENUE
PM NO. 072916

3090/1 OF 1 SHEET

PREPARED FOR:

PARALLAX INVESTMENT CORPORATION
26 SOHO STREET, SUITE 205
TORONTO, ON M5T 1Z7
PHONE: (416) 944–0968
FAX: (416) 944–0914

PREPARED BY:

TEi
Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521–4811 FAX(714)521–4173

Designed by
Date
Checked by
Date
Designed by
Date
Checked by
Date

Approved by Date

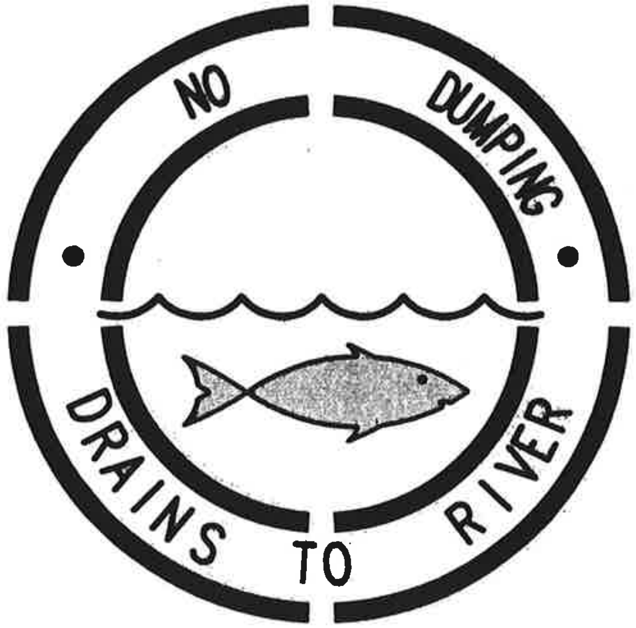
Public Works Director R.C.E. XXXXX

Sheet 1 of 1 Sheets

APPENDIX C

BMP Operation and Maintenance

BMP Operation and Maintenance			
BMP	**Operation/Maintenance**	**Inspection Frequency**	**Responsibility**
Storm Drain Stencil and Signage	➢ Visually inspect for legibility and replace/repaint as necessary.	Annually	Owner
Parking Lot Sweeping	➢ At a minimum, sweep on a monthly basis.	Monthly (minimum)	Owner
StormTech MC-3500 Chambers	➢ The isolator row shall be inspected semi-annually (October 1st and February 1st) and maintained once sediment depth is greater than 3-inches. The isolator row shall be inspected and maintained by a qualified technician and he/she will properly dispose of all wastes. A manhole is installed in order to inspect and maintain the isolator row. It is installed per OSHA codes to ensure operator and inspector safety.	Semi-annually (October 1st and February 1st) through maintenance service contract with the vendor or equally qualified contractor.	Owner
Drain Inserts	➢ Visually inspect for defects and illegal dumping. Notify proper authorities if illegal dumping has occurred. ➢ Using an industrial vacuum, the collected materials shall be removed from the filter basket and disposed of properly. ➢ Inspect biosorb hydrocarbon boom and replace as necessary.	Semi-annually (October 1st and February 1st) through maintenance service contract with the vendor or equally qualified contractor.	Owner
Modular Treatment System	➢ Clean separation (sediment) chamber. ➢ Replace cartridge filter media, drain down filter media, and evaluate wetland media. ➢ All work to be done by manufacturer or another qualified professional.	Prior to (Oct 1st), during, and following (May 31st) the rainy season. A minimum of three times per year.	Owner
Maintenance Log	➢ Keep a log of all inspection and maintenance performed on the above mentioned BMPs for at least 5 years. Keep this log on-site.	Ongoing	Owner



SAMPLE STENCIL TO BE USED NEAR
GRATE AND CURB OPENING INLETS
SYMBOL TO BE 24" IN DIAMETER

Thienes Engineering
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

SAMPLE CATCH BASIN STENCIL
PER BMP SD-13

APPENDIX D

Covenant and Agreement

RECORDING REQUESTED BY
AND MAIL TO:

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUILDING AND SAFETY DIVISION
900 S. FREMONT AVENUE, 3RD FLOOR
ALHAMBRA, CA 91803-1331

Space above this line is for Recorder's use

COVENANT AND AGREEMENT
REGARDING THE MAINTENANCE OF LOW IMPACT DEVELOPMENT (LID) & NATIONAL POLLUTANTS DISCHARGE ELIMINATION SYSTEM (NPDES) BMPs

The undersigned, ______________________________ ("Owner"), hereby certifies that it owns the real property described as follows ("Subject Property"), located in the County of Los Angeles, State of California:

LEGAL DESCRIPTION

ASSESSOR'S ID # 8264-021-20 TRACT NO.____________________ LOT NO.______________________________

ADDRESS: ____

Owner is aware of the requirements of County of Los Angeles' Green Building Standards Code, Title 3m Section 4.106.4 (LID), and the National Pollutant Discharge Elimination System (NPDES) permit. The following post-construction BMP features have been installed on the Subject Property:

☐ Porous pavement
☐ Cistern/rain barrel
☐ Infiltration trench/pit
☒ Bioretention or biofiltration
☐ Rain garden/planter box
☐ Disconnect impervious surfaces
☐ Dry Well
☐ Storage containers
☐ Landscape and landscape irrigation
☐ Green roof
☒ Other Underground chambers with impervious liner to store 1.5x SWQDv
____

The location, including GPS x-y coordinates, and type of each post-construction BMP feature installed on the Subject Property is identified on the site diagram attached hereto as Exhibit 1.

Owner hereby covenants and agrees to maintain the above-described post-construction BMP features in a good and operable condition at all times, and in accordance with the LID/NPDES Maintenance Guidelines, attached hereto as Exhibit 2.

Owner further covenants and agrees that the above-described post-construction BMP features shall not be removed from the Subject Property unless and until they have been replaced with other post-construction BMP features in accordance with County of Los Angeles' Green Building Standards Code, Title 31.

Owner further covenants and agrees that if Owner hereafter sells the Subject Property, Owner shall provide printed educational materials to the buyer regarding the post-construction BMP features that are located on the Subject Property, including the type(s) and location(s) of all such features, and instructions for properly maintaining all such features.

Owner makes this Covenant and Agreement on behalf of itself and its successors and assigns. This Covenant and Agreement shall run with the Subject Property and shall be binding upon Owner, future owners, and their heirs, successors and assignees, and shall continue in effect until the release of this Covenant and Agreement by the County of Los Angeles, in its sole discretion.

Owner(s):

By:______________________________ Date:______________________________

By:______________________________ Date:______________________________

A notary public or other officer completing the attached certificate verifies only the identity of the individual who signed the document to which the certificate is attached, and not the truthfulness, accuracy, or validity of that document.

(PLEASE ATTACH NOTARY)

FOR DEPARTMENT USE ONLY:

MUST BE APPROVED BY COUNTY OF LOS ANGELES BUILDING AND SAFETY DIVISION PRIOR TO RECORDING.

APPROVED BY:______________________________ ______________________________ Date ________________
(Print Name) (Signature)

APPENDIX E

Infiltration Feasibility

GEOTECHNICAL INVESTIGATION AND LIQUEFACTION EVALUATION PROPOSED MIXED USE DEVELOPMENT

18800 East Gale Avenue
Los Angeles County, California
for
Parallax Corporation

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL
A California Corporation

February 3, 2014

Parallax Corporation
c/o Thienes Engineering
14349 Firestone Boulevard
La Mirada, California 90638

Attention: Mr. Jeff Potter

Project No.: **13G184-1**

Subject: **Geotechnical Investigation and Liquefaction Evaluation**
Proposed Mixed Used Development
18800 East Gale Avenue
Los Angeles County, California

Gentlemen:

In accordance with your request, we have conducted a geotechnical investigation and liquefaction evaluation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Daniel W. Nielsen
No. 77915
CIVIL

Daniel W. Nielsen, RCE 77915
Project Engineer

John A. Seminara
No. 2125
CERTIFIED ENGINEERING GEOLOGIST

John A. Seminara, CEG 2125
Principal Geologist

Distribution: (2) Addressee

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- Very dense, weathered bedrock was encountered at various depths below the existing site grades. The bedrock materials were encountered at relatively shallow depths near the center of the site, and at greater depths in the northern (14½ to 33± feet) and southern (19½ to 49± feet) portions of the site. A boring drilled to 61½± feet the southwestern portion of the site, did not encounter bedrock.
- Groundwater was encountered at depths of 25 to 37± feet, in the southern portion of the site, and at a depth of 25± feet near the northeast corner of the site. The borings drilled in the central and northwest portions of the site did not encounter groundwater.
- A site-specific liquefaction evaluation was performed as part of this geotechnical investigation. Based on the results of our liquefaction evaluation, liquefaction is not considered to be a design concern for the majority of the proposed buildings at the subject site, due to the presence of very dense bedrock at depths shallower than the historic high groundwater table. However, liquefiable soils were encountered within portions of the northeastern-most office/retail building, and beneath a portion of the southeastern-most hotel building.
- Liquefaction analyses performed for three of the deep borings indicate total dynamic settlements on the order of 1± inch in the northeast portion of the site and 1¼± inches in the southwest portion of the site. A boring drilled in the southeast portion of the site did not identify any liquefiable soils.
- The liquefaction induced differential settlements are expected to be equal to the total dynamic settlements. These settlements are assumed to occur over a distance of 100± feet producing angular distortions of less than 0.002 inches per inch.
- At the present time, grading plans are not available for the proposed development. Based on the existing site topography, we expect that cuts and fills of up to 15± feet may be necessary to achieve the proposed site grades. Additionally, we understand that some of the proposed buildings including the two 6-story hotel buildings and the 3-story retail building may incorporate one or two subterranean levels for parking. Preliminary grading and foundation design recommendations have been included in subsequent sections of this report. However, it should be understood that these recommendations are based on preliminary assumptions and will require review and may be revised upon review of grading and foundation plans.
- Based on the subsurface conditions encountered at the subject site, the office and retail buildings may be supported on conventional shallow foundation systems. It is also expected that the two 6-story hotel buildings will be supported on shallow foundations. However, this assumption is subject to review of the grading plans and foundation loads when this information becomes available. Due to relatively large anticipated foundation loads and other considerations, it may be desirable or necessary to support the one or both of the 6-story

hotel buildings on an alternative foundation system such as a mat foundation or a deep foundation system.

Site Preparation

- Site stripping should include removal of any surficial vegetation and topsoil. Based on conditions encountered at the time of the subsurface exploration, stripping of sparse to moderate grass and weed growth will be necessary at the site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.
- Initial site preparation should also include demolition of the newly constructed temporary street, existing asphalt parking areas, and the remnants of an old asphaltic concrete road. Any remnants of previous development and including pavements, foundations, floor slabs, and debris resulting from demolition activities should be properly disposed of off-site. Concrete and asphalt debris may be re-used within the compacted fills, provided they are pulverized and the maximum particle size is less than 2 inches.
- Undocumented fill soils were encountered at several of the boring locations, extending to depths of 1½ to 8½± feet. These soils possess variable strengths, densities, and marginal consolidation/collapse characteristics and are not considered suitable for the support of the new buildings.
- Remedial grading is recommended to be performed within the new building pad areas to remove all of the undocumented fill soils and a portion of the near-surface native soils. The overexcavation should extend to a depth of at least 5 feet below the existing grade, 5 feet below the proposed pad grade and to a depth sufficient to remove all of the existing undocumented fill soils.
- Within the proposed building areas, the overexcavation should remove existing soils and bedrock materials in cut and shallow fill areas to provide a minimum 5-foot thick blanket of newly placed compacted fill, below pad grade in order to mitigate possible differential settlement due to cut/fill transitions.
- Additional overexcavation should be performed within the influence zones of the new foundations, to provide for a new layer of compacted structural fill extending to a depth of at least 3 feet below proposed bearing grade in the areas of single and 2-story office and retail buildings. Within the areas of the two proposed 6-story hotel buildings and the 3-story retail building, the overexcavation below shallow foundations should extend to a depth equal to the width of the footing, or into suitable bedrock materials.
- Following completion of the recommended overexcavation, the exposed soils or bedrock materials should be evaluated by the geotechnical engineer. Based on conditions encountered at the boring locations, additional overexcavation may be required where porous, low density, or otherwise unsuitable soils are encountered. After the subgrade soils have been approved by the geotechnical engineer, the previously excavated soils may then be replaced and compacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 2,500 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least six (6) No. 5 rebars (3 top and 3 bottom) in strip footings due to the presence of medium to highly expansive soils and liquefaction potential

of the soils in localized areas. Additional reinforcement may be necessary for structural considerations.

Building Floor Slabs

- Conventional slabs-on-grade, minimum 5½ inches thick.
- Minimum slab reinforcement: No. 4 bars at 16 inches on-center, in both directions, due to medium to high expansive potentials of the near-surface soils and the presence of liquefiable soils in localized areas. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed loading.

Pavements

ASPHALT PAVEMENTS (R = 10)				
Materials	**Thickness (inches)**			
	Auto Parking (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)
Asphalt Concrete	3	3	3½	4
Aggregate Base	6	9	12	15
Compacted Subgrade (90% minimum compaction)	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS			
Materials	**Thickness (inches)**		
	Auto Parking & Drives (TI = 5.0)	Light Truck Traffic (TI =6.0)	Moderate Truck Traffic (TI = 7.0)
PCC	5	5½	7
Compacted Subgrade (95% minimum compaction)	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 13P359-1R2, dated November 4, 2013. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. Based on the location of the subject site, this investigation also included a site-specific liquefaction evaluation. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located on the north side of East Gale Avenue, approximately 835 feet west of the intersection of East Gale Avenue and Nogales Street in the unincorporated Rowland Heights area of Los Angeles County, California. The site is bounded to the north by a Union Pacific railroad easement, to the east by a retail building, to the south by East Gale Avenue, and to the west by several commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, included as Plate 1 in Appendix A of this report.

The site consists of an irregular shaped parcel, 14.06± acres in size. A paved temporary access road trending north-south bisects the subject site, dividing the site into an east-half and west-half. We understand that this access road will be utilized as a temporary detour to divert traffic during construction of improvements on Nogales Street between Railroad Street and Gale Avenue. The access road was closed at the time of our site investigation. The southwest portion of the site was being utilized as an equipment storage and construction staging area for the upcoming Nogales Street improvements by the Griffith Company. This area was surrounded by a chain link fence. A construction trailer was located in the southwest corner of this area. Multiple soil stockpiles covered in plastic were also located in the central portion of this area. At the time of subsurface exploration, these stockpiles were generally 5 to 8± feet in height and 8 to 10± feet in diameter. Metal pipes, traffic control equipment, light standards, and other miscellaneous construction equipment were being stored along the east and north sides of the chain link fence. The ground surface cover in the fenced area consists of exposed soil.

Remnants of an old asphaltic concrete road trends roughly east-west in the central area of the west half of the site and roughly north-south along the western property line in the northern portion of the west half of the site. This road is in poor condition with major cracks throughout the road and appears to have been part of a previous development of the site. The ground surface cover in the western half of the site consists of exposed soil with sparse to moderate native grass and weed growth. An earthen drainage channel is located along the northern property line and on the west side of a parking area in the northeast corner of the site The channel ranges from 5 to 9 feet in depth.

The eastern half of the subject site is generally undeveloped, except for localized areas along the east property line. An asphaltic concrete parking lot for the retail building on the easterly adjacent site extends into the northeast corner of the subject site. This parking lot is in good condition. Another asphaltic concrete parking lot for the easterly adjacent retail building extends into the subject site, along the eastern property line near the southeast corner of the site. This parking lot is located east of the toe of an existing slope. The pavements in this area are also in good condition. The remaining areas of the eastern half of the site are vacant and undeveloped. Several large soil stockpiles were located in the southern portion of the eastern half of the site. These stockpiles ranged from 40± to 90± feet in width, 100± to 285± feet in length, and 10 to

15± feet in height. Dump trucks were depositing soil to the stockpiles in this area at the time of our subsurface investigation.

Detailed topographic information was obtained from a topographic plan provided by Thienes Engineering, Inc. The plan indicates that the site elevation ranges from elevation 467.8± feet mean sea level (msl) in the southeastern area of the site to elevation 435.7± feet msl in the northwestern area of the site. The eastern side of the site slopes downward to the north. This slope is about 25± feet in height with portions as steep as 4h:1v (4 horizontal to 1 vertical). Another slope is located around the southeast corner of the site and descends toward the south and east property lines. This slope ranges from approximately 11 to 17± feet in height with an inclination of about 2.5h:1v. An asphaltic concrete parking area for the easterly adjacent retail development is present along the toe of the east side of the slope.

3.2 Proposed Development

The preliminary site plans for the proposed development were obtained from Gene Fong Associates. We understand that the proposed development will consist of two phases, Phase I and Phase II. The proposed development for Phase I will consist of five (5) new retail and office buildings, identified as Buildings 1 through Building 5, and one hotel building, identified as the Sheraton hotel. The five retail buildings will possess footprint areas ranging from 9,400± ft^2 to 24,795± ft^2. The plan indicates that the largest of these retail buildings, Building 5, will be three stories in height and may include a subterranean parking level. The footprint area for the proposed Sheraton hotel was not provided on the plan. The hotel will be six stories in height with a total of 280 rooms and will include a 9,500± ft^2 ballroom on the ground floor. The hotel may include one or two-levels of below grade parking.

The proposed development for Phase II will include a six-story hotel building located in the northwestern area of the site. The hotel is identified as the Select Service hotel. The building will have a total of 220 rooms and may include one or two-levels of below grade parking.

All of the buildings are expected to be surrounded by concrete flatwork, asphaltic concrete pavements in the parking and drive lanes, and landscape planter areas throughout the site.

We assume that the proposed retail buildings will be single story structures except for Building 5, since the plan does not specifically indicate that these buildings will have multiple stories. We assume that the retail buildings will consist of wood frame construction, supported on conventional shallow foundation systems with concrete slab-on-grade floors. Building 5 will be a three-story structure. Detailed structural information has not been provided for this building. Therefore, we assume that this structure will be of wood frame construction supported on a conventional shallow foundation system with a concrete slab-on-grade floor. The two (2) hotel buildings will be six-story structures. Detailed structural information has also not been provided for these buildings. Therefore, we assume that these structures will be of cast-in-place concrete or steel frame structures supported on conventional shallow foundation systems. Based on the assumed construction, maximum column and wall loads for the single story retail buildings are expected to be on the order of 30 kips and 1 to 2 kips per linear foot, respectively. The maximum column and wall loads for Building 5 are expected to be on the order of 80 kips and 2 to 4 kips per linear foot, respectively. The maximum column and wall loads for the six-story hotel buildings are expected to be on the order of 200 kips and 3 to 5 kips per linear foot, respectively.

Building 5, the hotel building, and the proposed parking structure, may each include one to two subterranean levels for parking. The remainder of the proposed development is not expected to include any significant amounts of below grade construction such as basements or crawl spaces.

Grading plans were not available at the time of our investigation. Based on the existing site grades, it is assumed that cuts and fills of up to 15± feet will be required. However, these estimates are exclusive of site preparation and overexcavation requirements.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration conducted for this project consisted of eighteen (18) borings advanced to depths of 5 to 61½± feet below currently existing site grades. Two (2) of the borings were drilled to at least 50± feet, as part of the liquefaction evaluation. We attempted to extend several other borings to depths of at least 50± feet, but most of these borings encountered very dense bedrock at shallower depths. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow-stem augers, by a truck-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. Samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Pavements

Two (2) of the borings were drilled through the existing pavements. At Boring Nos. B-11 and B-14, these pavements consist of 3± inches of asphaltic concrete underlain by 3 to 5± inches of underlying aggregate base.

Artificial Fill

Artificial fill soils were encountered beneath the pavements at Boring Nos. B-11 and B-14 and at the ground surface at Boring Nos. B-4, B-7, B-9, B-12, and B-15 through B-18. These fill soils extend to depths of 1½ to 8½± feet below existing grade. These fill soils generally consist of dark gray brown to gray brown, loose to medium dense clayey fine sands, clayey fine to medium sands, and silty fine sands and medium stiff to stiff fine to medium sandy clays and silty clays.

The fill soils possess variable strengths and a disturbed appearance, resulting in their classification as fill.

Colluvium

Native colluvium was encountered beneath the fill soils at Boring No B-9 and at the ground surface at Boring Nos. B-2, B-3, B-8, and B-13. The colluvium extends to depths of 4½ to 12± feet below existing grade. The colluvium generally consists of dark gray brown to black, medium stiff to hard silty clays with varying amounts of calcareous veining and bedrock fragments.

Alluvium

Native alluvial soils were encountered beneath the fill materials, colluvium, and/or at the ground surface at most of the boring locations. The alluvium generally consists of loose to dense fine sands, silty fine sands, silty fine to medium sands, clayey fine sands and clayey fine to medium sands, and medium stiff to stiff fine to medium sandy clays and silty clays extending to depths of 14½ to 47± feet and to at least the maximum depth explored of 61½± feet at Boring No. B-5.

Bedrock

Silty claystone and sandy siltstone bedrock of the Monterey Formation was encountered beneath the colluvium and alluvium at most of the boring locations. The Monterey Formation bedrock extends from depths of 4½ to 47± feet below the ground surface to depths of at least 56± feet, the maximum depth of drilling before refusal conditions were encountered at Boring No. B-6. Bedrock was generally encountered at shallower depths within the central portion of the site, and at greater depths in the northern and southern portions of the site. The bedrock generally consisted of friable, weakly to moderately cemented, thinly interbedded stiff to hard gray brown silty claystone, fine grained sandy siltstone, and silty fine grained sandstone with iron oxide staining and calcareous veining. The bedrock was also slightly diatomaceous and possessed relatively high moisture contents while appearing to be less moist.

Groundwater

Very moist to wet soils were encountered during drilling at Boring Nos. B-4, B-5, B-6, B-11, and B-17 at depths ranging from 25 to 37± feet below the existing site grades (elevations of 414 to 431± feet msl). Delayed readings taken within the open boreholes identified free water at similar depths.

Based on the water level measurements, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at elevations between 423 and 431± feet msl in the southern area of the site and at an elevation of 414± feet msl in the northeastern area of the site at the time of the subsurface exploration.

As part of our research, we reviewed historic high groundwater levels reported in the CA DMG Open-File Report 98-10 for the La Habra Quadrangle. Plate 1.2 of OFR 98-19 is a map which displays the historically highest ground water levels using contour lines. This map indicates that the historic high ground water level at the subject site and surrounding areas is approximately 20± feet below existing site grades.

4.3 Geologic Conditions

Geologic research indicates that the site is underlain by the Yorba member shale of the Monterey Formation bedrock. The primary available reference applicable to the subject site is the Geology Map of the Whittier and La Habra Quadrangles, (Western Puente hills), Los Angeles and Orange Counties, California, by T.W. Dibblee, 2001. A portion of this map indicating the location of the subject site is included herein as Plate 3 in Appendix A.

This map indicates that the subject site is underlain by the Yorba member shale of the Monterey Formation. The Yorba member shale of the Monterey Formation is described as thin-bedded, white-weathering, platy, siliceous, to light gray, semi-siliceous to silty, locally with thin layers of fine-grained sandstone; locally includes few thin layers of hard dolomite. The bedding attitude on this map indicates that the beds in the area of the subject site strike generally east-west, dipping 32 degrees downward to the north. Based on the conditions encountered in the exploratory borings, the geologic mapping is considered to be consistent with the subject site except for the angle of the bedding which is further described in Section 6.2 of this report. The majority of the borings encountered Monterey Formation bedrock at depths of 4½ to 47± feet below existing site grades.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. The field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

In-situ Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-15 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

Representative bulk samples have been tested for their maximum dry densities and optimum moisture contents. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557. These tests are generally used to compare the in-situ densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date. The results of this test are plotted on Plates C-16 through C-19 in Appendix C of this report.

Direct Shear

Direct shear tests were performed on selected soil samples to determine their shear strength parameters. The test was performed in accordance with ASTM D-3080. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Three samples of the same soil are prepared by remolding them to 90± percent compaction and near optimum moisture. Each of the three samples are then loaded with different normal loads and the resulting shear strength is determined for that particular normal load. The shearing of the samples is performed at a rate slow enough to permit the dissipation of excess pore water pressure. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The results of the direct shear test are presented on Plates C-20 through C-22.

Soluble Sulfates

Representative samples of the near-surface soils were submitted to a subcontracted analytical laboratory for determination of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete which comes into contact with these soils. The result of the soluble sulfate testing is presented below, and is discussed further in a subsequent section of this report.

Sample Identification	Soluble Sulfates (%)	ACI 318 Classification
B-1 @ 0 to 5 feet	0.001	Negligible
B-5 @ 0 to 5 feet	0.004	Negligible
B-12 @ 0 to 5 feet	0.004	Negligible
B-18 @ 0 to 5 feet	0.008	Negligible

Expansion Index

The expansion potential of the on-site soils was determined in general accordance with ASTM D-4829 as required by the California Building Code. The testing apparatus is designed to accept a 4-inch diameter, 1-in high, remolded sample. The sample is initially remolded to 50± 1 percent saturation and then loaded with a surcharge equivalent to 144 pounds per square foot. The sample is then inundated with water, and allowed to swell against the surcharge. The resultant swell or consolidation is recorded after a 24-hour period. The results of the EI testing are as follows:

Sample Identification	Expansion Index	Expansive Potential
B-1 @ 0 to 5 feet	73	Medium
B-8 @ 0 to 5 feet	106	High
B-12 @ 0 to 5 feet	73	Medium

Resistivity and pH Testing

Selected representative bulk samples of soil collected from the building areas were submitted to a subcontracted analytical laboratory for determination of electrical resistivity and pH. The resistivity of the soils is a measure of their potential to attack buried metal improvements such as utility lines. The results of the resistivity and pH testing are presented below, and are discussed further in a subsequent section of this report.

Sample Identification	**Resistivity (ohm-cm)**	**pH**
B-1 @ 0 to 5	6500	7.5
B-8 @ 0 to 5	4100	7.5
B-12 @ 0 to 5	5200	7.6

6.0 CONCLUSIONS AND RECOMMENDATIONS

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the site is considered low.

Seismic Design Parameters

The 2013 California Building Code (CBC) was adopted by all municipalities within Southern California on January 1, 2014. The CBC provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

The 2013 CBC Seismic Design Parameters have been generated using U.S. Seismic Design Maps, a web-based software application developed by the United States Geological Survey. This software application, available at the USGS web site, calculates seismic design parameters in accordance with the 2013 CBC, utilizing a database of deterministic site accelerations at 0.01 degree intervals. The table below is a compilation of the data provided by the USGS application. A copy of the output generated from this program is included as Plate E-1 in Appendix E of this report. A copy of the Design Response Spectrum, as generated by the USGS application is also included in Appendix E. Based on this output, the following parameters may be utilized for the subject site:

2013 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	2.155
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.766
Site Class	---	C*
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	2.155
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	0.996
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.437
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.664

*The 2013 CBC requires that Site Class F be assigned to any profile containing soils vulnerable to potential failure or collapse under seismic loading, such as liquefiable soils. For Site Class F, the site coefficients are to be determined in accordance with Section 11.4.7 of ASCE 7-10. However, Section 20.3.1 of ASCE 7-10 indicates that for sites with structures having a fundamental period of vibration equal to or less than 0.5 seconds, the site class is determined using the standard procedures. Based on the liquefaction evaluation, two of the buildings at the subject site may be underlain by potentially liquefiable soils. **If the proposed structures have fundamental periods greater than 0.5 seconds, SCG should be contacted to revise these seismic design parameters.**

Ground Motion Parameters

For the purposes of the liquefaction analysis performed for this study, we utilized a site acceleration that is consistent with maximum considered earthquake ground motions, as required by the 2013 CBC. The peak ground acceleration (PGA_M) was determined in accordance with Section 11.8.3 of ASCE 7-10. The parameter PGA_M is the maximum considered earthquake geometric mean (MCE_G) PGA, multiplied by the appropriate site coefficient from Table 11.8-1 of ASCE 7-10. The web-based software application U.S. Seismic Design Maps (described in the previous section) was used to determine PGA_M, using ASCE 7-10 as the building code reference document. A portion of the program output is included as Plate E-2 in Appendix E of this report

Liquefaction

Research of the Seismic Hazards Zones Map for the La Habra Quadrangle, published by the California Geological Survey (CGS) indicates that a portion of the site subject site is located within a liquefaction hazard zone. Based on this mapping, and the subsurface conditions encountered at the borings, the scope of this investigation included a detailed liquefaction evaluation in order to determine the site-specific liquefaction potential.

The liquefaction evaluation was performed using the reported historic groundwater depth of 20 feet. The primary reference used to determine the historic groundwater depths in this area is CGS Open File Report 98-10, the Seismic Hazard Evaluation of the La Habra Quadrangle.

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The liquefaction analysis was conducted in accordance with the requirements of Special Publication 117A (CDMG, 2008), and currently accepted practice (SCEC, 1997). The liquefaction potential of the subject site was evaluated using the empirical method developed by Boulanger and Idriss (Boulanger and Idriss, 2008). This method predicts the earthquake-induced liquefaction potential of the site based on a given design earthquake magnitude and peak ground acceleration at the subject site. This procedure essentially compares the cyclic resistance ratio (CRR) [the cyclic stress ratio required to induce liquefaction for a cohesionless soil stratum at a given depth] with the earthquake-induced cyclic stress ratio (CSR) at that depth from a specified design earthquake (defined by a peak ground surface acceleration and an associated earthquake moment magnitude). CRR is determined as a function of the corrected SPT N-value $(N_1)_{60\text{-}cs}$, adjusted for fines content. The factor of safety against liquefaction is defined as CRR/CSR. Based on Special Publication 117A, a factor of safety of at least 1.3 is required in order to demonstrate that a given soil stratum is non-liquefiable. Additionally, in accordance with Special Publication 117A, clayey soils which do not meet the criteria for liquefiable soils defined by Bray and Sancio (2006), loose soils with a plasticity index (PI) less than 12 and moisture content greater than 85% of the liquid limit, are considered to be insusceptible to liquefaction. Non-sensitive soils with a PI greater than 18 are also considered non-liquefiable.

The liquefaction analysis procedure is tabulated on the spreadsheet forms included in Appendix F of this report. The liquefaction analysis was performed for Boring Nos. B-6, B-11 and B-17, which were each advanced to depths of at least 50± feet, except Boring No. B-11 which encountered refusal conditions on very dense bedrock at a depth of 37± feet. Prior to subsurface exploration, additional deep borings were intended to be drilled in the northwest and central portions of the site, for the purpose of evaluating the liquefaction hazard. However, the majority of these borings encountered very dense bedrock at depths shallower than the depth of the historic high groundwater table. The liquefaction potential was analyzed at the three boring locations utilizing a PGA_M of 0.796g related to a 6.99M magnitude seismic event.

If liquefiable soils are identified, the potential settlements that could occur as a result of liquefaction are determined using the equation for volumetric strain due to post-cyclic reconsolidation (Yoshimine et. al, 2006). This procedure uses an empirical relationship between the induced cyclic shear strain and the corrected N-value to determine the expected volumetric strain of saturated sands subjected to earthquake shaking. This analysis is also documented on the spreadsheets included in Appendix F.

Conclusions and Recommendations

Since a grading plan is not available for the proposed development, the results of this liquefaction evaluation are considered preliminary. Changing the site grades in the areas susceptible to liquefaction will change the soil overburden pressure which will affect the results of the analysis. The calculated settlement may increase or decrease as a result of such changes.

Liquefaction is not considered to be a design concern for most of the proposed buildings, due to the presence of very dense bedrock at depths shallower than the historic high groundwater table. However, native alluvial soils extending to depths greater than the historic high and existing groundwater table elevations were encountered at borings which were drilled near the southwest, southeast, and northeast corners of the site.

The results of the liquefaction analysis have identified potentially liquefiable soils at Boring Nos. B-6 and B-11, which were drilled in the southwest and northeast building locations, respectively. Liquefiable soils were not encountered at boring number B-17, which was drilled within the southeastern-most building location. The potentially liquefiable soils are located between depths of 20 to 32± feet. Soils which are located above the historic groundwater table (20 feet), or possessing factors of safety in excess of 1.3 are considered non-liquefiable. The silty clay stratum encountered between depths of 20 and 22± feet at Boring No. B-17 is also considered non-liquefiable due to its cohesive characteristics and the results of the Atterberg limits testing with respect to the requirements of Special Publication 117A. Settlement analyses were conducted for each of the potentially liquefiable strata.

Based on the settlement analysis (also tabulated on the spreadsheets in Appendix F) total dynamic (liquefaction induced) settlements on the order of 1.25 inches at Boring No. B-6 which represents a portion of the subsurface profile beneath the southwestern-most proposed hotel building, and dynamic settlements on the order of 0.96 inches could be expected at boring No. B-11, which represents a portion of the subsurface profile beneath the northwestern-most, proposed retail/office building. The remaining buildings are considered to be in areas which are not susceptible to liquefaction due to the presence of bedrock at depths shallower than the historic high groundwater table.

The subsurface profiles beneath both of these buildings possess variable liquefaction potentials, due the varying bedrock depths. Portions of each of these building areas are considered to be insusceptible to liquefaction due to the presence of relatively shallow, dense soils and/or very dense bedrock. Therefore, the associated differential settlements for each of these buildings are considered to be equal to the potential total dynamic settlements. The associated differential settlement in the area of the southwestern-most hotel building would therefore be on the order of 1¼± inches. The associated differential settlement in the area of the northeastern-most retail/office building would be on the order of 1± inch.

The estimated differential settlements for these two buildings should be assumed to occur across a distance of 100 feet, indicating maximum angular distortions of less than 0.002 inches per inch. These settlements are considered to be within the structural tolerances of typical buildings supported on shallow foundation systems. However, it should be noted that minor to moderate repairs, including repair of damaged drywall and stucco, etc., could be required after the occurrence of liquefaction-induced settlements.

Shallow foundation systems can be designed to resist the effects of the anticipated differential settlements, to the extent that the structures would not catastrophically fail. Designing the proposed structures to remain completely undamaged during a major seismic event is not considered to be economically feasible. Based on this understanding, the use of a shallow foundation system is considered to be the most economical means of supporting the majority of the proposed structures. Although shallow foundations can be designed to resist the effects of the anticipated differential settlements, it may be necessary or desirable support the heaviest structures, such as the two 6-story hotel buildings, on an alternative foundation system such as a mat foundation or deep foundations, as discussed in the subsequent Foundation Design section of this report.

In order to support the proposed buildings on shallow foundations (such as spread footings) the structural engineer should verify that the structure would not catastrophically fail due to the predicted dynamic differential settlements. Any utility connections to the structures should be designed to withstand the estimated differential settlements. It should also be noted that minor to moderate repairs, including releveling, restoration of utility connections, repair of damaged drywall and stucco, etc., would likely be required after occurrence of the liquefaction-induced settlements.

The use of shallow foundation systems, as described in this report, is typical for buildings of these types, where they are underlain by the extent of liquefiable soils encountered at this site. The post-liquefaction damage that could occur within the buildings at this site will also be typical of similar buildings in the vicinity of this project. However, if the owner determines that this level of potential damage is not acceptable, other geotechnical and structural options are available, including the use of ground improvement, deep foundations or a mat foundation.

6.2 Geotechnical Design Considerations

General

At the present time, grading plans are not available for the proposed development. Additionally, proposed building pad elevations are not available. Based on the existing site topography, we expect that cuts and fills of up to 15± feet may be necessary to achieve the proposed site grades. Additionally, we understand that some of the buildings (including the two hotel buildings and the 3-story retail building may incorporate one or two subterranean levels for parking). Preliminary grading and foundation design recommendations have been included in subsequent sections of this report. However, it should be understood that these recommendations are based on preliminary assumptions and will require review and may be revised upon review of grading and foundation plans. Factors which may affect the grading and foundation design recommendations include the depth of bedrock with respect to the proposed building pad elevations, foundation loads, and if the proposed buildings will include below grade subterranean parking levels. It may be necessary to perform additional subsurface exploration in the areas of the proposed buildings in order to update the grading and foundation design recommendations after the finished building pad elevations and foundation loads become available.

The most noteworthy geotechnical feature of the subject site is the variable depth bedrock below the ground surface, throughout the subject site. In general, Monterey Formation bedrock consisting primarily of interbedded layers of silty claystone and silty sandstone was encountered at depths as shallow as 5½± feet in the central portion of the site, at depths of 14½ to 33± feet in the northern portion of the site, and at depths as great as 19½ to 49± feet in the southern portion of the site. Boring No. B-5, in the southwestern portion of the site, did not encounter bedrock within the upper 61½± feet.

The near surface soils at the subject site consist of artificial fill materials, colluvium, and native alluvium. The artificial fill soils possess variable strengths, composition, and densities. These soils are not considered suitable to support the foundation loads of the new structures. Additionally some of the artificial fill materials possess unfavorable consolidation/collapse characteristics. Therefore, remedial grading is recommended to remove the artificial fill soils in their entirety. The native alluvial soils and colluvium generally possess higher strengths and more favorable consolidation/collapse characteristics. Some remedial grading of these materials is recommended in order to provide uniform support characteristics for new structures, to limit settlement, and to eliminate cut/fill transitions within the building pads.

As discussed in a previous section of this report, potentially liquefiable soils were identified in localized areas of the site. The presence of the recommended layer of newly placed compacted structural fill above these liquefiable soils will help to reduce any surface manifestations that could occur as a result of liquefaction. The foundation and floor slab design recommendations presented in the subsequent sections of this report also contain recommendations to provide additional rigidity in order to reduce the potential effects of differential settlement that could occur as a result of liquefaction. The liquefaction analysis should be revised after the grading plan becomes available. The depths of cut or fill performed within these areas will affect the potential settlement.

High angle bedding was observed within the samples of bedrock materials recovered at the boring locations. However, conventional drilling techniques do not maintain the directional orientation of the samples as they are withdrawn from the borehole. Therefore, it was not possible to determine the bedding attitudes of the bedrock materials. The Geologic Map, included as Plate 3 in Appendix A of this report, indicates that the bedrock materials possess a bedding angle of 32 degrees dipping downward to the north. However, the bedding angles of recovered bedrock samples appeared to be steeper than 32 degrees. Based on these considerations, additional subsurface exploration consisting of backhoe test pits should be performed in areas where slopes, retaining walls or basements will extend into the bedrock materials, so that the actual bedding attitudes may be determined. If adverse bedding conditions are present, it may be necessary to design slopes, retaining walls and basement walls for a geologic surcharge.

Settlement

The near surface fill soils possess variable strengths, compositions, and densities. Some of the artificial fill materials also possess marginal consolidation/collapse characteristics. The recommended remedial grading will remove the artificial fill soils and the upper portion of the native soils from the building pad areas. The native soil and bedrock materials remaining beneath the depth of overexcavation generally possess greater strengths. The proposed remedial grading will also help mitigate the potential for differential settlement across cut-fill transitions. Provided that the recommended remedial grading is completed, the post-construction static settlements of the proposed structure are expected to be within tolerable limits.

Cut/Fill Transitions

Due to the varying existing topography within the proposed building areas, cut/fill transitions are likely to be created within the proposed building pad areas. The differing support conditions of the native soils and bedrock versus the newly compacted fill soils may result in excessive differential settlements if not mitigated. Remedial grading will be required to eliminate the cut/fill transitions which will occur at building pad and foundation bearing grades.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the selected samples of the on-site soils contain negligible concentrations of soluble sulfates, in accordance with American Concrete Institute (ACI) guidelines. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at pad grade within the building area.

Expansion

Most of the near surface soils at this site consist of sandy clays and silty clays. Laboratory testing indicates that these materials have medium to high expansion potentials (EI = 73 and 106). The recommendations contained in this report are made with respect to this condition. **Based on the presence of expansive soils, special care should be taken to properly moisture condition and maintain adequate moisture content within all subgrade soils as well as newly placed fill soils.** Due to the significant amount of grading expected to be performed at this site, it is recommended that additional expansion index testing be performed subsequent to grading to confirm the actual conditions at the building pad subgrade elevations. Based on the varied expansion potentials, and with respect to the relatively large volume of grading which is proposed, it is expected that the finished lot will possess a medium expansion potential.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the native alluvial soils and colluvium is estimated to result in an average shrinkage of 8 to 12 percent. Relatively minor bulking on the order of 0 to 5 percent may occur in areas of significant cut into weathered bedrock materials.

Minor ground subsidence is expected to occur in the soils below the zone of removal due to settlement and machinery working. The subsidence is estimated to be 0.1 feet. This estimate is based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

Detailed grading and foundation plans were not available at the time of this report. It is therefore recommended that we be provided with copies of the preliminary plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping and Demolition

Development of the subject site will require demolition of the newly constructed temporary street, existing parking lot pavements, remnants of the former asphaltic concrete road, and any utilities, septic systems, or other improvements that will not remain in place with the new development. Any remnants of previous structures, including foundations, slabs, and debris resulting from demolition activities should be properly disposed of off-site. Concrete and asphalt debris may be re-used within the compacted fills, provided they are pulverized and the maximum particle size is less than 2 inches.

Initial site stripping should include removal of any surficial vegetation and topsoil. Based on conditions encountered at the time of the subsurface exploration, stripping of grass and weeds will be necessary, especially near the drainage ditches along the northern property line in the northeast corner of the site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

Treatment of Existing Soils: Building Pads

Remedial grading should be performed within the proposed building areas in order to provide uniform foundation support characteristics by removing the upper portion of the native soils and the artificial fill materials in their entirety. Based on conditions encountered at the boring locations, the existing soils within the proposed building areas are recommended to be overexcavated to a depth of at least 5 feet below the proposed building pad subgrade elevation and to a depth of at least 5 feet below existing grade, whichever is greater. The depth of the overexcavation should also extend to a depth sufficient to remove all artificial fill soils or any soils disturbed during demolition. Artificial fill materials extended to depths 1½ to 8½± feet at the boring locations.

Additional overexcavation should be performed within the influence zones of the new foundations, to provide for a new layer of compacted structural fill extending to a depth of 3 feet below proposed bearing grade in the areas of single-story office and retail buildings. Within the areas of the two proposed 6-story hotel buildings and the 3-story retail building, the overexcavation should extend below the foundation bearing grade to a depth equal to the width of the footing, or into suitable bedrock materials, in order to limit potential settlements to within tolerable limits.

In order to reduce the potential for excessive differential settlement due to the differing support conditions provided by the native soils and/or weathered bedrock and the newly placed fill soils, the cut portion of the building pads should be overexcavated to at least 5 feet below the proposed pad grade and to at least 3 feet below foundation bearing grade.

The overexcavation areas should extend outside the building perimeter to at least 5 feet beyond the edges of the foundations, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the overexcavation should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the building areas should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose or otherwise unstable soils that must be removed.

The borings generally encountered soils at or near the optimum moisture content within the upper 10 to 20± feet in native alluvial soils. The near surface native colluvium, deeper alluvial soils, and bedrock materials generally possess elevated moisture contents. If very moist silt or clay layers are encountered at the base of the overexcavations, some subgrade stabilization may be required. Scarification and air drying of these materials may be sufficient to obtain a stable subgrade. However, if highly unstable soils are identified, and if the construction schedule does not allow for delays associated with drying, mechanical stabilization of these materials may be necessary. Some localized areas of deeper excavation may be required if additional fill materials or loose, porous, or low density native soils are encountered at the base of the overexcavations.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches and moisture treated to 2 to 4 percent above optimum moisture content. The subgrade soils should then be recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of any proposed retaining walls should be overexcavated to a depth of 3 feet below foundation bearing grade and replaced as compacted structural fill, as discussed above for the proposed building pads. Subgrade soils in areas of non-retaining site walls should be overexcavated to a depth of 2 feet below proposed bearing grade. In both cases, the overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning to 2 to 4 percent above optimum moisture content and recompacting the upper 12 inches of exposed subgrade soils. The previously excavated soils may then be replaced as compacted structural fill. Expansive sandy clays and silty clays should not be used as backfill material behind retaining walls. Therefore, on-site silty sands and sandy soils should be selectively graded for use as retaining wall backfill.

Treatment of Existing Soils: Flatwork Areas

Subgrade preparation in the new flatwork areas should initially consist of removal of all soils disturbed during stripping and demolition operations. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Consideration should be given to selectively grading sands and silty sands encountered during excavation and selectively placing such materials within the proposed lightly loaded flatwork areas.

Treatment of Existing Soils: Parking Areas

Subgrade preparation in the new parking areas should initially consist of removal of all soils disturbed during stripping and demolition operations. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength alluvial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not mitigate the extent of undocumented fill soils in the parking areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, all of the existing undocumented fill soils within these areas should be removed and replaced as structural fill.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer. Some of the existing near surface soils are expected to possess elevated moisture contents. Drying of these materials will likely be required in order to obtain a moisture content suitable for recompaction.
- All grading and fill placement activities should be completed in accordance with the requirements of the CBC and the grading code of the County of Los Angeles.

- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Due to the varied expansive potentials of the on-site soils, fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Imported Structural Fill

All imported structural fill should consist of low (EI < 50), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. As an alternative, a clean sand (minimum Sand Equivalent of 30) may be placed within trenches and compacted in place (jetting or flooding is not recommended). Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the County of Los Angeles. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near surface soils generally consist of sandy clays and silty clays with underlying layers of sands, silty sands and clayey sands. These materials may be subject to minor caving within shallow excavations. Where caving does occur within shallow excavations, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 1.5h:1v. Deeper excavations may require some form of external stabilization such as shoring or bracing. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. All excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Moisture Sensitive Subgrade Soils

Most of the near surface soils possess appreciable silt and clay content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

If the construction schedule dictates that site grading will occur during a period of wet weather, allowances should be made for costs and delays associated with drying the on-site soils or import of a drier, less moisture sensitive fill material.

Expansive Soils

The near surface on-site soils have been determined to possess a medium to high expansion potential. Therefore, care should be given to proper moisture conditioning of all building pad subgrade soils to a moisture content of 2 to 4 percent above the Modified Proctor optimum during site grading. All imported fill soils should have low expansive (EI < 50) characteristics. **In addition to adequately moisture conditioning the subgrade soils and fill soils during grading, special care must be taken to maintain moisture content of these soils at 2 to 4 percent above the Modified Proctor optimum. This will require the contractor to frequently moisture condition these soils throughout the grading process, unless grading occurs during a period of relatively wet weather**.

Due to the presence of expansive soils at this site, provisions should be made to limit the potential for surface water to penetrate the soils immediately adjacent to the structures. These provisions should include directing surface runoff into rain gutters and area drains, reducing the extent of landscaped areas around the structure, and sloping the ground surface away from the buildings. Where possible, it is recommended that landscaped planters not be located immediately adjacent to the buildings. If landscaped planters around the buildings are necessary, it is recommended that drought tolerant plants or a drip irrigation system be utilized, to minimize the potential for deep moisture penetration around the structures. Presented below is a list of additional soil moisture control recommendations that should be considered by the owner, developer, and civil engineer:

- Ponding and areas of low flow gradients in unpaved walkways, grass and planter areas should be avoided. In general, minimum drainage gradients of 2 percent should be maintained in unpaved areas.
- Bare soil within five feet of proposed structures should be sloped at a minimum 2 percent gradient away from the structure (about three inches of fall in five feet), or the same area could be paved with a minimum surface gradient of one percent. Pavement is preferable.
- Decorative gravel ground cover tends to provide a reservoir for surface water and may hide areas of ponding or poor drainage. Decorative gravel is, therefore, not recommended and should not be utilized for landscaping unless equipped with a subsurface drainage system designed by a licensed landscape architect.
- Positive drainage devices, such as graded swales, paved ditches, and catch basins should be installed at appropriate locations within the area of the proposed development.
- Concrete walks and flatwork should not obstruct the free flow of surface water to the appropriate drainage devices.
- Area drains should be recessed below grade to allow free flow of water into the drain. Concrete or brick flatwork joints should be sealed with mortar or flexible mastic.
- Gutter and downspout systems should be installed to capture all discharge from roof areas. Downspouts should discharge directly into a pipe or paved surface system to be conveyed offsite.
- Enclosed planters adjoining, or in close proximity to proposed structures, should be sealed at the bottom and provided with subsurface collection systems and outlet pipes.

- Depressed planters should be raised with soil to promote runoff (minimum drainage gradient two percent or five percent, see above), and/or equipped with area drains to eliminate ponding.
- Drainage outfall locations should be selected to avoid erosion of slopes and/or properly armored to prevent erosion of graded surfaces. No drainage should be directed over or towards adjoining slopes.
- All drainage devices should be maintained on a regular basis, including frequent observations during the rainy season to keep the drains free of leaves, soil and other debris.
- Landscape irrigation should conform to the recommendations of the landscape architect and should be performed judiciously to preclude either soaking or excessive drying of the foundation soils. This should entail regular watering during the drier portions of the year and little or no irrigation during the rainy season. Automatic sprinkler systems should, therefore, be switched to manual operation during the rainy season. Good irrigation practice typically requires frequent application of limited quantities of water that are sufficient to sustain plant growth, but do not excessively wet the soils. Ponding and/or run-off of irrigation water are indications of excessive watering.

Other provisions, as determined by the landscape architect or civil engineer, may also be appropriate.

Groundwater

Based on the conditions encountered in the borings, the groundwater table is expected to be located approximately between approximate elevations of 423 and 431± feet msl in the southern area of the site and at an elevation of 414± feet msl in the northeastern corner of the site (depths of 25 to 37± feet below the existing ground surface). Based on the depths to groundwater, it is not expected that the groundwater will affect excavations for the foundations or utilities. However, grading plans are currently unavailable.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pads will be underlain by structural fill soils used to replace artificial fill soils and the upper portion of the near surface native alluvium and colluvium. In the areas of the proposed single-story buildings, the new structural fill soils are expected to extend to a depth of at least 3 feet below foundation bearing grade, underlain by an additional 12 inches of soils that have been moisture conditioned and compacted in place. In the areas of 3-story retail and 6-story story hotel buildings, the structural fill soils will extend at least to a depth equal to the foundation width below foundation bearing grades, assuming the at these structures will be supported on shallow foundations.

Based on this subsurface profile, all of the office and retail buildings may be supported on conventional shallow foundation systems. It is also expected that the two 6-story hotel buildings can be supported on shallow foundations. However, this recommendation is subject to review of the grading plans and foundation loads when this information becomes available. Due to the height of the 6-story hotel buildings, greater foundation loads are anticipated. These buildings may also incorporate additional levels of subterranean parking. The 6-story building in the southwest is partially underlain by potentially liquefiable soils. Based on these considerations, it may be desirable to support one or both of the 6-story hotel buildings on an alternative foundation system, such as a mat foundation or a deep foundation system. Recommendations for alternative foundation systems can be provided following review of the grading plans and foundation loads for these buildings. Additional subsurface exploration may be necessary in order to provide an alternative foundation design. Until such information becomes available, it is assumed that both of the hotel buildings can be supported on conventional shallow foundation systems.

Building Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 2,500 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: six (6) No. 5 rebars (3 top and 3 bottom), due to the medium to high expansive potential and the liquefaction potential (in localized areas) of the soils at this site.
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent grade.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by 1/3 when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice, given the magnitude of predicted liquefaction-induced settlements, and the structure type proposed for this site. Additional rigidity may be necessary for structural considerations, or to resist the effects of the liquefaction-induced differential settlements as discussed in Section 6.1. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Within the new building areas, soils suitable for direct foundation support should consist of newly placed structural fill, compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, bedrock, or competent native alluvial soils, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to at least 2 to 4 percent of the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 30-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch. These settlements are in addition to the liquefaction-induced settlements previously discussed in Section 6.1 of this report.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 250 lbs/ft^3
- Friction Coefficient: 0.28

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against suitable compacted structural fill. The maximum allowable passive pressure is 2500 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support new floor slabs should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floors of the proposed structures may be constructed as a conventional slabs-on-grade, supported on newly placed structural fill, extending to depths of at least 5 feet below finished pad grades. Based on geotechnical considerations, the floor slabs may be designed as follows:

- Minimum slab thickness: 5½ inches.

- Minimum slab reinforcement: No. 4 bars at 16 inches on-center, in both directions, due to the medium to high expansive potential and liquefaction potential (in localized areas) of the on-site soils. The actual floor slab reinforcement should be determined by the structural engineer, based on the imposed loading.

- Consideration should be given to structurally connecting the floor slabs to the perimeter foundations and/or grade beams. The method of connection should be determined by the structural engineer.

- If moisture sensitive floor coverings will be used, then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire area of the proposed slab. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. Stego® Wrap Vapor Barrier, 15 mils in thickness, meets this specification. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

- The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement. The steel reinforcement recommendations presented above are based on standard geotechnical practice, given the presence of medium to highly expansive soils, the magnitude of predicted liquefaction-induced settlements (where applicable), and the structure type proposed for this site. Additional rigidity may be necessary for structural considerations, or to resist the effects of the liquefaction-induced differential settlements, as discussed in Section 6.1.

6.7 Concrete Flatwork Design and Construction

Presented below are recommendations for flatwork which will be subject only to pedestrian traffic. Based on recommendations presented in Section 6.3 of this report, the flatwork areas will be underlain by at least 12 inches of compacted structural fill. It is recommended that the concrete flatwork incorporate the following characteristics:

- Concrete Thickness: 5 inches due to the presence of medium to highly expansive soils.

- Reinforcement: No. 3 bars at 18 inches on center in both directions, due to the presence of medium to highly expansive soils.

- Consideration should be given to selectively grading sands and silty sands encountered during excavation and selectively placing such materials within the upper 1± foot below lightly loaded flatwork areas.

- Subgrade Preparation: Moisture condition all flatwork subgrade soils to 2 to 4 percent above the optimum moisture content and compact to at least 90 percent of the ASTM D-1557 maximum dry density. The moisture content of all flatwork subgrade soils should be maintained within this range until concrete is poured.

- Where the flatwork is adjacent to a landscape planter or another area with exposed soil, it should incorporate a turned down edge. This turned down edge should be at least 18 inches in depth and 6 inches in width. The turned down edge should incorporate longitudinal steel reinforcement consisting of at least one No. 3 bar.

- Flatwork which is constructed immediately adjacent to the new structure should be dowelled into the perimeter foundations in a manner determined by the structural engineer.

These recommendations are contingent upon additional expansion index testing being conducted at the completion of rough grading, to verify the actual expansion potential of the flatwork subgrade soils.

6.8 Retaining Wall Design and Construction

Although not indicated on the site plan, some retaining walls may be required to facilitate the new site grades. If subterranean parking levels are constructed, the basement walls should be designed to resist lateral earth pressures. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. We have provided parameters assuming the use of sands and silty sands for retaining wall backfill. However, the near surface soils at the site generally consist of sandy clays and silty clays which possess medium to high expansion potentials. **Expansive sandy clays, silty clays, and claystone bedrock materials should not be used. Therefore, on-site silty sands and sandy soils should be selectively graded for use as retaining wall backfill.** Based on the results of direct shear testing, the on-site silty sand materials are expected to possess a friction angle of 30 degrees.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		**Soil Type**
		On-Site Silty Sands
Internal Friction Angle (ϕ)		30°
Unit Weight		125 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	42 lbs/ft^3
	Active Condition (2h:1v backfill)	67 lbs/ft^3
	At-Rest Condition (level backfill)	63 lbs/ft^3

Regardless of the backfill type, the walls should be designed using a soil-footing coefficient of friction of 0.28 and an equivalent passive pressure of 250 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Retaining Wall Foundation Design

The foundation subgrade soils for any new retaining walls should be prepared in accordance with the grading recommendations presented in Section 6.3 of this report. The foundations should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Seismic Lateral Earth Pressures

In accordance with the 2013 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Backfill Material

With exception to expansive silty clay, sandy clay, and claystone bedrock materials, the on-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well graded.

It is recommended that a a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 4-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 8-foot on-center spacing. The weep holes should include a one cubic foot gravel pocket surrounded by a suitable geotextile at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system.

6.9 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The near surface soils generally consist of sandy clays, silty clays, clayey sands, sands and silty sands. Based on their classifications, these materials are expected to possess poor to fair pavement support characteristics, with R-values in the range of 5 to 30. Since R-value testing was not included in the scope of services for this project, the subsequent pavement design is based upon an assumed R-value of 10. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that R-value testing be performed after completion of rough grading. Depending upon the results of the R-value testing, it may be feasible to use thinner pavement sections in some areas of the site.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20 year design life, assuming six operational traffic days per week.

Traffic Index	**No. of Heavy Trucks per Day**
4.0	0
5.0	1
6.0	3
7.0	11

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R = 10)

Materials	**Thickness (inches)**			
	Auto Parking (TI = 4.0)	Auto Drive Lanes (TI = 5.0)	Light Truck Traffic (TI = 6.0)	Moderate Truck Traffic (TI = 7.0)
Asphalt Concrete	3	3	3½	4
Aggregate Base	6	9	12	15
Compacted Subgrade (90% minimum compaction)	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS

Materials	**Thickness (inches)**		
	Auto Parking & Drives (TI = 5.0)	Light Truck Traffic (TI =6.0)	Moderate Truck Traffic (TI = 7.0)
PCC	5	5½	7
Compacted Subgrade (95% minimum compaction)	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. Reinforcing within all pavements should consist of at least heavy welded wire mesh (6x6-W2.9xW2.9 WWF) placed at mid-height in the slab. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness.

7.0 GENERAL COMMENTS

This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

8.0 REFERENCES

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APPENDIX A

SOURCE: LOS ANGELES COUNTY
THOMAS GUIDE, 2013

SITE LOCATION MAP

PROPOSED MIXED USE DEVELOPMENT

LOS ANGELES COUNTY, CALIFORNIA

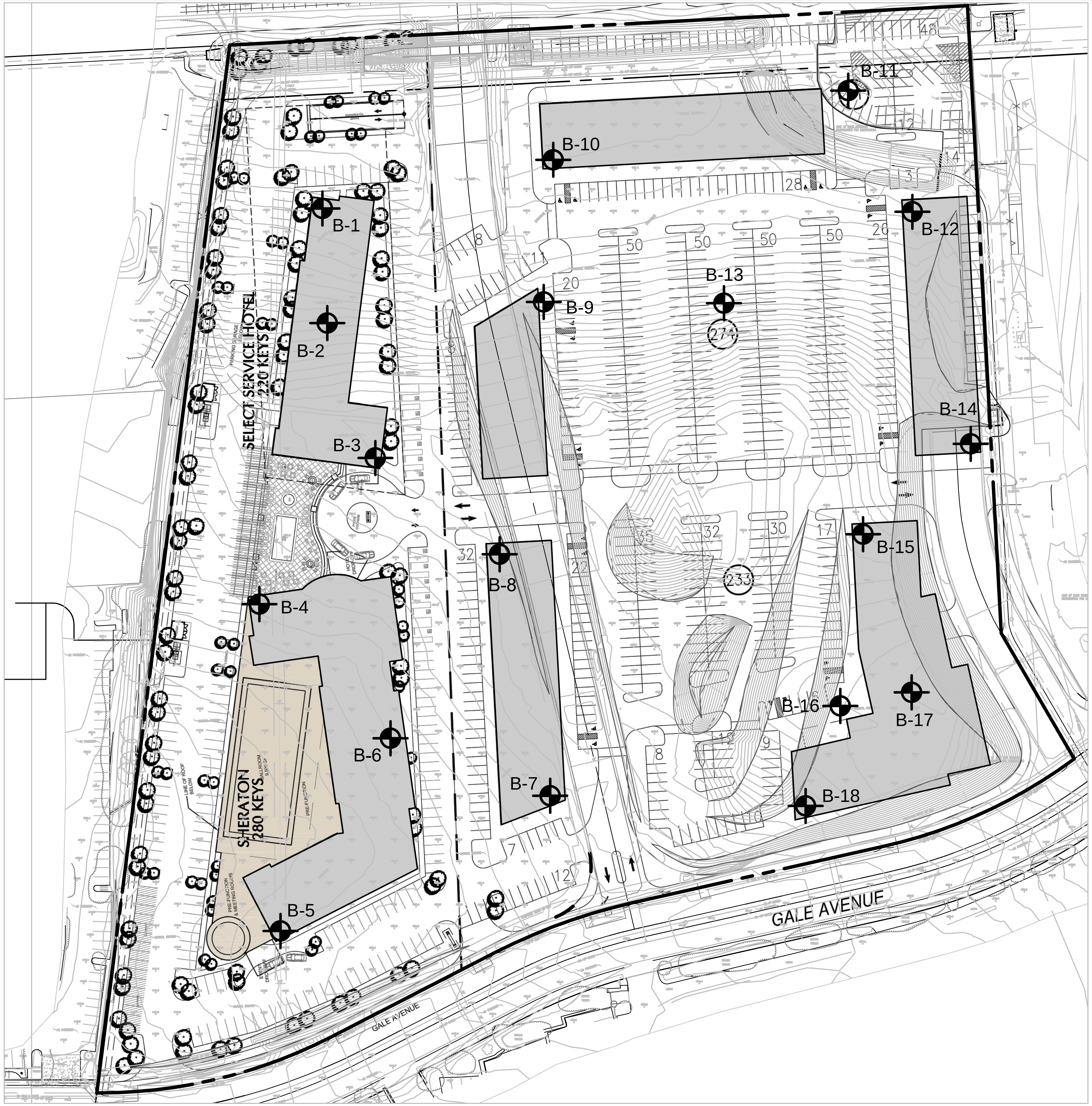
SCALE: 1" = 2400'

DRAWN: ENT
CHKD: JAS

SCG PROJECT
13G184-1

PLATE 1

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

⌖ APPROXIMATE BORING LOCATION

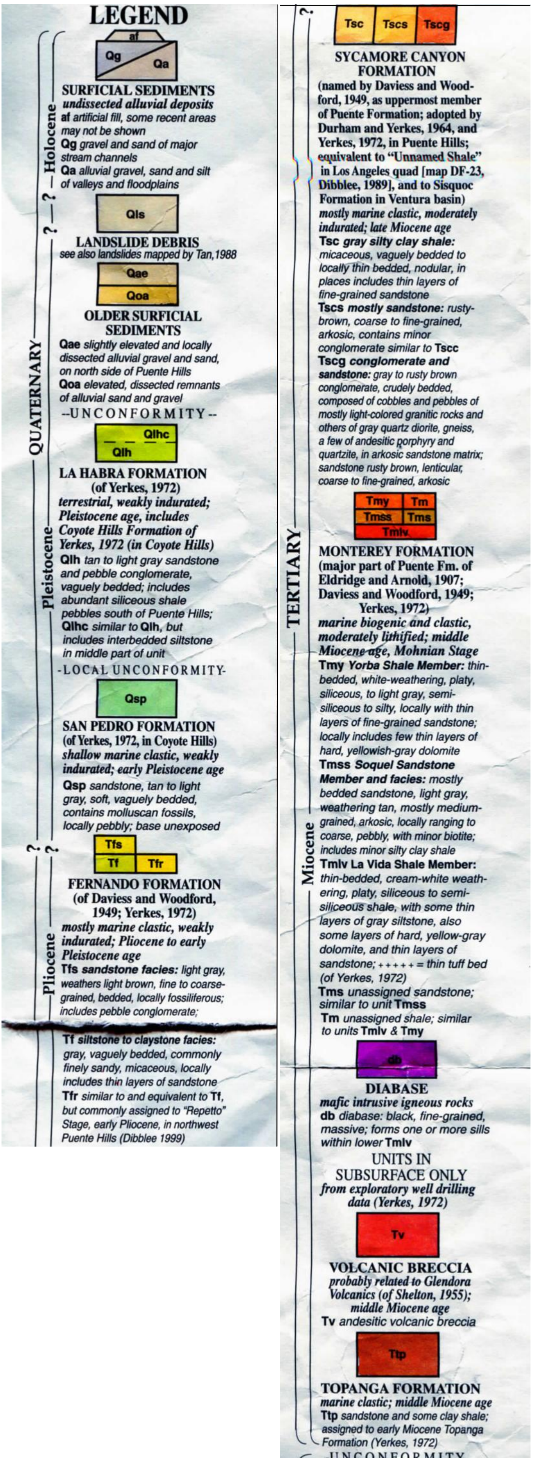
▨ PROPOSED BUILDING

NOTE: BASE MAP PREPARED BY THIENES ENGINEERING, INC.

BORING LOCATION PLAN
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 100'
DRAWN: ENT
CHKD: JAS
SCG PROJECT
13G184-1
PLATE 2

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



LEGEND

QUATERNARY

Holocene

af

Qg | Qa

SURFICIAL SEDIMENTS

undissected alluvial deposits

af *artificial fill, some recent areas may not be shown*

Qg *gravel and sand of major stream channels*

Qa *alluvial gravel, sand and silt of valleys and floodplains*

Qls

LANDSLIDE DEBRIS

see also landslides mapped by Tan,1988

Qae

Qoa

OLDER SURFICIAL SEDIMENTS

Qae *slightly elevated and locally dissected alluvial gravel and sand, on north side of Puente Hills*

Qoa *elevated, dissected remnants of alluvial sand and gravel*

--UNCONFORMITY--

Pleistocene

Qlhc

Qlh

LA HABRA FORMATION

(of Yerkes, 1972)

terrestrial, weakly indurated; Pleistocene age, includes Coyote Hills Formation of Yerkes, 1972 (in Coyote Hills)

Qlh *tan to light gray sandstone and pebble conglomerate, vaguely bedded; includes abundant siliceous shale pebbles south of Puente Hills;*

Qlhc *similar to* **Qlh**, *but includes interbedded siltstone in middle part of unit*

-LOCAL UNCONFORMITY-

Qsp

SAN PEDRO FORMATION

(of Yerkes, 1972, in Coyote Hills)

shallow marine clastic, weakly indurated; early Pleistocene age

Qsp *sandstone, tan to light gray, soft, vaguely bedded, contains molluscan fossils, locally pebbly; base unexposed*

Pliocene

Tfs

Tf | Tfr

FERNANDO FORMATION

(of Daviess and Woodford, 1949; Yerkes, 1972)

mostly marine clastic, weakly indurated; Pliocene to early Pleistocene age

Tfs ***sandstone facies:*** *light gray, weathers light brown, fine to coarse-grained, bedded, locally fossiliferous; includes pebble conglomerate;*

Tf ***siltstone to claystone facies:*** *gray, vaguely bedded, commonly finely sandy, micaceous, locally includes thin layers of sandstone*

Tfr *similar to and equivalent to* **Tf**, *but commonly assigned to "Repetto" Stage, early Pliocene, in northwest Puente Hills (Dibblee 1999)*

TERTIARY

Tsc | Tscs | Tscg

SYCAMORE CANYON FORMATION

(named by Daviess and Woodford, 1949, as uppermost member of Puente Formation; adopted by Durham and Yerkes, 1964, and Yerkes, 1972, in Puente Hills; equivalent to "Unnamed Shale" in Los Angeles quad [map DF-23, Dibblee, 1989], and to Sisquoc Formation in Ventura basin)

mostly marine clastic, moderately indurated; late Miocene age

Tsc ***gray silty clay shale:*** *micaceous, vaguely bedded to locally thin bedded, nodular, in places includes thin layers of fine-grained sandstone*

Tscs ***mostly sandstone:*** *rusty-brown, coarse to fine-grained, arkosic, contains minor conglomerate similar to* **Tscc**

Tscg ***conglomerate and sandstone:*** *gray to rusty brown conglomerate, crudely bedded, composed of cobbles and pebbles of mostly light-colored granitic rocks and others of gray quartz diorite, gneiss, a few of andesitic porphyry and quartzite, in arkosic sandstone matrix; sandstone rusty brown, lenticular, coarse to fine-grained, arkosic*

Miocene

Tmy | Tm

Tmss | Tms

Tmlv

MONTEREY FORMATION

(major part of Puente Fm. of Eldridge and Arnold, 1907; Daviess and Woodford, 1949; Yerkes, 1972)

marine biogenic and clastic, moderately lithified; middle Miocene age, Mohnian Stage

Tmy ***Yorba Shale Member:*** *thin-bedded, white-weathering, platy, siliceous, to light gray, semi-siliceous to silty, locally with thin layers of fine-grained sandstone; locally includes few thin layers of hard, yellowish-gray dolomite*

Tmss ***Soquel Sandstone Member and facies:*** *mostly bedded sandstone, light gray, weathering tan, mostly medium-grained, arkosic, locally ranging to coarse, pebbly, with minor biotite; includes minor silty clay shale*

Tmlv La Vida Shale Member: *thin-bedded, cream-white weathering, platy, siliceous to semi-siliceous shale, with some thin layers of gray siltstone, also some layers of hard, yellow-gray dolomite, and thin layers of sandstone; + + + + + = thin tuff bed (of Yerkes, 1972)*

Tms *unassigned sandstone; similar to unit* **Tmss**

Tm *unassigned shale; similar to units* **Tmlv** *&* **Tmy**

db

DIABASE

mafic intrusive igneous rocks

db *diabase: black, fine-grained, massive; forms one or more sills within lower* **Tmlv**

UNITS IN SUBSURFACE ONLY

from exploratory well drilling data (Yerkes, 1972)

Tv

VOLCANIC BRECCIA

probably related to Glendora Volcanics (of Shelton, 1955); middle Miocene age

Tv *andesitic volcanic breccia*

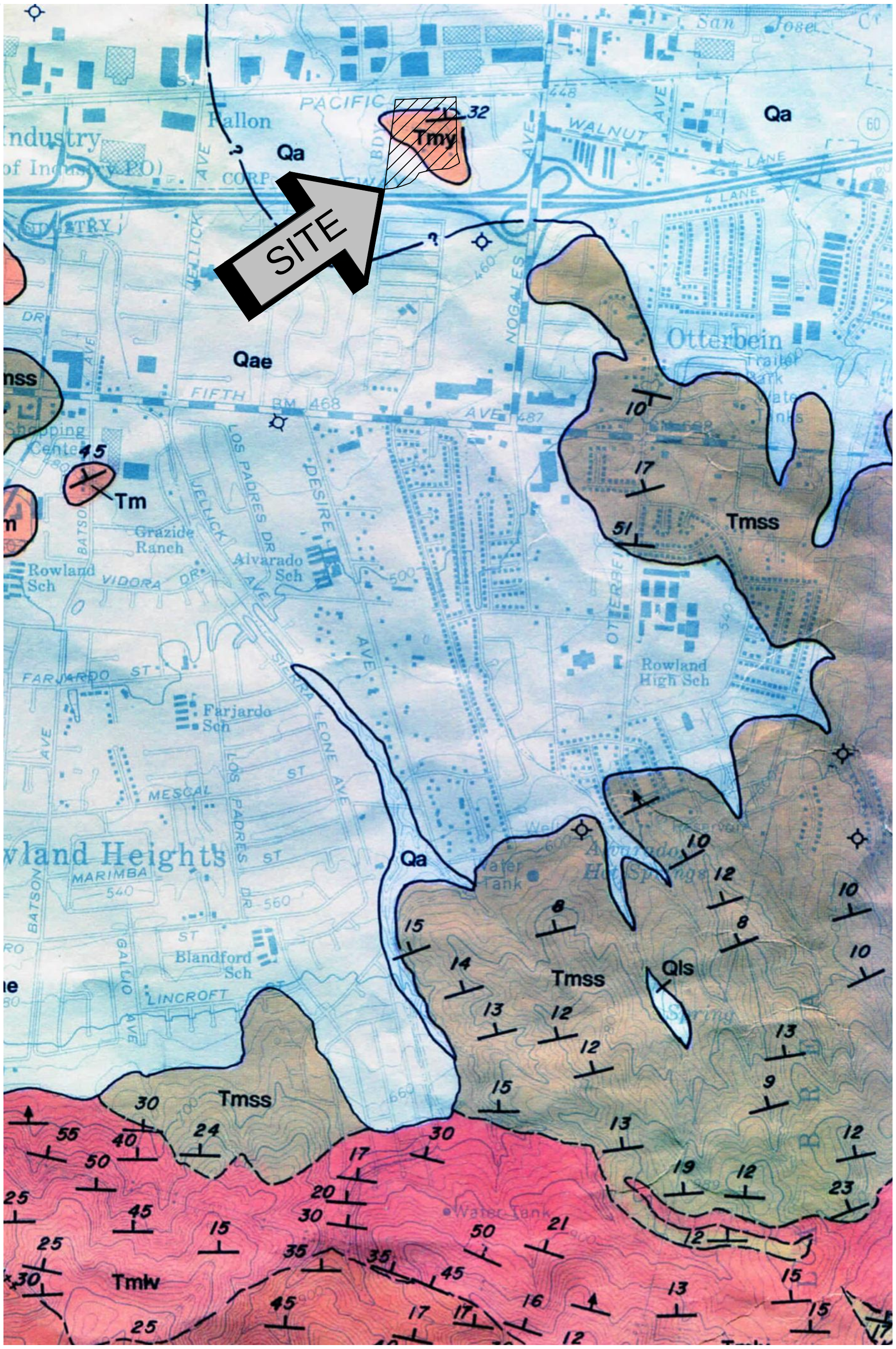
Ttp

TOPANGA FORMATION

marine clastic; middle Miocene age

Ttp *sandstone and some clay shale; assigned to early Miocene Topanga Formation (Yerkes, 1972)*

-UNCONFORMITY-



SOURCE: "GEOLOGY MAP OF THE WHITTIER AND LA HABRA QUADGRANGLES, (WESTERN PUENTE HILLS), LOS ANGELES AND ORANGE COUNTIES, CALIFORNIA" DIBBLEE, 2001

GEOLOGIC MAP

PROPOSED MIXED USE DEVELOPMENT

LOS ANGELES COUNTY, CALIFORNIA

SCALE: 1" = 2000'

DRAWN: DRK
CHKD: JAS

SCG PROJECT
13G184-1

PLATE 3

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SOUTHERN
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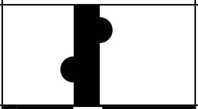
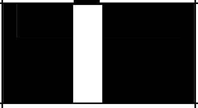
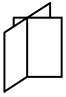
APPENDIX B

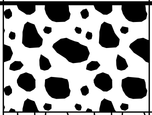
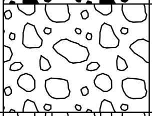
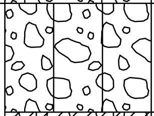
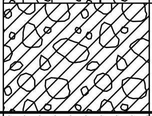
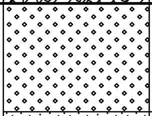
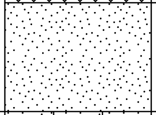
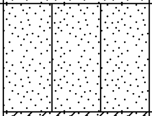
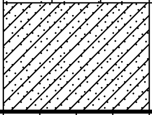
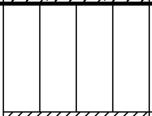
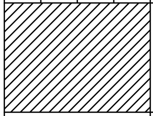
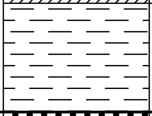
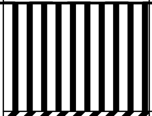
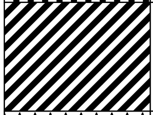
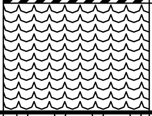
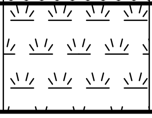
BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS	⋈	CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR	○	NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT	☒	STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH	■	SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH:	Distance in feet below the ground surface.
SAMPLE:	Sample Type as depicted above.
BLOW COUNT:	Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.
POCKET PEN.:	Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.
GRAPHIC LOG:	Graphic Soil Symbol as depicted on the following page.
DRY DENSITY:	Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.
MOISTURE CONTENT:	Moisture content of a soil sample, expressed as a percentage of the dry weight.
LIQUID LIMIT:	The moisture content above which a soil behaves as a liquid.
PLASTIC LIMIT:	The moisture content above which a soil behaves as a plastic.
PASSING #200 SIEVE:	The percentage of the sample finer than the #200 standard sieve.
UNCONFINED SHEAR:	The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN
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BORING NO. B-1

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				SURFACE ELEVATION: 439.5 feet MSL							
				ALLUVIUM: Brown fine Sandy Clay, trace Silt, very stiff-damp							
	☒	37	4.5+		114	11					EI = 73 @ 0 to 5'
	☒	27	4.5+		97	13					
5											
				Light Brown fine Sand, loose-damp							
	☒	33			110	6					
10				Brown fine to medium Sand, trace fine Gravel, medium dense-damp							
				Brown Silty fine Sand, trace to little Clay, medium dense-damp to moist							
	☒	42			106	13					
				Gray Brown Silty fine to medium Sand, medium dense-damp to moist							
				BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Silty Claystone, thinly interbedded with fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-moist to very moist							
15	☒	58	4.5+		83	31					
	☒	63	3.0		80	40					
20	☒	61	4.5+		86	30					
				Dark Gray Brown Siltstone, slightly diatomaceous, cemented, hard-moist							
25	☒	50/5"				21					

Boring Terminated at 27' due to refusal on very dense Bedrock

TEST BORING LOG

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BORING NO.
B-2

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 31 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 447.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					<u>COLLUVIUM:</u> Gray Brown Silty Clay, some fine Sand, trace fine Gravel, abundant calcareous veining, hard-damp							
	☒	32	4.5+				12					
5												
					<u>ALLUVIUM:</u> Brown fine Sandy Clay, little Silt, very stiff-damp							
	☒	24	4.5				15					
10												
					Gray Brown fine Sandy Silt, medium dense-damp to moist							
	☒	23					14					
			2.0		<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Gray Brown Silty Claystone with thinly interbedded with fine grained Sandy Siltstone lenses, Iron oxide staining, friable, stiff to very stiff-moist		22					
15												
					@ 17 feet, transitions to Gray Brown fine grained Sandy Siltstone with thinly interbedded Brown Silty fine grained Sandstone lenses, very dense-moist to very moist							
	☒	58					30					
20												
	☒	59	4.5+				31					
25												
					@ 27 feet, transitions to Dark Gray Brown Silty Claystone with thinly interbedded Gray Brown fine grained Sandy Siltstone lenses, hard to very dense-moist							
	☒	87/8"	4.5				25					
30												
					@ 32 feet, transitions to Gray fine grained Sandy Silstone with thinly interbedded Silty fine grained Sandstone lenses, very dense-moist							
	☒	88/8"					26					

TEST BORING LOG

BORING NO. B-2

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California
DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas
WATER DEPTH: Dry
CAVE DEPTH: 31 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	Gray fine grained Sandy Silstone with thinly interbedded Silty fine grained Sandstone lenses, Iron oxide staining, slightly diatomaceous, friable, very dense-moist							
	☒	98/7"		▨			22					
					Boring Terminated at 39' due to refusal on very dense Bedrock							

TEST BORING LOG

BORING NO.
B-3

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 458 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	<u>COLLUVIUM:</u> Dark Gray Brown Silty Clay, trace fine Sand, abundant Bedrock fragments, very stiff-moist							
	⧗	22	4.5+	▨		82	22					
	⧗	51	4.5+	▨		84	24					
5				▩	<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Gray Silty Claystone with thinly interbedded Gray Brown fine grained Sandy Siltstone lenses, Iron oxide staining, abundant calcareous veining, friable, hard-damp							
	⧗	84	4.5+	▩		97	20					
10				▩								
				▩	@ 12 feet, transitions to Light Gray fine Sandy Siltstone with thinly interbedded Silty fine grained Sandstone, very dense-damp to moist							
	⧗	69/11"	4.5+	▩		93	28					
15				▩								
	⧗	86/10"	4.5+	▩		101	21					
20				▩								
				▩	Interbedded Gray Silty Claystone and Brown fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-damp							
	⧗	71/9"	4.5+	▩		90	26					
25				▩								
	⧖	78/11"	3.0	▩			26					
30				▩								
	⧖	44	3.0	▩			30					

BORING NO. B-3

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	Interbedded Gray Silty Claystone and Brown fine grained Sandy Siltstone, Iron oxide staining, slightly diatomaceous, friable, hard to very dense-damp							
40	☒	48	3.0	▨			29					
					Boring Terminated at 41' due to refusal on very dense Bedrock							

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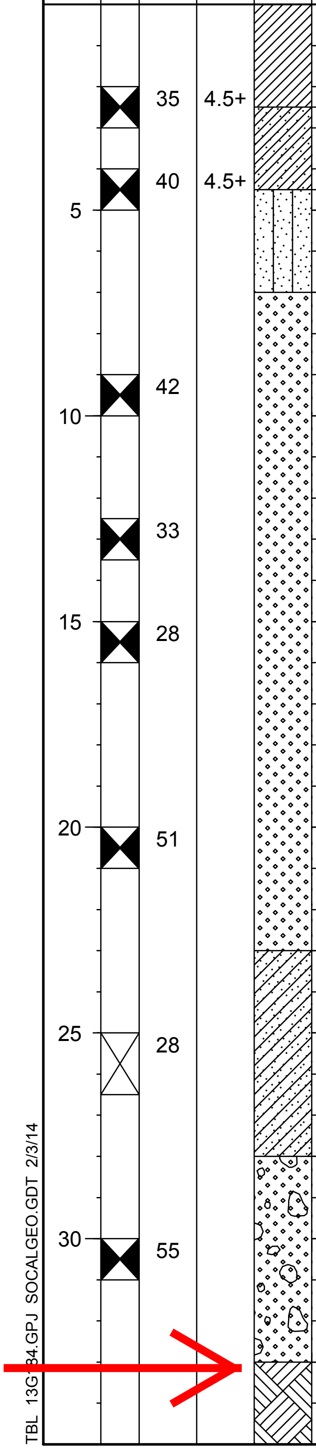
BORING NO. B-4

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 32 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion



FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 452 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					FILL: Dark Gray Brown Silty Clay, some fine to medium Sand, trace fine Gravel, mottled, very stiff-damp							
	⧓	35	4.5+			111	13					
					ALLUVIUM: Orange Brown fine Sandy Clay, some calcareous veining, very stiff-damp							
	⧓	40	4.5+			103	9					
5					Light Brown Silty fine Sand, medium dense-damp							
					Brown fine to coarse Sand, some fine to coarse Gravel, medium dense to dense-damp							
	⧓	42				116	4					
10												
	⧓	33			@ 12½ feet, trace Silt	95	11					
15	⧓	28				109	4					
20	⧓	51				101	4					
					Brown Clayey fine to coarse Sand, abundant fine to coarse Gravel, 3" lense of Gray Brown Silty Clay, medium dense-moist							
25	⋈	28					19					
					Brown Gravelly fine to coarse Sand, dense-very moist							
30	⧓	55				116	8					
					▽							
					@ 33 feet, Water encountered during drilling							
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown Silty Claystone, thinly interbedded with Brown fine Sandy Siltstone strata, Iron oxide staining,							

TEST BORING LOG

SOUTHERN
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BORING NO.
B-4

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 32 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	50/1"		▨	friable, hard to dense-damp to moist							
				▨	<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Light Gray Brown Silty Claystone, thinly interbedded with Brown fine Sandy Siltstone strata, Iron oxide staining, friable, hard to dense-damp to moist							
	☒	35		▨			31					
40												
					Boring Terminated at 40'							

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BORING NO.
B-5

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 26 feet
CAVE DEPTH: 32 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 449 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	ALLUVIUM: Brown fine Sandy Clay, stiff-damp							
	⧗	18	4.5+	▨		111	14					
	⧗	24		▨	Brown Clayey fine Sand, medium dense-damp	109	9					
5				▨								
				░	Brown fine to medium Sand, trace to little Silt, medium dense-damp							
	⧗	31		░		100	6					
10				░								
	⧗	38		░		102	8					
15	⧗	46		▨	Dark Brown Clayey fine to medium Sand, trace fine Gravel, dense-damp		8					Disturbed Sample
	⧗	46		▨	Dark Brown Clayey fine to coarse Sand, trace fine to coarse Gravel, dense-damp	115	7					
20	⧗	35		▨		109	7					
				▥	Orange Brown Silty fine Sand, medium dense-damp							
				▥	Gray Brown Clayey Silt, medium stiff-very moist							
25	⧗	16	2.5	▥		95	27					
				▥	Gray Brown fine Sandy Silt, Iron oxide staining, medium dense-very moist @ 26 feet, Water encountered during drilling ▽							
				▨	Brown Clayey fine to medium Sand, medium dense-wet							
30	⧖	22		▨			18					
				▨	Brown fine to medium Sandy Clay, very stiff-wet							
				░	Brown fine to coarse Sand, medium dense-wet							

SOUTHERN
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BORING NO.
B-5

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 26 feet
CAVE DEPTH: 32 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	(Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧓	18	2.0	⁙	Brown fine to coarse Sand, medium dense-wet	102	21					
40	⊠	13		⁙			19					
				▧	Brown Clayey fine to coarse Sand, medium dense-wet							
45	⧓	25		▨	Gray Brown Silty Clay, very stiff-wet	102	22					
			3.0	▨								
				▧	Gray Brown fine to medium Sandy Clay, little Silt, Iron oxide staining, very stiff-wet							
50	⊠	28	1.5	▧			23					
				⁙	Gray Brown fine to coarse Sand, little fine to coarse Gravel, trace Silt, dense-wet							
55	⊠	41		⁙			13					
60	⊠	45		⁙			22					
					Boring Terminated at 61½'							

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BORING NO. B-6

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 25 feet
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 452 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					ALLUVIUM: Brown Clayey fine Sand, medium dense-damp							
	☒	20					11					
5												
					Brown Silty Clay, stiff to very stiff-moist							
	☒	13	3.5				19					
10												
					Brown fine to coarse Sand, trace fine to coarse Gravel, medium dense-damp							
	☒	22					6					
15					Dark Brown Clayey fine to coarse Sand, medium dense-damp to moist							
	☒	25			@ 18½' trace fine to coarse Gravel		12			16		
20												
					Gray Brown Silty Clay, little Silt, very stiff-moist							
	☒	19	2.5		@ 23½' two 1" thick lenses of Light Brown fine to coarse Sand		10	46	19	58		
25					▽ @ 25' Water encountered during drilling							
					Gray Brown Clayey fine Sand, loose-wet							
	☒	14					29			32 21		
					Light Gray Brown Silty fine Sand, medium dense-wet							
30												
					Brown fine to coarse Sand, trace Silt, medium dense-wet							
	☒	23					13			9		

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 25 feet
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					Brown fine to coarse Sand, trace Silt, medium dense-wet							
					Gray Brown Clayey fine to coarse Sand, very stiff-wet							
40	☒	29	3.0				17			34		
					Brown fine to coarse Sand, trace Silt, trace fine to coarse Gravel, dense-wet							
45	☒	33					13					
					Gray Brown Silty Clay, trace fine to medium Sand, medium stiff-wet							
	☒	57	4.0				32					
50			4.5+		<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Dark Gray Clayey Siltstone, thinly interbedded with Brown Silty fine grained Sandstone, abundant Iron oxide staining, slightly diatomaceous, friable, hard to dense-moist		28					
55	☒	83/11"					21					

Boring Terminated at 56' due to refusal on very dense Bedrock

BORING NO. B-7

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 18 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 455 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⊠	19	4.5+		FILL: Brown fine to medium Sandy Clay to Clayey fine to medium Sand, mottled, loose to very stiff-damp to moist	92	12					
					ALLUVIUM: Light Brown Silty fine Sand, slightly to moderately porous, trace fine root fibers, medium dense-damp							
	⊠	39	4.5+		Dark Brown fine Sandy Clay, very stiff-damp	119	11					
5	⊠	36			Brown Silty fine Sand, trace calcareous veining, medium dense-damp	113	10					
	⊠	26	4.5+		Gray Brown Silty Clay, very stiff-moist	99	20					
	⊠	32	4.5+		Brown fine Sandy Clay, some Silt, medium stiff to stiff-moist	112	14					
10					Brown Silty fine Sand, medium dense-moist							
					Brown fine to coarse Sand, little fine to coarse Gravel, trace Silt, dense-damp							
15	⊠	45				116	4					
					Brown Silty fine to coarse Sand, little fine to coarse Gravel, trace Clay, dense-damp							
20	⊠	59				115	10					

Boring Terminated at 20'

TEST BORING LOG

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BORING NO. B-8

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/9/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION SURFACE ELEVATION: 458 feet MSL	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG		DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	13	4.5+	▨	COLLUVIUM: Dark Gray Brown to Black Silty Clay, trace fine Sand, mottled, stiff-dry		13					EI = 106 @ 0 to 5'
5	☒	15	4.5+	▨	COLLUVIUM: Dark Gray Brown to Black Silty Clay, some fine to medium Sand, trace calcareous veining, stiff to very stiff-moist		15					
	☒	35	4.5	▩	BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray Brown Silty Claystone interbedded with Light Brown Silty fine Sandstone, slightly diatomaceous, friable, hard to dense-damp to moist		27					
10	☒	25	3.0	▩			32					
15	☒	26	1.0	▩			33					

Boring Terminated at 15'

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

TEST BORING LOG

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BORING NO.
B-9

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 15 feet
READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION SURFACE ELEVATION: 444 feet MSL	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG		DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					<u>FILL:</u> Gray Brown Clayey fine to medium Sand, loose-damp							
	⧗	33			<u>COLLUVIUM:</u> Dark Gray Brown to Black fine to medium Sandy Clay, very stiff-moist	82	16					
			4.5									
	⧗	45	4.5+			88	21					
5	⧗	32	4.5+			92	22					
	⧗	30	4.5+			88	27					
					<u>COLLUVIUM:</u> Dark Brown Silty Clay, abundant Siltstone fragments, abundant calcareous veining, very stiff-moist							
	⧗	36	4.5+			93	28					
10												
					<u>ALLUVIUM:</u> Gray Brown fine Sandy Clay, very stiff-moist							
	⧗	40	4.5+			100	22					
15												
					<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Gray Brown fine grained Sandy Siltstone, thinly interbedded wtih Light Brown Silty fine grained Sandstone, Iron oxide staining, weakly cemented, medium dense-damp							
	⧖	24	2.0				24					
20												
					Boring Terminated at 20' due to refusal on very dense Bedrock							

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-10

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/10/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 14 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 437 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					<u>ALLUVIUM:</u> Dark Gray Brown fine Sandy Clay, very stiff-damp							
	⊠	28	4.5+			99	8					
	⊠	33	4.5+			111	10					
5	⊠	27	4.5+		Gray Brown fine Sandy Clay to Clayey fine Sand, dense to very stiff-damp	113	9					
					Brown Silty fine Sand, loose-damp							
	⊠	17	4.0			103	10					
					Gray Brown fine Sandy Clay, stiff-damp							
					Gray Brown Silty Clay, very stiff-moist							
	⊠	24	4.0			100	18					
10												
	⊠	34	4.5+			108	17					
15					Gray Brown fine Sandy Silt, trace Clay, medium dense-moist							
					<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Light Brown Silty fine grained Sandstone, weakly cemented, Iron oxide staining, friable, very dense-damp to moist							
	⊠	88/8"				84	17					
20												

Boring Terminated at 20'

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

BORING NO. B-11

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 11/21/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 25 feet
CAVE DEPTH: 19 feet
READING TAKEN: At Completion

SURFACE ELEVATION: 439 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Asphaltic concrete, 3± inches Aggregate base							
	☒	8			FILL: Dark Gray Brown fine Sandy Clay, trace fine Gravel, mottled, medium stiff to stiff-damp		14					
	☒	9					10					
5												
	☒	27					13 8					
					ALLUVIUM: Brown fine Sandy Clay, very stiff-dry to damp							
					Brown Clayey fine Sand, medium dense-damp							
	☒	13					6					
10	☒	6			Brown Silty fine Sand, trace to little Clay, loose-damp		8					
15	☒	5					10					
20	☒	11					8 11			22 4		
					Light Brown fine Sand, medium dense-damp							
					Orange Brown Silty fine Sand, some fine Gravel, Iron oxide staining, dense-very moist to wet ▽							
25	☒	50/5.5"					22					
					Brown fine to coarse Gravlley Sand, occasional Cobbles, very dense-wet							
30	☒	50/2"					19					
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown fine grained Sandy Siltstone, weakly cemented, Iron oxide staining, friable, very dense-wet							

BORING NO.
B-11

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 11/21/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 25 feet
CAVE DEPTH: 19 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	50/3"		▨	<u>BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy):</u> Light Gray Brown fine grained Sandy Siltstone, weakly cemented, Iron oxide staining, friable, very dense-wet		27					
					Boring Terminated at 37' due to refusal on very dense Bedrock							

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BORING NO.
B-12

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 13 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 439 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	29	4.5+		FILL: Gray Brown fine Sandy Clay, very stiff-damp		8					EI = 73 @ 0 to 5'
	☒	26	4.5+		ALLUVIUM: Brown fine Sandy Clay, very stiff-damp		9					
5												
	☒	23			Brown Clayey fine Sand, medium dense-damp		10					
	☒	22			Light Brown Silty fine Sand, medium dense-damp		7					
10												
	☒	50/5"			Light Gray Gravelly fine to coarse Sand, very dense-dry to damp		3					
15												
	☒	71			BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Light Gray Brown Silty fine grained Sandstone, weakly cemented, Iron oxide staining, friable, very dense-moist		21					
20												

Boring Terminated at 20'

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

TEST BORING LOG

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-13

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 3 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 447 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	17	4.5+	▨	COLLUVIUM: Dark Gray to Black Silty Clay, some fine Sand, trace calcareous veining, very stiff-moist		19					
5	☒	20	4.5+	▨	COLLUVIUM: Dark Gray to Black Silty Clay, abundant Siltstone fragments, trace calcareous veining, stiff-moist		18					
					Boring Terminated at 5'							

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-14

JOB NO.: 13G184	DRILLING DATE: 11/21/13	WATER DEPTH: Dry
PROJECT: Proposed Mixed Use Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 8 feet
LOCATION: Los Angeles County, California	LOGGED BY: Daryl Kas	READING TAKEN: At Completion

FIELD RESULTS					DESCRIPTION	LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	SURFACE ELEVATION: 445 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					3± inches Asphaltic concrete, 5± inches Aggregate base							
	☒	72			FILL: Gray Brown Clayey fine Sand, mottled, Plastic fragments, very dense-damp		8					Disturbed Sample
	☒	32			FILL: Brown Silty fine Sand, trace fine Gravel, medium dense-damp	97	8					
5	☒	51			FILL: Light Brown Clayey fine to medium Sand, trace fine to coarse Gravel, occasional Cobbles, trace Siltstone fragments, dense-damp	116	8					
	☒	26	4.5+		BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Gray to Light Gray Brown Silty Claystone, interbedded with Clayey Siltstone, weakly cemented, Iron oxide staining, friable, medium stiff-moist	75	31					
	☒	34	4.5+			77	33					
10												
	☒	29	4.5+			79	32					
15					Boring Terminated at 15'							

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BORING NO. B-15

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 35 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 462 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧓	24			FILL: Gray Brown Clayey fine Sand, medium dense-damp	103	6					
	⧓	71			ALLUVIUM: Brown Clayey fine Sand, trace to little medium Sand, very dense-damp	118	7					
5	⧓	28			ALLUVIUM: Brown Clayey fine to medium Sand, trace coarse Sand, trace fine Gravel, medium dense-damp		7					Disturbed Sample
	⧓	44			Brown Silty fine to coarse Sand, some fine to coarse Gravel, medium dense to very dense-damp	116	6					
10	⧓	41				114	8					
15	⧓	72/10"			@ 14 feet, Siltstone fragments	120	8					
					Light Gray Brown Silty Clay, stiff-moist							
20	☒	17	3.0				43					
					BEDROCK: MONTEREY FORMATION, YORBA MEMBER (Tmy): Dark Gray Brown Silty Claystone, interbedded with Light Gray Brown Sandy Siltstone, weakly cemented, Iron oxide staining, friable, slightly diatomaceous, stiff to medium dense-moist							
25	⧓	40	4.5+			75	38					
					@ 27 feet, transitions to Light Gray Brown fine grained Sandy Siltstone, thinly interbedded with Silty fine grained Sandstone, dense-moist							
30	☒	64					34					
					@ 32 feet, transitions to Gray Silty Claystone thinly interbedded with Brown fine grained Sandy Siltstone, hard to dense-moist							
	☒	53	2.5				50					

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: 35 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▨	Gray Silty Claystone thinly interbedded with Brown fine grained Sandy Siltstone, hard to dense-moist							
	☒	46	4.5+	▨			33					
40				▨								
				▨	Dark Gray Siltstone, cemented, hard-moist							
	☒	74/9"		▨			23					
45												

Boring Terminated at 45' due to refusal on very dense Bedrock

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-16

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/11/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH:
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 466 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	☒	22		▨	FILL: Gray Brown Clayey fine Sand, trace fine Gravel, medium dense-dry		5					
			4.5+	▨	FILL: Gray Brown Silty Clay, trace fine Sand, stiff-damp		11					
	☒	37	4.5+	▨	ALLUVIUM: Brown fine Sandy Clay, trace medium Sand, very stiff-damp		11					
5					Boring Terminated at 5'							

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. B-17

JOB NO.: 13G184	DRILLING DATE: 12/12/13	WATER DEPTH: 37 feet
PROJECT: Proposed Mixed Use Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: 27 feet
LOCATION: Los Angeles County, California	LOGGED BY: Daryl Kas	READING TAKEN: At Completion

SURFACE ELEVATION: 468 feet MSL

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					<u>FILL:</u> Brown Silty fine Sand, trace medium to coarse Sand, trace fine Gravel, dense-damp							
	☒	40					7					
					<u>FILL:</u> Brown to Orange Brown Clayey fine to medium Sand, medium dense-damp							
	☒	21					9					
5												
	☒	23					10					
					<u>ALLUVIUM:</u> Brown Silty fine to coarse Sand, abundant fine to coarse Gravel, medium dense to very dense-damp							
	☒	28					8					
10												
	☒	51					7					
15												
	☒	12					9			14		
			2.5		Light Gray Brown Silty Clay, trace to little fine Sand, some Iron oxide staining, stiff-moist to very moist		41	45	24	86		
20												
					Orange Brown fine Sand, trace medium to coarse Sand, Iron oxide staining, very dense-dry to damp							
	☒	56					3					
25												
					Gray Brown fine Sandy Clay, trace Silt, Iron oxide staining, hard-moist							
	☒	31	3.0				17			67		
30												
					Light Brown fine to medium Sand, trace fine Gravel, with 2" thick lense of Gray Brown Silty fine Sand to fine Sandy Silt, dense-very moist							
	☒	36					12					

TEST BORING LOG

SoCalGeo
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BORING NO.
B-17

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/12/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: 37 feet
CAVE DEPTH: 27 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
				▒	Light Brown fine to medium Sand, trace fine Gravel, with 2" thick lense of Gray Brown Silty fine Sand to fine Sandy Silt, dense-very moist ▽							
				▒	Light Gray fine to coarse Sand, trace Silt, medium dense-wet @ 37 feet, Water encountered during drilling							
	☒	26		▒			15			5		
40				▒								
	☒	31		▒	@ 43½ feet, 2" lense of Gray Silty Clay, medium dense-wet		17			14		
45				▒								
				▨	<u>MONTEREY FORMATION: YORBA MEMBER BEDROCK (Tmy):</u> Dark Gray Silty Claystone, thinly interbedded with Clayey Siltstone, cemented, hard-damp to moist							
	☒	80/11"		▨			27					
50												
					Boring Terminated at 50' due to refusal on very dense Bedrock							

TBL 13G184.GPJ SOCALGEO.GDT 2/3/14

TEST BORING LOG

SOUTHERN
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BORING NO.
B-18

JOB NO.: 13G184
PROJECT: Proposed Mixed Use Development
LOCATION: Los Angeles County, California

DRILLING DATE: 12/12/13
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

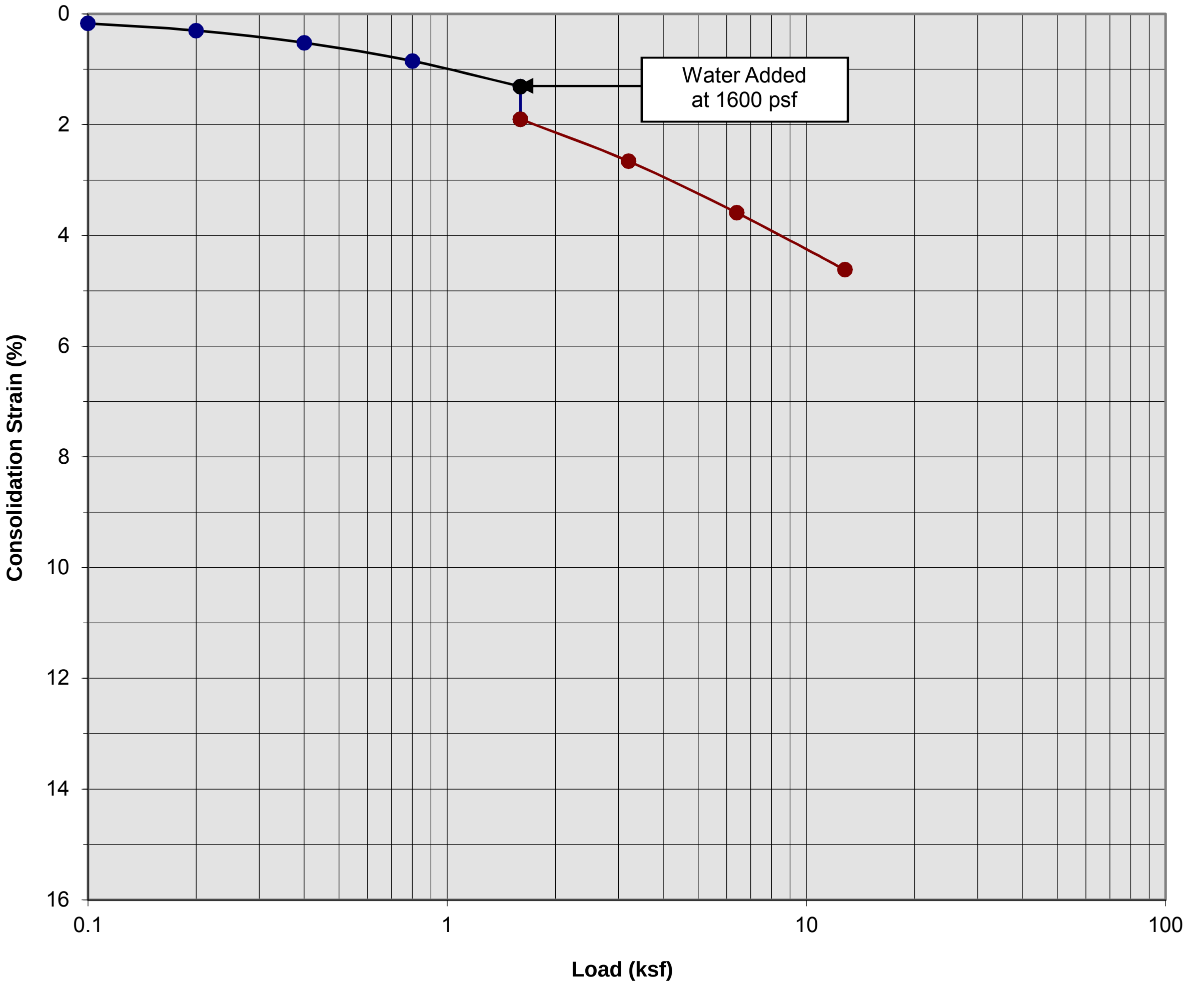
WATER DEPTH: Dry
CAVE DEPTH: 22 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 463 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
	⧗	34			FILL: Gray Brown Silty fine Sand, trace medium to coarse Sand, trace Claystone fragments, medium dense-dry to damp	113	5					
	⧗	32			FILL: Brown to Orange Brown Clayey fine to medium Sand, medium dense-damp	115	7					
5	⧗	43			FILL: Orange Brown Clayey fine to coarse Sand, some fine to coarse Gravel, medium dense-damp	120	5					
	⧗	37				112	10					
	⧗	34			ALLUVIUM: Brown fine Sandy Silt, medium dense-moist	102	20					
10					Orange Brown Silty fine Sand, trace Clay, medium dense-moist							
					Brown Silty fine to coarse Sand, some fine to coarse Gravel, very dense-damp							
15	⧗	73				119	8					
					Brown fine Sand, trace to little Silt, dense-damp							
20	⧖	41					8					
					Brown to Dark Brown Silty fine to coarse Sand, trace fine to coarse Gravel, very dense-damp							
25	⧖	63					3					
					Gray Brown Silty Clay, trace fine Sand, very stiff-very moist							
30	⧖	20	1.25				23					
					Boring Terminated at 30'							

TEST BORING LOG

APPENDIX C

Consolidation/Collapse Test Results



Classification: Brown fine to medium Sand, trace fine Gravel

Boring Number:	B-1	Initial Moisture Content (%)	6
Sample Number:	---	Final Moisture Content (%)	16
Depth (ft)	9 to 10	Initial Dry Density (pcf)	109.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	114.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.59

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 1

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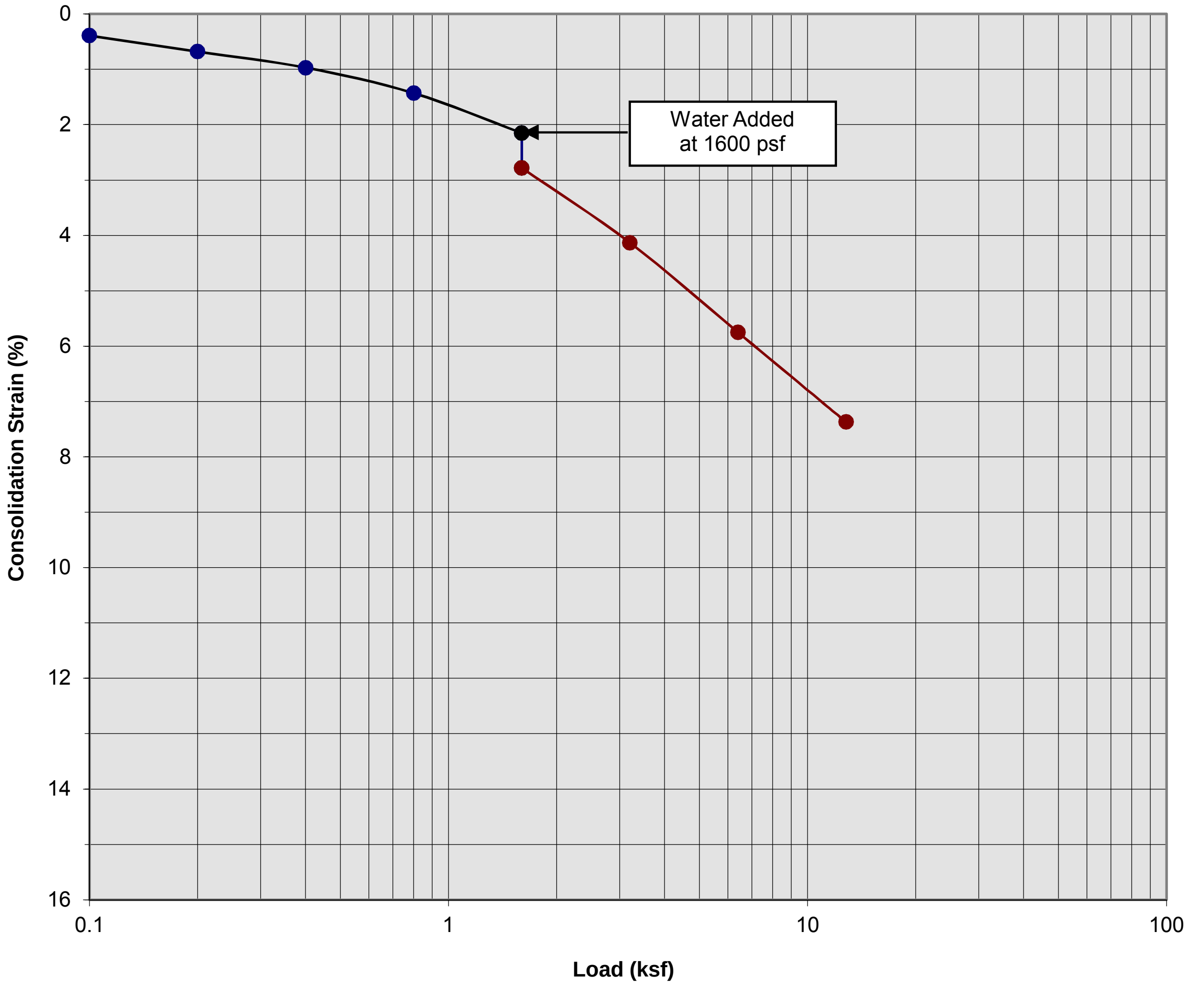
Consolidation/Collapse Test Results



Classification: Brown Silty fine Sand, trace to little Clay

Boring Number:	B-1	Initial Moisture Content (%)	14
Sample Number:	---	Final Moisture Content (%)	17
Depth (ft)	12½ to 13½	Initial Dry Density (pcf)	106.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.63

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 2

SoCalGeo
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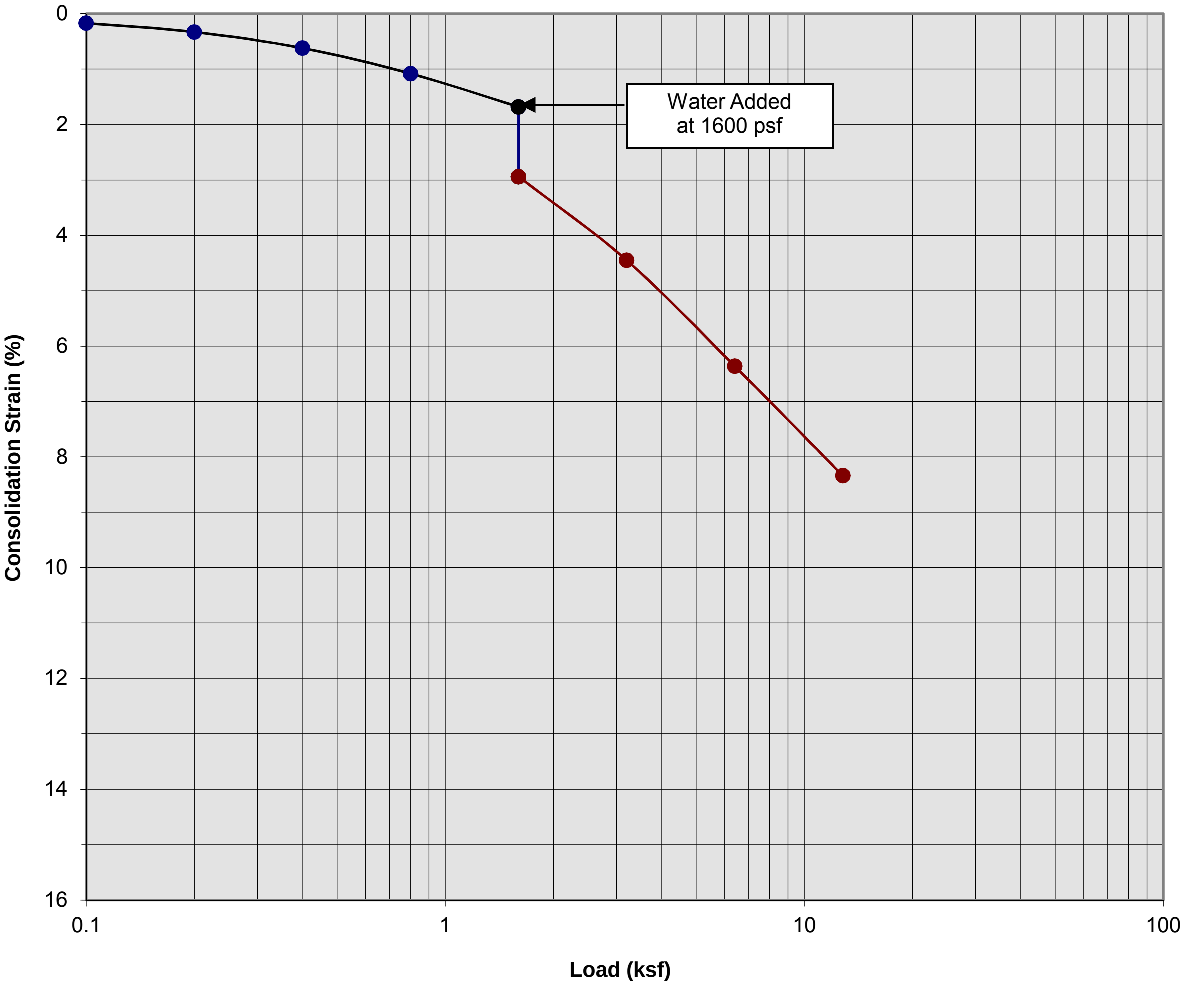
Consolidation/Collapse Test Results



Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4	Initial Moisture Content (%)	11
Sample Number:	---	Final Moisture Content (%)	22
Depth (ft)	12½ to 13½	Initial Dry Density (pcf)	94.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	102.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.26

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 3

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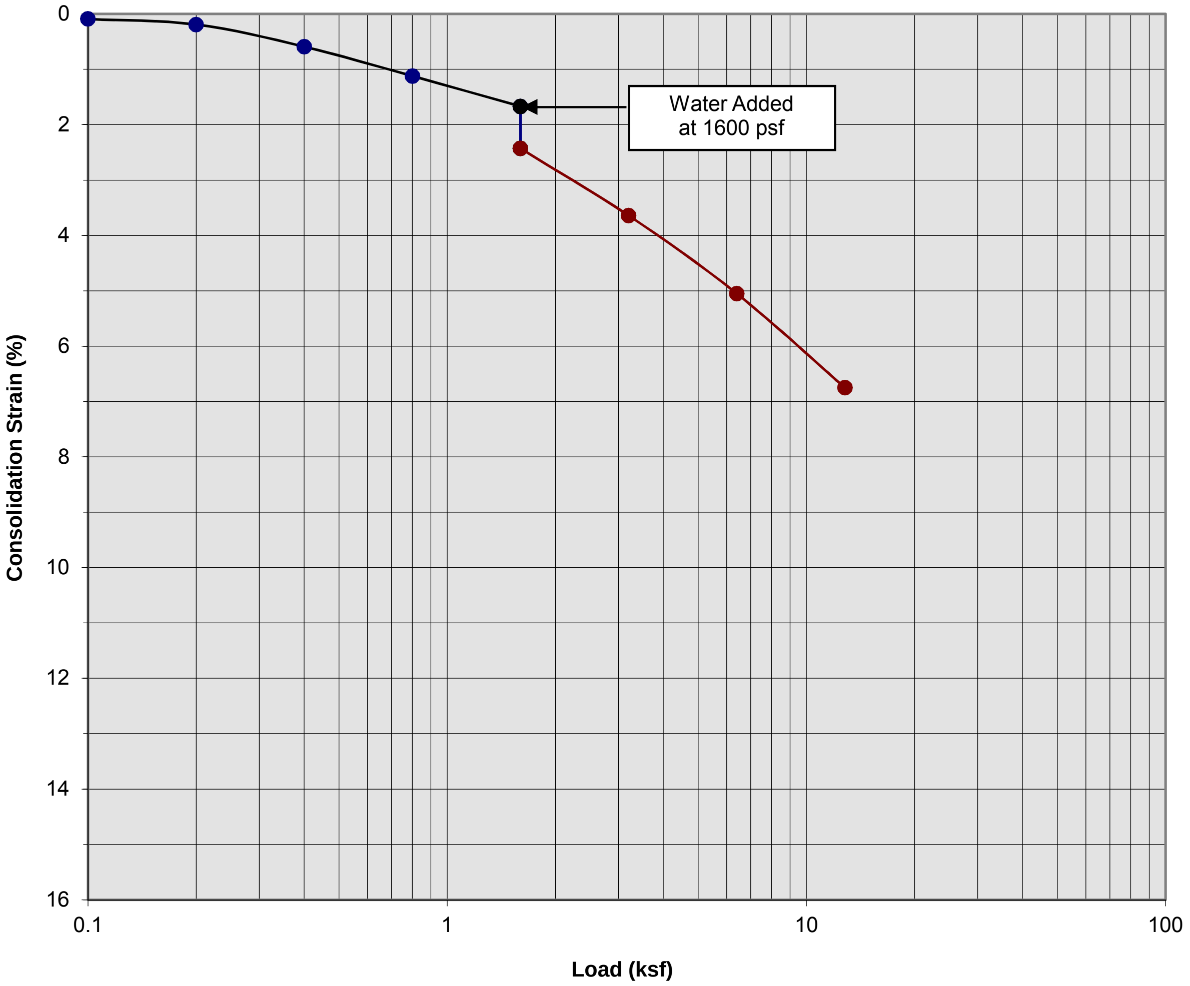
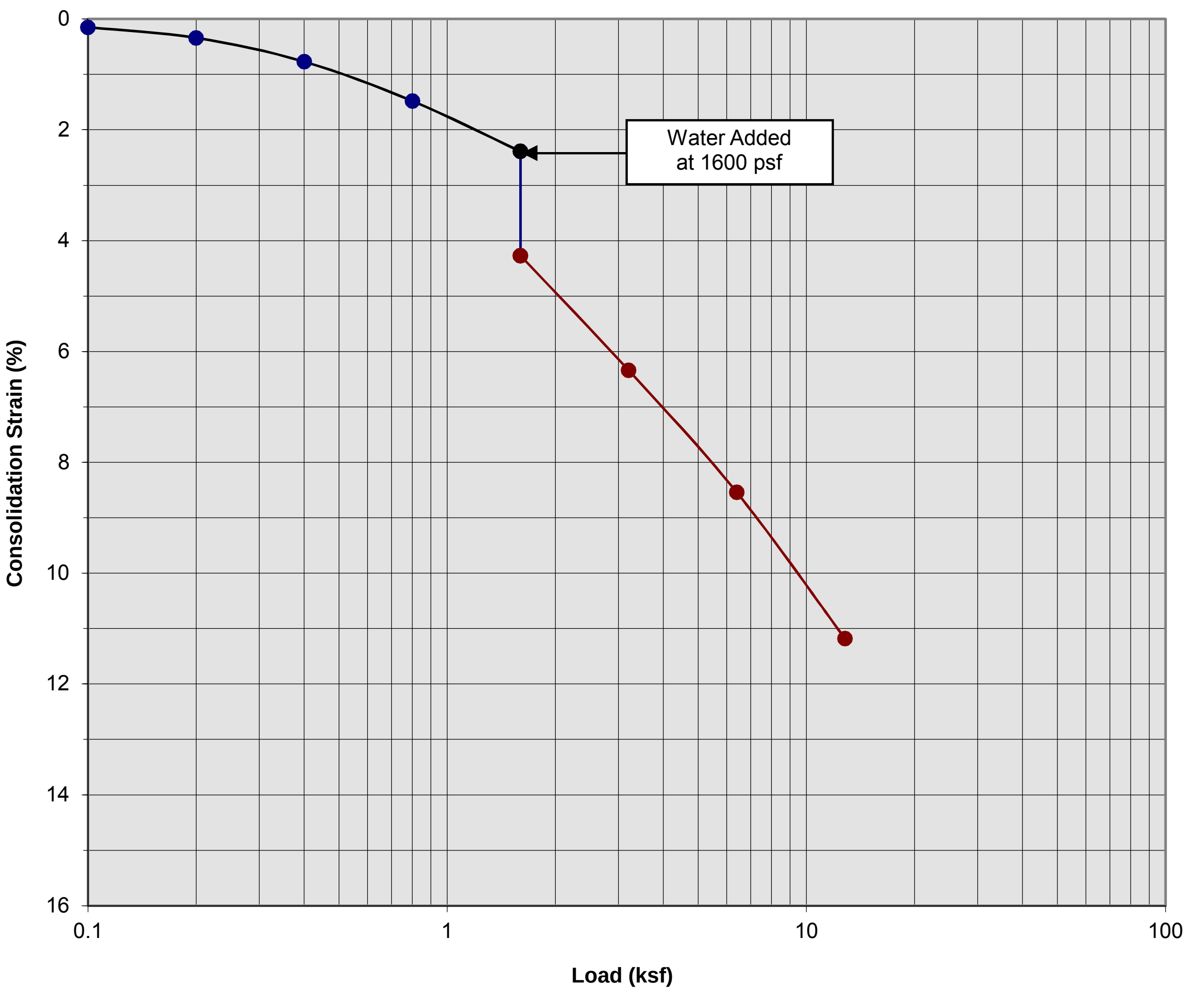
Consolidation/Collapse Test Results



Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4	Initial Moisture Content (%)	4
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	15 to 16	Initial Dry Density (pcf)	108.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	116.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.76

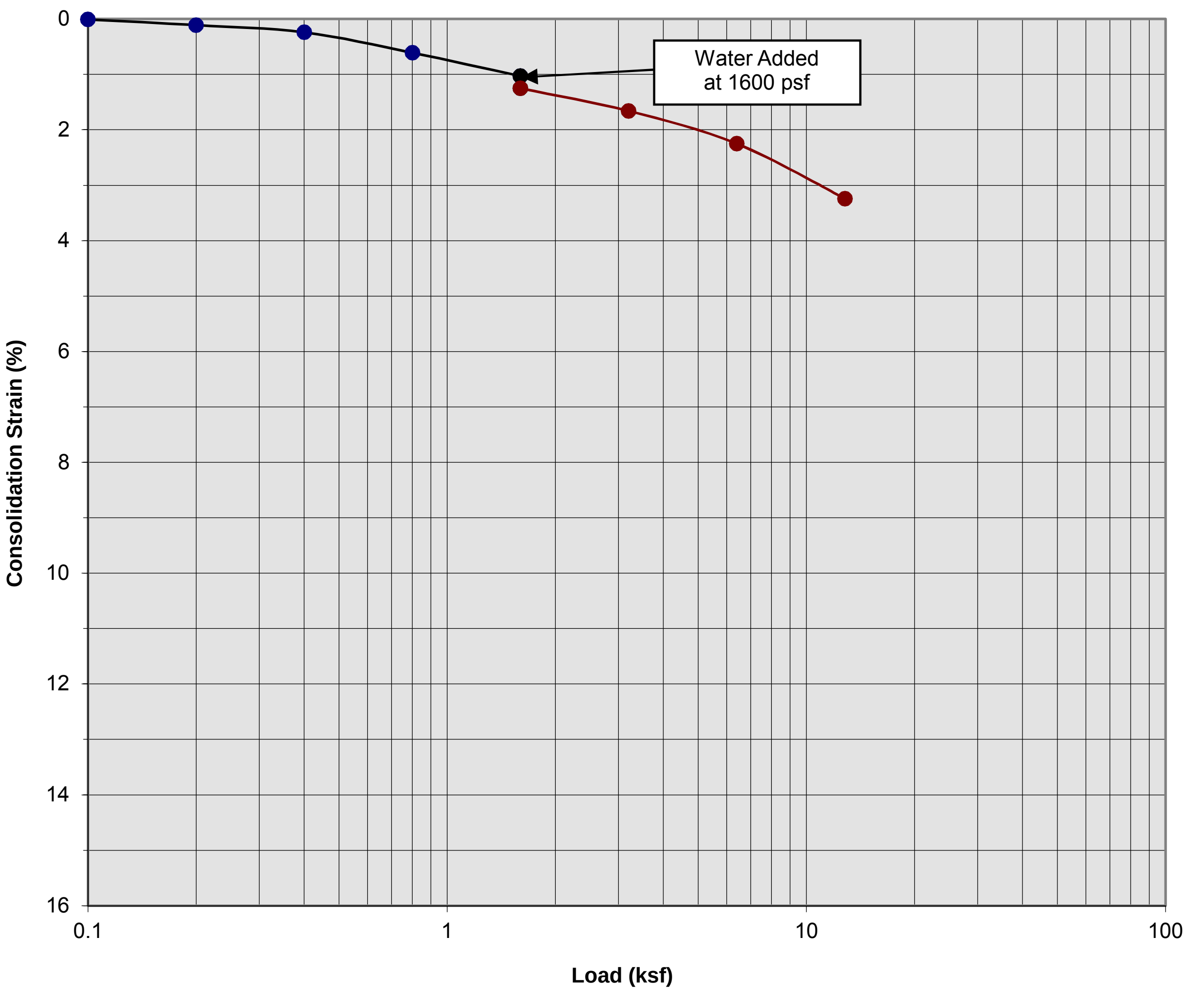
Consolidation/Collapse Test Results



Classification: Brown fine to coarse Sand, some fine Gravel

Boring Number:	B-4	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	20 to 21	Initial Dry Density (pcf)	100.8
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	114.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.88

Consolidation/Collapse Test Results



Classification: Dark Gray Brown fine Sandy Clay

Boring Number:	B-10	Initial Moisture Content (%)	9
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	3 to 4	Initial Dry Density (pcf)	121.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	125.9
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.22

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 6

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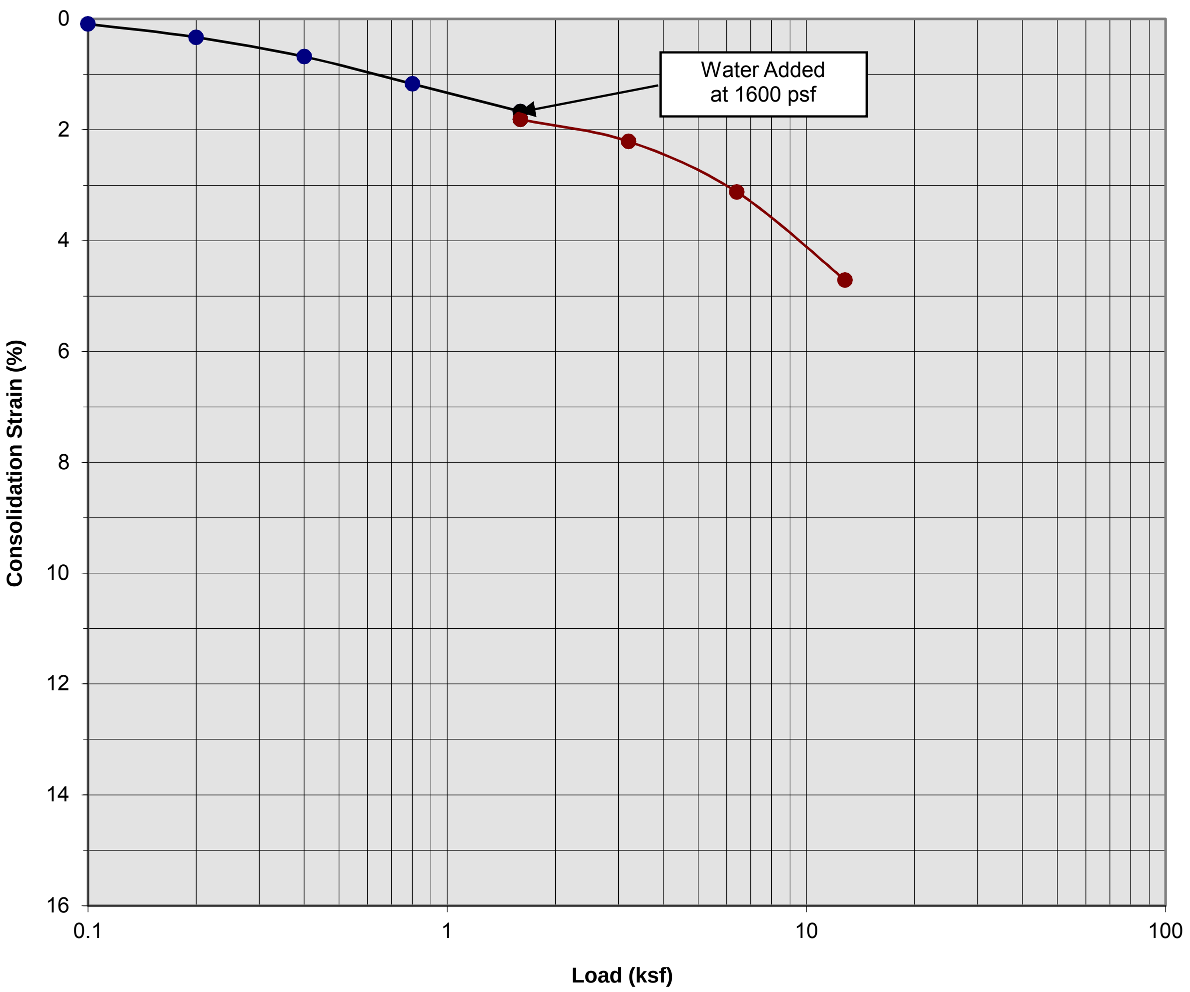
Consolidation/Collapse Test Results



Classification: Gray Brown fine Sandy Clay to Clayey fine Sand

Boring Number:	B-10	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	5 to 6	Initial Dry Density (pcf)	113.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	118.8
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.14

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 7

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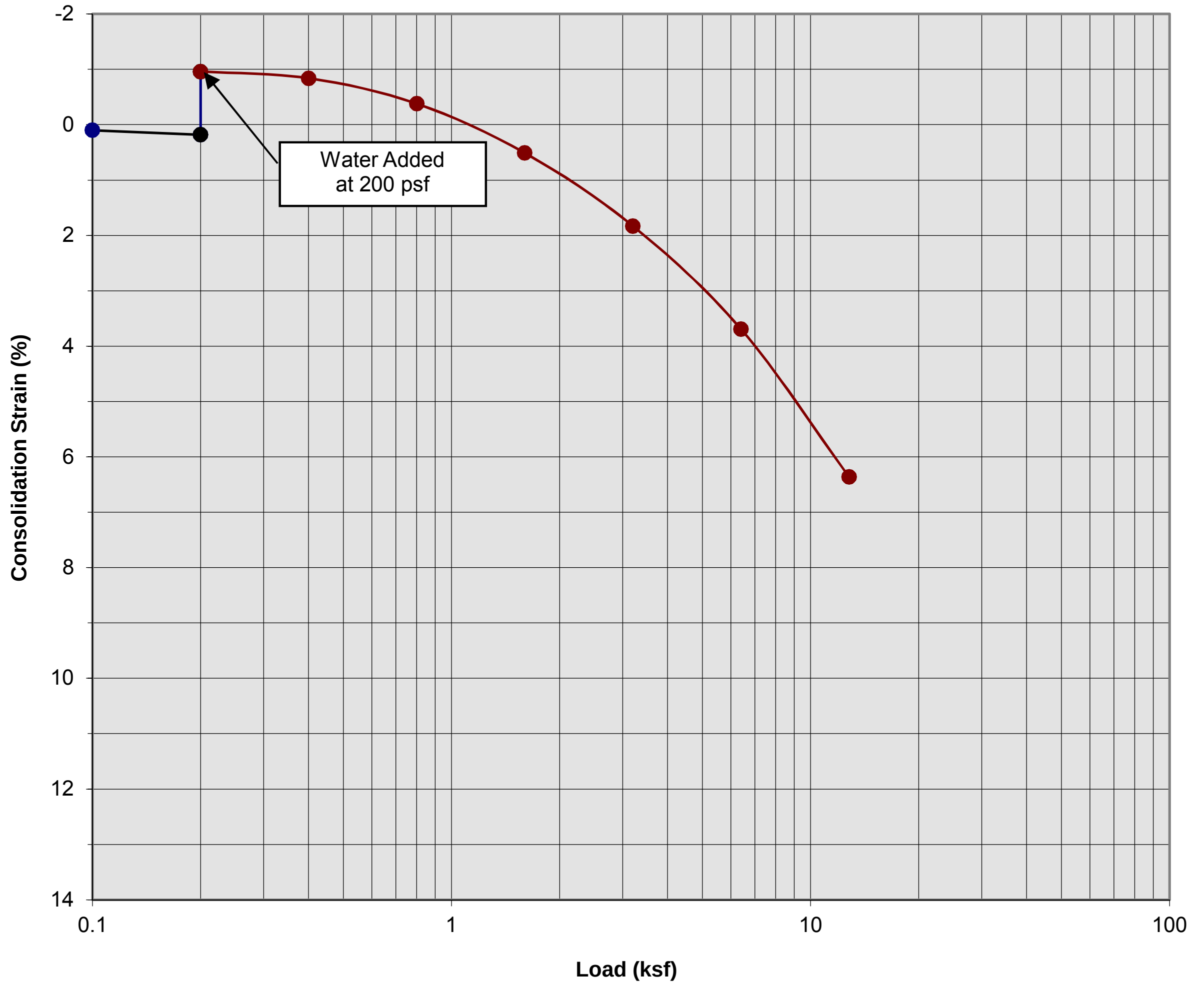
Consolidation/Collapse Test Results



Classification: Gray Brown fine Sandy Clay

Boring Number:	B-10	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	7 to 8	Initial Dry Density (pcf)	102.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	109.8
Specimen Thickness (in)	1.0	Percent Swell	1.14

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 8

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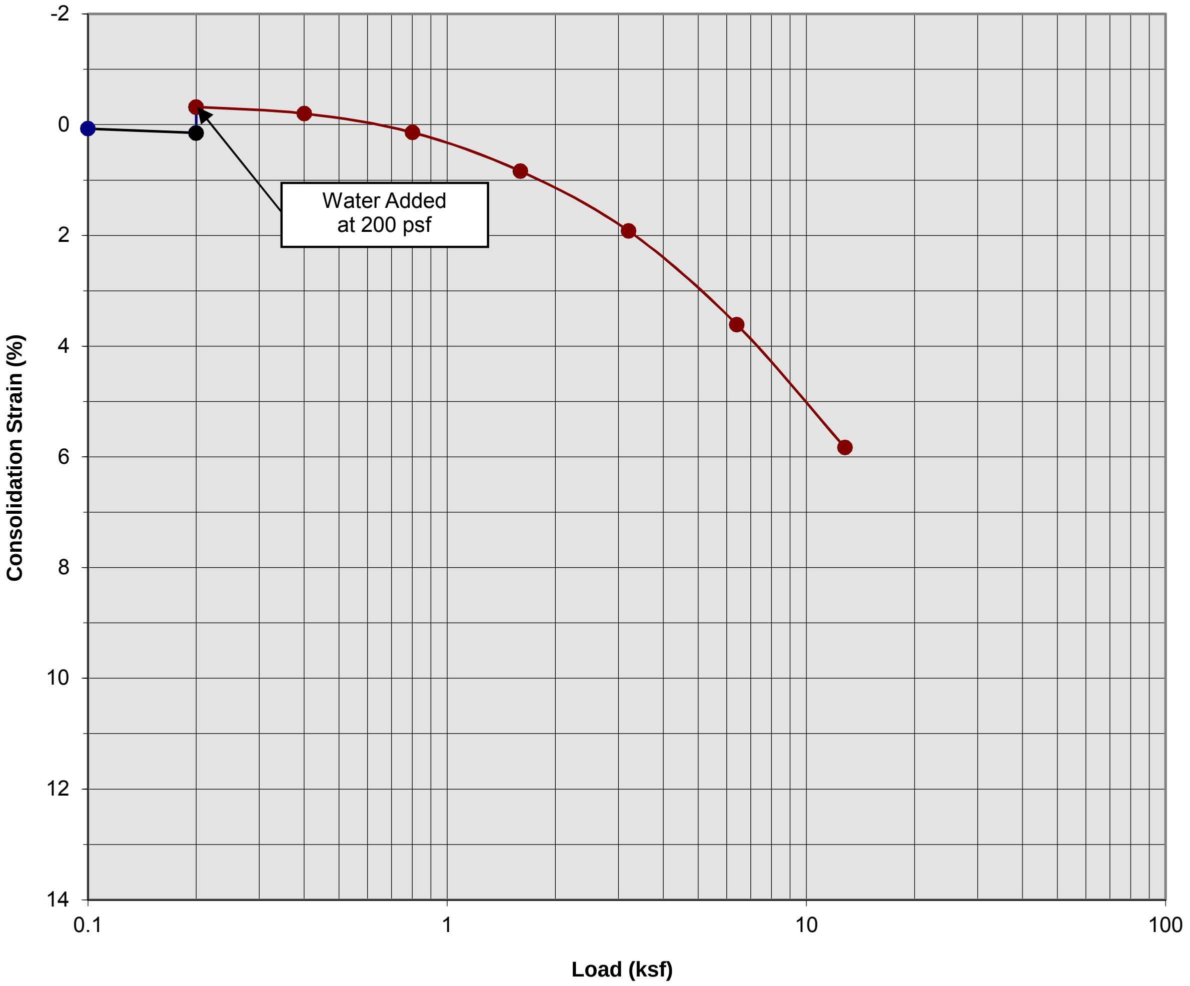
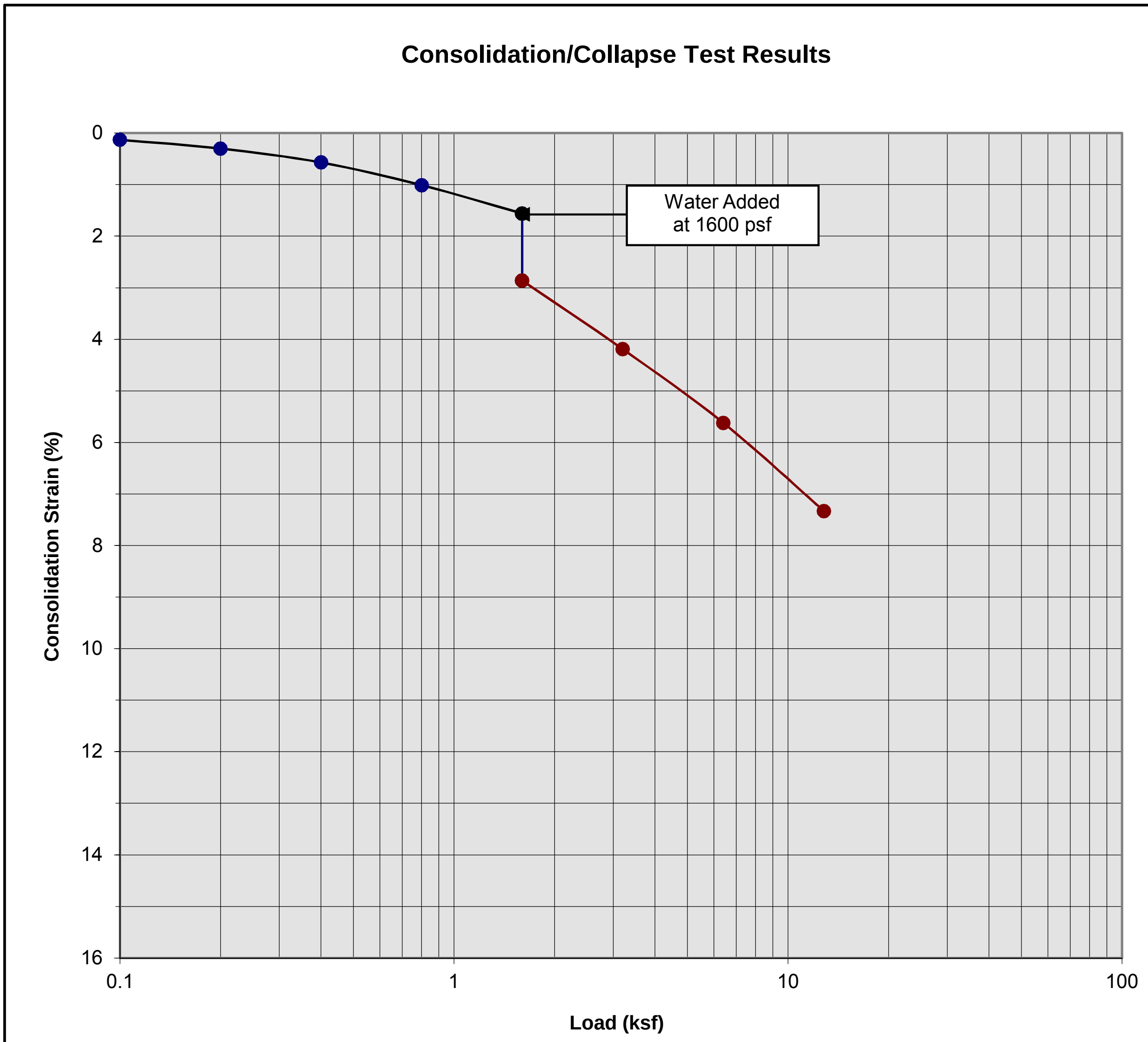
Consolidation/Collapse Test Results



Classification: Gray Brown Silty Clay

Boring Number:	B-10	Initial Moisture Content (%)	19
Sample Number:	---	Final Moisture Content (%)	22
Depth (ft)	9 to 10	Initial Dry Density (pcf)	100.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	106.9
Specimen Thickness (in)	1.0	Percent Swell (%)	0.47



Classification: FILL: Gray Brown Silty fine Sand, trace medium to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	1 to 2	Initial Dry Density (pcf)	112.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	120.9
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.30

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 10

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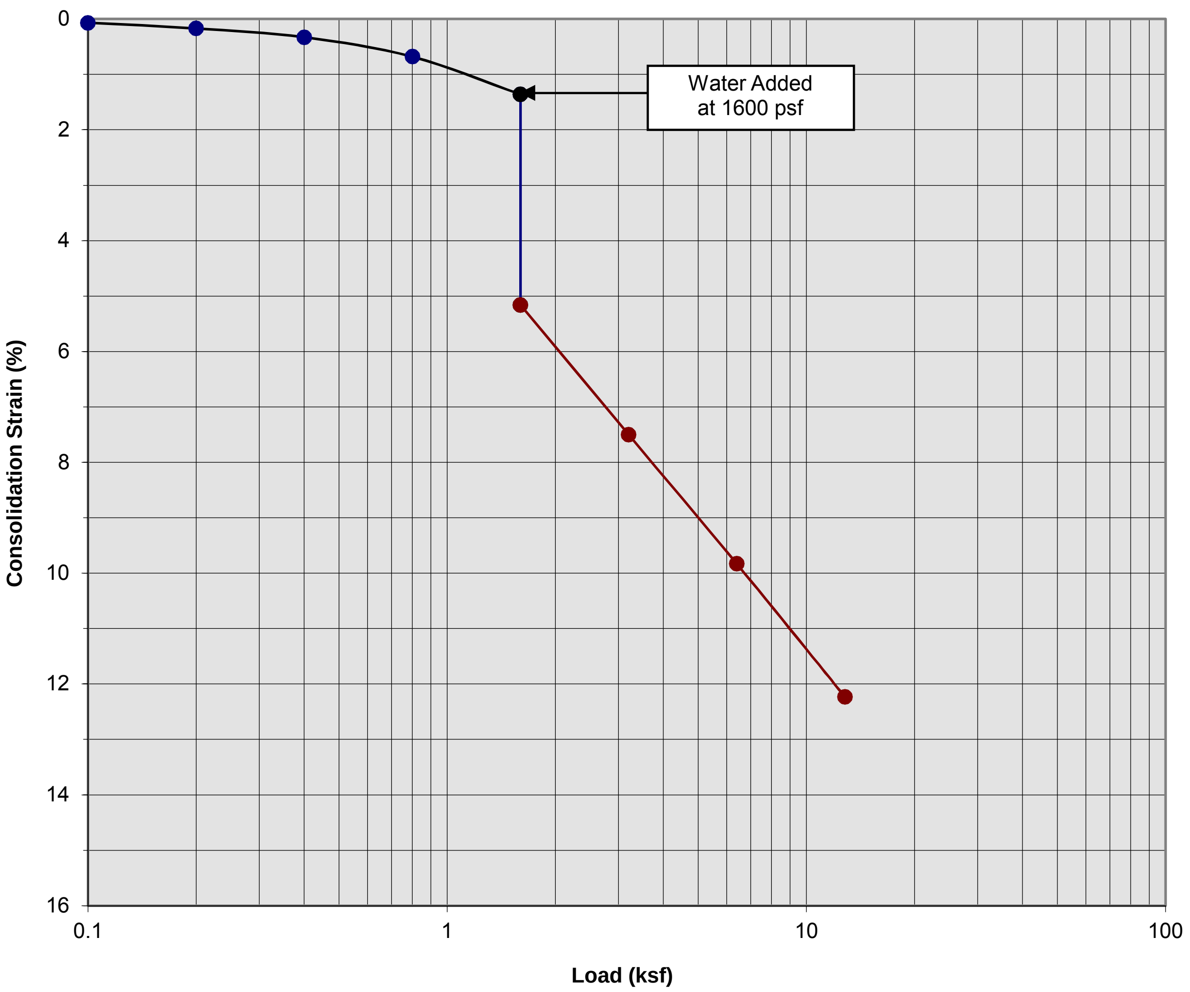
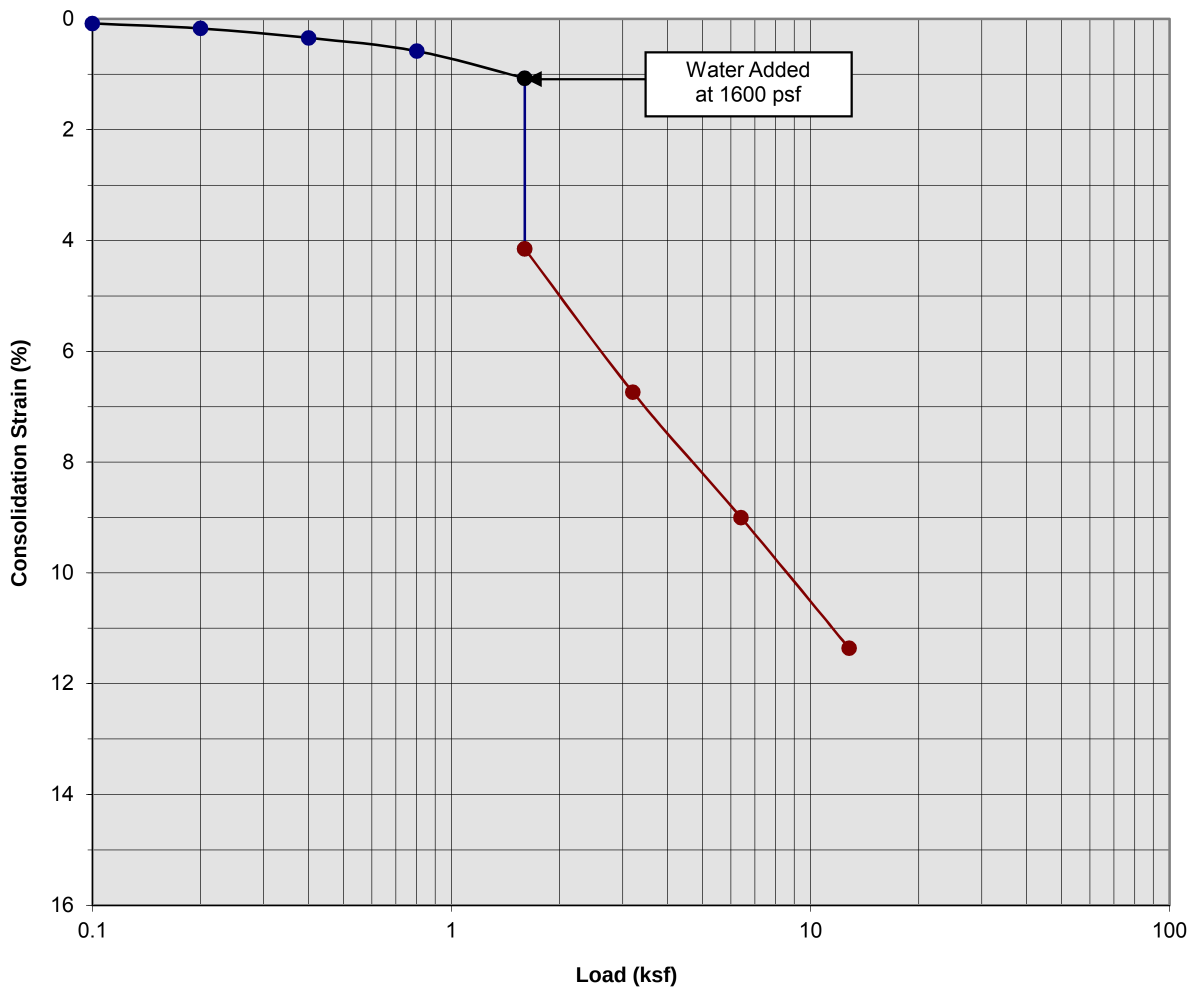
Consolidation/Collapse Test Results



Classification: Brown to Orange Brown Clayey fine to medium Sand

Boring Number:	B-18	Initial Moisture Content (%)	7
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	3 to 4	Initial Dry Density (pcf)	115.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	130.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	3.80

Consolidation/Collapse Test Results



Classification: FILL: Orange Brown Clayey fine to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	12
Depth (ft)	5 to 6	Initial Dry Density (pcf)	119.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	131.6
Specimen Thickness (in)	1.0	Percent Collapse (%)	3.08

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 12

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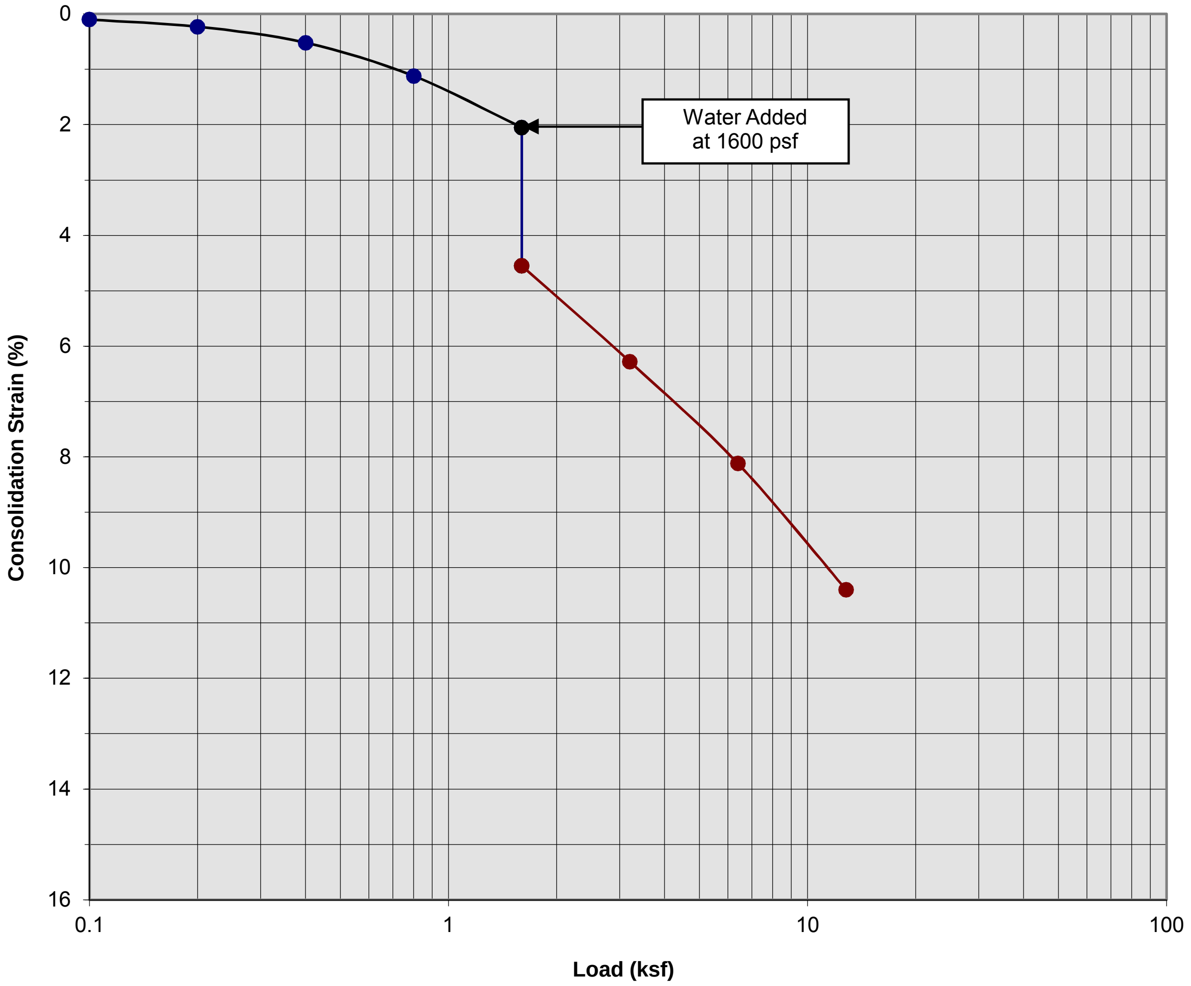
Consolidation/Collapse Test Results



Classification: FILL: Orange Brown Clayey fine to coarse Sand

Boring Number:	B-18	Initial Moisture Content (%)	10
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	7 to 8	Initial Dry Density (pcf)	112.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	125.7
Specimen Thickness (in)	1.0	Percent Collapse (%)	2.50

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 13

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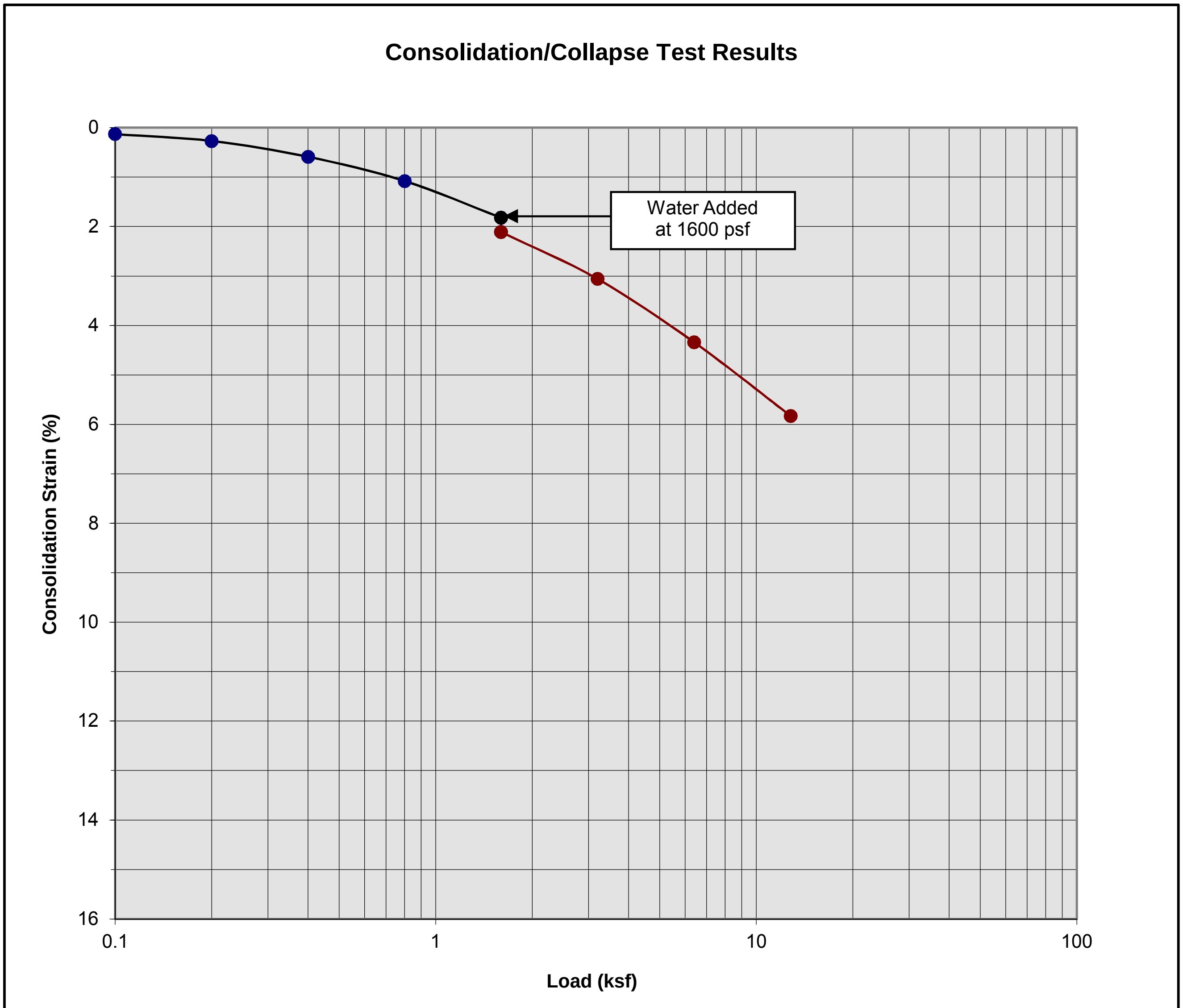

Classification: Orange Brown Silty fine Sand, trace Clay

Boring Number:	B-18	Initial Moisture Content (%)	20
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	9 to 10	Initial Dry Density (pcf)	101.8
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	117.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.29

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C- 14

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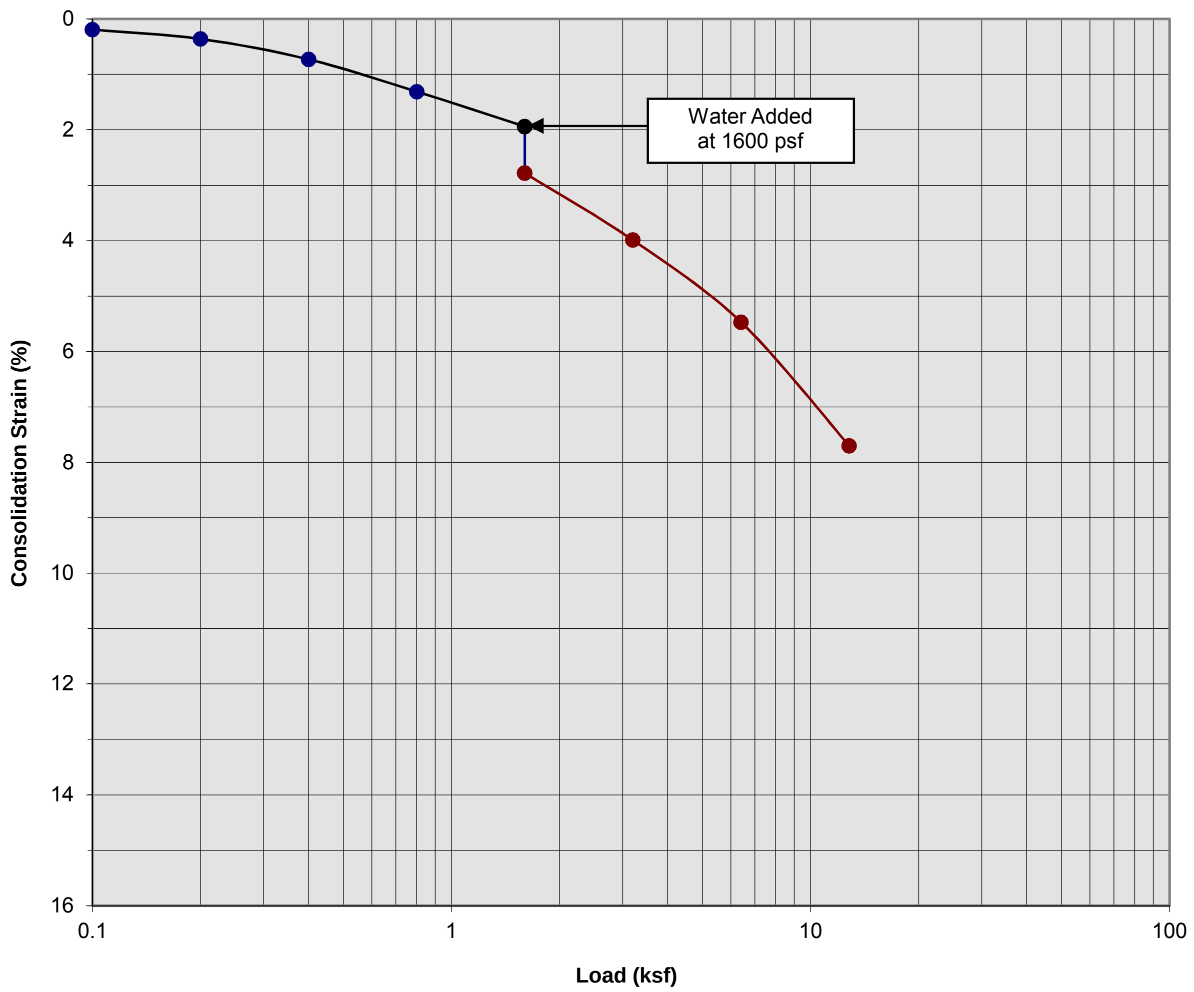
Consolidation/Collapse Test Results



Classification: Brown Silty fine to coarse Sand, some fine to coarse Gravel

Boring Number:	B-18	Initial Moisture Content (%)	8
Sample Number:	---	Final Moisture Content (%)	13
Depth (ft)	15 to 16	Initial Dry Density (pcf)	118.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	128.1
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.84

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C- 15

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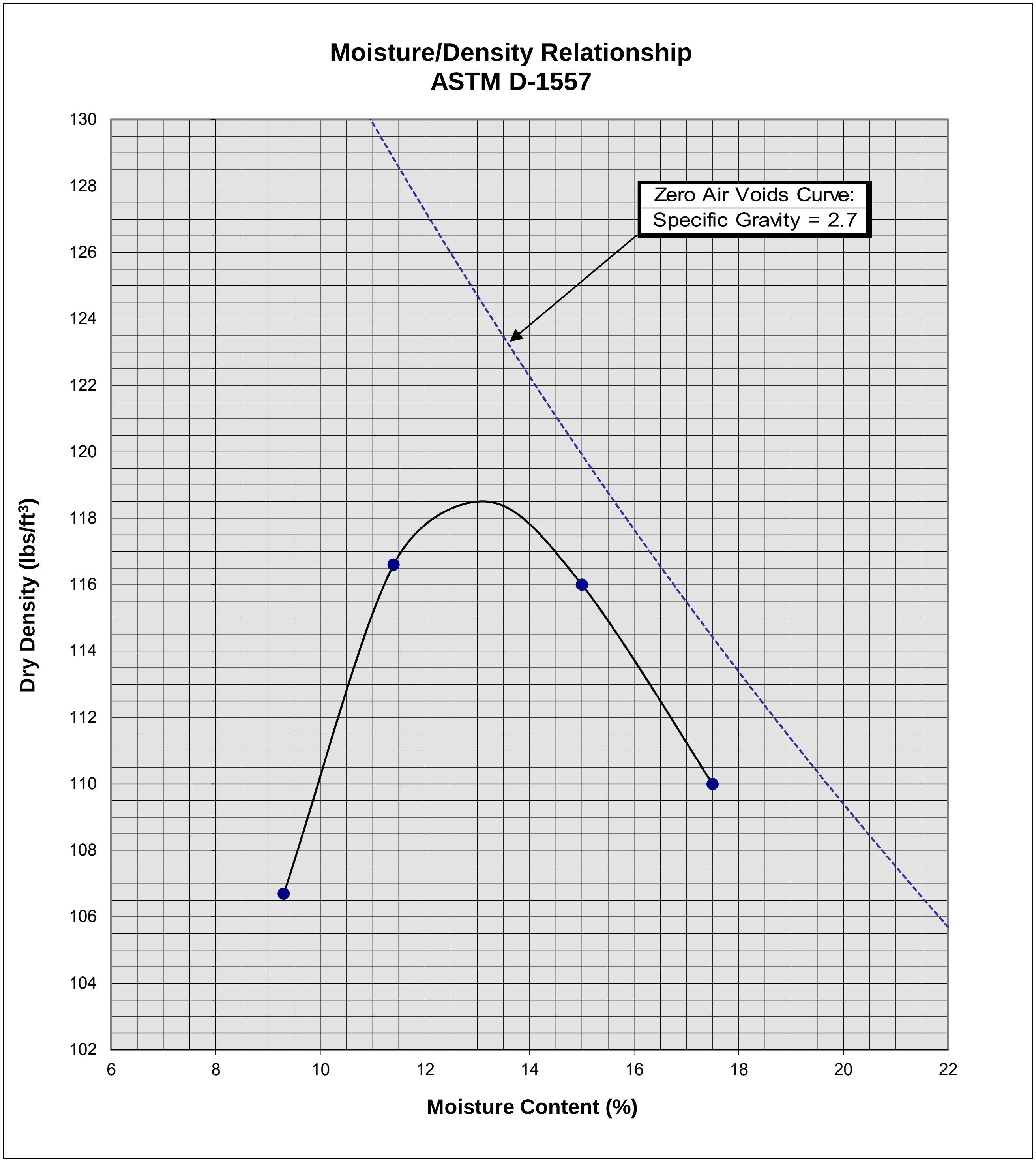

Soil ID Number		B-1 @ 0 to 5'
Optimum Moisture (%)		13
Maximum Dry Density (pcf)		118
Soil Classification	Brown fine Sandy Clay, trace Silt	

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-16

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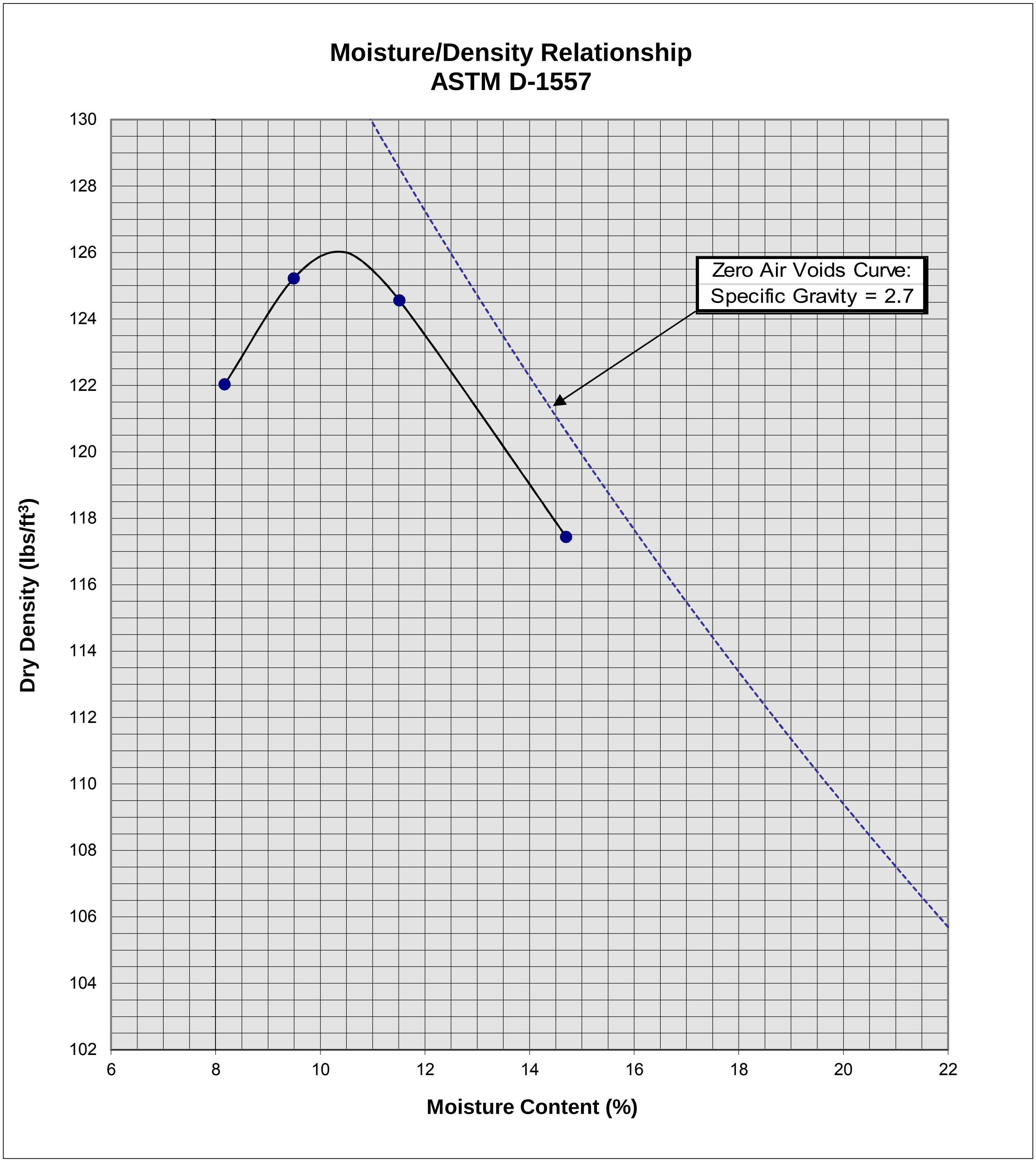

Soil ID Number	B-5 @ 0 to 5'
Optimum Moisture (%)	10.5
Maximum Dry Density (pcf)	126
Soil Classification	Brown fine Sandy Clay, trace to little fine to coarse Gravel

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-17

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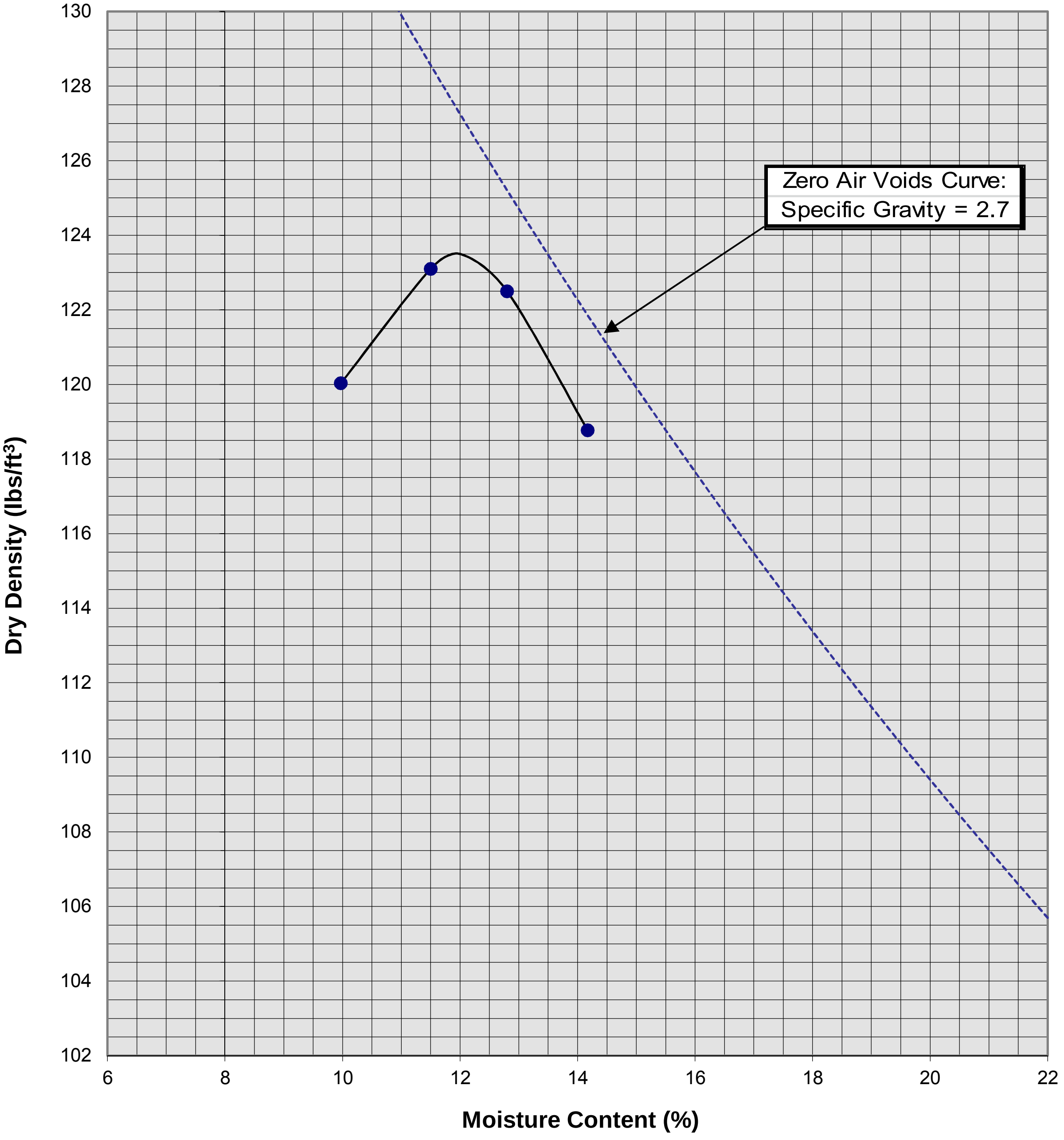
Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-12 @ 0 to 5'
Optimum Moisture (%)	12
Maximum Dry Density (pcf)	123.5
Soil Classification	Brown fine Sandy Clay, trace Silt

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-18

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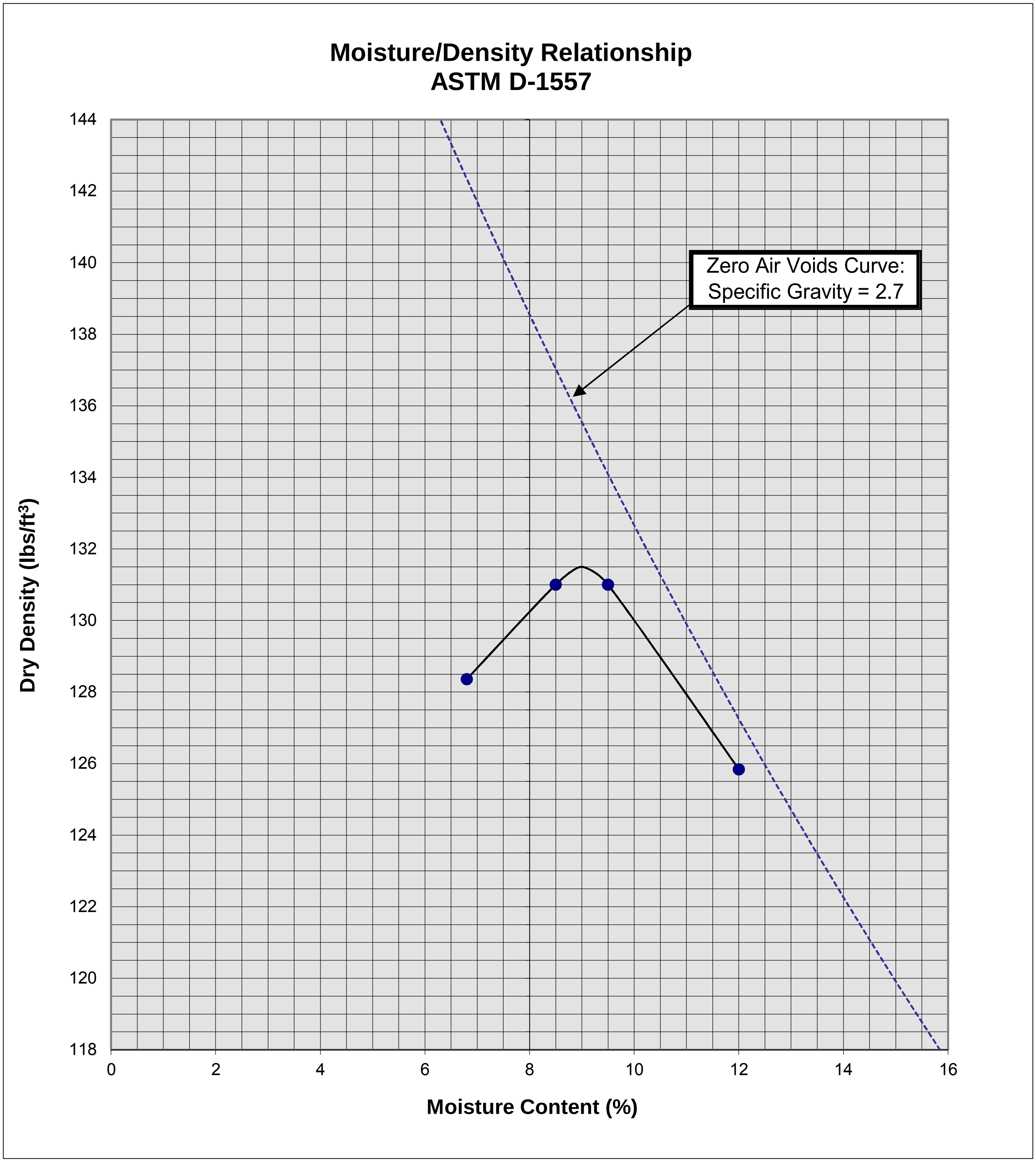

Soil ID Number	B-18 @ 0 to 5'
Optimum Moisture (%)	9
Maximum Dry Density (pcf)	131.5
Soil Classification	Light Brown Clayey fine to coarse Sand, trace Silt

Proposed Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-19

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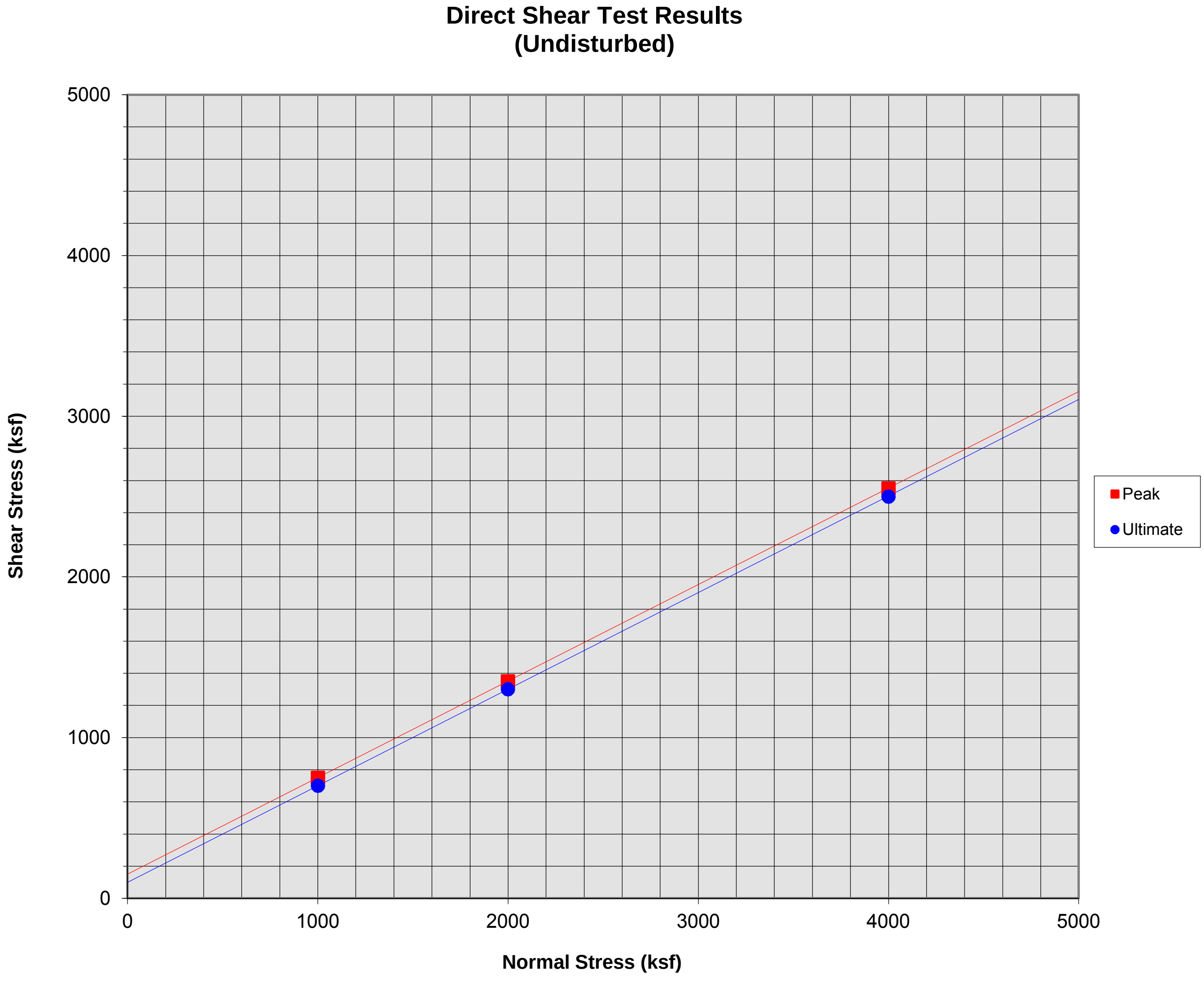

Sample Description: B-1 @ 4 to 5 feet

Classification: ALLUVIUM: Brown fine Sandy Clay, trace Silt

Sample Data

Initial Moisture Content	10.7
Final Moisture Content	24.3
Initial Dry Density	99.5
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results

	Peak	Ultimate
ϕ (°)	31.0	31.0
C (psf)	150	100

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-20

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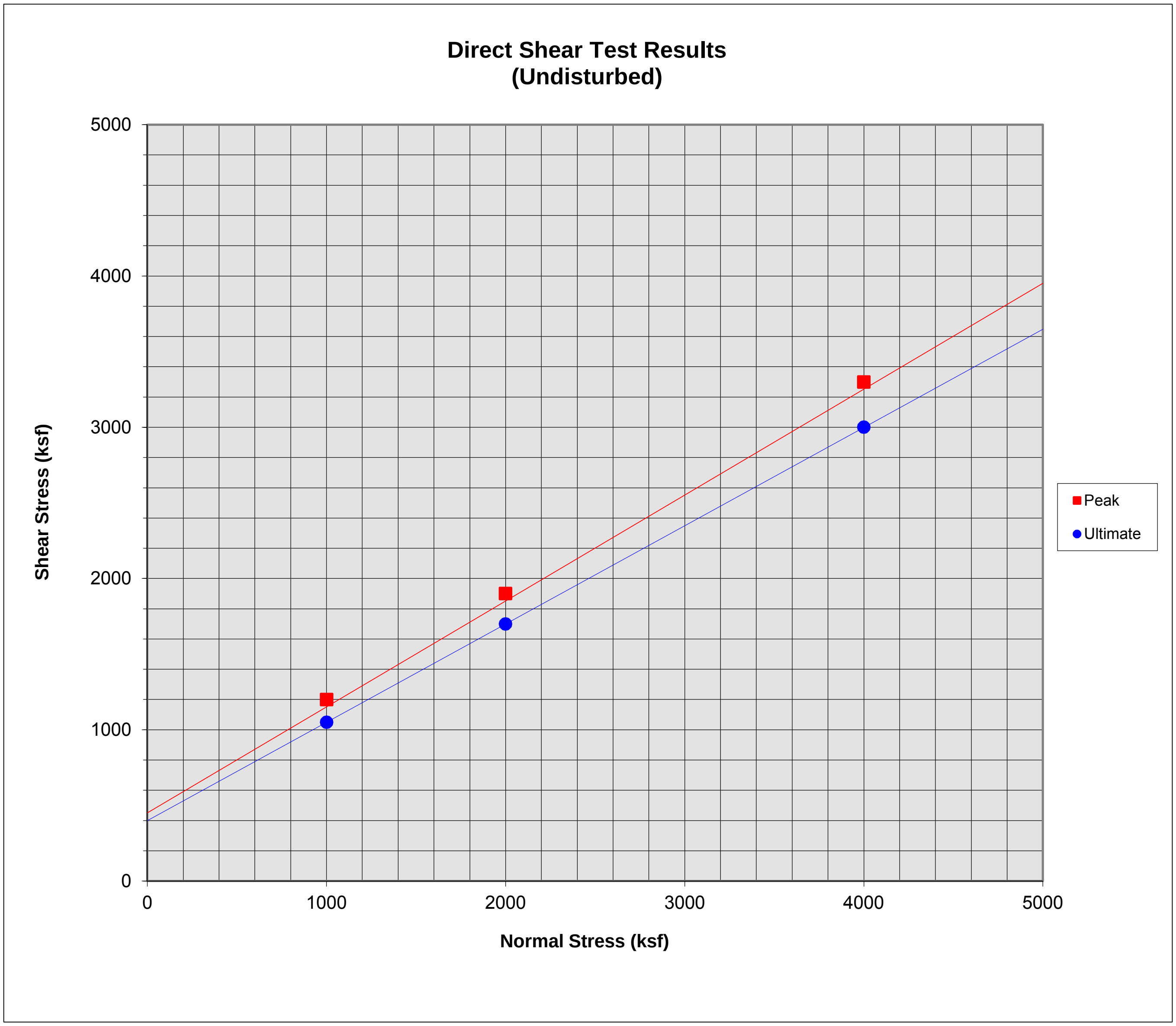

Sample Description: B-3 @ 9 to 10 feet

Classification: BEDROCK: Brown fine Sandy Siltstone, little Clay

Sample Data	
Initial Moisture Content	20.0
Final Moisture Content	34.0
Initial Dry Density	96.0
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results	Peak	Ultimate
ϕ (°)	35.0	33.0
C (psf)	450	400

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184
PLATE C-21

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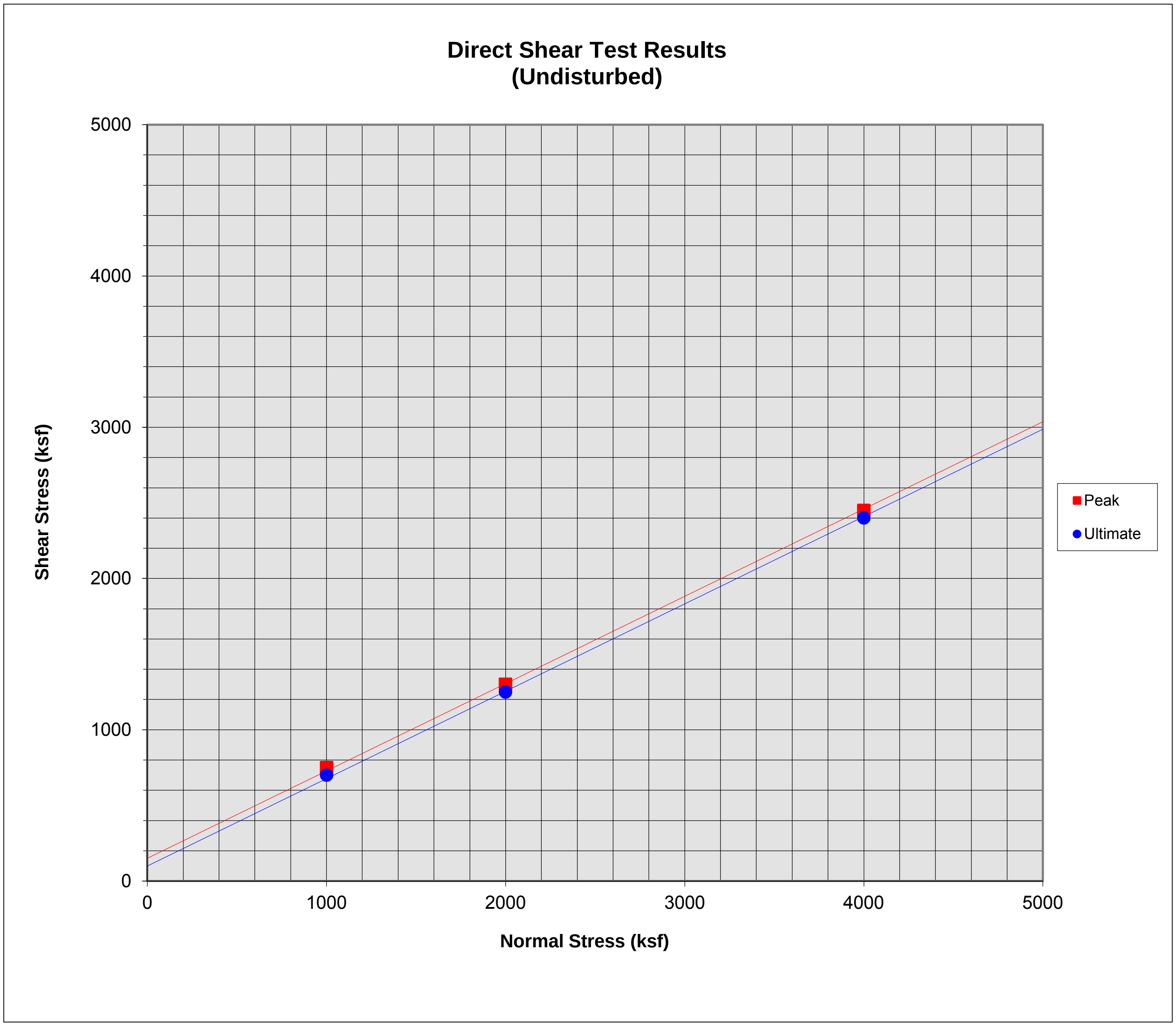

Sample Description: B-4 @ 4 to 5 feet

Classification: ALLUVIUM: Light Brown Silty fine Sand

Sample Data	
Initial Moisture Content	10.2
Final Moisture Content	21.0
Initial Dry Density	104.0
Final Dry Density	-
Specimen Diameter (in)	2.4
Specimen Thickness (in)	1.0

Test Results	Peak	Ultimate
ϕ (°)	30.0	30.0
C (psf)	150	100

Parallax Mixed Use Development
Los Angeles County, California
Project No. 13G184

PLATE C-22

SOUTHERN CALIFORNIA GEOTECHNICAL
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APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

  - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

  - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

  - Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

  - To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

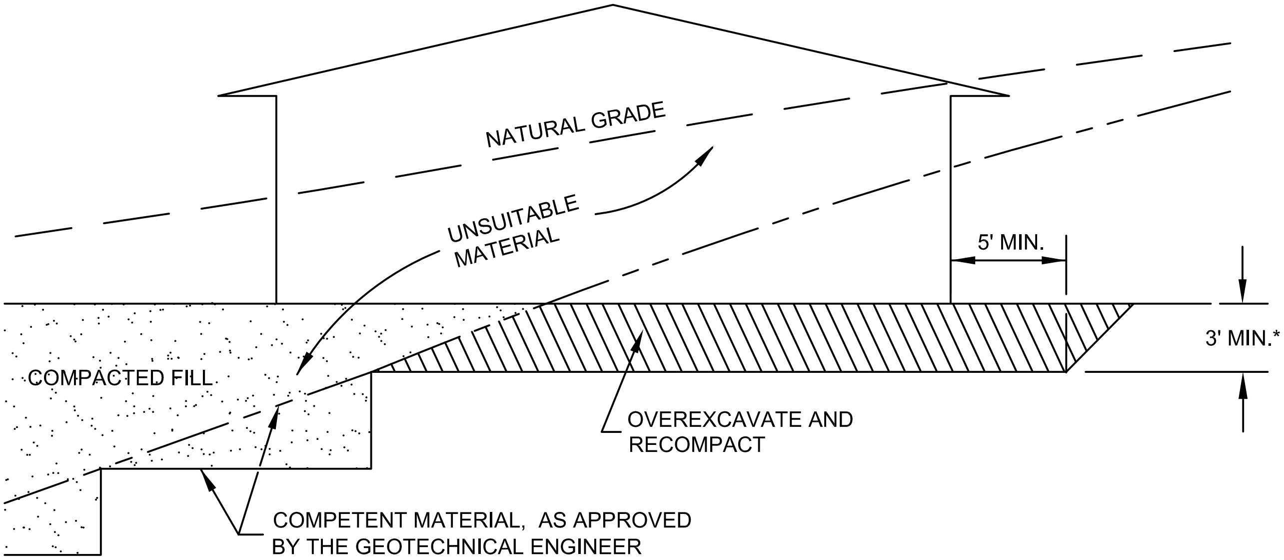
- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

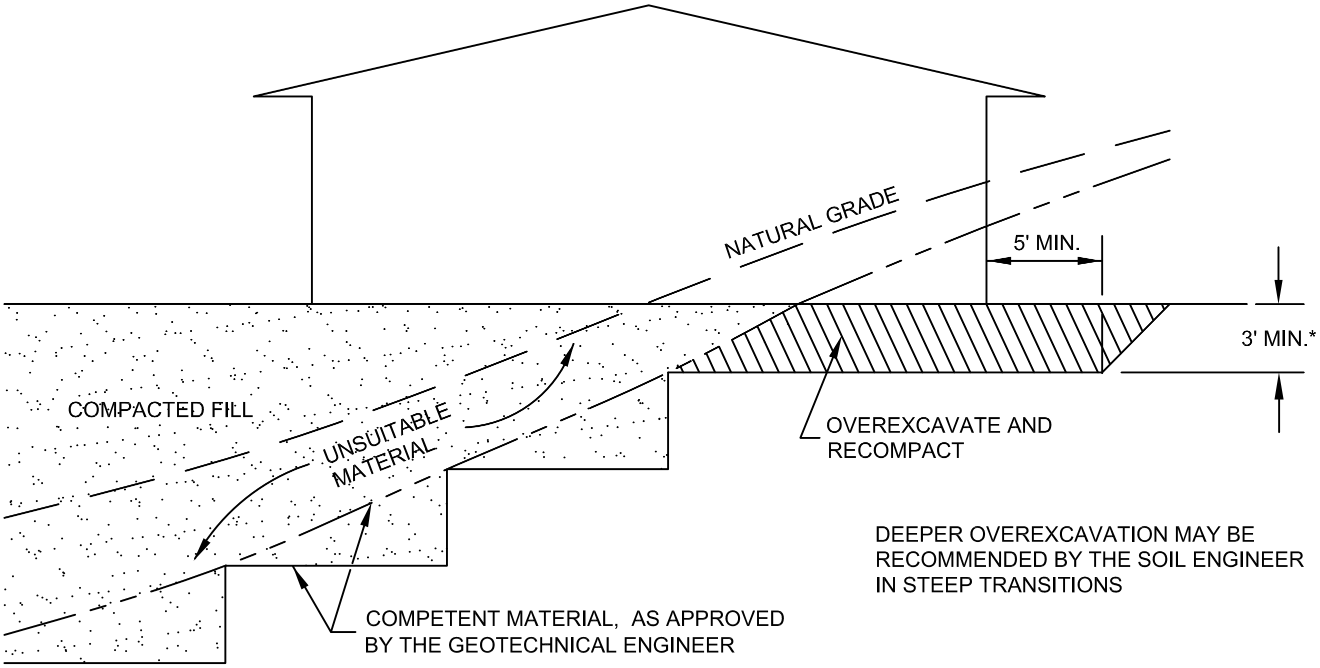
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.
- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



DEEPER OVEREXCAVATION MAY BE
RECOMMENDED BY THE SOIL ENGINEER
IN STEEP TRANSITIONS

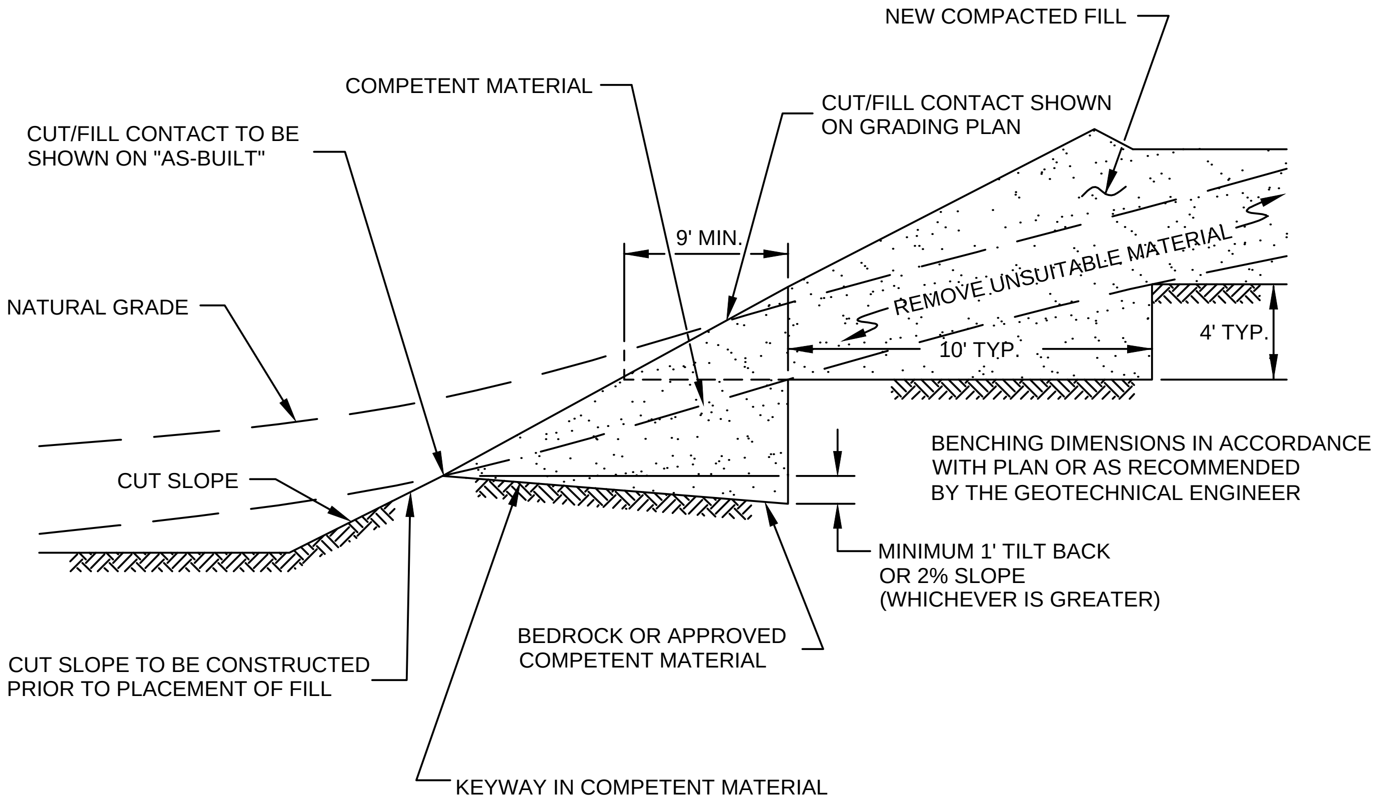
*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION.
ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE
DRAWN: JAS
CHKD: GKM

PLATE D-1

SOUTHERN
CALIFORNIA
GEOTECHNICAL



BENCHING DIMENSIONS IN ACCORDANCE WITH PLAN OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER

MINIMUM 1' TILT BACK OR 2% SLOPE (WHICHEVER IS GREATER)

KEYWAY IN COMPETENT MATERIAL MINIMUM WIDTH OF 15 FEET OR AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER. KEYWAY MAY NOT BE REQUIRED IF FILL SLOPE IS LESS THAN 5 FEET IN HEIGHT AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE CUT SLOPE DETAIL

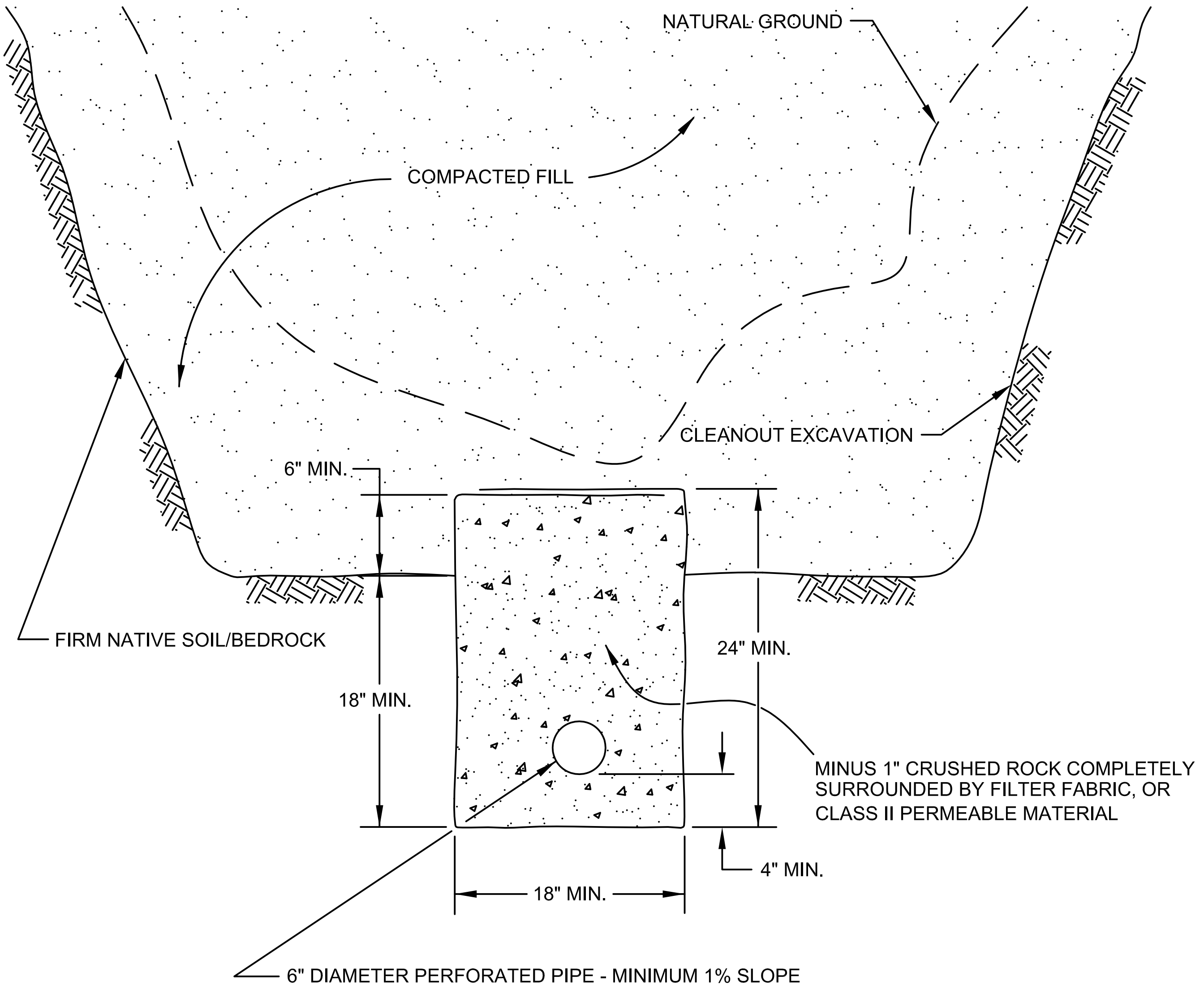
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



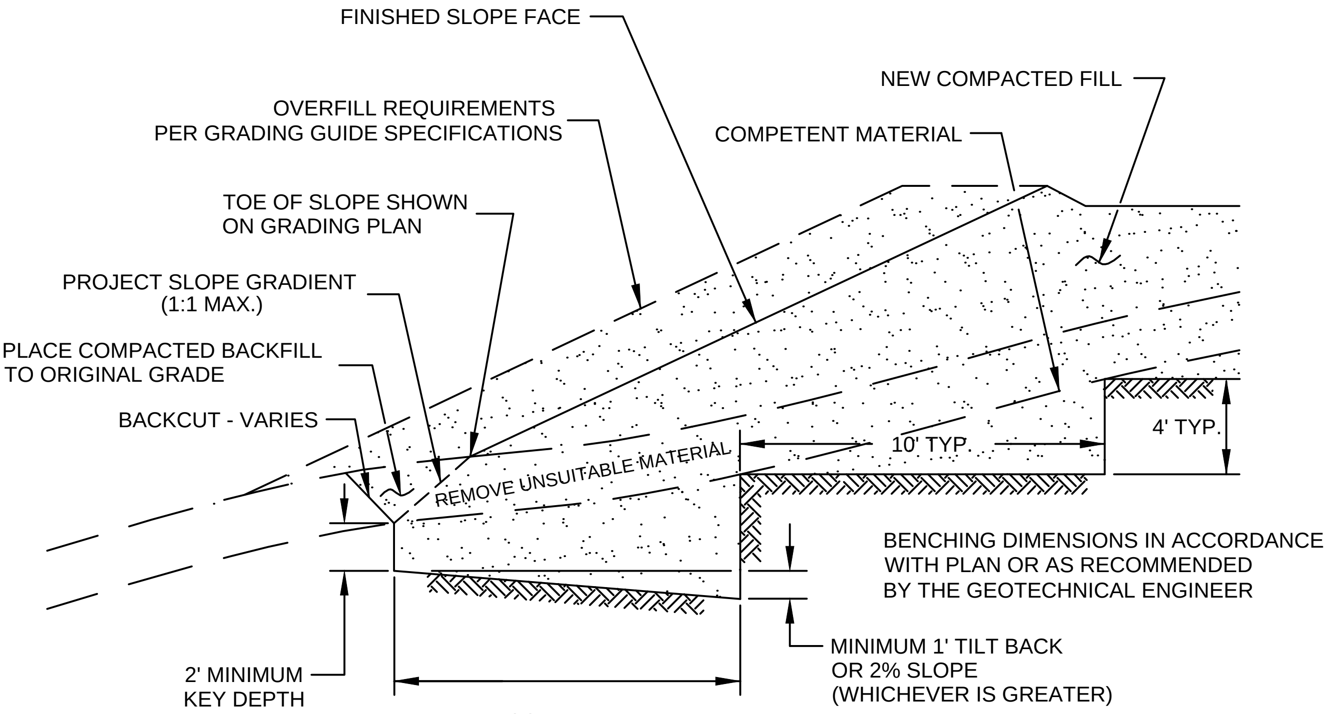
PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE
DRAWN: JAS
CHKD: GKM
PLATE D-3

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



KEYWAY IN COMPETENT MATERIAL. MINIMUM WIDTH OF 15 FEET OR AS RECOMMENDED BY THE GEOTECHNIAL ENGINEER. KEYWAY MAY NOT BE REQUIRED IF FILL SLOPE IS LESS THAN 5' IN HEIGHT AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

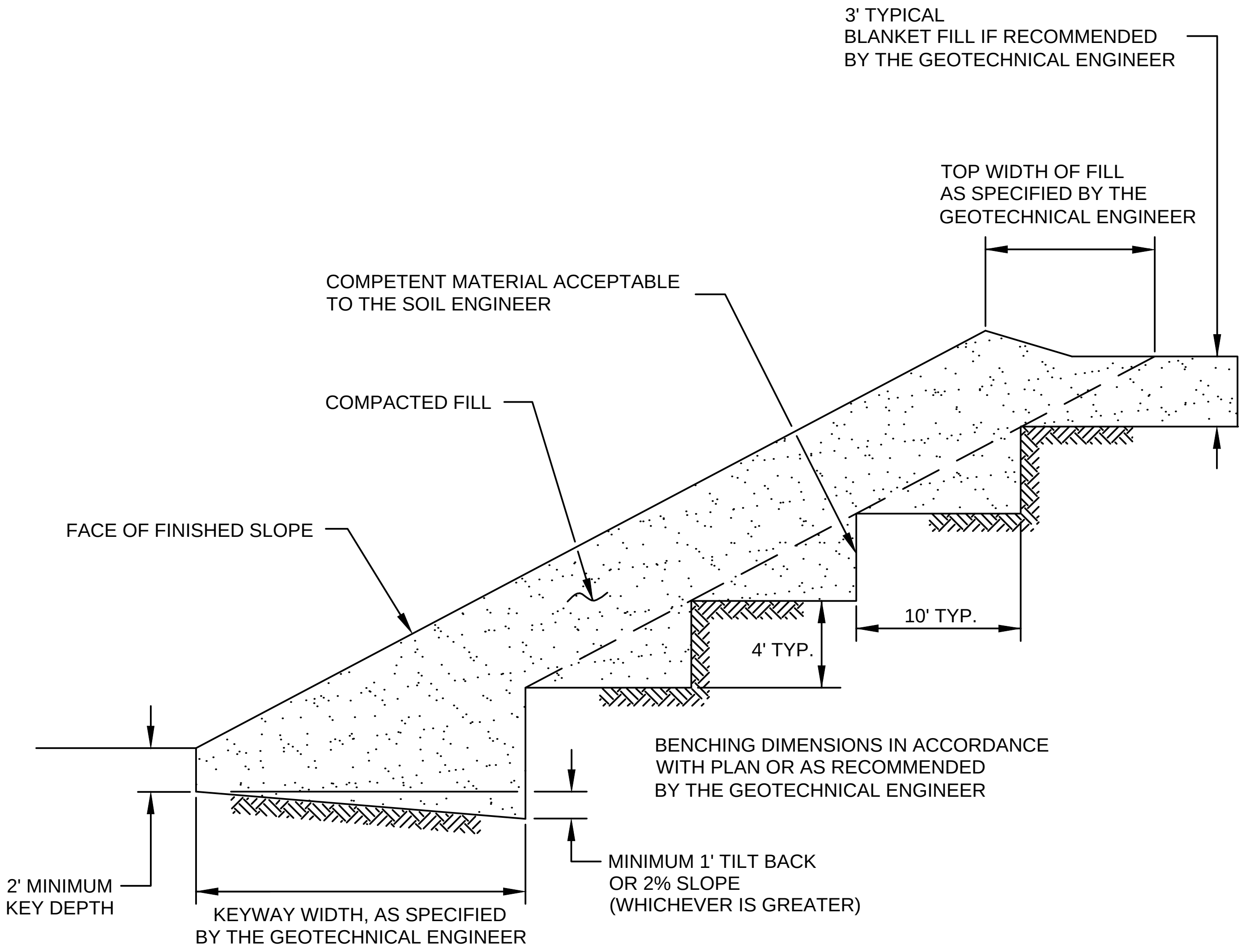
FILL ABOVE NATURAL SLOPE DETAIL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE
DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



STABILIZATION FILL DETAIL

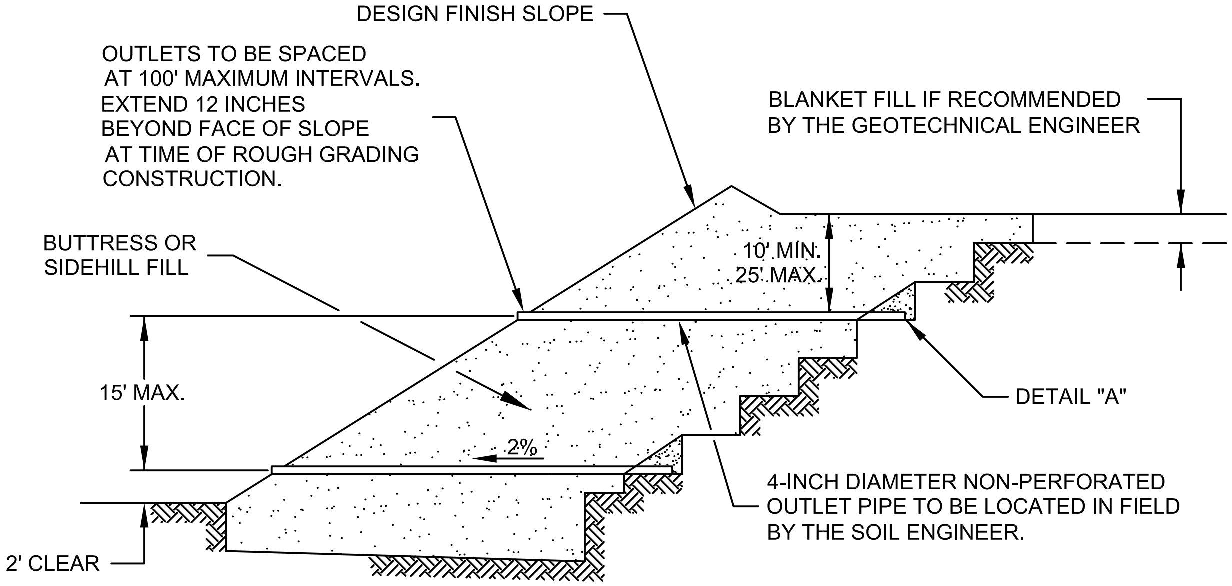
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SOUTHERN
CALIFORNIA
GEOTECHNICAL



OUTLETS TO BE SPACED AT 100' MAXIMUM INTERVALS. EXTEND 12 INCHES BEYOND FACE OF SLOPE AT TIME OF ROUGH GRADING CONSTRUCTION.

4-INCH DIAMETER NON-PERFORATED OUTLET PIPE TO BE LOCATED IN FIELD BY THE SOIL ENGINEER.

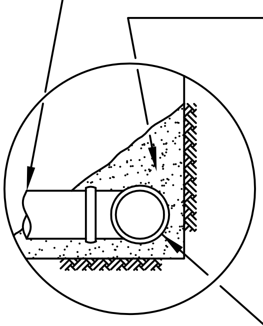
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



OUTLET PIPE TO BE CONNECTED TO SUBDRAIN PIPE WITH TEE OR ELBOW

FILTER MATERIAL - MINIMUM OF FIVE CUBIC FEET PER FOOT OF PIPE. SEE ABOVE FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL FIVE CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE ABOVE FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 12 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

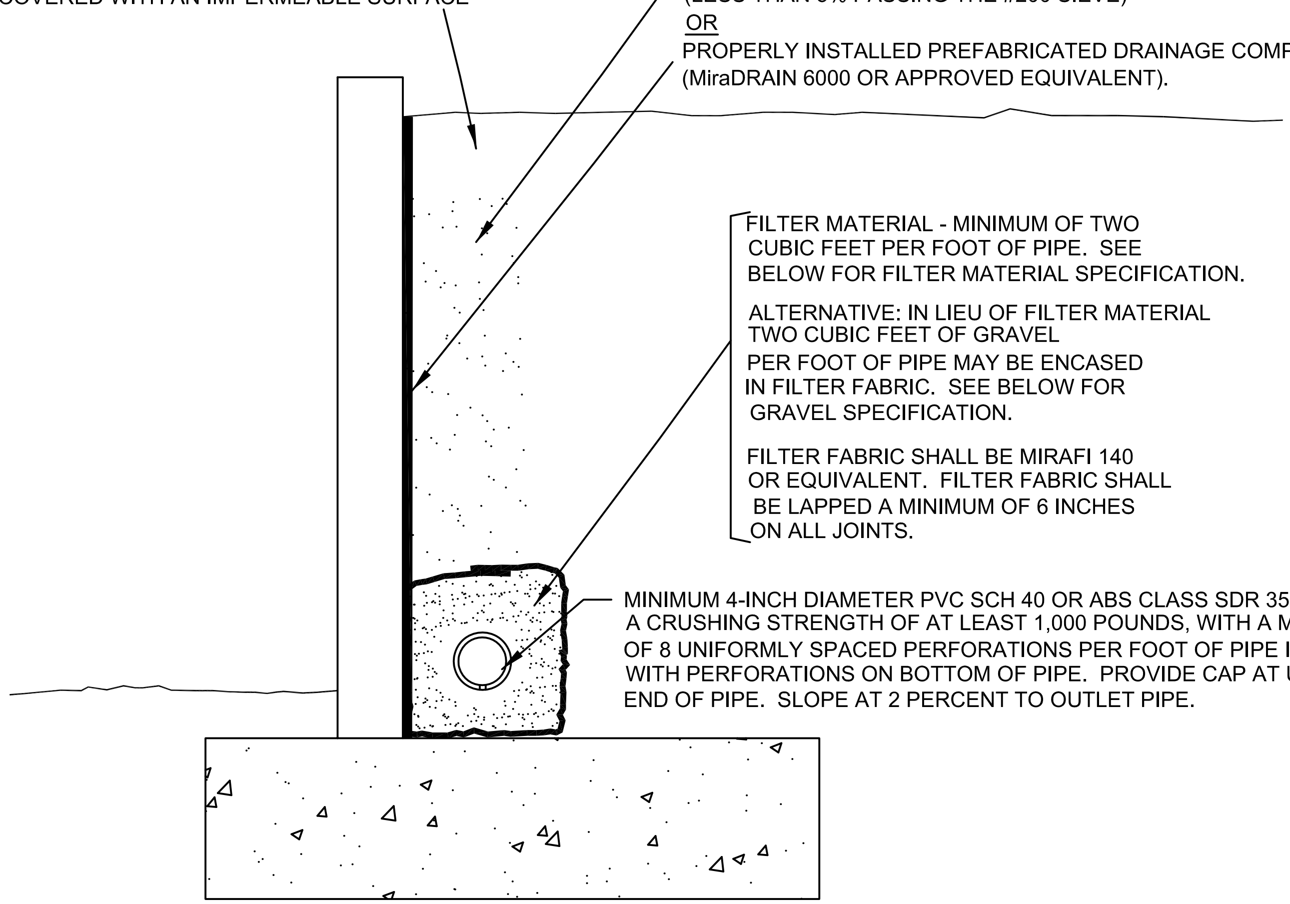
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL



MINIMUM ONE FOOT THICK LAYER OF
LOW PERMEABLILITY SOIL IF NOT
COVERED WITH AN IMPERMEABLE SURFACE

MINIMUM ONE FOOT WIDE LAYER OF
FREE DRAINING MATERIAL
(LESS THAN 5% PASSING THE #200 SIEVE)
OR
PROPERLY INSTALLED PREFABRICATED DRAINAGE COMPOSITE
(MiraDRAIN 6000 OR APPROVED EQUIVALENT).

FILTER MATERIAL - MINIMUM OF TWO CUBIC FEET PER FOOT OF PIPE. SEE BELOW FOR FILTER MATERIAL SPECIFICATION.

ALTERNATIVE: IN LIEU OF FILTER MATERIAL TWO CUBIC FEET OF GRAVEL PER FOOT OF PIPE MAY BE ENCASED IN FILTER FABRIC. SEE BELOW FOR GRAVEL SPECIFICATION.

FILTER FABRIC SHALL BE MIRAFI 140 OR EQUIVALENT. FILTER FABRIC SHALL BE LAPPED A MINIMUM OF 6 INCHES ON ALL JOINTS.

MINIMUM 4-INCH DIAMETER PVC SCH 40 OR ABS CLASS SDR 35 WITH A CRUSHING STRENGTH OF AT LEAST 1,000 POUNDS, WITH A MINIMUM OF 8 UNIFORMLY SPACED PERFORATIONS PER FOOT OF PIPE INSTALLED WITH PERFORATIONS ON BOTTOM OF PIPE. PROVIDE CAP AT UPSTREAM END OF PIPE. SLOPE AT 2 PERCENT TO OUTLET PIPE.

"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION
OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR
APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

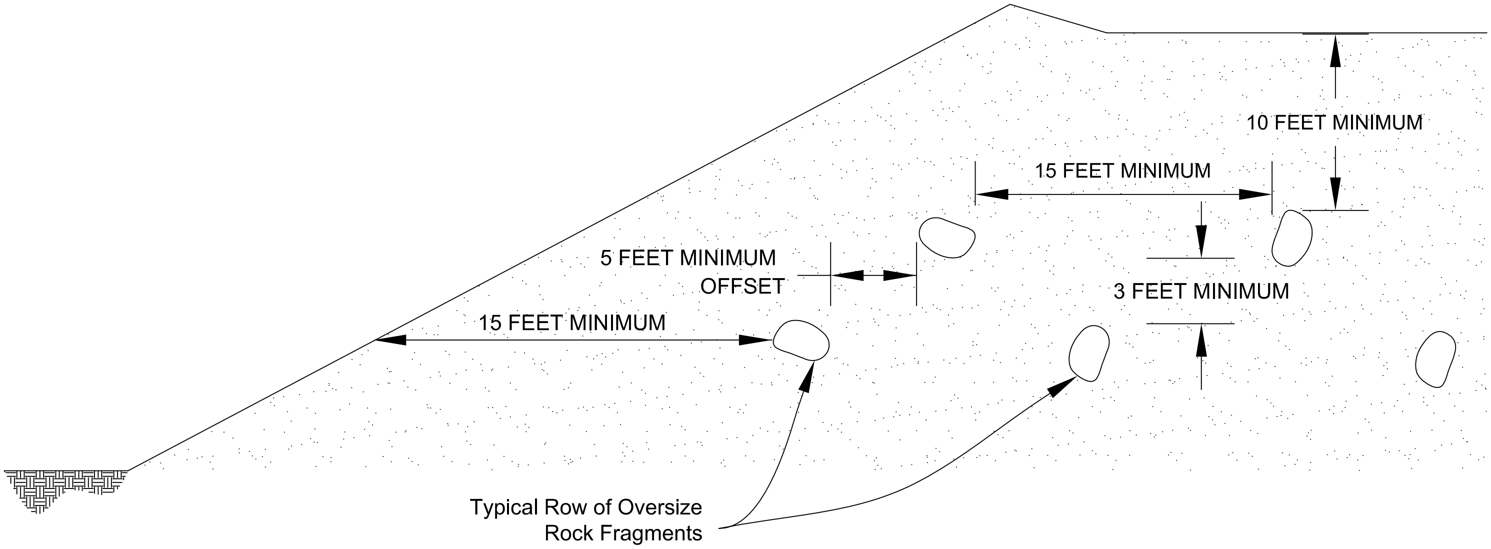
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

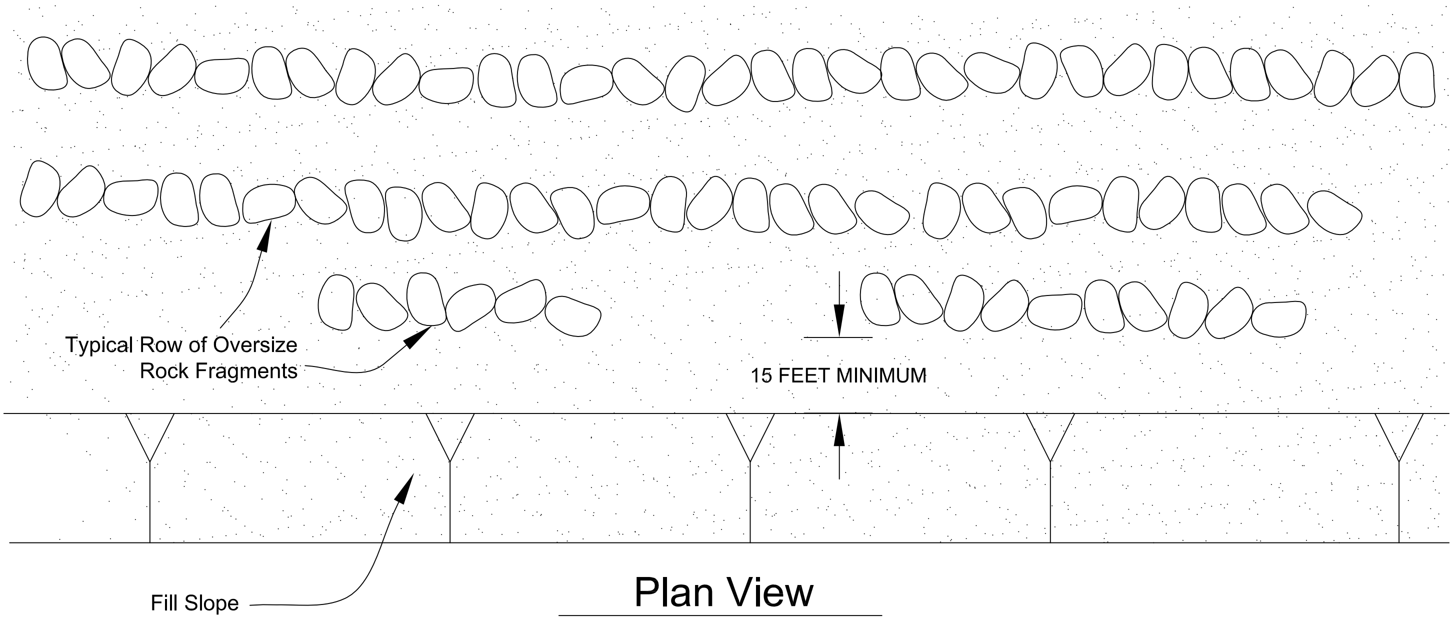
DRAWN: JAS
CHKD: GKM

PLATE D-7

SOUTHERN
CALIFORNIA
GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN
CALIFORNIA
GEOTECHNICAL

APPENDIX E

USGS Design Maps Summary Report

User–Specified Input

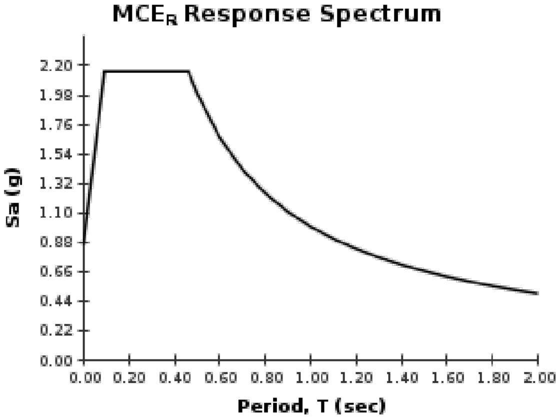
Report Title	Proposed Mixed Use Development Tue January 7, 2014 16:40:50 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.99597°N, 117.89268°W
Site Soil Classification	Site Class C – "Very Dense Soil and Soft Rock"
Risk Category	I/II/III

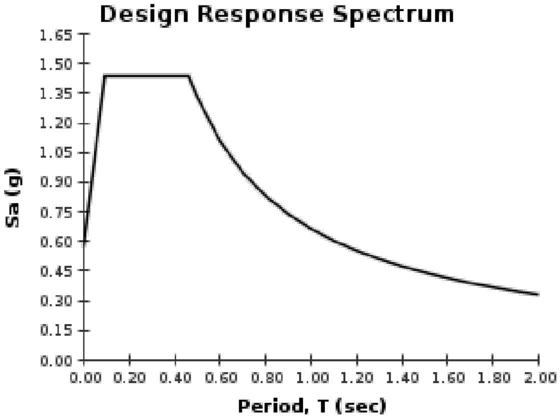
USGS–Provided Output

$S_S =$ 2.155 g $S_{MS} =$ 2.155 g $S_{DS} =$ 1.437 g

$S_1 =$ 0.766 g $S_{M1} =$ 0.996 g $S_{D1} =$ 0.664 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

DRAWN: DRK
CHKD: JAS

SCG PROJECT
13G184-1

PLATE E-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.796

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.796 = 0.796$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = C and PGA = 0.796 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.972

From Figure 22-18 [6] C_{R1} = 0.990

SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS
PROPOSED MIXED USE DEVELOPMENT
LOS ANGELES COUNTY, CALIFORNIA

DRAWN: DRK
CHKD: JAS
SCG PROJECT
13G184-1
PLATE E-2

SoCalGeo
SOUTHERN
CALIFORNIA
GEOTECHNICAL

APPENDIX F

LIQUEFACTION EVALUATION

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN
Boring No.	B-6

MCE$_G$ Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	25	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction (1)	C_B (2)	C_S (3)	C_N (4)	Rod Length Correction (5)	$(N_1)_{60}$ (6)	$(N_1)_{60\text{-CS}}$ (7)	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d) (9)	Ks (10)	Cyclic Resistance Ratio (M=7.5) (11)	Cyclic Resistance Ratio (M=6.99) (12)	Cyclic Stress Ratio Induced by Design Earthquake (13)	Factor of Safety	Comments
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	N/A	N/A	0.45	N/A	Above Water Table
19.5	20	22	21	25	120	16	1.27	1.15	1.3	0.89	0.95	40.2	43.7	2520	2458	2520	0.67	0.95	2.00	2.00	0.36	5.62	Non-liquefiable
24.5	22	25	23.5	19	120	58	1.27	1.15	1.22	0.84	0.95	27.1	32.7	2820	2602	2820	0.64	0.95	0.73	0.79	0.36	2.21	Non-liquefiable
24.5	25	27	26	19	120	58	1.27	1.15	1.21	0.81	0.95	25.9	31.5	3120	2746	3058	0.61	0.94	0.59	0.64	0.36	1.79	Non-liquefiable
29.5	27	29	28	14	120	32	1.27	1.15	1.15	0.79	0.95	17.8	23.2	3360	2861	3173	0.59	0.95	0.25	0.28	0.36	0.77	**Liquefiable**
29.5	29	32	30.5	14	120	21	1.27	1.15	1.15	0.78	0.95	17.4	22.0	3660	3005	3317	0.57	0.95	0.23	0.25	0.36	0.70	**Liquefiable**
34.5	32	37	34.5	23	120	9	1.27	1.15	1.25	0.75	1	31.6	32.3	4140	3235	3547	0.55	0.9	0.68	0.70	0.37	1.91	Non-liquefiable
39.5	37	42	39.5	29	120	34	1.27	1.15	1.3	0.72	1	39.8	45.2	4740	3523	3835	0.55	0.85	2.00	1.94	0.39	5.02	Non-liquefiable
44.5	42	47	44.5	33	120		1.27	1.15	1.3	0.70	1	43.6	43.6	5340	3811	4123	0.59	0.82	2.00	1.89	0.42	4.44	Non-liquefiable
49.5	47	49	48	57	120		1.27	1.15	1.3	0.68	1	73.6	73.6	5760	4013	4325	0.62	0.81	2.00	1.85	0.46	3.99	Non-liquefiable
49.5	49	50	49.5	83	130		1.27	1.15	1.3	0.67	1	106.1	106.1	5945	4104	4416	0.64	0.8	2.00	1.84	0.48	3.80	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-6

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	40.2	3.6	43.7	5.62	0.00	3.69	0.00	2.00		0.000		0.00	Non-liquefiable
24.5	22	25	23.5	27.1	5.6	32.7	2.21	0.03	3.07	0.00	3.00		0.000		0.00	Non-liquefiable
24.5	25	27	26	25.9	5.6	31.5	1.79	0.04	2.99	0.04	2.00		0.000		0.00	Non-liquefiable
29.5	27	29	28	17.8	5.4	23.2	0.77	0.11	2.45	0.11	2.00		0.020		0.49	**Liquefiable**
29.5	29	32	30.5	17.4	4.6	22.0	0.70	0.13	2.36	0.13	3.00		0.021		0.77	**Liquefiable**
34.5	32	37	34.5	31.6	0.7	32.3	1.91	0.03	3.04	0.03	5.00		0.000		0.00	Non-liquefiable
39.5	37	42	39.5	39.8	5.5	45.2	5.02	0.00	3.76	0.00	5.00		0.000		0.00	Non-liquefiable
44.5	42	47	44.5	43.6	0.0	43.6	4.44	0.00	3.68	0.00	5.00		0.000		0.00	Non-liquefiable
49.5	47	49	48	73.6	0.0	73.6	3.99	0.00	5.04	0.00	2.00		0.000		0.00	Non-liquefiable
49.5	49	50	49.5	106.1	0.0	106.1	3.80	0.00	6.23	0.00	1.00		0.000		0.00	Non-liquefiable
											Total Deformation (in)				1.25	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

LIQUEFACTION EVALUATION

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN
Boring No.	B-11

MCE_G Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	25	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=6.99)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(9)	(10)	(11)	(12)	(13)		
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	0.06	0.07	0.45	N/A	Above Water Table
21	20	21	20.5	11	120	22	1.27	1.15	1.14	0.90	0.95	15.7	20.4	2460	2429	2460	0.68	0.98	0.21	0.24	0.36	0.67	**Liquefiable**
21	21	23	22	11	120	4	1.27	1.15	1.13	0.87	0.95	15.0	15.0	2640	2515	2640	0.66	0.98	0.16	0.18	0.36	0.49	**Liquefiable**
26	23	28	25.5	50	130		1.27	1.15	1.3	0.81	0.95	73.0	73.0	3085	2742	3054	0.61	0.92	2.00	2.00	0.36	5.61	Non-liquefiable
31	28	33	30.5	50	130		1.27	1.15	1.3	0.77	0.95	69.3	69.3	3735	3080	3392	0.57	0.89	2.00	2.00	0.36	5.60	Non-liquefiable
36	33	37	35	50	130		1.27	1.15	1.3	0.74	1	69.8	69.8	4320	3384	3696	0.55	0.86	2.00	1.97	0.36	5.40	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-11

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$ (1)	DN for fines content (2)	$(N_1)_{60\text{-}CS}$ (3)	Liquefaction Factor of Safety (4)	Limiting Shear Strain γ_{min} (5)	Parameter Fα (6)	Maximum Shear Strain γ_{max} (7)	Height of Layer		Vertical Reconsolidation Strain ε_v (8)		Total Deformation of Layer (in)	Comments
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
21	20	21	20.5	15.7	4.8	20.4	0.67	0.15	2.24	0.15	1.00		0.023		0.27	**Liquefiable**
21	21	23	22	15.0	0.0	15.0	0.49	0.27	1.80	0.27	2.00		0.029		0.69	**Liquefiable**
26	23	28	25.5	73.0	0.0	73.0	5.61	0.00	5.02	0.00	5.00		0.000		0.00	Non-liquefiable
31	28	33	30.5	69.3	0.0	69.3	5.60	0.00	4.86	0.00	5.00		0.000		0.00	Non-liquefiable
36	33	37	35	69.8	0.0	69.8	5.40	0.00	4.89	0.00	4.00		0.000		0.00	Non-liquefiable

Total Deformation (in) 0.96

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

LIQUEFACTION EVALUATION

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN
Boring No.	B-17

MCE_G Design Acceleration	0.796	(g)
Design Magnitude	6.99	
Historic High Depth to Groundwater	20	(ft)
Current Depth to Groundwater	37	(ft)
Borehole Diameter	8	(in)
Calculated Magnitude Scaling Factor (8)	1.14	

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction (1)	C_B (2)	C_S (3)	C_N (4)	Rod Length Correction (5)	$(N_1)_{60}$ (6)	$(N_1)_{60CS}$ (7)	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d) (9)	Ks (10)	Cyclic Resistance Ratio (M=7.5) (11)	Cyclic Resistance Ratio (M=6.99) (12)	Cyclic Stress Ratio Induced by Design Earthquake (13)	Factor of Safety	Comments
5.5	0	20	10		120		1.27	1.15	1.1	1.29	0.75	0.0	0.0	1200	1200	1200	0.86	1.03	0.06	0.07	0.45	N/A	Above Water Table
19.5	20	22	21	12	120	86	1.27	1.15	1.15	0.89	0.95	17.0	22.6	2520	2458	2520	0.67	0.98	0.24	0.27	0.36	N/A	Non-liquefiable: PI≥12
24.5	22	27	24.5	56	120		1.27	1.15	1.3	0.82	0.95	83.3	83.3	2940	2659	2940	0.62	0.93	2.00	2.00	0.36	5.60	Non-liquefiable
29.5	27	32	29.5	31	120	67	1.27	1.15	1.3	0.75	0.95	42.0	47.6	3540	2947	3540	0.58	0.9	2.00	2.00	0.36	5.59	Non-liquefiable
34.5	32	37	34.5	36	120		1.27	1.15	1.3	0.70	1	47.5	47.5	4140	3235	4140	0.55	0.87	2.00	2.00	0.37	5.46	Non-liquefiable
39.5	37	42	39.5	26	120		1.27	1.15	1.25	0.66	1	31.4	31.4	4740	3523	4584	0.55	0.89	0.59	0.60	0.39	1.54	Non-liquefiable
44.5	42	47	44.5	31	120	14	1.27	1.15	1.29	0.64	1	37.4	40.3	5340	3811	4872	0.59	0.82	2.00	1.89	0.42	4.44	Non-liquefiable
49.5	47	50	48.5	80	130		1.27	1.15	1.3	0.63	1	95.0	95.0	5835	4057	5117	0.63	0.81	2.00	1.84	0.47	3.93	Non-liquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Lao and Whitman, 1986, $C_N = (2.0 \text{ ksf} / p'_o)^{1/2}$

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Magnitude Scaling Factor calculated by Eq. 51 (Boulanger and Idriss, 2008)

(9) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Mixed Use Development
Project Location	Los Angeles County, California
Project Number	13G184
Engineer	DWN

Boring No. B-17

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines content	$(N_1)_{60\text{-CS}}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
5.5	0	20	10	0.0	0.0	0.0	N/A	0.50	0.95	0.00	20.00		0.000		0.00	Above Water Table
19.5	20	22	21	17.0	5.5	22.6	N/A	0.12	2.40	0.00	2.00		0.000		0.00	on-liquefiable: PI≥1
24.5	22	27	24.5	83.3	0.0	83.3	5.60	0.00	5.42	0.00	5.00		0.000		0.00	Non-liquefiable
29.5	27	32	29.5	42.0	5.6	47.6	5.59	0.00	3.88	0.00	5.00		0.000		0.00	Non-liquefiable
34.5	32	37	34.5	47.5	0.0	47.5	5.46	0.00	3.88	0.00	5.00		0.000		0.00	Non-liquefiable
39.5	37	42	39.5	31.4	0.0	31.4	1.54	0.04	2.99	0.04	5.00		0.000		0.00	Non-liquefiable
44.5	42	47	44.5	37.4	2.9	40.3	4.44	0.01	3.50	0.00	5.00		0.000		0.00	Non-liquefiable
49.5	47	50	48.5	95.0	0.0	95.0	3.93	0.00	5.85	0.00	3.00		0.000		0.00	Non-liquefiable
											Total Deformation (in)				0.00	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Voumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

APPENDIX G

NOISE DATA WORKSHEETS

Rowland Heights Plaza and Hotel Project

Draft EIR

Appendix G, Noise Data Worksheets

Appendix G-1

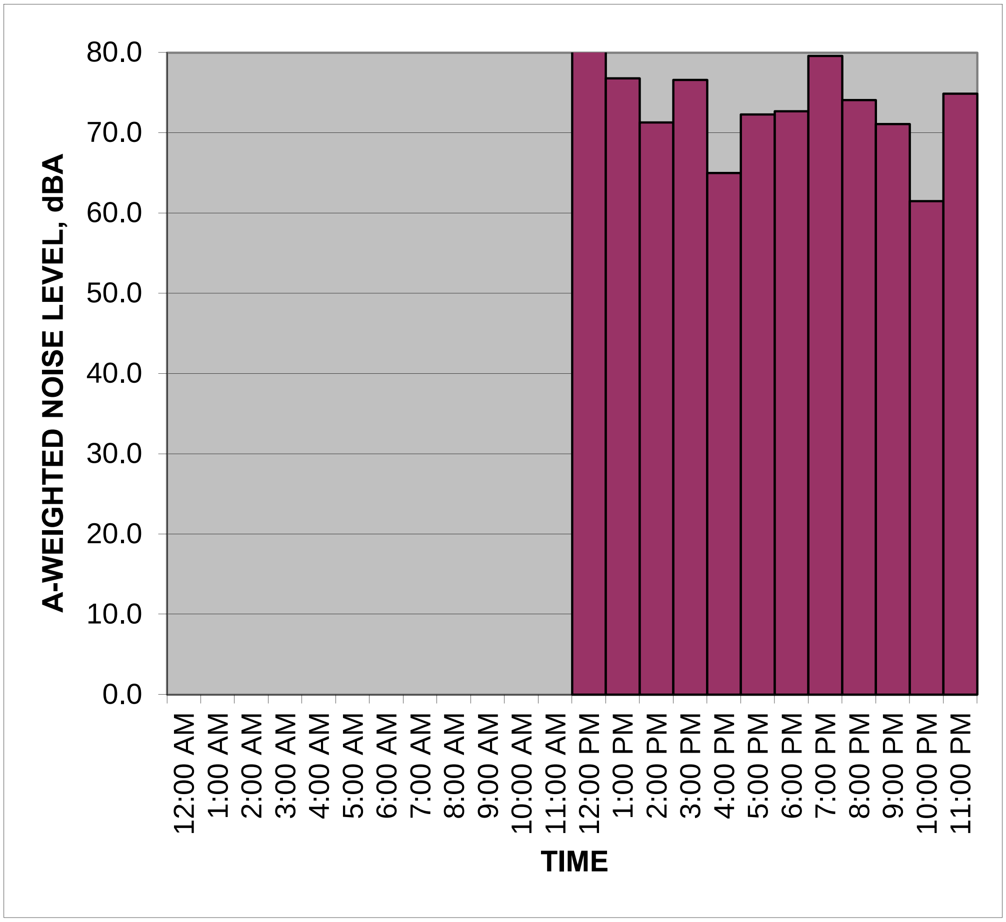
Ambient Noise Data

Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R1- Southeast Corner of Gale Avenue and New Charlie Road
Sources: Ambient

Date: June 15, 2015

TIME	*HNL, dB(A)*
12:00 AM	0.0
1:00 AM	0.0
2:00 AM	0.0
3:00 AM	0.0
4:00 AM	0.0
5:00 AM	0.0
6:00 AM	0.0
7:00 AM	0.0
8:00 AM	0.0
9:00 AM	0.0
10:00 AM	0.0
11:00 AM	0.0
12:00 PM	81.8
1:00 PM	76.8
2:00 PM	71.3
3:00 PM	76.6
4:00 PM	65.0
5:00 PM	72.3
6:00 PM	72.7
7:00 PM	79.6
8:00 PM	74.1
9:00 PM	71.1
10:00 PM	61.5
11:00 PM	74.9
CNEL, dB(A):	**79.3**



NOTES:

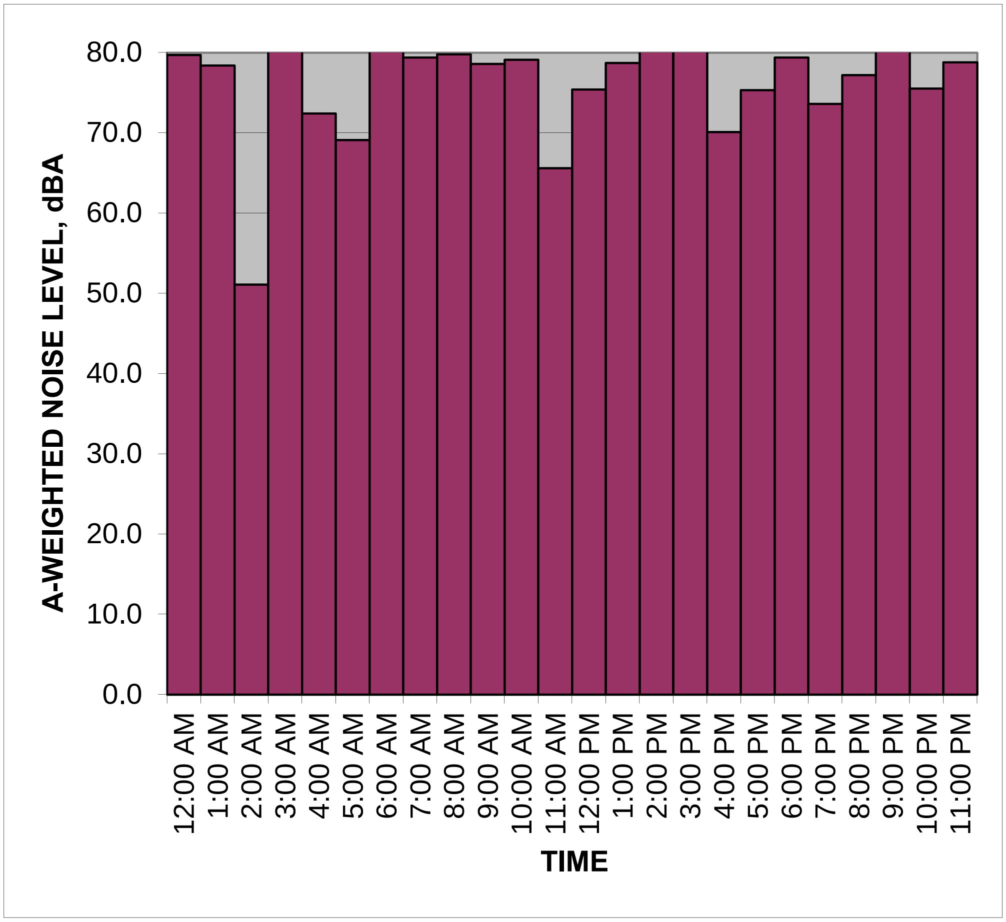
fieldcnel.xls

Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R1- Southeast Corner of Gale Avenue and New Charlie Road
Sources: Ambient

Date: June 16, 2015

TIME	*HNL, dB(A)*
12:00 AM	79.7
1:00 AM	78.4
2:00 AM	51.1
3:00 AM	83.4
4:00 AM	72.4
5:00 AM	69.1
6:00 AM	81.7
7:00 AM	79.4
8:00 AM	79.8
9:00 AM	78.6
10:00 AM	79.1
11:00 AM	65.6
12:00 PM	75.4
1:00 PM	78.7
2:00 PM	80.2
3:00 PM	80.6
4:00 PM	70.1
5:00 PM	75.3
6:00 PM	79.4
7:00 PM	73.6
8:00 PM	77.2
9:00 PM	83.1
10:00 PM	75.5
11:00 PM	78.8
CNEL, dB(A):	**85.4**



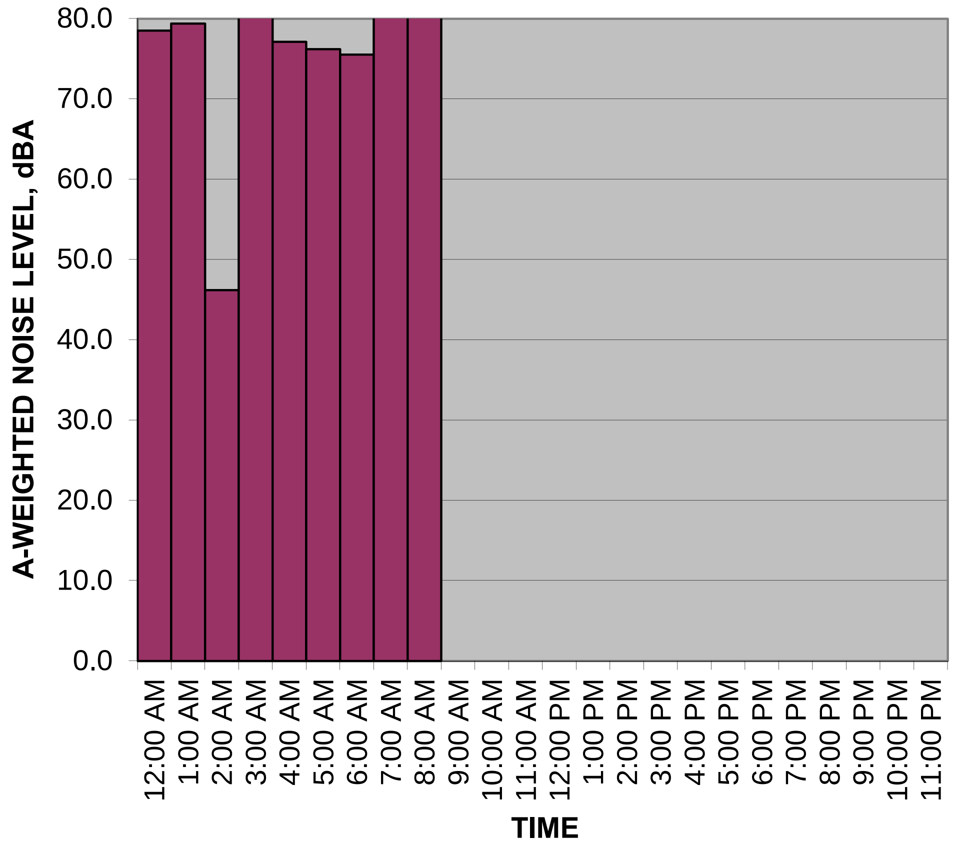
NOTES:

Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R1- Southeast Corner of Gale Avenue and New Charlie Road
Sources: Ambient

Date: June 17, 2015

TIME	*HNL, dB(A)*
12:00 AM	78.5
1:00 AM	79.4
2:00 AM	46.2
3:00 AM	80.8
4:00 AM	77.1
5:00 AM	76.2
6:00 AM	75.5
7:00 AM	80.7
8:00 AM	82.0
9:00 AM	0.0
10:00 AM	0.0
11:00 AM	0.0
12:00 PM	0.0
1:00 PM	0.0
2:00 PM	0.0
3:00 PM	0.0
4:00 PM	0.0
5:00 PM	0.0
6:00 PM	0.0
7:00 PM	0.0
8:00 PM	0.0
9:00 PM	0.0
10:00 PM	0.0
11:00 PM	0.0
CNEL, dB(A):	**86.8**



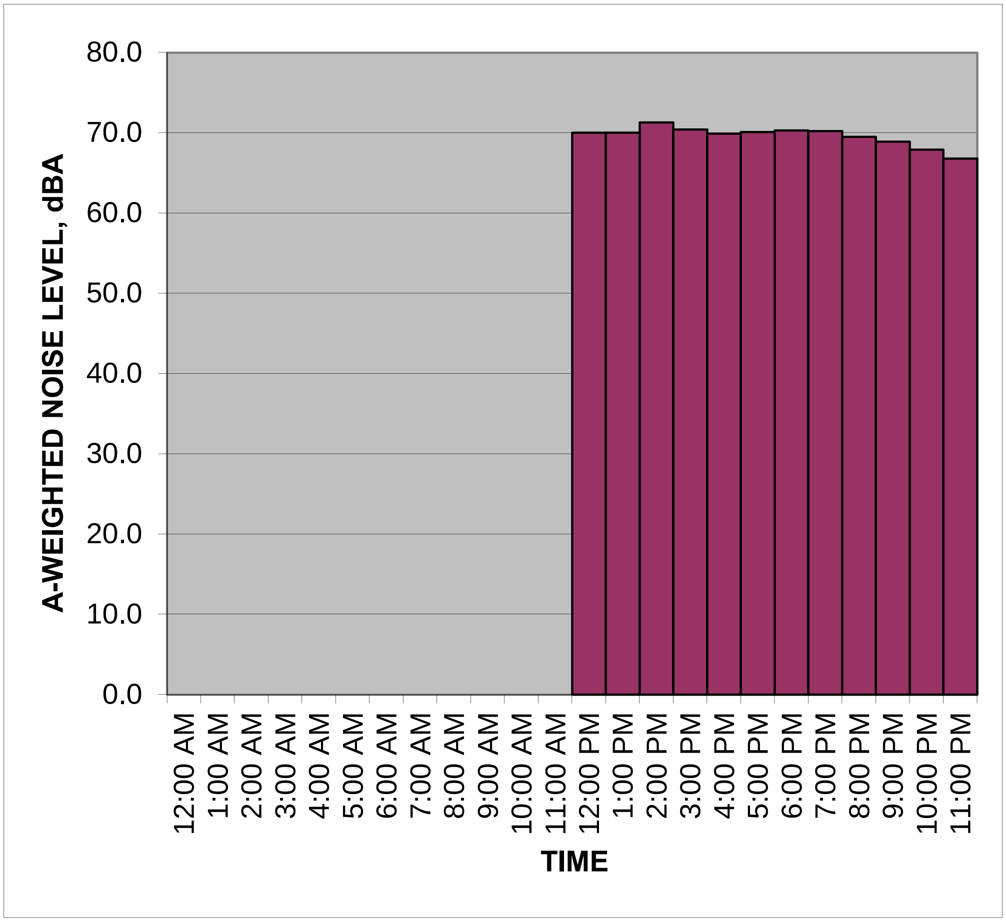
NOTES:

Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R2- Northwest Corner of Project Along Railroad
Sources: Ambient

Date: June 15, 2015

TIME	*HNL, dB(A)*
12:00 AM	0.0
1:00 AM	0.0
2:00 AM	0.0
3:00 AM	0.0
4:00 AM	0.0
5:00 AM	0.0
6:00 AM	0.0
7:00 AM	0.0
8:00 AM	0.0
9:00 AM	0.0
10:00 AM	0.0
11:00 AM	0.0
12:00 PM	70.0
1:00 PM	70.0
2:00 PM	71.3
3:00 PM	70.4
4:00 PM	69.9
5:00 PM	70.1
6:00 PM	70.3
7:00 PM	70.2
8:00 PM	69.5
9:00 PM	68.9
10:00 PM	67.9
11:00 PM	66.8
CNEL, dB(A):	**73.5**



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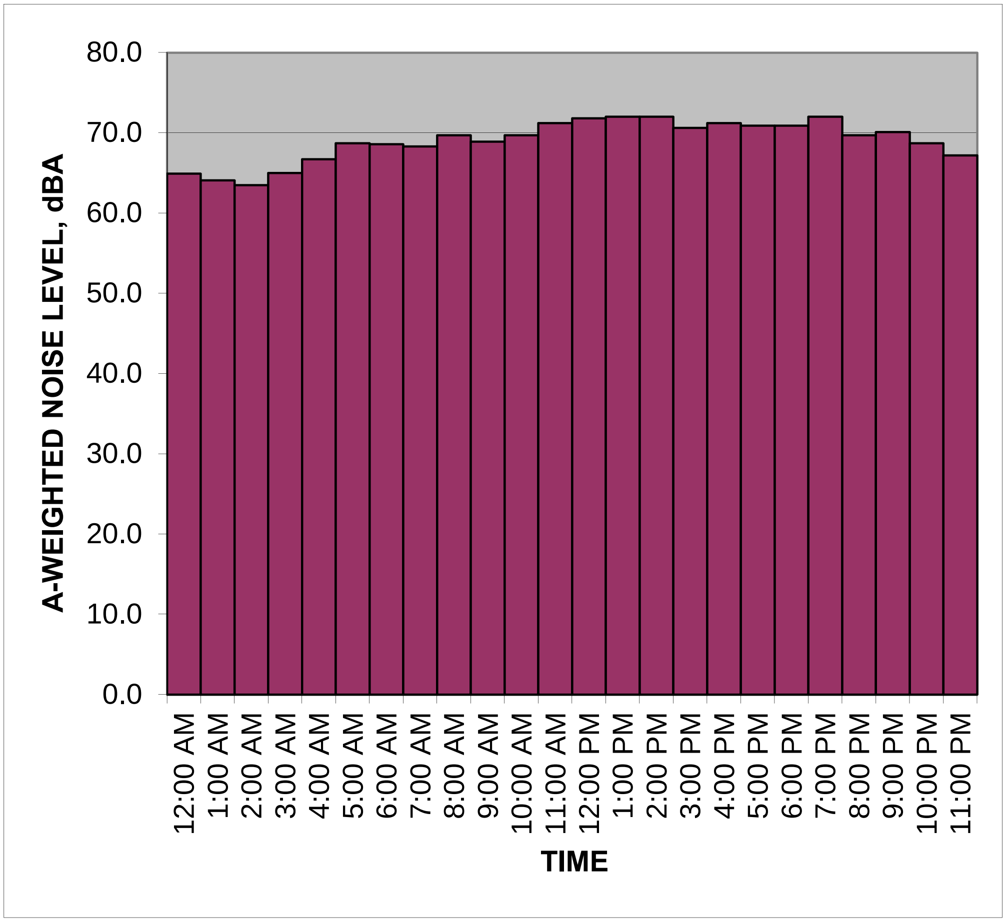
Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R2- Northwest Corner of Project Along Railroad
Sources: Ambient

Date: June 16, 2015

TIME	HNL, dB(A)
12:00 AM	64.9
1:00 AM	64.1
2:00 AM	63.5
3:00 AM	65.0
4:00 AM	66.7
5:00 AM	68.7
6:00 AM	68.6
7:00 AM	68.3
8:00 AM	69.7
9:00 AM	68.9
10:00 AM	69.7
11:00 AM	71.2
12:00 PM	71.8
1:00 PM	72.0
2:00 PM	72.0
3:00 PM	70.6
4:00 PM	71.2
5:00 PM	70.9
6:00 PM	70.9
7:00 PM	72.0
8:00 PM	69.7
9:00 PM	70.1
10:00 PM	68.7
11:00 PM	67.2
CNEL, dB(A):	**74.6**



NOTES:

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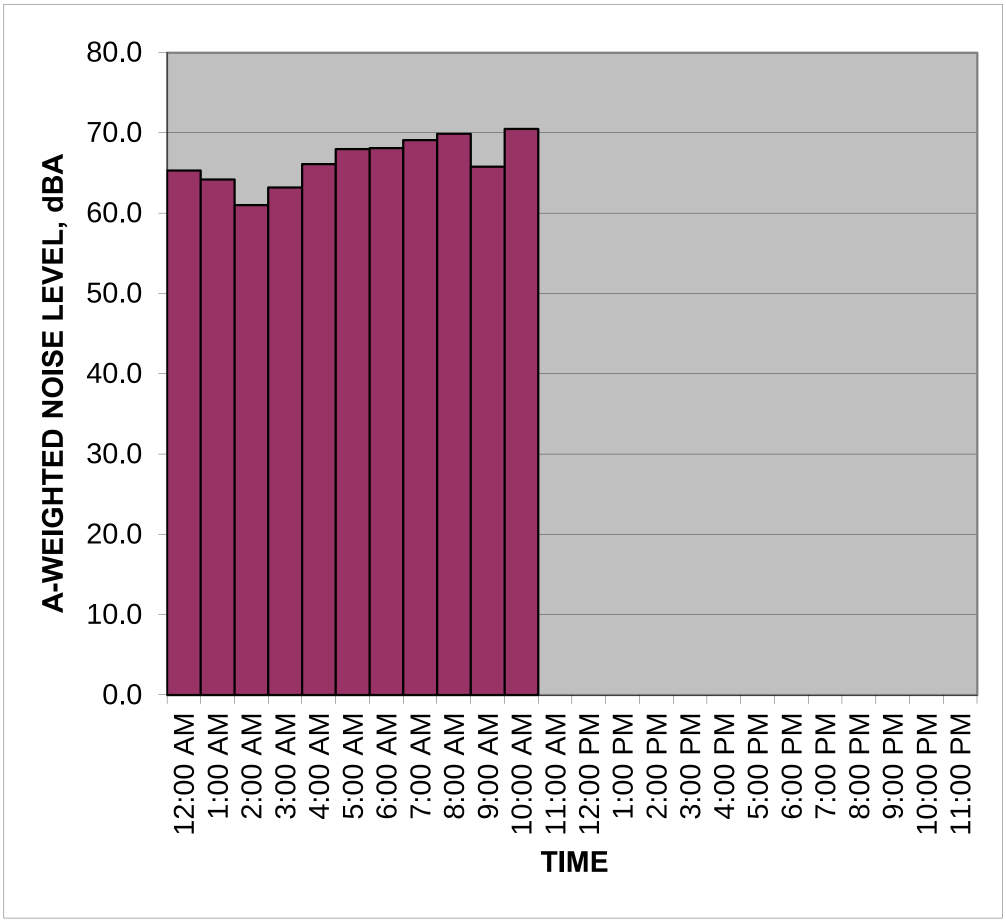
Measured Ambient Noise Levels

Project: Rowland Heights Mixed Use Project
Location: R2- Northwest Corner of Project Along Railroad
Sources: Ambient

Date: June 17, 2015

TIME	*HNL, dB(A)*
12:00 AM	65.3
1:00 AM	64.2
2:00 AM	61.0
3:00 AM	63.2
4:00 AM	66.1
5:00 AM	68.0
6:00 AM	68.1
7:00 AM	69.1
8:00 AM	69.9
9:00 AM	65.8
10:00 AM	70.5
11:00 AM	0.0
12:00 PM	0.0
1:00 PM	0.0
2:00 PM	0.0
3:00 PM	0.0
4:00 PM	0.0
5:00 PM	0.0
6:00 PM	0.0
7:00 PM	0.0
8:00 PM	0.0
9:00 PM	0.0
10:00 PM	0.0
11:00 PM	0.0
CNEL, dB(A):	**74.3**



NOTES:

fieldcnel.xls

Appendix G-2

Construction Noise Calculations

PCR

Project: Rowland Heights Mixed Use Project

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R1 (Motel)					**R3 (Single-Family Residential Uses)**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Site Preparation					**77**	***74***				**56**	***54***		
Rubber Tired Dozers	1	82	40%	90	77	73	76	0	300	56	52	55	10
Tractors/Loaders/Backhoes	1	80	25%	90	75	69	72	0	300	54	48	51	10
Grading					**80**	***78***				**59**	***57***		
Excavators	1	81	40%	90	76	72	75	0	300	55	51	54	10
Graders	1	85	40%	90	80	76	79	0	300	59	55	58	10
Tractors/Loaders/Backhoes	1	80	25%	90	75	69	72	0	300	54	48	51	10
Building Foundation					**76**	***76***				**55**	***56***		
Drill Rig Truck	1	79	20%	90	74	67	70	0	300	53	46	49	10
Cranes	1	81	40%	90	76	72	75	0	300	55	51	54	10
Excavators	1	81	40%	90	76	72	75	0	300	55	51	54	10
Tractors/Loaders/Backhoes	1	80	25%	90	75	69	72	0	300	54	48	51	10
Concrete Pour					**76**	***74***				**55**	***54***		
Concrete Pump Trucks	1	81	20%	90	76	69	72	0	300	55	48	51	10
Concrete Mixer Trucks	1	79	40%	90	74	70	73	0	300	53	49	52	10
Tractors/Loaders/Backhoes	1	80	25%	90	75	69	72	0	300	54	48	51	10
Building Construction					**76**	***75***				**55**	***55***		
Cranes	1	81	40%	90	76	72	75	0	300	55	51	54	10
Forklift	1	75	10%	90	70	60	63	0	300	49	39	42	10
Air Compressor	1	78	50%	90	73	70	73	0	300	52	49	52	10
Tractors/Loaders/Backhoes	1	80	25%	90	75	69	72	0	300	54	48	51	10
Paving					**75**	***74***				**54**	***54***		
Pavers	1	77	50%	90	72	69	72	0	300	51	48	51	10
Roller	1	80	20%	90	75	68	71	0	300	54	47	50	10
Finishes					**73**	***71***				**52**	***50***		
Air Compressor	1	78	50%	90	73	70	73	0	300	52	49	52	10
Aerial Lift	1	75	20%	90	70	63	66	0	300	49	42	45	10

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Project: Rowland Heights Mixed Use Project

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

				R4 (Motel)					**R5 (Single Family Residential Uses)**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Site Preparation					**48**	***45***				**45**	***42***		
Rubber Tired Dozers	1	82	40%	830	48	44	47	10	1180	45	41	44	10
Tractors/Loaders/Backhoes	1	80	25%	830	46	40	43	10	1180	43	37	40	10
Grading					**51**	***49***				**48**	***46***		
Excavators	1	81	40%	830	47	43	46	10	1180	44	40	43	10
Graders	1	85	40%	830	51	47	50	10	1180	48	44	47	10
Tractors/Loaders/Backhoes	1	80	25%	830	46	40	43	10	1180	43	37	40	10
Building Foundation					**47**	***47***				**44**	***44***		
Drill Rig Truck	1	79	20%	830	45	38	41	10	1180	42	35	38	10
Cranes	1	81	40%	830	47	43	46	10	1180	44	40	43	10
Excavators	1	81	40%	830	47	43	46	10	1180	44	40	43	10
Tractors/Loaders/Backhoes	1	80	25%	830	46	40	43	10	1180	43	37	40	10
Concrete Pour					**47**	***45***				**44**	***42***		
Concrete Pump Trucks	1	81	20%	830	47	40	43	10	1180	44	37	40	10
Concrete Mixer Trucks	1	79	40%	830	45	41	44	10	1180	42	38	41	10
Tractors/Loaders/Backhoes	1	80	25%	830	46	40	43	10	1180	43	37	40	10
Building Construction					**47**	***46***				**44**	***43***		
Cranes	1	81	40%	830	47	43	46	10	1180	44	40	43	10
Forklift	1	75	10%	830	41	31	34	10	1180	38	28	31	10
Air Compressor	1	78	50%	830	44	41	44	10	1180	41	38	41	10
Tractors/Loaders/Backhoes	1	80	25%	830	46	40	43	10	1180	43	37	40	10
Paving					**46**	***45***				**43**	***42***		
Pavers	1	77	50%	830	43	40	43	10	1180	40	37	40	10
Roller	1	80	20%	830	46	39	42	10	1180	43	36	39	10
Finishes					**44**	***41***				**41**	***38***		
Air Compressor	1	78	50%	830	44	41	44	10	1180	41	38	41	10
Aerial Lift	1	75	20%	830	41	34	37	10	1180	38	31	34	10

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Appendix G-3

Off-Site Construction Traffic Noise Calculations

Off-Site Traffic Noise Calculations

Project: Rowland Heights Plaza and Hotel Project

Haul Truck Noise

Existing

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Gale Avenue			33	41.7	38.8	37.0	38.7	35.8	34.0
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
--			0	-	-	-	-	-	-

Future No Project

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Gale Avenue			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
--			0	-	-	-	-	-	-

Future With Project

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Gale Avenue			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
--			0	-	-	-	-	-	-

CNEL

Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	**Project Increment**	**Cumulative Increment**	**Project Increment**	**Cumulative Increment**
Gale Avenue	-	-	-	-
0	-	-	-	-
0	-	-	-	-
0	-	-	-	-
--	-	-	-	-

Appendix G-4

Traffic Noise Model Calibration Results

6220 West Yucca Street Mixed Use Project

Traffic Noise Model Calibration

Existing

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**10 Feet**	**25 Feet**	**ROW**	**10 Feet**	**25 Feet**
Nogales Street			18048	69.9	69.0	67.9	67.0	66.0	65.0
Gale Avenue			4757	62.5	61.5	60.3	59.6	58.5	57.3
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-

Future No Project

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**10 Feet**	**25 Feet**	**ROW**	**10 Feet**	**25 Feet**
Nogales Street			0	-	-	-	-	-	-
Gale Avenue			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-

Future With Project

	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**AM**	**PM**	**ADT**	**ROW**	**10 Feet**	**25 Feet**	**ROW**	**10 Feet**	**25 Feet**
Nogales Street			0	-	-	-	-	-	-
Gale Avenue			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-
0			0	-	-	-	-	-	-

CNEL

Summary	**10 ft. from ROW**		**At ROW**	
Roadway/Segment	**Project Increment**	**Cumulative Increment**	**Project Increment**	**Cumulative Increment**
Nogales Street	-	-	-	-
Gale Avenue	-	-	-	-
0	-	-	-	-
0	-	-	-	-
0	-	-	-	-

Appendix G-5

Off-Site Traffic Noise Calculations

Roadway Traffic Noise Calculations
1 of 8

Project: Rowland Heights Plaza and Hotel Project

Existing										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street s/o Colima Rd	40			20800	70.2	67.9	66.5	71.4	69.2	67.7
Nogales Street n/o Colima Rd	40			28700	72.5	69.8	68.2	73.7	71.0	69.4
Nogales Street between Walnut Dr and Railroad St	40			26400	72.1	69.5	67.8	73.3	70.7	69.1
Nogales Street between Railroad St and San Jose Ave	40			25500	72.0	69.3	67.7	73.2	70.5	68.9
Nogales Street between San Jose Ave and Valley Blvd	40			23800	71.7	69.0	67.4	72.9	70.2	68.6
Future No Project										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street s/o Colima Rd	40			20900	70.2	68.0	66.5	71.5	69.2	67.7
Nogales Street n/o Colima Rd	40			28700	72.5	69.8	68.2	73.7	71.0	69.4
Nogales Street between Walnut Dr and Railroad St	40			26400	72.1	69.5	67.8	73.3	70.7	69.1
Nogales Street between Railroad St and San Jose Ave	40			25500	72.0	69.3	67.7	73.2	70.5	68.9
Nogales Street between San Jose Ave and Valley Blvd	40			23800	71.7	69.0	67.4	72.9	70.2	68.6
Future With Project										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street s/o Colima Rd	40			21800	70.4	68.2	66.7	71.6	69.4	67.9
Nogales Street n/o Colima Rd	40			30600	72.8	70.1	68.5	74.0	71.3	69.7
Nogales Street between Walnut Dr and Railroad St	40			29400	72.6	69.9	68.3	73.8	71.2	69.5
Nogales Street between Railroad St and San Jose Ave	40			28500	72.4	69.8	68.2	73.7	71.0	69.4
Nogales Street between San Jose Ave and Valley Blvd	40			26800	72.2	69.5	67.9	73.4	70.7	69.1

CNEL

Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	**Project Increment**	**Cumulative Increment**	**Project Increment**	**Cumulative Increment**
Nogales Street s/o Colima Rd	0.2	0.2	0.1	0.2
Nogales Street n/o Colima Rd	0.3	0.3	0.3	0.3
Nogales Street between Walnut Dr and Railroad St	0.5	0.5	0.5	0.5
Nogales Street between Railroad St and San Jose Ave	0.5	0.5	0.5	0.5
Nogales Street between San Jose Ave and Valley Blvd	0.5	0.5	0.5	0.5

	% of ADT			
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Project: Rowland Heights Plaza and Hotel Project

Existing										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street between Valley Blvd and La Puente Rd	40			22100	71.7	68.9	67.2	72.9	70.1	68.4
Nogales Street between La Puente Rd and Shadow Oak Dr	40			20400	71.7	68.7	67.0	72.9	69.9	68.2
Gale Avenue between Nogales St and Project Central Access	35			15000	71.0	66.9	64.8	72.2	68.1	66.1
Gale Avenue between Project Central Access and Coiner Ct	35			12200	70.1	66.0	64.0	71.3	67.2	65.2
Gale Avenue between Coiner Ct and Fullerton Rd	40			12300	69.5	66.5	64.8	70.7	67.7	66.0
Future No Project										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street between Valley Blvd and La Puente Rd	40			22100	71.7	68.9	67.2	72.9	70.1	68.4
Nogales Street between La Puente Rd and Shadow Oak Dr	40			20400	71.7	68.7	67.0	72.9	69.9	68.2
Gale Avenue between Nogales St and Project Central Access	35			15000	71.0	66.9	64.8	72.2	68.1	66.1
Gale Avenue between Project Central Access and Coiner Ct	35			12200	70.1	66.0	64.0	71.3	67.2	65.2
Gale Avenue between Coiner Ct and Fullerton Rd	40			12300	69.5	66.5	64.8	70.7	67.7	66.0
Future With Project										
	Speed	**Traffic Volumes**			**Leq**			**CNEL**		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Nogales Street between Valley Blvd and La Puente Rd	40			24300	72.1	69.3	67.6	73.3	70.5	68.8
Nogales Street between La Puente Rd and Shadow Oak Dr	40			22000	72.0	69.1	67.3	73.3	70.3	68.5
Gale Avenue between Nogales St and Project Central Access	35			21800	72.6	68.5	66.5	73.8	69.8	67.7
Gale Avenue between Project Central Access and Coiner Ct	35			16200	71.3	67.2	65.2	72.5	68.5	66.4
Gale Avenue between Coiner Ct and Fullerton Rd	40			16300	70.7	67.8	66.0	72.0	69.0	67.2

	CNEL			
Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	**Project Increment**	**Cumulative Increment**	**Project Increment**	**Cumulative Increment**
Nogales Street between Valley Blvd and La Puente Rd	0.4	0.4	0.4	0.4
Nogales Street between La Puente Rd and Shadow Oak Dr	0.4	0.4	0.4	0.4
Gale Avenue between Nogales St and Project Central Access	1.7	1.7	1.6	1.6
Gale Avenue between Project Central Access and Coiner Ct	1.3	1.3	1.2	1.2
Gale Avenue between Coiner Ct and Fullerton Rd	1.3	1.3	1.3	1.3

	% of ADT			
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Roadway Traffic Noise Calculations
3 of 8

Project: Rowland Heights Plaza and Hotel Project

Existing

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Fullerton Road s/o Colima Rd	40			21700	72.0	69.0	67.2	73.2	70.2	68.5
Fullerton Road n/o Colima Rd	40			27000	72.9	69.9	68.2	74.1	71.2	69.4
Fullerton Road s/o Gale Ave	40			20800	71.1	68.4	66.8	72.3	69.6	68.0
Fullerton Road n/o Gale Ave	40			15400	69.8	67.1	65.5	71.0	68.3	66.7
Valley Boulevard Loop	40			6300	66.6	63.6	61.9	67.8	64.8	63.1

Future No Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Fullerton Road s/o Colima Rd	40			21800	72.0	69.0	67.3	73.2	70.2	68.5
Fullerton Road n/o Colima Rd	40			27300	73.0	70.0	68.2	74.2	71.2	69.5
Fullerton Road s/o Gale Ave	40			20900	71.1	68.5	66.8	72.3	69.7	68.0
Fullerton Road n/o Gale Ave	40			15500	69.8	67.2	65.5	71.0	68.4	66.7
Valley Boulevard Loop	40			6300	66.6	63.6	61.9	67.8	64.8	63.1

Future With Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Fullerton Road s/o Colima Rd	40			22900	72.2	69.2	67.5	73.4	70.4	68.7
Fullerton Road n/o Colima Rd	40			28900	73.2	70.2	68.5	74.4	71.5	69.7
Fullerton Road s/o Gale Ave	40			24300	71.8	69.1	67.5	73.0	70.3	68.7
Fullerton Road n/o Gale Ave	40			16000	69.9	67.3	65.7	71.2	68.5	66.9
Valley Boulevard Loop	40			7200	67.2	64.2	62.5	68.4	65.4	63.7

	CNEL			
Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	**Project Increment**	**Cumulative Increment**	**Project Increment**	**Cumulative Increment**
Fullerton Road s/o Colima Rd	0.2	0.2	0.2	0.2
Fullerton Road n/o Colima Rd	0.3	0.3	0.2	0.3
Fullerton Road s/o Gale Ave	0.6	0.7	0.7	0.7
Fullerton Road n/o Gale Ave	0.1	0.2	0.2	0.2
Valley Boulevard Loop	0.6	0.6	0.6	0.6

	% of ADT			
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Roadway Traffic Noise Calculations
4 of 8

Project: Rowland Heights Plaza and Hotel Project

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Valley Boulevard w/o Nogales St	40			19100	70.7	68.1	66.4	71.9	69.3	67.6
Valley Boulevard e/o Nogales St	40			21500	71.2	68.6	66.9	72.4	69.8	68.2
Colima Road e/o Nogales St	40			25100	71.9	69.3	67.6	73.1	70.5	68.8
Colima Road between Nogales St and Fullerton Rd	40			26600	72.1	69.5	67.9	73.4	70.7	69.1
Colima Road w/o Fullerton Rd	40			24800	71.8	69.2	67.6	73.1	70.4	68.8
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Valley Boulevard w/o Nogales St	40			19100	70.7	68.1	66.4	71.9	69.3	67.6
Valley Boulevard e/o Nogales St	40			21500	71.2	68.6	66.9	72.4	69.8	68.2
Colima Road e/o Nogales St	40			25200	71.9	69.3	67.6	73.1	70.5	68.9
Colima Road between Nogales St and Fullerton Rd	40			27000	72.2	69.6	67.9	73.4	70.8	69.2
Colima Road w/o Fullerton Rd	40			25000	71.9	69.2	67.6	73.1	70.4	68.8
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Valley Boulevard w/o Nogales St	40			19600	70.8	68.2	66.5	72.0	69.4	67.8
Valley Boulevard e/o Nogales St	40			21800	71.3	68.6	67.0	72.5	69.9	68.2
Colima Road e/o Nogales St	40			25700	72.0	69.4	67.7	73.2	70.6	68.9
Colima Road between Nogales St and Fullerton Rd	40			27500	72.3	69.6	68.0	73.5	70.9	69.2
Colima Road w/o Fullerton Rd	40			25500	72.0	69.3	67.7	73.2	70.5	68.9

	CNEL			
Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Valley Boulevard w/o Nogales St	0.1	0.1	0.1	0.1
Valley Boulevard e/o Nogales St	0.1	0.1	0.1	0.1
Colima Road e/o Nogales St	0.1	0.1	0.1	0.1
Colima Road between Nogales St and Fullerton Rd	0.1	0.2	0.1	0.1
Colima Road w/o Fullerton Rd	0.1	0.1	0.1	0.1

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Roadway Traffic Noise Calculations

Project: Rowland Heights Plaza and Hotel Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet

Existing

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Nogales Street s/o Colima Rd	40			20800	70.2	67.9	66.5	71.4	69.2	67.7
Nogales Street n/o Colima Rd	40			28700	72.5	69.8	68.2	73.7	71.0	69.4
Nogales Street between Walnut Dr and Railroad St	40			26400	72.1	69.5	67.8	73.3	70.7	69.1
Nogales Street between Railroad St and San Jose Ave	40			25500	72.0	69.3	67.7	73.2	70.5	68.9
Nogales Street between San Jose Ave and Valley Blvd	40			23800	71.7	69.0	67.4	72.9	70.2	68.6

Existing With Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Nogales Street s/o Colima Rd	40			21700	70.4	68.1	66.6	71.6	69.3	67.9
Nogales Street n/o Colima Rd	40			30600	72.8	70.1	68.5	74.0	71.3	69.7
Nogales Street between Walnut Dr and Railroad St	40			29400	72.6	69.9	68.3	73.8	71.2	69.5
Nogales Street between Railroad St and San Jose Ave	40			28500	72.4	69.8	68.2	73.7	71.0	69.4
Nogales Street between San Jose Ave and Valley Blvd	40			26800	72.2	69.5	67.9	73.4	70.7	69.1

	CNEL	
Summary	25 ft. from ROW	At ROW
Roadway/Segment	Project Increment	Project Increment
Nogales Street s/o Colima Rd	0.1	0.2
Nogales Street n/o Colima Rd	0.3	0.3
Nogales Street between Walnut Dr and Railroad St	0.5	0.5
Nogales Street between Railroad St and San Jose Ave	0.5	0.5
Nogales Street between San Jose Ave and Valley Blvd	0.5	0.5

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Project: Rowland Heights Plaza and Hotel Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
	40			0	-	-	-	-	-	-
	40			0	-	-	-	-	-	-
	35			0	-	-	-	-	-	-
	35			0	-	-	-	-	-	-
	40			0	-	-	-	-	-	-

Existing

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Nogales Street between Valley Blvd and La Puente Rd	40			22100	71.7	68.9	67.2	72.9	70.1	68.4
Nogales Street between La Puente Rd and Shadow Oak Dr	40			20400	71.7	68.7	67.0	72.9	69.9	68.2
Gale Avenue between Nogales St and Project Central Access	35			15000	71.0	66.9	64.8	72.2	68.1	66.1
Gale Avenue between Project Central Access and Coiner Ct	35			12200	70.1	66.0	64.0	71.3	67.2	65.2
Gale Avenue between Coiner Ct and Fullerton Rd	40			12300	69.5	66.5	64.8	70.7	67.7	66.0

Existing With Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Nogales Street between Valley Blvd and La Puente Rd	40			24300	72.1	69.3	67.6	73.3	70.5	68.8
Nogales Street between La Puente Rd and Shadow Oak Dr	40			22000	72.0	69.1	67.3	73.3	70.3	68.5
Gale Avenue between Nogales St and Project Central Access	35			21800	72.6	68.5	66.5	73.8	69.8	67.7
Gale Avenue between Project Central Access and Coiner Ct	35			16200	71.3	67.2	65.2	72.5	68.5	66.4
Gale Avenue between Coiner Ct and Fullerton Rd	40			16300	70.7	67.8	66.0	72.0	69.0	67.2

CNEL

Summary	25 ft. from ROW	At ROW
Roadway/Segment	Project Increment	Project Increment
Nogales Street between Valley Blvd and La Puente Rd	0.4	0.4
Nogales Street between La Puente Rd and Shadow Oak Dr	0.4	0.4
Gale Avenue between Nogales St and Project Central Access	1.7	1.6
Gale Avenue between Project Central Access and Coiner Ct	1.3	1.2
Gale Avenue between Coiner Ct and Fullerton Rd	1.3	1.3

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Project: Rowland Heights Plaza and Hotel Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet

Existing

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Fullerton Road s/o Colima Rd	40			21700	72.0	69.0	67.2	73.2	70.2	68.5
Fullerton Road n/o Colima Rd	40			27000	72.9	69.9	68.2	74.1	71.2	69.4
Fullerton Road s/o Gale Ave	40			20800	71.1	68.4	66.8	72.3	69.6	68.0
Fullerton Road n/o Gale Ave	40			15400	69.8	67.1	65.5	71.0	68.3	66.7
Valley Boulevard Loop	40			6300	66.6	63.6	61.9	67.8	64.8	63.1

Future With Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Fullerton Road s/o Colima Rd	40			22800	72.2	69.2	67.5	73.4	70.4	68.7
Fullerton Road n/o Colima Rd	40			28600	73.2	70.2	68.4	74.4	71.4	69.7
Fullerton Road s/o Gale Ave	40			24200	71.7	69.1	67.5	72.9	70.3	68.7
Fullerton Road n/o Gale Ave	40			15900	69.9	67.3	65.6	71.1	68.5	66.9
Valley Boulevard Loop	40			7200	67.2	64.2	62.5	68.4	65.4	63.7

	CNEL	
Summary	25 ft. from ROW	At ROW
Roadway/Segment	Project Increment	Project Increment
Fullerton Road s/o Colima Rd	0.2	0.2
Fullerton Road n/o Colima Rd	0.2	0.3
Fullerton Road s/o Gale Ave	0.7	0.6
Fullerton Road n/o Gale Ave	0.2	0.1
Valley Boulevard Loop	0.6	0.6

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Project: Rowland Heights Plaza and Hotel Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**

Existing

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Valley Boulevard w/o Nogales St	40			19100	70.7	68.1	66.4	71.9	69.3	67.6
Valley Boulevard e/o Nogales St	40			21500	71.2	68.6	66.9	72.4	69.8	68.2
Colima Road e/o Nogales St	40			25100	71.9	69.3	67.6	73.1	70.5	68.8
Colima Road between Nogales St and Fullerton Rd	40			26600	72.1	69.5	67.9	73.4	70.7	69.1
Colima Road w/o Fullerton Rd	40			24800	71.8	69.2	67.6	73.1	70.4	68.8

Existing With Project

	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	**MPH**	**AM**	**PM**	**ADT**	**ROW**	**25 Feet**	**50 Feet**	**ROW**	**25 Feet**	**50 Feet**
Valley Boulevard w/o Nogales St	40			19600	70.8	68.2	66.5	72.0	69.4	67.8
Valley Boulevard e/o Nogales St	40			21800	71.3	68.6	67.0	72.5	69.9	68.2
Colima Road e/o Nogales St	40			25600	72.0	69.3	67.7	73.2	70.6	68.9
Colima Road between Nogales St and Fullerton Rd	40			27100	72.2	69.6	68.0	73.4	70.8	69.2
Colima Road w/o Fullerton Rd	40			25300	71.9	69.3	67.7	73.1	70.5	68.9

CNEL

Summary	**25 ft. from ROW**	**At ROW**
Roadway/Segment	**Project Increment**	**Project Increment**
Valley Boulevard w/o Nogales St	0.1	0.1
Valley Boulevard e/o Nogales St	0.1	0.1
Colima Road e/o Nogales St	0.1	0.1
Colima Road between Nogales St and Fullerton Rd	0.1	0.0
Colima Road w/o Fullerton Rd	0.1	0.0

	% of ADT			
Vehicle Type	**Day**	**Eve**	**Night**	**Sub total**
Auto	77.6%	9.7%	9.7%	97.0%
Medium Truck	1.6%	0.2%	0.2%	2.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

APPENDIX H

SERVICE PROVIDER CORRESPONDENCE

H-1: FIRE DEPARTMENT CORRESPONDENCE

COUNTY OF LOS ANGELES
FIRE DEPARTMENT
1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

July 2, 2015

Anne Doehne, Planner
City of Santa Monica
PCR Services Corporation
201 Santa Monica Boulevard, Suite 500
Santa Monica, CA 90401

Dear Ms. Doehne:

REQUEST FOR INFORMATION REGARDING FIRE PROTECTION FACILITIES AND SERVICES, "ROWLAND HEIGHTS PLAZA AND HOTEL PROJECT", PROPOSES A COMMERCIAL/HOTEL ON AN UNDEVELOPED, 14.85-ACRE PROPERTY, 14.06 ACRES IS WITHIN THE UNINCORPORATED PORTION OF THE COUNTY, REMAINING 0.79 ACRES IS WITHIN THE CITY OF INDUSTRY MUNICIPAL BOUNDARY, 18800 RAILROAD STREET, ROWLAND HEIGHTS (FFER 201500115)

The Request for Information Regarding Fire Protection Facilities and Services 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. Fire Station(s) providing fire protection services to the Project Site?

   Fire Station 145, located 1525 S. Nogales Avenue, Rowland Heights, CA 91748, is the jurisdictional station (1st-due) for the Project Site.

2. Most recent data on yearly emergency incidents for each station serving the Project area (broken up by type) and associated average response times. Are current response times at or under the response time goals for the Department?

SERVING THE UNINCORPORATED AREAS OF LOS ANGELES COUNTY AND THE CITIES OF:

AGOURA HILLS
ARTESIA
AZUSA
BALDWIN PARK
BELL
BELL GARDENS
BELLFLOWER
BRADBURY
CALABASAS
CARSON
CERRITOS
CLAREMONT
COMMERCE
COVINA
CUDAHY
DIAMOND BAR
DUARTE
EL MONTE
GARDENA
GLENDORA
HAWAIIAN GARDENS
HAWTHORNE
HIDDEN HILLS
HUNTINGTON PARK
INDUSTRY
INGLEWOOD
IRWINDALE
LA CANADA FLINTRIDGE
LA HABRA
LA MIRADA
LA PUENTE
LAKEWOOD
LANCASTER
LAWNDALE
LOMITA
LYNWOOD
MALIBU
MAYWOOD
NORWALK
PALMDALE
PALOS VERDES ESTATES
PARAMOUNT
PICO RIVERA
POMONA
RANCHO PALOS VERDES
ROLLING HILLS
ROLLING HILLS ESTATES
ROSEMEAD
SAN DIMAS
SANTA CLARITA
SIGNAL HILL
SOUTH EL MONTE
SOUTH GATE
TEMPLE CITY
WALNUT
WEST HOLLYWOOI
WESTLAKE VILLAG
WHITTIER

Please provide anticipated response time(s) to the Project Site.

During 2014, Fire Station 145 responded to a total of 1,857 emergency incidents, of which 52 were fires, 1,523 were medical and 282 were other types with an average emergency response time of 4:37 minutes.

The Fire Department uses national guidelines of a 5-minute response time for the 1st-arriving unit for fire and EMS responses and 8 minutes for the advanced life support (paramedic) unit in urban areas.

Based on the distance to the Project Site (1.2 miles), it is estimated that Fire Station 145 would have an emergency response time of 4:00 minutes.

3. Service boundaries and population served by the fire station(s) serving the Project Site?

   Fire Station 145 has a jurisdictional service boundary of 8.13 square miles, however, the Los Angeles County Fire Department operates under a regional concept in its approach to providing fire protection and emergency medical incident anywhere in the District's service territory based on distance and availability, without regard to jurisdictional or municipal boundaries.

4. Equipment and staffing of the stations serving the Project Site (e.g., engines, trucks, squads, total full-time and part-time staff, number of firefighters on 24-hour duty, paramedic staff and services, etc.)

   Fire Station 145 is staffed with a 3-person engine company (1-Captain, 1-Fire Fighter Specialist and 1-Fire Fighter) and a 2-person emergency support team (1-Fire Fighter Specialist and 1-Fire Fighter) for each 24-hour shift.

5. Describe any mutual aid-agreements, particularly relevant to the Project's service area.

   There are no mutual aid agreements in effect in the Project area. The Project and the surrounding areas are served by the LACoFD.

6. Planned improvements to the fire protection facilities in the service area for the Project Site (i.e., expansion, new facilities, additional staffing etc.), if applicable;

7. There are no planned improvements in the immediate area of the Project Site.

8. Please note any relevant LACFD development requirements relevant to the Project including, but not limited to:

   These questions should be addressed by Land Development Division.

   a. Fire flow;
   b. Fire protection devices (e.g., sprinklers, alarms);
   c. Fire access (including ingress/egress, turning radii, driveway width, grading);
   d. Fire hydrants and spacing

9. Any special fire protection requirements, concerns or necessary measures due to the location or other attributes of the Project?

10. We have no further comments at this time.

LAND DEVELOPMENT UNIT:

1. The requirements below will answer the question No. 7 of the requested information. There is no special fire requirement for this project.

2. 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 four-hour duration. The actual fire flow will be based on the total square footage of the largest building proposed and the type of construction used. A reduction in fire flow may apply if the buildings are equipped with an approved fire sprinkler system.

3. 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.

4. 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 used for fire apparatus access exceeding 150 feet in-length.

5. All on-site driveways and fire lanes shall provide a minimum unobstructed width of 26 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. Buildings shall not exceed 30 feet above the lowest level of the Fire Department's vehicular access road or the building is more than three stories. Buildings exceeding this height shall provide a minimum paved fire lane width of 28 feet. The required fire lane shall be parallel to the longest side of the building between 15 feet and 30 feet from the edge of the fire lane to the building wall. Verification for compliance will be performed during the Fire Department review of the architectural plan or the revised Exhibit A process prior to building permit issuance.

6. All fire sprinkler systems within the building shall be in compliance with the County of Los Angeles Building and Fire Codes.

7. Should any questions arise regarding the above requirement/comments, please contact Juan Padilla of the Fire Prevention Division, Land Development Unit at (323) 890-4243 or Juan.Padilla@fire.lacounty.gov.

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.

HEALTH HAZARDOUS MATERIALS DIVISION:

1. The Health Hazardous Materials Division (HHMD) of the Los Angeles County Fire Department has no comment regarding project fire protection facilities or services.

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

KTJ:ad

H-2: SHERIFF'S DEPARTMENT CORRESPONDENCE

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169

Jim McDonnell, Sheriff

July 28, 2015

Ms. Margaret Shekell
Senior Planner II
PCR Services Corporation
201 Santa Monica Boulevard, Suite 500
Santa Monica, California 90401

Dear Ms. Shekell:

RESPONSE TO REQUEST FOR SHERIFF'S FACILITIES/SERVICES INFORMATION
ROWLAND HEIGHTS PLAZA AND HOTEL PROJECT
COUNTY PROJECT NO. R2014-01529

The Los Angeles County Sheriff's Department (Department) provides the attached information in response to your Request for Information Regarding Sheriff's Facilities and Services (Request), dated June 15, 2015, for the Rowland Heights Plaza and Hotel Project (Project). According to the Request, the proposed Project is located on a 14.06-acre site at 18800 Railroad Street in the unincorporated community of Rowland Heights, and will construct 129,926 square feet of retail, restaurant, and commercial uses, a 275-room full-service hotel with meeting rooms and restaurant, a 202-room extended stay hotel, surface parking areas, and necessary infrastructure systems.

The proposed Project is located within the service area of the Department's Walnut/Diamond Bar Station (Station). Accordingly, the Station reviewed the Request and authored responses thereto (see attached correspondence dated July 21, 2015, from Captain Jeffrey L. Scroggin).

Should you need any clarification or have further questions regarding this matter, please contact me at (626) 300-1933, or your staff may contact Lester Miyoshi at (626) 300-3012.

Sincerely,

JIM McDONNELL, SHERIFF

Tracey Jue, Director
Facilities Planning Bureau

COUNTY OF LOS ANGELES

SHERIFF'S DEPARTMENT

"A Tradition of Service"

DATE: July 21, 2015
FILE:

OFFICE CORRESPONDENCE

FROM: JEFFREY L. SCROGGIN, CAPTAIN
WALNUT/DIAMOND BAR STATION

TO: TRACEY JUE, DIRECTOR
FACILITIES PLANNING BUREAU

SUBJECT: **ROWLAND HEIGHTS PLAZA AND HOTEL PROJECT – RESPONSE TO REQUEST FOR INFORMATION REGARDING SHERIFF'S FACILITIES AND SERVICES**

The following information is provided by the Walnut/Diamond Bar Station (Station) in response to a request for information regarding Sheriff's Facilities and Services (Request) from PCR Services Corporation (Requestor), dated June 15, 2015. The Requestor is an environmental consultant to the Department of Regional Planning and is preparing an environmental impact report for the Rowland Heights Plaza and Hotel Project (Project). The proposed Project is located on a 14.06-acre site at 18800 Railroad Street in the unincorporated community of Rowland Heights, and will construct 129,926 square feet of retail, restaurant, and commercial uses, a 275-room full-service hotel with meeting rooms and restaurant, a 202-room extended stay hotel, surface parking areas, and necessary infrastructure systems.

The information below is formatted to correspond with the format of the request:

1. The station is the Department's primary service provider to the proposed Project site. The Station is a 24/7 full-service facility located at 21695 East Valley Boulevard in the City of Walnut, approximately 4.6 miles from the proposed Project site.

2. As of January 1, 2015, the Station is staffed by 118 sworn personnel and 41 civilian employees. Equipment and services provided by the Station or Department include 24-hour designated County patrol vehicles, helicopters and fixed-winged aircraft, mounted patrol, search and rescue, and emergency operations. The Department maintains mutual aid agreements with other law enforcement agencies within and beyond Los Angeles County, which are facilitated through the State Office of Emergency Services.

3. The Station's service area encompasses the cities of Walnut and Diamond Bar, the unincorporated communities of Rowland Heights and Covina

Hills, and unincorporated areas of West Covina. As of January 1, 2015, the estimated resident population of the Station's service area is 160,000.

4. The Department's Special Enforcement Bureau (SEB) is comprised of Special Enforcement Detail, Emergency Services Detail, and Canine Services Detail. SEB is equipped to handle various high-risk operations, including but not limited to, explosive detection, hostage resolution, barricades, security for dignitaries, dive and maritime operations, etc.

5. The County's Emergency Operations Center (EOC) is located at 1275 North Eastern Avenue in Los Angeles, and is responsible for emergency operations in all unincorporated County territories. The Los Angeles County Emergency Response Plan establishes the coordinated emergency management system, which includes prevention, protection, response, recovery, and mitigation within the operational area. The plan also provides an overview of emergency management in the area. In the event of an emergency, the Department and the County Fire Department provide first response, as well as the initial contact with other agencies and organizations that may need to be involved.

6. Generally accepted response times for law enforcement agencies are 10 minutes or less for emergency incidents (i.e., a crime that is in progress and includes a life threatening situation), 20 minutes or less for priority incidents (i.e., a crime or incident that is presently occurring but excludes life threatening circumstances), and 60 minutes or less routine, or non-emergency incidents (i.e., a crime that has already occurred and excludes life threatening circumstances), as measured from the time a call is received until the time a patrol car arrives at the incident scene.

   The Station's anticipated response times to the proposed Project site for emergent, priority, and routine incidents are 3 to 5 minutes, 7 to 9 minutes, and 20 to 30 minutes, respectively. Response times are variable because the responding patrol unit may be deployed elsewhere within the station's service area and not necessarily dispatched from the Station itself.

7. The proposed Project site is located within the Station's 2931 Reporting District. During the reporting period beginning January 1, 2015 and ending June 30, 2015, a total of 74 Part I crimes were committed in this Reporting District. For comparison purposes, a total of 1,049 Part I crimes were committed throughout the Station's service area during the same reporting period.

8. The Station is not aware of any planned improvements, expansion of existing facilities, new facilities, additional staffing, etc., that would affect the Station.

9. The proposed Project should provide for the provision of a private security to patrol the construction site to minimize the potential for trespass, theft, and other unlawful activities. In addition, a construction traffic management plan should be implemented as part of the proposed Project to address construction-related traffic congestion and emergency access issues. If temporary lane closures are necessary for the installation of utilities, emergency access should be maintained at all times. Flag persons and/or detours should also be provided as needed to ensure safe traffic operations, and construction signs should be posted to advise of reduced construction zone speed limits.

   The Station and Department prescribe to the theory of crime prevention through environmental design. Accordingly, design elements such as building orientation, landscaping, and lighting should be considered to enhance visibility and safety. The proposed Project should also incorporate various operational security features, such as Knox Box entry systems at all gated entries to allow emergency access at all times. In addition, building address numbers should be well lit to facilitate emergency response, and upon completion of the proposed Project, the Station's command staff should receive a diagram of the Project site, including building entries, access routes, and other appropriate information to facilitate law enforcement response.

Thank you for including the Walnut/Diamond Bar Station in the environmental review process for the proposed Project. Should you have questions regarding this matter, please contact Operations Sergeant Bruce Lang of my staff at (909) 595-2284, extension 2802.

JLS:BL:vg

COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING
LAND DIVISIONS SECTION
320 West Temple Street
Los Angeles, California 90012