



September 26, 2018
Kleinfelder Project No. 20173187.003A

Kim Dominy
Casa de las Campanas
18655 West Bernardo Drive
San Diego, California 92127

**SUBJECT: Geotechnical Investigation
Phase III Expansion
Casa de las Campanas
18655 West Bernardo Drive
San Diego, California**

City Project No.: 546769

Dear Ms. Dominy:

In response to the request of Mr. Joe Tucker of Ankrom Moisan Architects, Inc., Kleinfelder is presenting our response to August 30, 2018 City of San Diego LDR-Geology Cycle 4 review comments for the proposed Phase III Expansion project located at the Casa de las Campanas campus (CDLC) at 18655 West Bernardo Drive in San Diego, California. This an addendum to our November 30, 2017 geotechnical report for the project and is subject to the same limitations presented therein.

The only comment requiring our response is Issue 7.

Issue 7: Clarify whether or not the existing engineered fill is considered suitable for the intended use.

Response: Confirming that the existing engineered fill is considered suitable for the intended use. This opinion is included in the second paragraph in Section 3.5 of the report and is restated in Section 5.1. Section 5.1.5 includes a discussion of subgrade preparation and the potential for recompaction in some areas.

Respectfully submitted,

KLEINFELDER

A handwritten signature in blue ink that reads 'Kevin Crennan'.

Kevin Crennan, PE, GE 2511
Senior Geotechnical Engineer

CC: Joe Tucker, Ankrom Moisan Architects, Inc.



November 20, 2017
Kleinfelder Project No. 20173187.003A

Kim Dominy
Casa de las Campanas
18655 West Bernardo Drive
San Diego, California 92127

**SUBJECT: Geotechnical Investigation
Phase III Expansion
Casa de las Campanas
18655 West Bernardo Drive
San Diego, California**

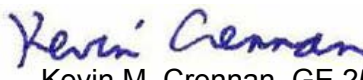
Dear Ms. Dominy:

This report presents the results of our geotechnical investigation and recommendations for design and construction of the proposed Phase III Expansion project located at the Casa de las Campanas campus (CDLC) at 18655 West Bernardo Drive in San Diego, California. This final report addresses City of San Diego LDR-Geology Cycle 3 review comments on our April 7, 2017 draft report. The City comments and our responses are included in Appendix D to assist in their final review.

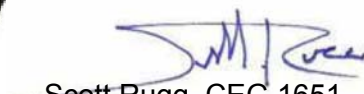
We appreciate this opportunity to be of service and look forward to continuing working with you. If you have any questions about this report or need additional services please contact us at 619.831.4600.

Very truly yours,

KLEINFELDER


Kevin M. Crennan, GE 2511
Senior Project Manager




Scott Rugg, CEG 1651
Senior Engineering Geologist





**GEOTECHNICAL ENGINEERING INVESTIGATION
PHASE III EXPANSION
CASA DE LAS CAMPANAS
18655 WEST BERNARDO DRIVE
SAN DIEGO, CALIFORNIA
KLEINFELDER PROJECT NO. 20173187.003A**

NOVEMBER 20, 2017

**Copyright 2017 Kleinfelder
All Rights Reserved**

**ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC
PROJECT FOR WHICH THIS REPORT WAS PREPARED.**

A Report Prepared for:

Kim Dominy
Casa de las Campanas
18655 West Bernardo Drive
San Diego, California 92127

**GEOTECHNICAL ENGINEERING INVESTIGATION
PHASE III EXPANSION
CASA DE LAS CAMPANAS
18655 WEST BERNARDO DRIVE
SAN DIEGO, CALIFORNIA**

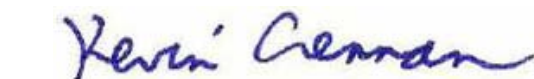
Prepared by:



Scott Rugg, CEG 1651
Senior Project Manager



Reviewed by:



Kevin M. Crennan, GE 2511
Senior Engineering Geologist



KLEINFELDER
550 West C Street, Suite 1200
San Diego, CA 92101
Phone: 619.831.4600
Fax: 619.232.1039

November 20, 2017
Kleinfelder Project No. 20173187.003A

TABLE OF CONTENTS

Section	Page
1 INTRODUCTION.....	1
1.1 PROJECT DESCRIPTION	1
1.2 GENERAL SITE DESCRIPTION.....	2
1.3 PURPOSE AND SCOPE OF SERVICES.....	3
2 METHODS OF STUDY	5
2.1 BACKGROUND INFORMATION.....	5
2.2 FIELD EXPLORATIONS	6
2.2.1 Borehole Explorations.....	6
2.2.2 Geophysical Surveys.....	7
2.3 LABORATORY TESTING	7
3 GEOLOGY AND SUBSURFACE CONDITIONS.....	8
3.1 REGIONAL GEOLOGIC AND GEOTECTONIC SETTING	8
3.2 REGIONAL FAULTING AND SEISMICITY	9
3.3 ROSE CANYON FAULT ZONE.....	9
3.4 SITE GEOLOGY AND SUBSURFACE CONDITIONS	10
3.5 FILL (AF).....	11
3.6 WEATHERED GRANITIC BEDROCK (K _{GR})	11
3.7 GROUNDWATER.....	12
4 SEISMIC AND GEOLOGIC HAZARDS.....	13
4.1 EXPANSIVE SOILS.....	13
4.2 SEISMIC GROUND SHAKING.....	13
4.3 LIQUEFACTION	14
4.4 SEISMIC COMPRESSION.....	15
4.5 FAULT SURFACE RUPTURE.....	15
4.6 LANDSLIDES AND SLOPE STABILITY.....	16
4.7 TSUNAMIS AND SEICHES.....	16
4.8 FLOODING.....	17
5 DISCUSSION, CONCLUSIONS, AND PRELIMINARY RECOMMENDATIONS	18
5.1 SITE GRADING	19
5.1.1 General.....	19
5.1.2 Excavation Characteristics	20
5.1.3 Construction Observation	21
5.1.4 Site Preparation	21
5.1.5 Subgrade Preparation.....	21
5.1.6 Engineered Fill.....	22
5.1.7 Pipe Bedding and Trench Backfill.....	23
5.2 TEMPORARY EXCAVATIONS AND PERMANENT SLOPES.....	23
5.3 TEMPORARY SHORING	25
5.3.1 Tieback Anchors.....	25
5.3.2 Wooden Lagging	26
5.3.3 Lateral Pressures	27
5.3.4 Lateral Resistance.....	28
5.3.5 Estimated Lateral Displacements.....	28
5.3.6 Shoring Construction Considerations and Monitoring	29
5.3.7 CBC Design Recommendations.....	29
5.4 FOUNDATION RECOMMENDATIONS.....	31

TABLE OF CONTENTS (continued)

<u>Section</u>	<u>Page</u>
5.5 PERMANENT RETAINING WALLS	33
5.6 SIGN AND LIGHT POLE SUPPORT	34
5.7 INTERIOR CONCRETE SLABS-ON-GRADE	35
5.8 EXTERIOR CONCRETE FLATWORK	37
5.9 PAVEMENTS	37
5.9.1 Flexible Pavement Design	37
5.9.2 Rigid Pavement Design	38
5.9.3 Crushed Miscellaneous Base	40
5.10 PRELIMINARY AGGRESIVITY SOIL SCREENING	40
5.11 SITE DRAINAGE AND EROSION CONTROL	42
5.12 STORMWATER INFILTRATION STUDY	42
5.12.1 Mitigation Measures.....	44
5.12.2 Data Evaluation	45
5.12.3 Design Infiltration Rates	46
5.12.4 Recommendations and Conclusions	47
5.13 ADDITIONAL STUDIES	48
6 LIMITATIONS	49
7 REFERENCES.....	52

TABLES

1	Recommended 2016 CBC Seismic Design Parameters
2	Equivalent Fluid Weights for Calculating Lateral Earth Pressures
3	Recommended Flexible Pavement Sections - R-Value of 30
4	Preliminary Soil Aggressivity Test Results

FIGURES

1	Site Location Map
2	Existing Site Conditions and Site Exploration Map
3	Proposed Improvements and Site Exploration Map
4	Regional Fault Map and Earthquake Epicenters
5	Regional Geologic Map
6	Cross Section A-A' and B-B'
7	Cross Section C-C' and D-D'

APPENDICES

A	Field Exploration and Boring Logs
B	Laboratory Test Results
C	Infiltration Study
D	Response to City of San Diego LDR-Geology Cycle 3 Review Comments
E	Geotechnical Business Council Insert

1 INTRODUCTION

In accordance with authorization of our November 29, 2016 proposal, we have performed a geotechnical investigation for the proposed Phase III Expansion project of the Casa de las Campanas (CDLC) facility located at 18655 West Bernardo Drive in San Diego, California. The expansion area is located on the east side of the campus directly east of the existing Casa Sur building, and 50 feet north of the existing central energy plant (CEP) and approximately 150 feet north of the Phase 1 Skilled Nursing facility currently under construction. This report addresses the existing skilled nursing building that will be demolished and replaced with a new 5-story building with one additional level below grade.

The purpose of our geotechnical investigation was to evaluate surface and subsurface conditions at the site, evaluate potential geologic hazards, and provide recommendations for foundations, temporary shoring, retaining wall, site grading, and asphalt pavement design. This report presents the results of our background review, subsurface exploration, laboratory testing, geotechnical analyses, conclusions regarding the geotechnical conditions at the project site, and our recommendations for the project.

1.1 PROJECT DESCRIPTION

Our understanding of the project is based on conversations with representatives of the design team and review of a preliminary grading plan titled “Casa de las Campanas, Phase III Expansion”, dated November 1, 2017, and prepared by Pasco Laret Suiter and Ankrom Moisan,. The site location is shown on the Site Location Map, Figure 1. A site plan showing the existing improvements and approximate subsurface exploration locations is presented as Existing Site Conditions and Site Exploration Map, Figure 2. A site plan showing the proposed improvements and approximate subsurface exploration locations is presented as Proposed Improvements and Site Exploration Map, Figure 3.

The proposed project includes the complete demolition of the existing skilled nursing building located in southeast area of campus and construction of a new 5-story building with one additional level below grade for vehicle parking. The finish floor elevation of ground level 1 is 418 feet mean sea level (msl) which matches that of the adjacent Casa Sur building and the

basement finish floor elevation will be 406.5 feet. An entry ramp will be constructed to access the southern side of the underground parking level, and retaining walls will be constructed on both sides. The proposed building is generally a U-shaped structure with the open end facing east towards Interstate 15 (I-15). A patio and pedestrian walkway to access the entrance of the building will be built in the central portion of the building. Construction would also include hardscape, roadway pavement subsurface utilities and light poles. Storm water BMPs are being considered but may not be feasible due to site constraints.

Changes to existing site grades will be on the order of 1 to 2 feet. Excavations for the new access ramp and underground level for vehicle parking will be up to approximately 12 feet from current grade. Retaining walls will be built along the alignment of the access ramp. Temporary excavation slopes will be utilized where feasible; however, temporary shoring will likely be required for much of the lower level excavation to protect existing site improvements and maintain access.

The address and latitude/longitude coordinates for the site are listed below, and the Site Location Map is shown on Figure 1.

Address: Casa de las Campanas
18655 West Bernardo Drive
San Diego, California 92127

Latitude: 33.051° N

Longitude: -117.074° W

1.2 GENERAL SITE DESCRIPTION

The existing main CDLC facility is situated on a broad elevated rise located between I-15 and West Bernardo Drive, just south of the Pomerado Road exit from I-15. The existing facility has a ground surface elevation between approximately +395 and +450 feet MSL and has approximate dimensions of 800 feet by 1,400 feet.

The proposed 5-story building will be located directly east of the Casa Sur building about 50 feet north of the existing CEP on the east side of campus. The existing ground surface elevations at the proposed building site ranges from about +416 to +418 feet MSL. This area is

currently occupied by a square shaped skilled nursing building with surrounding asphalt paving and landscaping. An approximately 20-feet high slope is located about 110 feet south of the building which descends to the Phase 1 Skilled Nursing facility under construction. An approximately 20-feet high slope is located about 50 feet east of the building which descends to Interstate 15.

1.3 PURPOSE AND SCOPE OF SERVICES

Our scope of services consisted of reviewing available information relevant to the site, conducting a field exploration and laboratory testing program, performing geotechnical engineering analyses and developing recommendations for project design and construction.

The following geotechnical information and recommendations are presented in our report:

- A description of the proposed project including a site plan showing the approximate locations of borings.
- A discussion of regional geology and site seismicity, and a regional geology map.
- A description of local and regional active faults, their distances from the site, their potential for future earthquakes, and a regional fault map.
- A discussion of other geologic hazards such as ground shaking, landslides, liquefaction, seismic settlement, flooding, and tsunamis.
- A discussion of site conditions, including the geotechnical suitability of the site for the general type of construction proposed.
- Site specific recommendations for geotechnical seismic design coefficients in accordance with the 2016 California Building Code.
- Recommendations for foundation design including parameters for shallow foundations.
- Anticipated total and differential settlements for shallow foundations.
- Recommendations for lateral load resistance.
- Recommendations for site preparation, earthwork, and fill compaction.
- Discussion of anticipated excavation conditions.
- Recommendations for temporary excavation slopes and shoring.

- Recommendations for slabs-on-grade, including recommendations for reducing the potential for moisture transmission through interior slabs.
- Recommendations for supporting concrete exterior flatwork.
- Recommendations for design of asphalt pavement sections.
- Recommendations for potential infiltration of stormwater runoff.
- A discussion of the corrosion / aggressivity potential of the near-surface soils encountered during our field exploration.
- Appendixes which include results of the field investigation and laboratory testing program.

The conclusions and recommendations contained in this report are subject to the limitations presented in Section 7. Recommendations presented herein should not be extrapolated to other areas of the campus or used for other projects without our prior review. An information sheet prepared by attached Geotechnical Business Council (GBC) insert in Appendix D. We recommend that all individuals using this report read the limitations along with the GBC information sheet.

2 METHODS OF STUDY

2.1 BACKGROUND INFORMATION

We performed a document search at the City of San Diego Engineering Department and were able to secure several previous documents for the site area from the period 1984 through 1986. We also reviewed the 2014 Kleinfelder report for Phase I improvements to the south. The pertinent documents include:

- “Geotechnical Investigation, Casa de las Campanas, Rancho Bernardo Area, San Diego, California”, prepared by Woodward-Clyde Consultants, Project No. 531791-SI01, dated June 21, 1984.
- “Rough Grading Report, Casa de las Campanas”, prepared by H.L. Land Development, dated July 21, 1986.
- “Geologic and Geotechnical Engineering Investigation, Proposed Wellness and Healthcare Buildings, Casa de las Campanas, 18655 West Bernardo Drive, San Diego, California”, prepared by Kleinfelder, dated July 23, 2014.

One pre-development boring (boring B-10) within the subject building area was included within the 1984 Woodward Clyde report for the campus development. This boring was performed at the original ground elevation of 403 feet msl and encountered weathered granitic rock from a depth of 2 feet to the maximum depth drilled of 10 feet.

The results of field compaction tests during site grading within the building footprint and surrounding area were included in the 1986 H.L Land Development report. In general, review of these documents indicates that the overall design and earthwork execution were performed in substantial conformance with the procedures and methodologies that were in practice during the cited performance periods. The depths of the compaction tests were utilized in this report to estimate the depth of fill. The reports reviewed were attested to and signed by licensed Registered Civil/Geotechnical Engineers and Certified Engineering Geologists.

2.2 FIELD EXPLORATIONS

2.2.1 Borehole Explorations

Four exploratory borings and two shallow borehole percolation tests were performed for the current study by hollow-stem auger drilling on January 27, 2017. The boring locations were selected based on proposed construction and access constraints from the presence of the existing buildings, landscaping, slopes, enclosures, walls, utilities and loading dock operations. The approximate locations of the borings are shown on Figures 2 and 3. The four deeper hollow-stem auger borings were drilled to depths of approximately 20 feet below ground surface (bgs) and the percolation boreholes were drilled to depths of 5 feet in close proximity to the deeper borings. Pacific Drilling of San Diego utilized a limited access drill rig equipped with 6-inch diameter hollow-stem augers.

An engineer from our office supervised the field operations and logged the soil based on the methods outlined in the Unified Soil Classification System (USCS) and general procedures established in ASTM D 2488. Selected bulk and relatively intact samples were retrieved from the borings, sealed, and transported to our laboratory for further evaluation. Our typical vertical sampling interval for field investigations is 5 feet with more frequent sampling within the top 5 feet of the boring. We recorded the number of blows to drive the California sampler using 140 pound hammer dropped 30 inches in general accordance with ASTM D1586. Graphic notations on the boring logs indicate the sampler type utilized at each sample depth. Upon completion, borings were backfilled with drill cuttings. A summary of the Kleinfelder field exploration program and the logs of the exploratory borings are presented in Appendix A.1.

Kleinfelder has also utilized information from the previous subsurface borings completed for our 2014 Phase I report for improvements south of the project which are currently under construction. The approximate locations of pertinent borings are shown on Figures 2 and 3 and logs of the borings are presented in Appendix A.2. Upon further review, it appears that the granitic rock suspected at the bottom of boring B-5 was likely auger refusal on rock within the fill.

2.2.2 Geophysical Surveys

One refraction microtremor (ReMi) survey and three multichannel analysis of surface wave (MASW) profiles were performed to evaluate shear wave velocity at various locations across the site. The locations were limited by access constraints from existing improvements, subsurface utilities and operations along with length. The surveys were performed to develop a compression wave and shear wave velocity profile below the site which could be used to evaluate excavation characteristics. This work was performed by Southwest Geophysics, Inc. of San Diego, California in February, 2017. Descriptions of the geophysical methods and results are presented in Appendix A.3, Geophysical Survey Results. The approximate locations of the survey lines are shown on Figures 2 and 3.

Kleinfelder performed a previous geophysical survey in July 2016 for evaluation of subsurface conditions for a retaining wall associated with the Phase I project to the south. This survey included three seismic refraction lines on the slope. The report prepared by our subconsultant Southwest Geophysics, Inc is presented in Appendix A.4. The approximate locations of the survey lines are shown on Figures 2 and 3.

2.3 LABORATORY TESTING

Geotechnical laboratory testing was performed on selected bulk and intact drive samples to substantiate field descriptions and to provide the basis for geotechnical parameters for design. Laboratory testing performed consisted of moisture/density measurement, particle size determinations (sieve analyses), Atterberg Limits, direct shear strength, compaction characteristics and R-value test. In addition, laboratory testing was performed to evaluate soil aggressivity with respect to pH, minimum electrical resistivity, soluble sulfates and soluble chlorides. Laboratory testing procedures and test results are provided in Appendix B.

3 GEOLOGY AND SUBSURFACE CONDITIONS

3.1 REGIONAL GEOLOGIC AND GEOTECTONIC SETTING

San Diego County resides within the southern portion of California's Peninsular Ranges Geomorphic Province (California Geologic Survey (CGS), 2002; Norris and Webb, 1990). This province is characterized as an assemblage of north to northwest trending, high-relief ranges stretching south from the Santa Monica Mountains in Los Angeles, through San Diego County and well into Baja California. Some of the notable ranges of Southern California Batholith include the Santa Ana Mountains, the Laguna Mountains and the Cuyamaca Mountains. The development of this mountainous terrain is closely tied to the transform tectonism of the San Andreas Fault System.

San Diego County encompasses three geomorphic sub-zones set in a series of north to northwest trending belts, roughly parallel to the coastline. From west to east, these zones are comprised of a relatively narrow, low-relief coastal plain; a central high-relief mountainous zone; and a low-lying desert zone. The coastal plain and mountainous zones are part of a more extensive geomorphic province of the Peninsular Ranges. The desert zone is part of the geomorphic province known as the Colorado Desert.

The project site lies within the western flank of the Peninsular Ranges of the Southern California Batholith. The bedrock that underlies the entire site is granitic, more specifically a tonalite. The referenced CGS geologic map (2005) has identified the bedrock as Undifferentiated Tonalite (Kt). The previous mapping by CDMG (1975) identifies the bedrock as Granitic Rock (Kg). The older referenced report and map by Larson (1948) has identified the bedrock as the Green Valley Tonalite (Kgv). For purposes of this report, we use the general term of Granitic Bedrock and the geologic symbol (Kt). The Regional Geologic Map, Figure 5, utilizes the 1975 CDMG map since the scale and contour interval of the geologic map provide better detail and delineation of the site.

3.2 REGIONAL FAULTING AND SEISMICITY

Southern California straddles the boundary between two global tectonic Figures known as the North American Figure (on the east) and the Pacific Figure (on the west). Active faults associated with this Figure boundary cross through some of the most densely populated and developed areas of Southern California, putting this region high on the list of vulnerability for damage to infrastructure and human health and safety. The main Figure boundary is represented by the San Andreas fault which stretches northwest from the Gulf of California in Mexico, through the desert region of the Imperial Valley, through the San Bernardino region, and up into Northern California where it eventually trends offshore north of San Francisco. Within Southern California, the San Andreas fault is actually a complex system (San Andreas Fault System – SAFS) of numerous faults that span a 150-mile wide zone from the main San Andreas fault in the Imperial Valley westward to offshore of San Diego. The major faults east of San Diego (from east to west) include the San Andreas fault, the San Jacinto fault, and the Elsinore fault (see Fault and Seismicity Map, Figure 4). Major faults west of San Diego include the Palos Verdes-Coronado Bank fault, the San Diego Trough fault, and the Santa Clemente fault. The most dominant zone of faulting within the San Diego region includes several faults associated with the Rose Canyon fault zone (RCFZ). Although activity on any of the faults within the SAFS affects the seismicity of the San Diego region, activity within the RCFZ poses the greatest threat by far to the region.

3.3 ROSE CANYON FAULT ZONE

The Rose Canyon fault zone (RCFZ) is an active system of faults that occurs both in the offshore and onshore (terrestrial) areas of the San Diego region. It stretches north from offshore of Imperial Beach through Coronado, downtown San Diego, up along the I-5 corridor, into southern Rose Canyon, across Mount Soledad and finally passing offshore just north of the La Jolla Beach and Tennis Club. Current knowledge indicates that the RCFZ is comprised of a complex system of numerous sub-parallel fault strands, both active and potentially active, occupying a band of deformation between 0.5 miles to 3 miles wide. An active fault is a fault that has experienced seismic activity during historic time (since roughly 1800) or exhibits evidence of surface displacement during Holocene time (Hart and Bryant, 1997). The definition of “potentially active” varies. A generally accepted definition of “potentially active” is a fault showing evidence of displacement that is older than 11,000 years (Holocene age) and younger than 1.7 million years (Pleistocene age). However, “potentially active” is no longer used as

criteria for zoning by the California Geologic Survey (CGS). The terms “sufficiently active” and “well-defined” are now used by the CGS as criteria for zoning faults under the Alquist-Priolo Earthquake Fault Act. A “sufficiently active fault” is a fault that shows evidence of Holocene surface displacement along one or more of its segments and branches, while a “well-defined fault” is a fault whose trace is clearly detectable by a trained geologist as a physical feature at, or just below, the ground surface. The definition “inactive” generally implies that a fault has not been active since the beginning of the Pleistocene Epoch (older than 1.7 million years old).

The site is located approximately 15 miles east from the closest active portion of the Rose Canyon fault, which is just offshore near the La Jolla Beach and Tennis Club. The next closest active fault is the Elsinore fault located approximately 20.2 miles to the northeast near Highway 76 in the Pauma Valley. A major seismic event on this or other nearby faults may cause substantial ground shaking at the site. Characterization of the hazard from strong ground shaking at the site is provided in Section 4.2 of this report.

A short fault has been mapped approximately 2,000 feet west of the subject site. This fault has offset the Cretaceous-age granitic rock and the Jurassic-age Santiago Peak Volcanics. There is no evidence that this fault has displaced Pleistocene-age or younger deposits and it is not considered to be sufficiently active.

3.4 SITE GEOLOGY AND SUBSURFACE CONDITIONS

The results of our site investigation indicate that previously placed fill and variably weathered Granitic Bedrock underlie the subject site. Based on our review of the reports referenced in Section 2.1, original surficial soils (topsoil and colluvium) were reportedly removed and used as fill, and cut excavations were made into the weathered rock during the prior phases of site development. The approximate extent of the geologic units within the areas of proposed site improvements addressed in this report are presented on Figure 3 and basically shows fill over granitic rock. A geologic map showing the approximate extent of the regional geologic units in this site vicinity is presented on Figure 5. Generalized geologic cross sections of the project area are presented as Figures 6 and 7.

Descriptions of the materials encountered during our exploration are provided on the boring logs in Appendix A. Generalized descriptions of these units, as observed in our borings and as described in the cited literature, are presented below:

3.5 FILL (AF)

Previously placed fill was encountered in all boring excavations. The fill generally consisted of silty to clayey, fine to coarse grained sands (SM and SC). However, low plasticity clay was encountered between depths of 8½ feet and 20 feet in Boring 1. The observed fill thickness in our borings varied from 7 feet on the northern side of the building to 17½ feet on the eastern side. The boring on the southern side was advanced to 20 feet but did not appear to penetrate the fill. Our review of the 1984 rough grading report by H.L. Land Development indicates that the fill should vary in depth from 7 feet on the north to 17 feet on the eastern and southern side of the proposed building footprint. It is possible that the fill was locally deeper than the reported 17 feet, as suggested by our interpretation of Boring 1.

Blow counts for fill soils encountered in our borings ranged from 18 to 80 blows per foot (bpf) and were typically in the 25 to 35 bpf range. These blow counts may be interpreted as compacted fill soils having a relative density ranging from medium dense to dense. It is our opinion that the existing engineered fill is considered suitable support for the proposed building.

3.6 WEATHERED GRANITIC BEDROCK (K_{GR})

Based on our investigation and review of the referenced literature, the geologic unit that underlies the entire site is Cretaceous-age Granitic Bedrock. The observed bedrock in the borings varies in depth and is typically highly to moderately weathered within the proposed excavation grading depths. The borings were advanced to depths of 20 feet with typical penetration blow counts of the sampler of 50 blows per 6 inches. However, recent observations during grading of Phase I to the south have shown that localized slightly weathered rock and core stones can be present adjacent to less weathered material. Highly weathered portions of the bedrock may be described as very dense, silty, and fine to coarse grained sands with various amounts of gravel. This material is also locally referred to as decomposed granite or DG. The weathered granitic rock does not have geologic structure, therefore, geologic structure cannot be depicted on the geologic map or cross sections.

3.7 GROUNDWATER

Groundwater was not encountered in the borings. In general, the soils encountered are in a moist condition below saturation levels necessary for free groundwater conditions.

It is possible that perched groundwater or seepage zones may be present at isolated locations. It should be noted that groundwater levels at the site can fluctuate with time due to changes in weather, irrigation, construction, or other influences that were not present at the time the observations were made. In particular, perched groundwater typically develops at the interface between more permeable fill and less permeable native materials such as the encountered bedrock or within fractures within the rock.

4 SEISMIC AND GEOLOGIC HAZARDS

We have reviewed the site with respect to the potential presence of geologic and/or seismic hazards. This evaluation is based on review of geologic maps, aerial photographs, our geologic site reconnaissance, boring and laboratory data and engineering analysis. The City of San Diego Seismic Safety Study (2008) classifies the site as within a “53” Hazard Category Zone which is defined as an area of level or sloping terrain with unfavorable geologic structure with low to moderate risk. The following sections discuss various geologic hazards and their potential at this site.

4.1 EXPANSIVE SOILS

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade.

In general, the majority of encountered soils within the fill and weathered rock are granular with low fines content (silt and clay), and are considered non-plastic. However, low plasticity clay was encountered between depths of 8 ½ feet and 20 feet in Boring 1. These soils are considered to have low plasticity and expansion characteristics. Based on the laboratory test results and visual descriptions of soil samples, it is our opinion that mitigation measures for expansive soils are not required. However, mitigation measures such as segregation and disposal should be provided if localized zones of medium or highly expansive soils are encountered at foundation or slab-on-grade elevations during construction.

4.2 SEISMIC GROUND SHAKING

The project site, like all Southern California, is a seismically active area and is likely to experience ground shaking as a result of earthquakes on nearby or more distant faults. The Rose Canyon fault zone and Elsinore fault zones dominate the seismicity of the area. The

Rose Canyon fault zone (CDMG, 1999) is located approximately 15 miles west of the project site.

Our recommendations for seismic design parameters are in accordance with the 2016 California Building Code (CBC) and ASCE 7-10. Based on our review of previous investigations, current field investigation and using the 2016 CBC and ASCE 7-10, we classify the site as Site Class C. Site Class C is defined as a very dense soil and soft rock with average shear wave velocities within the upper 30 meters between 1,200 ft/s and 2,500 ft/s, average SPT $N > 50$, or average undrained shear strength $S_u > 2,000$ psf.

Based on the Site Class C designation and the site location with respect to mapped spectral acceleration parameters S_s and S_1 , the 2016 CBC seismic design parameters have been developed. The recommended seismic design parameters are summarized in Table 1.

Table 1
Recommended 2016 CBC Seismic Design Parameters

Design Parameter	Symbol	Recommended Values
Site Class	--	C
Mapped MCE_R (5% damped) spectral acceleration for short periods	S_s	0.967 g
Mapped MCE_R (5% damped) spectral acceleration for a 1-sec period	S_1	0.375 g
Short Period Site Coefficient	F_a	1.013
Long Period Site Coefficient (at 1-second period)	F_v	1.425
MCE_R (5% damped) spectral response acceleration for short periods adjusted for site class ($F_a * S_s$)	S_{MS}	0.980 g
MCE_R (5% damped) spectral response acceleration at 1-second period adjusted for site class ($F_v * S_1$)	S_{M1}	0.534 g
Design spectral response acceleration (5% damped) at short periods ($2/3 * S_{MS}$)	S_{DS}	0.653 g
Design spectral response acceleration (5% damped) at 1-second period ($2/3 * S_{M1}$)	S_{D1}	0.356 g
MCER Peak Ground Acceleration adjusted for site class effects (SM at $T=0$)	PGA_M	0.249 g

4.3 LIQUEFACTION

Earthquake-induced soil liquefaction can be described as a significant loss of soil strength and stiffness caused by an increase in pore water pressure resulting from cyclic loading during shaking. Liquefaction is most prevalent in loose to medium dense, sandy and gravely soils below the groundwater table. The potential consequences of liquefaction to engineered structures include loss of bearing capacity, buoyancy forces on underground structures, ground oscillations or “cyclic mobility”, increased lateral earth pressures on retaining walls, post liquefaction settlement, lateral spreading and “flow failures” in slopes.

The subject site is underlain by compacted fill and weathered granitic rock. Based on the nature of the on-site soil materials as well the absence of a shallow groundwater table, it is our opinion that the potential for liquefaction at the site is low.

4.4 SEISMIC COMPRESSION

Seismic compression results from the accumulation of contractive volumetric strains in unsaturated soil during earthquake shaking. Loose to medium dense granular material with no fines or with low plasticity fines are most susceptible to seismic compression.

We evaluated seismic compression potential of the existing fill soils using the method of Tokimatsu and Seed (1987). Using the stratigraphy and blow counts from our borings where the fill was the deepest, we calculated total seismic compression settlement of less than ½-inch for the design earthquake. Due to the very dense soil and weathered rock, the seismic compression potential is considered negligible. The expected differential seismic settlement is expected to be ¼ inch over approximately 100 feet.

4.5 FAULT SURFACE RUPTURE

The project area is considered to be seismically active, as is most of southern California. Based on our review of the referenced geologic maps and geologic reconnaissance, the subject site is not underlain by known “sufficiently active” faults (i.e., faults that exhibit evidence of ground displacement in the last 11,000 years). Additionally, we performed a geologic

reconnaissance of the site and surrounding area and did not observe indications of faulting through the site. Therefore, the potential for ground rupture due to faulting at the site is considered low.

4.6 LANDSLIDES AND SLOPE STABILITY

Landslides are deep-seated ground failures in which a large arcuate or block shaped section of a slope detaches and slides downhill. Landslides are not to be confused with minor slope failures (slumps), which are usually limited to the topsoil zone and can occur on slopes composed of almost any geologic material. Landslides can cause damage to structures both above and below the slide mass. Structures above the slide area are typically damaged by undermining of foundations. Areas below a slide mass can be damaged by being overridden and crushed by the failed slope material.

Several formations within the San Diego region are particularly prone to landslides. These formations generally have high clay content and mobilize when they become saturated with water. Other factors, such as steeply dipping bedding that project out of the daylight of the slope and/or the presence of fracture planes, will also increase the potential for a landslide.

As previously mentioned, the City of San Diego Seismic Safety Study (2008) classifies the site as within a "53" Hazard Category Zone which is defined as an area of level or sloping terrain with unfavorable geologic structure with low to moderate risk. The existing slopes located approximately 110 feet south and 50 feet east of the proposed building have maximum heights on the order of 20 feet. The slopes have inclinations of 2:1 or flatter. A visual evaluation of this slopes did not indicate the presence of a landslide or instability. Based on our review of geologic maps, literature and previous geotechnical reports, landslides are not associated with the granitic rock or fill slopes in the site area. The weathered granitic rock below the fill does not have geologic structure and therefore does not have unfavorable geologic structure. Based on our observations of the project site conditions, set back of proposed building from the slopes, inclination of the slopes and professional judgment, the hazard posed to the site by static and seismic slope stability is considered low and the proposed development will not be impacted by slope instability.

4.7 TSUNAMIS AND SEICHES

A tsunami is a giant sea wave (which can reach over 50 feet in height) usually generated by catastrophic displacement on a submarine fault. Tsunamis can travel at speeds of hundreds of miles per hour over distances of thousands of miles. In the open ocean, tsunamis have large wavelengths and are difficult to detect. As the sea wave approaches shore, the wave decreases in wavelength and increases in amplitude (height). Large tsunamis can travel well beyond the normal wave break of the shoreline and cause damage to near shore structures. A seiche is an oscillation (wave) of a body of water in an enclosed or semi-enclosed basin that varies in period, depending on the physical dimensions of the basin, from a few minutes to several hours, and in height from several inches to several feet. A seiche is caused chiefly by local changes in atmospheric pressure, aided by winds, tidal currents, and occasionally earthquakes.

The project site is located about 12 miles from the Pacific Ocean and is located at an elevation above +400 feet mean sea level. The potential for tsunami and seiche hazards are considered low.

4.8 FLOODING

Flooding occurs as a result of several factors in developed areas. These factors include rainfall rates that exceed an area's ability to absorb or control the runoff; impounded water retained behind a flood control structure (upstream-inundation), failure of a flood control structure (downstream-inundation), seiches, or tsunami.

The Federal Emergency Management Administration (FEMA) maintains a collection of Flood Insurance Rate Maps (FIRM), which covers the entire United States (<http://hazards.fema.gov/mapviewer/>). These maps identify those areas, which may be subjected to 100-year and 500-year cycle floods. Based on our review of Federal Emergency Management Agency (FEMA) flood insurance map 06073C1090G, the project site is not located within either a 100-year or 500-year floodplain. Based on review of topographic maps, the site is not located downstream of a dam or within a dam inundation area. Based on the FEMA mapping, the potential for regional flooding to affect the site is considered low.

5 DISCUSSION, CONCLUSIONS, AND PRELIMINARY RECOMMENDATIONS

The discussions, conclusions and recommendations presented in this report are based on the information provided to us, results of our field explorations, laboratory testing, a review of available information, engineering analyses and professional judgment.

It is our opinion that the construction of the proposed building and associated improvements is feasible from a geotechnical standpoint. The proposed development as recommended will not measurably destabilize neighboring properties or induce the settlement of adjacent structures. Geotechnical considerations for the project include the following:

- The site is located in the seismically active Southern California area. The project should be designed in accordance with the 2016 California Building Code requirements for seismic design.
- There are no known active faults crossing the proposed site. Based on this information it is our opinion that the hazard with respect to fault rupture is low.
- Static groundwater was not encountered within the depths explored. However, perched water or seeps may be encountered in excavations.
- On-site soils are non- to low-expansive. No special mitigation or considerations will be required in this regard. Earthwork activities may be performed in a conventional manner as recommended herein.
- Temporary excavation slopes and shoring should be designed and constructed in general accordance with our recommendations contained herein. Likewise, lateral earth pressures for permanent retaining walls are presented in this report.
- The foundations of the planned structure should bear either entirely on formational soils or on properly compacted fill soils. The anticipated transition between fill and granitic rock across the building footprint should be mitigated in accordance with the options in Section 5.1.5 of this report. This basically involves either overexcavating the northern portion of the building underlain by anticipated granitic rock at foundation elevations or placing cement slurry between the bottom of foundations and granitic rock in the southern portion of the building.

- The on-site soils are generally suitable for re-use as engineered fill following removal of any oversized and deleterious materials and proper moisture conditioning.
- Stormwater infiltration into the ground was evaluated by performing two borehole percolation tests and evaluating site constraints. It is our opinion that infiltration is not practical considering the very dense state of the underlying rock, the presence of compacted fill below the building footprint, and the proximity of proposed subterranean retaining walls and existing descending slopes to the building.

5.1 SITE GRADING

Based on our review of existing geotechnical documents related to original project design and earthwork activities for the project area, along with the results of our current investigation, it is our opinion that the majority of existing fills soils in the proposed development area may be deemed as properly compacted and in substantial conformance with the procedures and methodologies that were in practice during the cited performance periods. Inasmuch, the following site grading recommendations were prepared based on our understanding of the proposed project as depicted on the preliminary development plans provided.

The existing skilled nursing building in the location of the proposed building will be demolished and replaced with a new 5-story building with one additional level below grade. The transition between weathered granite and compacted fill across the building footprint should be mitigated in accordance with the options in the following Section 5.1.5. Construction for the basement level of this building will require the use of temporary excavation slopes and/or temporary shoring to protect existing improvements around the perimeter. We have not been provided with locations of where temporary shoring will be required at this time.

Kleinfelder should be contacted to reevaluate our recommendations if changes in building layouts finish floor elevations, or other project feature configurations are made.

5.1.1 General

All site preparation and earthwork operations should be performed in accordance with applicable codes including the 2016 California Building Code. All reference in this report to

maximum dry density is established in accordance with American Society for Testing and Materials (ASTM) ASTM D 1557.

5.1.2 Excavation Characteristics

The results of our field exploration program and review indicate the project site is underlain by fill, and variably weathered granitic rock. The majority of the material within anticipated excavation depths should generally be excavated by heavy-duty earthwork equipment in good working condition.

In the event that slightly weathered granitic rock or core stones too large to handle are encountered, it may become necessary to use specialized excavation procedures such as percussive hydraulic hammers and rock breakers. Blasting should not be performed at the site.

The “rippability” of granitic bedrock can roughly be correlated to the depth at which a hollow stem auger boring can be drilled. Our borings which encountered weathered rock within the excavation depths were advanced to a depth of 20 feet, which is about 8 feet below anticipated bottom of foundation depths. The geophysical survey results also did not identify shear wave velocities indicative of non-rippable materials within excavation depths. However, the small diameter borings represent a small portion of the project area and the geophysical survey averages conditions over the length of the line. Determining the overall rippability of granitic bedrock over large areas can be difficult because the typical weathering of granitic bedrock is often controlled by the location of fractures and joints. The localized nature of the fractures and joints can cause uneven weathering which can create rippable zones that are directly adjacent to nonrippable zones.

Please note that this report should not be used to evaluate re-use of rock for other purposes, such as production of aggregate materials. The Contractor should conduct his own independent evaluation of rock materials for off-site use.

5.1.3 Construction Observation

The recommendations presented in this report are based on our understanding of the proposed project and on our evaluation of the data collected. The interpolated subsurface conditions should be evaluated by a representative of Kleinfelder in the field during construction. Final project drawings and specifications should be reviewed by Kleinfelder prior to the commencement of construction. Kleinfelder should observe the foundation preparation, grading, backfilling, and paving operations. Compacted fill and backfill soils should be tested for specified compaction by Kleinfelder.

5.1.4 Site Preparation

The existing building, walkways, pavement, and landscaping areas that are within the proposed building footprint and BMP area will be demolished prior to construction. Man-made structures, including buried pipes, utilities, etc., should be completely removed within the building area. Existing utility pipelines or conduits that extend beyond the limits of the proposed construction and are to be abandoned in place, should be plugged with non-shrinking cement grout to prevent migration of soil and/or water. Excavations for removal of any man-made items should be dish-shaped and backfilled with properly compacted engineered. All surficial vegetation and deleterious material should be stripped and completely removed from the proposed site area.

5.1.5 Subgrade Preparation

Following demolition of the existing building and associated improvements, temporary excavations and/or shoring will be installed to facilitate excavation for the lower level. The backfill should not straddle a cut/fill transition and all foundations should bear entirely on engineered fill or entirely on bedrock. In order to address the impacts of the cut/fill transition on the floor slab and to facilitate foundation excavation with small equipment, we recommend that the exposed ground in the northern cut portion of the building be over-excavated a minimum of 18 inches below the bottom of floor slab elevation. Depending on the option selected for foundation design, the depth of over-excavation may also extend 3 feet below bottom of planned foundation levels in the northern cut portion of the building. The resulting excavations should be backfilled with properly compacted engineered fill per Section 5.1.6. We anticipate that the resulting excavation may be on the order of 13 to 16 feet in depth in the northern

portion of the building, depending which foundation option is selected. We anticipate that the southern fill portion of the building may only require scarification and compaction of exposed subgrade. Due to potential variability of fill soils below the retaining walls for the access ramp to the lower level, we recommend that upper 2 feet of existing soil below wall footings and ramp area be excavated and recompacted.

The subgrade exposed at the bottom of all foundations excavations should be observed by a qualified representative of Kleinfelder prior to the placement of any fill or concrete to observe uniform bearing conditions and that potentially yielding or unsuitable soils have been removed. Additional removals may be required as a result of observation and testing of the exposed subgrade soils. The exposed surface should be scarified to a depth of 9 inches, moisture conditioned, compacted, and properly leveled. However, the need for scarification may be evaluated and waived by the geotechnical engineer at the time of grading if deemed appropriate.

After removal of the existing AC pavements and concrete structures within improvement areas where new pavements are proposed, we recommend that the upper 8 to 10 inches of subgrade be scarified, moisture conditioned and recompacted. Localized areas of soft or yielding subgrade should be evaluated at the time of grading by proof rolling and may require deeper excavation to achieve the specified compaction criteria.

Abandoned utilities should be completely removed, and the loose backfill removed and replaced with properly compacted fill. Man-made structures, including footings, buried pipes, utilities, pavements, etc., should be completely removed within the building area. Excavations for removal of man-made items should be dish-shaped and backfilled with properly compacted engineered fill per Section 5.1.6.

5.1.6 Engineered Fill

Remedial grading and replacement with compacted fill was discussed in the preceding Section 5.1.5. The onsite materials may be used as engineered fill, provided that they are free of oversized rock, organic materials, and deleterious debris. Oversize material in excess of 6 inches in diameter should not be used in engineered fill. The onsite soil placed as engineered fill should be moisture conditioned between 1 and 3 percent above optimum moisture content,

and compacted to a minimum of 90 percent relative compaction based on ASTM D 1557. In pavement areas, the upper 12 inches of subgrade soils should be moisture conditioned to a moisture content above optimum content and compacted to 95 percent of the maximum laboratory dry density, as evaluated by ASTM D 1557, just prior to placement of aggregate base.

Import materials used as engineered fill should consist of clean, granular material that has less than 30 percent passing the #200 sieve and expansion index of 30 or less as evaluated by ASTM 4829. Imported engineered fill should be moisture conditioned between 1 to 3 percent above optimum moisture content and compacted to a minimum of 90 percent relative compaction based on ASTM D 1557.

Although the optimum lift thickness for fill soils will be dependent on the size and type of compaction equipment utilized, fill should generally be placed in uniform lifts not exceeding approximately 8 inches in loose thickness. Oversized material, rocks, or hard clay lumps greater than 6 inches in dimension should not be used in compacted fills.

5.1.7 Pipe Bedding and Trench Backfill

Pipe bedding should consist of sand or similar granular material having a sand equivalent value of 30 or more. The sand should be placed in a zone that extends a minimum of 6 inches below and 12 inches above the pipe for the full trench width. The bedding material should be compacted to a minimum of 90 percent of the maximum dry density. Trench backfill above pipe bedding may consist of approved, onsite or import soils placed in lifts no greater than 8 inches loose thickness and compacted to 90 percent of the maximum dry density.

5.2 TEMPORARY EXCAVATIONS AND PERMANENT SLOPES

Temporary excavations will be required for construction of the basement level and access ramp. If very steep or vertical-sided trench excavations in excess of 5 feet deep are necessary, we recommend the sidewalls be temporarily supported in accordance with OSHA standards to provide temporary trench stability during construction. These regulations provide trench sloping and shoring design parameters for trenches (up to 20 feet deep) based on a description of the

soil types encountered. The contractor should be responsible for the structural design and safety of the temporary shoring system.

For preliminary planning of OSHA sloping and shoring requirements, we recommend that existing fill soils be considered as Type C soils. Highly and moderately weathered granitic rock may be considered as Type B soils. Temporary excavations deeper than 5 feet within Type C soils should be shored or laid back on a slope no steeper than 1.5H:1V (horizontal to vertical).

In the case of trench excavations, OSHA requirements regarding personnel safety should be met using appropriate shoring (including trench boxes), or by laying back the slopes in accordance with OSHA requirements. Temporary excavations that encounter seepage may require shoring or may be stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. On-site safety of personnel is the responsibility of the contractor, and their designated “competent person” should perform regular inspections of all temporary excavations and slopes.

Any vibratory equipment or stockpiled material should be kept away from the immediate excavation area. It is recommended that the setback distance be one-half the excavation depth, or a minimum of 5 feet, whichever is greater. Some minor sloughing may occur as the moisture content of the soils in the excavation walls dry out. Shoring and/or bracing of trenches may be required where construction personnel are working within excavations. Applicable governmental safety codes should be applied for safety of personnel.

We recommend that utility trenches be placed a safe distance from existing shallow and deep foundations. In general, trenches should be located outside of a 2H:1V projection from the bottom of existing foundations. Excavations should be coordinated or phased so that trenches do not impact adjacent foundations. Specific recommendations can be provided upon request.

Temporary excavated slopes for construction should have inclinations no steeper than 1.5H:1V and a maximum height of no greater than about 20 feet. Temporary excavated slopes as described herein are considered to have a safety factor against deep-seated failure in excess of 1.3.

All permanent fill slopes (if any) should have a maximum inclination of 2H:1V and maximum height of 20 feet. These slopes are considered to have a safety factor in excess of 1.5 static and 1.1 pseudo-static. We recommend that fill slopes be planted, drained and maintained with a minimum amount of surface irrigation.

5.3 TEMPORARY SHORING

While the details of site excavation and temporary excavation support are not known at this time, we anticipate that portions of the proposed excavation perimeter will require temporary shoring during construction to protect existing improvements. Underpinning may also be required to protect the foundations of existing improvements where the new basement level is adjacent to the existing building.

Based on site conditions, we recommend that a conventional shoring system consisting of closely-spaced soldier piles and wooden lagging. Cantilever shoring for level backfill should be achievable for shoring heights up to about 15 feet with the use of larger beam sections. Tieback anchors are not anticipated for the majority of the excavation but will likely be needed to limit horizontal deflection on the side adjacent to the existing building or for heights over 15 feet.

To accommodate installation of the shoring in the dense materials present at the site, wide-flange beam sections may be installed into pre-drilled holes surrounded by concrete. The presence of localized hard and slightly to moderately weathered granitic rock is possible and would result in difficult drilling of soldier beams and possible tieback anchors. Caving of drilled holes for soldier beams or tieback anchors may occur in cohesionless soils. The shoring contractor should determine the suitable drilling method for tie-back installation based on the subsurface conditions at the site and on their experience with similar materials.

5.3.1 Tieback Anchors

Where needed, tiebacks are installed by drilling a hole through the excavated vertical face and into the retained soil at a typical angle of approximately 10 to 20 degrees below horizontal. Steel tendons/bars with centering spacers are placed in the drilled hole, and grout is placed in the annulus zone around the tendons/bars. The grout can be placed by gravity, or under pressure to achieve higher capacities.

Tieback anchors derive their load capacity through frictional resistance along the grout “bonded zone”, which is located beyond the “active wedge”. For this project, the active wedge may be assumed at an angle of 30 degrees from the vertical, passing through a point located at least 5 feet behind the bottom of the excavation. We recommend the portion of the anchor within the unbonded zone for the active wedge have a sleeve so that it is not bonded to the grout or be backfilled using sand/cement slurry.

Since the load-carrying capacity of the tie-back anchors will depend on various site-specific, equipment- and method-related factors, tie-back capacities should be established by performance testing initial anchors to a minimum of two (2) times the design loads which do not exceed 80 percent of the specified minimum tensile strength of the anchor rod. A creep test is required for all pre-stressed anchors that are performance tested. All production anchors shall be tested at 150 percent of design loads and shall not be greater than 70 percent of the specified minimum tensile strength of the anchor rod.

We recommend performance testing and proof testing of anchors be performed in accordance with the latest edition of the Post-Tensioning Institute’s (PTI) Recommendations for Prestressed Rock and Soil Anchors. The performance and proof testing should confirm design tieback capacities. The PTI recommends that the first two to three tiebacks be performance tested; thereafter, a minimum of two percent of the tiebacks should be performance tested. The rest of the tiebacks should be proof tested. The unit friction between the grout and the soil may be assumed to be on the order of 4,000 psf if post-grouting is performed. If post-grouting is not performed, we recommend a unit friction of 1,000 psf be used. If tie-back anchors are installed at an angle below the horizontal, tie-back resistance should be taken as the horizontal component of the total anchor capacity. Additionally, the shoring designer should be aware that the vertical component of the total anchor capacity may act as a downward load on the shoring system.

5.3.2 Wooden Lagging

Timber lagging may be used between the soldier piles to support the exposed soils. Lagging should be treated lumber since it will permanently be left in-place. For the temporary shoring, the lagging should be designed for the full lateral pressures recommended below. Voids between the soil and lagging should be filled with soil or grouted to mitigate the potential for the

voids to propagate to the surface. Small voids may be backfilled with soil and compacted by hand tamping as the lagging ascends.

5.3.3 Lateral Pressures

Cantilever walls without tieback anchors and level backfill conditions should be designed for an equivalent fluid weight of 35 pcf applied as a triangular pressure distribution. Walls restrained with one row of tieback anchors and level backfill should be designed to resist a trapezoidal horizontal static soil pressure with a maximum of $26H$ in (psf) in the central $1/3$ of the height. For the upper and lower portions of trapezoidal distribution, this pressure decreases in the upper $2/3H_1$ and the lower $2/3(H-H_1)$, where H_1 is the depth to the tieback and H is the total wall height in feet.

To account for arching effects on temporary lagging, we recommend using 0.6 of the design earth pressure. The design pressure should include the static earth pressure for level ground, increase for ascending sloping ground, and any surcharge loading derived by utilizing Boussinesq equations. The structural designer should calculate the maximum surcharge pressure by utilizing the Boussinesq equation specific loading and site geometry.

Although not anticipated for the subject wall, thirty-five percent of any areal surcharge adjacent to the wall may be assumed to act as a uniform horizontal pressure against the wall. The wall designer should identify and account for any existing or proposed surcharge loads. To model the surcharge load from the existing building to the west, the designers should utilize the foundation plans and design loads of existing footings. For general or vehicular loading, we recommend a uniform horizontal pressure of 120 psf. Special cases such as other surcharge loads (such as planned stockpile or crane areas, etc.) may require an increase in the design values recommended above. These conditions should be evaluated by the project geotechnical engineer on a case-by-case basis.

The above pressures do not include hydrostatic pressures as it is assumed that groundwater is not present and that prefabricated strip drains will be utilized to capture and dissipate potential future seepage. The strip drains should be connected to a drainage conduit at the base of the wall and brought to a storm drain, sump or other suitable discharge location at the low point of the wall.

5.3.4 Lateral Resistance

All soldier piles should extend to a sufficient depth below the excavation bottom to provide the required lateral resistance. Regardless of the calculated embedment depth, the minimum embedment depth of soldier piles below the bottom of the excavation should not be less than 5 feet. We recommend that the required embedment depths be calculated based on the principles of force and moment equilibrium. For this method, the allowable passive pressure against soldier piles which extend below the level of excavation may be assumed to be equivalent to a fluid weighing 350 pcf.

To account for three-dimensional effects, the passive pressure may be assumed to act on an area 2 times the width of the embedded portion of the pile, provided adjacent piles are spaced at least 3 pile diameters, center-to-center. Additionally, we recommend a factor of safety of 1.5 be applied to the calculated embedment depth and that the passive pressure be limited to 3,500 psf.

5.3.5 Estimated Lateral Displacements

Lateral movement of a the wall will depend on the type and relative stiffness of the system designed by the engineer, the construction method and care used by the installation contractor, and other factors beyond the scope of this study. Although the geotechnical engineering firm typically provides soil design values for use by the wall designer and the contractor, the structural design of the permanent shoring/wall system that primarily accounts for lateral displacements (assuming proper construction) is outside our geotechnical scope and design services. However, based on our literature review and experience with projects with similar requirements, the lateral movement of a properly designed and constructed permanent shoring system to similar depths and in similar subsurface conditions typically has been reported as less than 1 inch. The designer should also specify on the plans the maximum acceptable lateral displacement measured by the contractor that can occur before the designer is notified to provide a review and potential mitigation measures.

In addition to the permanent shoring system stiffness, the ability of the system to provide stiffness resistance to lateral movement to support adjacent structures or buried utilities requires information on the size, material construction type, age, location, and acceptable

movement limits of the structure/buried utility. Providing this information and making evaluations of the shoring system design to provide acceptable support to the adjacent structures or buried utilities is beyond our scope and expertise. However, the geotechnical engineer should review the shoring plans and calculations to evaluate that the geotechnical engineering parameters and recommendations of this report have been used by the shoring designer.

5.3.6 Shoring Construction Considerations and Monitoring

The construction monitoring and performance of the permanent shoring system are ultimately the contractor's responsibility. The horizontal and vertical movements of the shoring system should be monitored by a licensed surveyor, and the movements be evaluated for performance. The shoring designer should establish a tie back anchor testing program and a monitoring program of the completed shoring installation to accommodate his intended design movement limits. Factors that should be addressed in the monitoring program include the location and number of monitoring points, monitoring frequency, and acceptable movement before notification of the shoring designer is required. However, at a minimum, we recommend the tops of the installed soldier piles should be surveyed prior to excavation, and that the top and bottom of the soldier piles be surveyed on a weekly basis until the maximum excavation depth has been reached, and on a bi-weekly basis for an additional two month period beyond reaching maximum excavation depth or until the shoring movements stabilize, whichever results in the longer shoring monitoring period. Surveying should consist of measuring movements in vertical and two perpendicular horizontal directions. The surveying should be able to measure to 0.01 foot. The results of the surveying should be submitted to the shoring designer for his review and comment. These minimum recommended shoring monitoring suggestions should not supersede those provided by the shoring designer. The surveyed soldier piles should be spaced at approximately 50 feet on-center with a minimum of 3 for the subject wall.

5.3.7 CBC Design Recommendations

Design of earth retaining shoring should comply with Section J106.2.4.1 of the 2016 CBC. Although some of this information is redundant with that provided in the preceding section, we are presenting the following 13 recommendations to correspond to the 13 issues contained in CBC Section J106.2.4.1.

1. The drill hole diameter shall be sized to provide a minimum grout cover of 0.5 inches, and the area of pre-stressing strands or bars within the hole should not exceed 15 percent of the total area of the hole for multiple-element tendons. In general, the holes should have a minimum diameter of 6 inches. The minimum center-to-center spacing should be at least four times the nominal anchor diameter or 4 feet, whichever is greater. Reduction factors for group effects may be provided if tiebacks need a closer spacing.
2. Tieback anchors derive their load capacity through frictional resistance along the grout “bonded zone”, which is located beyond the “active wedge”. The length of the unbounded length will decrease with depth, the active wedge may be assumed at an angle of 30 degrees from the vertical, passing through a point located at least 5 feet behind the bottom of the excavation. The tieback anchors should have a maximum unbonded length of 20 feet and a minimum bonded length of 10 feet.
3. The anchor type and capacity should be determined by the structural engineer based on the provided soil strength/grout bond, the structural load and the design anchor spacing. For example, based on an assumed bonded length of 30 feet, an allowable soil/grout bond stress of 4,000 psf, and minimum anchor spacing of 4 feet, the resulting maximum anchor tension capacity would be 190 kips.
4. We recommend an allowable bond stress of 4,000 psf at the ground /grout interface. A factor of safety of 2 may be used to calculate the ultimate bond stress for temporary anchors.
5. A minimum grout pressure and post-grout pressure of 300 psi is recommended for tieback anchor installation.
6. Corrosion protection is not required since the temporary anchors will be utilized for a short duration during construction.
7. Performance test for the anchors shall be at a minimum of two (2) times the design loads and shall not exceed 80 percent of the specified minimum tensile strength of the anchor rod. A creep test is required for all pre-stressed anchors that are performance tested. All production anchors shall be tested at 150 percent of design loads and shall not be greater than 70 percent of the specified minimum tensile strength of the anchor rod.
8. Recommendations for lateral earth pressure and surcharge pressure are presented in the preceding section of this report under Lateral Pressures. Design for seismic

increment of earth pressure loading is not required for the short duration the shoring will be utilized. The designers should verify whether OSHPD will require seismic design of the side supporting the existing building.

9. We recommend maximum lateral deformations be limited to 1-inch at the top of the soldier pile, ½-inch at the tie-back anchor locations and ½-inch at the drilled pier concrete shafts at the lowest grade level.
10. We recommend an allowable vertical soil bearing pressure of 2,000 psf, friction resistance of 300 psf and lateral passive soil resistance of 350 psf for the drilled soldier piles. A safety factor of 3 was used on bearing pressure, 2 for frictional resistance, and 1.5 for passive resistance. Additionally, we recommend a factor of safety of 1.5 be applied to the calculated embedment depth and that the passive pressure be limited to 3,500 psf.
11. To account for three-dimensional effects, the passive pressure may be assumed to act on an area 2 times the width of the embedded portion of the pile, provided adjacent piles are spaced at least 3 pile diameters, center-to-center.
12. The contractor is be responsible for using a drilling method to establish a stable hole with the specified dimensions and tolerances. Rotary, auger or percussion drilling methods are acceptable. Temporary casing is not anticipated but may be utilized if caving is encountered in cohesionless sand. Centralizers should be used on the tendons.
13. We recommend that geotechnical observation and monitoring of shoring installation be performed by Kleinfelder on a continuous basis. Installation should be performed in accordance with the recommendations previously discussed in this letter and in Section J106.2.5 of the CBC.

5.4 FOUNDATION RECOMMENDATIONS

To mitigate the potential for differential settlement, the building foundations should either be supported entirely on weathered rock or entirely on compacted fill. Due to the presence of a cut/fill transition across the building at the foundation elevation, the cut portion may be over-excavated to a depth of 3 feet below foundation elevation and replaced with compacted fill, or the foundations may be deepened in the fill portion. The foundations may be deepened by excavated the footing down to formation and placing unreinforced 3-sack cement slurry or concrete back up to the foundation elevation, or by installing drilled piers into the rock.

Although estimating the location of the cut / fill line is difficult without the original grading plan and depth of removal of colluvium, we estimate that the transition is roughly located across the middle of the building in an east west orientation. The remaining fill depth below the anticipated bottom of foundation elevation of 404 feet msl would gradually increase to the south to an estimated depth of 8 feet.

Footings for proposed structures should have a minimum embedment depth of 24 inches below the lowest adjacent grade into granular, very low or low expansive native materials or compacted fill. Continuous footings should be 24 or more inches wide and spread foundations should be 24 or more inches square.

An allowable foundation pressure of 3,500 pounds per square foot (psf) can be used to size foundations in fill and a value of 5,500 psf can be used in weathered rock. This allowable pressure is based on a Safety Factor of 3 and consideration of foundation settlement. The allowable design bearing value can be increased by one-third for transient loading due to seismic and wind forces. The lower outside edge of the footing should be located at least 8 feet from the face of slope (if any) or 1/3 of the slope height, whichever is greater.

Anticipated total static and seismic settlements are not expected to exceed 1 inch and the total differential settlements over a 40-foot span are not expected to exceed 1/2 of the total settlement for footings founded in weathered rock or engineered fill. Shallow foundations should contain reinforcing steel as determined by the project structural engineer.

Resistance to horizontal loadings can be developed by passive earth pressure on the sides of footings and frictional resistance developed along the footing bottom. Passive resistance to lateral earth pressures may be calculated using an allowable equivalent fluid unit weight of 350 psf. An allowable frictional coefficient of 0.35 may be applied to vertical dead loads supported by shallow foundations. If the passive pressure and frictional resistance are combined to resist lateral loads, an allowable frictional coefficient of 0.30 should be used.

Footings may experience a reduction in bearing capacity or an increased potential to settle when located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse, and/or a loss of

serviceability. To reduce this risk, utility excavations should not extend below a 2H:1V plane projected downward from 12 inches above the bottom of the outside edge of the footing. Also, no parallel utility excavations should be made within a lateral distance of 24 inches outside the footing.

Foundation reinforcement should be provided as directed by the structural engineer for load carrying purposes. Prior to placing reinforcing steel or concrete, footing excavations should be cleaned of all debris, loose or soft soil, and water. All footing excavations should be observed by a representative of Kleinfelder immediately prior to placement of reinforcing steel and concrete to check that the recommendations contained herein are implemented during construction.

5.5 PERMANENT RETAINING WALLS

We understand that permanent retaining walls will be required for the subterranean level and for the access ramp. Maximum retained heights are approximately 11 feet. Retaining walls should be waterproofed. The retaining walls should be provided with an adequate drainage system. Drainage systems may include composite geosynthetic drainage strips with collector drains. The drains should be connected to closed conduits at the base of the wall and brought to a storm drain, sump or other suitable discharge location.

Masonry and poured-in-place concrete retaining walls for the access ramp will be supported on shallow continuous footings founded entirely on engineered fill. Shallow foundations should be designed in accordance with the recommendations presented in Section 5.4 of this report.

Lateral pressures acting against masonry and poured-in-place concrete retaining walls can be calculated using soil equivalent fluid weight (EFW). The EFW value used for design depends on allowable wall movement. Walls that are free to rotate at least 0.5 percent of the wall height can be designed for the active EFW. Cantilever retaining walls that are not allowed to rotate in such a manner or are sensitive to movement and tilting should be designed for the at-rest EFW. In general the building walls will be restrained and the ramp walls will be cantilever. The cantilever ramp walls will rotate slightly at the junction with the building walls or they should be designed for restrained conditions if structurally connected.

Values given in the Table 2 below are in terms of equivalent fluid weight and assume a triangular distribution. These values assume that onsite or imported, sandy soils (SP, SM, SC) will be used as backfill and that the backfill is well drained and above the static water table. If walls with undrained backfill are to be used, Kleinfelder should be consulted for additional evaluation and recommendations.

Table 2
Equivalent Fluid Weights
for Calculating Lateral Earth Pressures

Conditions	Level Backfill (pcf)	2H:1V Sloping Backfill (pcf)
At-Rest	55	79
Active	35	55

Fifty percent (50%) and thirty percent (33%) percent of any uniform areal surcharge placed at the top of the wall may be assumed to act as a uniform horizontal pressure over the entire wall for the at-rest and active cases, respectively. As a minimum, we recommend that a traffic or general surcharge equivalent to 2 feet of soil backfill be assumed as a surcharge. For this condition a pressure of 120 psf may be assumed to act as a uniform horizontal pressure over the entire height of the wall, H. For passive resistance on retaining wall foundations, we recommend using the values presented in Section 5.4.

Retaining walls should be designed to resist earthquake loading with the following recommendations. Restrained and cantilever walls with level backfill conditions should be designed using an incremental seismic force of $10H^2$ for $PGA_M = 0.249$ g (in pounds per linear foot of wall length, with H as the wall height in feet), which are additive to the static active earth pressure described above. The incremental seismic force acts at $0.5H$ above the base of the wall. Static passive earth pressures and base friction can be used in seismic retaining wall design.

5.6 SIGN AND LIGHT POLE SUPPORT

Proposed sign structures and light standard foundations as columns embedded in earth or embedded in concrete footings in the earth to resist both axial and lateral loads, can be

designed in general accordance with Section 1807 of the 2016 California Building Code (CBC). We have conservatively assumed that foundations will be embedded in fill materials with the foundation properties as Class 4 Material as defined by the CBC, Table 1806A.2. We recommend that a lateral soil-bearing pressure of 150 lbs/ft² per foot of depth below natural grade be used. An allowable soil-bearing pressure of 2,000 lbs/ft² may be used to support vertical loads. The allowable lateral soil-bearing pressure may be increased by a factor of 2 for short-term lateral loads, as allowed in Section 1806A.3.4 of the 2016 CBC, provided the structures will not be adversely affected by a ½ inch of motion at the ground surface.

5.7 INTERIOR CONCRETE SLABS-ON-GRADE

Subgrade soils supporting concrete slabs should be scarified to a depth of 6 inches, moisture conditioned to within optimum and to 2 percent above optimum and compacted to at least 90 percent relative compaction per ASTM D 1557. A modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci) can be used to design floors, pavements, and walkways on the compacted subgrades. Floor slabs for vehicular parking should be designed by the project structural engineer. However, we recommend a minimum thickness of 6 inches and a minimum reinforcement of No. 3 rebar at 18-inch spacing in both directions. The reinforcement should be placed near the center of the concrete slab.

Special precautions should be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling of the slabs. High water-cement ratio and/or improper curing may also greatly increase the water vapor permeability of concrete. We recommend a maximum water-cement ratio of 0.45 for floor slab concrete. We recommend that all concrete placement, joint spacing, and curing operations be performed in accordance with the recommended guidelines of the American Concrete Institute (ACI).

In cases (if any) where the floor may have a vapor/moisture sensitive coverings, may be in a humidity controlled environment, or may likely have one or both of these conditions in the future, we recommend a polyolefin vapor barrier membrane be utilized between the prepared subgrade and the bottom of the floor slab. Although the floor slab will be uncovered for the parking level, there may be enclosures or covering for restrooms or storage.

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this subsurface moisture will collect and transmit through the concrete slab-on-grade. Traditional heavy plastic vapor retarders have been shown to be marginally effective in the short term and to eventually disintegrate with time. To reduce the impact of this subsurface moisture and the potential impact of future introduced moisture (such as landscape irrigation or precipitation) we recommend utilizing a polyolefin vapor retarder membrane between the subgrade and slab-on-grade. This vapor retarder membrane should consist of a polyolefin sheeting at least 15 mil in thickness, have a water vapor permeance less than 0.01 perms (ASTM F 1249), a puncture resistance of at least 2200 grams (ASTM D 1709), and a tensile strength of at least 45 lbf/in (ASTM D 882).

The material specified above should be highly resistant to tearing, cracking, flaking, or puncturing during construction and should not disintegrate with time. A granular subbase below the membrane or a sand or gravel layer on top of the membrane is not required. In accordance with recommendations in ACI guidelines and many flooring companies, we recommend placement of the concrete slab directly on the vapor retarder. This eliminates the potential for water to be trapped in the blotter layer that could later be transmitted through the slab and adversely affect the flooring system. However, a reduced joint spacing, slab reinforcement, a low shrinkage mix design, and/or other measures to reduce the potential for slab curl should be implemented by the concrete slab designer.

We recommend that the vapor retarder be installed in accordance with ASTM E 1643, "Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs". Some salient features of ASTM E 1643 are discussed below. All joints and seams should have a minimum 6-inch overlap and be taped. The area of tape adhesion should be free from dust, dirt and moisture. All penetrations must be sealed using a combination of membrane, tape and mastic. The tape and mastic used should conform to the vapor retarder manufacturer's recommendations. Care should be taken at the lateral terminations so that vapors do not go around the membrane. This may be accomplished by placing the membrane on top of the footing and against the vertical wall so that the membrane will be sandwiched between the footing, vertical wall and poured concrete floor slab. If damaged, the membrane should be repaired prior to placing concrete.

It is emphasized that we are not floor moisture proofing experts. We make no warranty or guarantee, nor provide any assurance that the recommendation above will reduce concrete

slab-on-grade floor moisture penetration to any specific rate or level. The designers should consider all available measures for slab moisture protection. Exterior grading and/or adjacent landscaping have an impact on the potential moisture beneath floor slabs.

5.8 EXTERIOR CONCRETE FLATWORK

All flatwork and exterior concrete should be supported on at least 12 inches of compacted, low to very low expansive engineered fill. The concrete slabs for walkways and sidewalks should have a nominal thickness of 4 inches thick. Concrete slabs should be designed by the structural engineer but minimally should be reinforced with welded wire mesh placed at mid depth. Loose or yielding subgrade identified during earthwork operations may require additional remedial measures.

5.9 PAVEMENTS

5.9.1 Flexible Pavement Design

We anticipate that the project may include both asphalt concrete (AC) roadways and parking areas and concrete access drives. R-value testing was performed as part of the scope of work for this project. Based on the results of our field explorations and laboratory testing, it is our opinion that the existing near surface soils at the site which may be used to support pavement may be classified mainly as silty to clayey sands with a R-values ranging from 25 to 60. A sample of near surface material from the current investigation had an R-value of 57.

In consideration of site variability, we are providing preliminary pavement design recommendations based on an assumed R-Values of 30. Final pavement sections should be adjusted based on testing of actual R-value testing of soils encountered during construction. Pavement sections have been evaluated in general accordance with Caltrans methods for pavement design. Due to the potential cost differential of R-values other than 30, we recommend that the contractor expose the subgrade and allow sufficient time for Kleinfelder to evaluate the actual conditions and provide a cost effective recommendation. To assist the civil engineer, we evaluated pavements for traffic indices (TI) of 5 and 6. We are not aware of the design TI for anticipated traffic but understand that it may include truck traffic for loading docks. Recommended flexible pavement sections for these conditions are given in Table 3.

Table 3
Recommended Flexible Pavement Sections
R-Value of 30

Traffic Index	Asphalt Concrete (inches)	Class 2 Untreated Aggregate Base (inches)
5	3 1/2	5
6	4	6

The flexible pavement should conform to, and be placed in general accordance with, current Caltrans Standard Specifications. The aggregate base (Class 2) should comply with the specifications in Section 26 of Caltrans Standard Specifications. The aggregate base and the upper 12 inches of subgrade should be compacted to a minimum of 95 percent relative compaction as obtained by the ASTM D 1557 test procedure. All concrete curbs should extend below the bottom of adjacent aggregate base materials.

5.9.2 Rigid Pavement Design

Rigid pavements are typically used in truck traffic areas, parking entrances, access ramp to underground parking or trash enclosures (typical Traffic Index of 6). The recommended minimum rigid pavement section is 7 inches of Portland cement concrete (PCC) over 12 inches of Class 2 Aggregate Base. Concrete for use in rigid pavements should have a flexural strength of at least 600 psi when tested in accordance with ASTM C78

The concrete pavement should be constructed in an approximate 15-foot square grid system. If a square system is impractical, rectangular panels can be used with the longitudinal distance a maximum of 20 feet.

Longitudinal or transverse control joints should be constructed by hand forming or placing a pre-molded filler such as “zip strips.” Longitudinal or transverse construction joints should be keyed. Expansion joints should be used to isolate fixed objects abutting or within the pavement area. The expansion joint should extend the full depth of the pavement. Joints should run continuously and extend through integral curbs and thickened edges. We recommend that joint layout be adjusted to coincide with the corners of objects and structures.

The recommended pavement sections for both flexible and rigid pavements are based on the following conditions:

1. Utility trench backfill should be properly placed and adequately compacted to provide a stable subgrade. Trench backfill below the 12 inches of pavement soil subgrade should be compacted to a minimum of 90 percent relative compaction (ASTM D 1557).
2. An adequate drainage system should be provided to prevent surface water from saturating the subgrade soil. Pavements should be sloped at least 1/2 percent to provide positive drainage, and not be allowed to pond.
3. A periodic maintenance program should be incorporated to include sealing cracks and other measures.
4. Aggregate base materials and the upper 12 inches of subgrade below aggregate base should be compacted to a minimum of 95 percent of ASTM D 1557 maximum dry density.
5. The finished subgrade should be brought to a firm and unyielding condition at the time aggregate base is laid and compacted.
6. Asphalt concrete pavement and aggregate base materials should conform to Section 02510, Parts 2 and 3 of the Standard Specifications for Construction of Public Works (Greenbook), current edition. Portland cement concrete pavement should conform to Subsections 201-1 and 302-6 of the Greenbook and City of San Diego Pavement Design Standards Schedule "J" SDG-113.
7. Concrete curbs separating pavement from landscaped areas extend at least six inches into the subgrade to reduce movement of moisture into the aggregate base layer. This reduces the risk of pavement failures to subsurface water originating from landscaped areas.
8. Concrete should be cured with a suitable curing compound or be kept continuously moist for a period of at least seven days in general accordance with Greenbook or ACI guidelines.
9. Traffic should be kept off newly placed concrete for at least seven days or until its flexural strength exceeds 600 pounds per square inch.

5.9.3 Crushed Miscellaneous Base

Crushed Miscellaneous Base may be used as a direct substitute for Caltrans Class II base, provided that it conforms to the Standard Specifications for Public Works Construction (200-2.4). Crushed miscellaneous base shall consist of broken and crushed asphalt concrete or Portland cement concrete and may contain crushed aggregate base or other rock. The material shall be free of any detrimental quantity of deleterious material. Material retained on the 4.75mm (No. 4) sieve shall contain no more than 15 percent gravel particles. Minimum required R-value for crushed miscellaneous base is 80.

5.10 PRELIMINARY AGGRESIVITY SOIL SCREENING

A preliminary aggressivity soil screening of the onsite materials was completed to evaluate their potential effect on concrete and ferrous metals. Bulk samples of near surface soils were tested to evaluate the potential effect on concrete and ferrous metals. The aggressivity potential was evaluated using the results of laboratory testing on the soil samples obtained during our subsurface evaluation near the anticipated depths for proposed improvements. The preliminary aggressivity screening laboratory test results for pH, minimum electrical resistivity, and soluble chloride and sulfate content are provided below in Table 4.

Table 4
Preliminary Soil Aggressivity Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Water Soluble Sulfates (%)	Water Soluble Chlorides (%)	Soil Type
B-1	0.5 to 4	1,500	7.6	0.028	0.007	Clayey SAND
B-4	0.5 to 4.5	2,400	7.6	0.010	0.005	Clayey SAND

Concrete in contact with soil or water that contains high concentrations of soluble sulfates can be subject to chemical deterioration. According to the Portland Cement Association (PCA, 1988), the potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight (0 to 1,000 ppm), and moderate for water-soluble sulfate contents ranging from 0.10 to 0.20 percent by weight (1,000 to 2,000 ppm). The potential for sulfate attack is severe for water-soluble sulfate contents ranging from 0.20 to 2.00

percent by weight (2,000 to 20,000 ppm) and very severe for water-soluble sulfate contents over 2.00 percent by weight (greater than 20,000 ppm).

Laboratory testing indicated sulfate content of for the samples tested between 0.010 (96 ppm) to 0.028 percent (280 ppm), which are considered negligible for sulfate attack by the PCA standards. Based on the laboratory test results and considering the natural potential for variability of soil, Type II or IV cement may be used for concrete in contact with soil.

For reference, Caltrans (2003) considers a site to be aggressive if one or more of the following conditions exist for the representative soil samples taken at the site: chloride concentration is 500 parts per million (ppm) or greater, sulfate concentration is 2,000 ppm or greater, or the pH is 5.5 or less. According to the Portland Cement Association, the potential for sulfate attack is negligible. The Portland Cement Association (1988), correlates sulfate content to potential sulfate attack as presented on the table below:

<u>Sulfate Content, ppm</u>	<u>Sulfate Attack Potential</u>
0 to 1,000	Negligible
1,000 to 2,000	Moderate
2,000 to 20,000	Severe
Over 20,000	Very Severe

The minimum resistivity tests performed indicated that the soil is considered to be moderately corrosive to corrosive buried unprotected metal objects. A commonly accepted correlation between soil resistivity and corrosivity towards unprotected ferrous metals (National Association of Corrosion Engineers (NACE), 1984) is provided below:

<u>Minimum Resistivity, ohm-cm</u>	<u>Corrosion Potential</u>
0 to 1,000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
Over 10,000	Mildly Corrosive

Based on the low value 1,500 ohm-cm and the NACE criteria, the soils are considered corrosive. The preliminary corrosion tests are only an indicator of potential soil aggressivity for

the sample tested. We recommend that the aggressivity test results be reviewed and evaluated by the project designers considering the proposed improvements and project lifespan requirements. Kleinfelder does not practice corrosion engineering and the purpose of our tests is only to provide a preliminary screening. Additional sampling and testing may be performed after completion of grading for the proposed site improvements. A qualified corrosion engineer can be contacted to for detailed evaluation of corrosion potential with respect to construction materials at this site and review the proposed design.

5.11 SITE DRAINAGE AND EROSION CONTROL

Final elevations at the site should be planned so that positive drainage is established around structures. Positive drainage is defined as a slope of 2 percent or more for a distance of 5 feet or more away from structure foundations. Roof gutters and downspouts should be installed on structures. Downspouts should discharge to controlled drainage systems and drainage gradients should be maintained to carry all surface water off the site. Ponding should not occur on the site.

Planters should be built so that water exiting from them will not seep into the foundation areas or beneath slabs and pavement. In any event, the maintenance personnel should be instructed to limit irrigation to the minimum actually necessary to properly sustain the landscaping plants. Should excessive irrigation, waterline breaks, or unusually high rainfall occur, saturated zones and perched groundwater may develop. Consequently, the site should be graded so that water drains away readily without saturating the foundation or landscaped areas. Potential sources of water, such as water pipes, drains, garden ponds, and the like, should be frequently examined for signs of leakage or damage. Any such leakage or damage should be repaired promptly.

5.12 STORMWATER INFILTRATION STUDY

We have evaluated stormwater infiltration at the site in conformance with the 2016 BMP Design Manual. For the purpose of this report, infiltration is defined as the flow of water through the ground surface and percolation is defined as the downward flow of water through the subsurface soil layers. Infiltration may be controlled primarily by factors such as the type and porosity of the surface filtering media, maintenance of these media, surface slope, surface vegetation, and intensity, duration, and type of precipitation. Percolation may be controlled

primarily by the soil types and properties such as grain size and density, soil layering, porosity, hydraulic head, and the proximity to the groundwater. Surface drainage and maintenance will largely determine the site's infiltration rate and the amount of water that will infiltrate for any given storm. The percolation rate will depend locally on the soil layering and will be controlled by the finer grained soil layers.

Borehole percolation testing was the selected method for field infiltration testing at the site. Two percolation tests were performed at two different locations. The percolation tests were performed in general accordance with those set forth in California Test 750, "Method for Determining the Percolation Rate of Soils Using a 6-Inch-Diameter-Test Hole". The tests were performed in drilled holes advanced to depth of 5 feet below existing site grades. The measured percolation rates have been converted to an adjusted short term infiltration rate based on borehole geometry using the Porchet Method (Ritzema, 1994) and are presented in Table 5. These values are converted to long term design infiltration rates later in this report by using correction factors based on Worksheet D.5-1 of the BMP Design Manual.

Table 5
Summary of Adjusted Infiltration Rates

Boring	Tested Depth from Ground Surface (feet)	Adjusted Short Term Infiltration Rate (inch/hour)	Soil Description
PERC-1	0-5	0.49	Clayey Sand
PERC-2	0-5	0.38	Clayey Sand

Note that relatively clean water was used to perform the tests above. However, surface runoff water from the site would likely contain silt, clay, oil and/or other materials that would eventually decrease the percolation rates. The provided field percolation rates in Table 5 do not include reduction factors for long term performance. These values are converted to long term design infiltration rates later in this report by using correction factors based on Worksheet D.5-1 of the BMP Design Manual.

Based on visual soil classifications and laboratory testing of the two soil samples collected during our field exploration at the percolation test locations, subsurface materials mostly consist of clayey sand within the depths of the test. Testing performed consisted of sieve analyses. The

results are presented on the boring logs and lab results in Appendix A and Appendix B, respectively.

5.12.1 Mitigation Measures

The following bullets present typical considerations (geotechnical and other) for implementation of infiltration systems, along with site specific conditions in *italics*.

- Presence of fill soils below building footprint. The site is underlain by up to about 20 feet with about 8 feet below the proposed lower level slab on grade. Water can induce settlement of fill and reduction in bearing pressure below building foundations which can adversely impact the building.
- Presence of shallow rock. The northern portion of the site has granitic rock approximately 7 feet from the surface. Water from overlying BMPs would likely percolate on the less permeable rock and move laterally to the south into the fill under the building footprint.
- Building sites located adjacent to or within landslide hazard areas or hillside grading areas. This sites are not located near landslide hazard areas.
- Sites with initial seasonal high groundwater elevation within 10 feet of the invert of a proposed basin. The sites are not within 10 feet of high groundwater table.
- Site soils with a moderate or high potential for liquefaction. The sites have a low potential for liquefaction.
- Site soils with a moderate or high expansion potential. The majority of observed soils within the infiltration test areas appear to have low expansion potential.
- Sloping sites. The proposed BMP basin sites are generally in flat and/or near gently sloping areas.
- Sites with soil and/or groundwater contamination. According to the California State Water Resources Control Board Geo Tracker Database, the closest site cleanup is located over 1.2 miles to the north at 105 E Via Rancho Parkway, Escondido.

5.12.2 Data Evaluation

The results of the field testing program provide a design infiltration rate based on correction factors contained within Tables D.5-1 and D.5-2 of the 2016 BMP Design Manual, as summarized below.

Table 6
Suitability Assessment Related Considerations for Infiltration Facility Safety Factors*

Consideration	High Concern (3 Points)	Medium Concern (2 Points)	Low Concern (1 Point)
Assessment methods (see explanation below)	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates Use of well permeameter or borehole methods without accompanying continuous boring log Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log Direct measurement infiltration area with localized infiltration measurement methods (e.g., infiltrometer) Moderate spatial resolution	Direct measurement with localized (double-ring infiltrometer & borehole) infiltration testing methods at relatively high resolution or Use of extensive test pit infiltration measurement methods (Extensive refers to large excavation, filling with water and monitoring drawdown – ideally 30 to 100 square feet)

Table 6 (continued)
Suitability Assessment Related Considerations for Infiltration Facility Safety Factors*

Consideration	High Concern (3 Points)	Medium Concern (2 Points)	Low Concern (1 Point)
Texture Class	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils
Site soil variability	Highly variable soils indicated from site assessment, or unknown variability	Soil borings/test pits indicate moderately homogeneous soils	Soil borings/test pits indicate relatively homogeneous soils
Depth to groundwater/impervious layer	<5 ft below facility bottom	5-15 ft below facility bottom	>15 below facility bottom

*As presented in Table D.5-1 in Appendix D on page D-13 of BMP Design Manual

Table 7
Design Related Considerations for Infiltration Facility Safety Factors*

Consideration	High Concern (3 Points)	Medium Concern (2 Points)	Low Concern (1 Point)
Level of pretreatment/ expected influent sediment loads	Limited pretreatment using gross solids removal devices only, such as hydrodynamic separators, racks and screens AND tributary area includes landscaped areas, steep slopes, high traffic areas, or any other areas expected to produce high sediment, trash, or debris loads.	Good pretreatment with BMPs that mitigate coarse sediments such as vegetated swales AND influent sediment loads from the tributary area are expected to be moderate (e.g., low traffic, mild slopes, stabilized pervious areas, etc.).	Excellent pretreatment with BMPs that mitigate fine sediments such as bioretention or media filtration OR sedimentation or facility only treats runoff from relatively clean surfaces, such as rooftops/non-sanded road surfaces.
Redundancy / resiliency	No "backup" system is provided; the system design does not allow infiltration rates to be restored relatively easily with maintenance.	The system has a backup pathway for treated water to discharge if clogging occurs <u>or</u> infiltration rates can be restored via maintenance.	The system has a backup pathway for treated water to discharge if clogging occurs <u>and</u> infiltration rates can be relatively easily restored via maintenance.
Compaction during construction	Construction of facility on a compacted site or increased probability of unintended/ indirect compaction.	Medium probability of unintended/ indirect compaction.	Equipment traffic is effectively restricted from infiltration areas during construction and there is low probability of unintended/ indirect compaction.

*As presented in Table D.5-2 in Appendix D on page D-14 of BMP Design Manual

5.12.3 Design Infiltration Rates

Based on our evaluation of the percolation test data discussed in a preceding section of this report, the soils encountered exhibit infiltration rates for *short-term, non-factored infiltration rates between 0.38 and 0.49 inch/hour*. The long term design infiltration rate was calculated by using the following correction factors based on Worksheet D.5-1 of the BMP Design Manual. The completed worksheets are presented in Appendix C. Design infiltration rates have been estimated for PERC-1 through PERC-2 and the values are presented in Table 8.

Table 8
Design Infiltration Rates*

Boring	Safety Factor	Long Term Design Infiltration Rate (Inch/hour)
PERC-1	2.6	0.19
PERC-2	2.6	0.14

*Worksheet D.5-1 of each borehole is presented in Appendix C

5.12.4 Recommendations and Conclusions

Based on the testing performed and the correction factors presented above, we recommend a combined safety factors of 2.6 for long term design for locations PERC-1 and PERC-2. However, for BMPs feasibility screening purposes, a factor of safety of 2 was used to complete the Geotechnical and Groundwater Investigation Requirement worksheet C.4-1 contained in the BMP Design Manual

Based on the design infiltration rates and the completed Geotechnical and Groundwater Investigation Requirement worksheet C.4-1 contained in the BMP Design Manual, we classify the site as a feasibility screening category of “No Infiltration”. The completed C.4-1 worksheets for each BMP location proposed at the site are included in Appendix C of this report.

Based on the field percolation testing, geotechnical observations, laboratory data, site constraints and completion of the BMP Manual Worksheets, it is our opinion that the project site is categorized as not suitable for infiltration. We recommend that basins and swales be underlain by an impermeable membrane. The various reasons for this are discussed below.

The proposed building and perimeter access road will occupy the vast majority of the site area, with the new building located adjacent to existing buildings which are supported on shallow foundations, descending slopes and retaining walls. The site is underlain by shallow compacted fill soils over very dense and variably weathered granitic rock. The underlying rock has very low porosity (very low void ratio) and therefore lower permeability characteristics than the fill. The overlying fill has the potential to settle with an increase in moisture content due to infiltration and could have a reduction in bearing pressure below the building foundations and floor slab

when wetted. Settlement or reduction of bearing below the proposed 5-story building or existing buildings is not acceptable. Infiltrated water could also have an adverse impact on retaining walls for the subterranean level and access ramp by increasing lateral pressures. Infiltrated water could also have an adverse impact on stability of nearby descending slopes. This is a particular hazard at this site since there are numerous utility trenches surrounding the building and in proximity to the proposed BMPs, and infiltrated water can travel laterally through the more permeable utility trench backfill or along the fill and rock interface.

5.13 ADDITIONAL STUDIES

The review of plans and specifications, and the observation and testing by Kleinfelder of earthwork related construction activities, are an integral part of the conclusions and recommendations made in this report. If Kleinfelder is not retained for these services, the client will be assuming our responsibility for any potential claims that may arise during or after construction. The required tests, observations, and consultation by Kleinfelder during construction include, but are not limited to:

- A review of plans and specifications;
- Observation of site clearing;
- Construction observation and density testing of fill material placement, trench backfill, subgrade preparation, and aggregate base for pavements;
- Observation during the installation of temporary construction shoring; and
- Observation of foundation excavations and foundation construction.

6 LIMITATIONS

This report has been prepared for the exclusive use of Casa de las Campanas, LCS Development and their consultants for specific application to the subject project. The findings, conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering practice. No warranty, express or implied, is made.

The scope of services was limited to the field exploration program described in this report. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on our field exploration, laboratory testing programs, and engineering analyses.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues addressed in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil or groundwater conditions could vary between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, or locations of the improvements, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid

until the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

Our geotechnical scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site. Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of this report and the nature of the new project, Kleinfelder may require that additional work be performed and that an updated report be issued.

Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party and the client agrees to defend, indemnify, and hold harmless Kleinfelder from any claims or liability associated with such unauthorized use or non-compliance.

7 REFERENCES

Aerial Photographs, AXN-14M-80/81 (May 2, 1953).

American Concrete Institute, 1991a, Guidelines for Concrete Floor and Slab Construction (ACI 302.1R).

American Concrete Institute, 1991b, Guidelines for Residential Cast-in-Place Concrete Construction (ACI 332R).

ASCE/SEI 7-10 (2010), "Minimum Design Loads for Buildings and Other Structures," Published by the American Society of Civil Engineers.

Boore, D.M., Joyner, W.B., and Fumal, T.E. (1997), "Equations for Estimating Horizontal Response Spectra and Peak Acceleration from Western North American Earthquakes," Seismological Research Letters, Vol. 68, No. 1, January-February.

California Building Code (CBC), 2016, "California Code of Regulations," California Building Standards Commission.

California Department of Transportation (Caltrans) (2003), Corrosion Guidelines, Version 1.0, available at <http://www.dot.ca.gov/hq/esc/ttsb/corrosion/Index.htm>

California Division of Mines and Geology (CDMG), 1975, Geology of the San Diego Metropolitan Area, California, Del Mar, La Jolla, Point Loma, La Mesa, Poway, and SW1/4 Escondido 7½ minute quadrangles, Bulletin 200, Scale 1:24,000.

California Division of Mines and Geology (CDMG), 1999, Fault-Rupture Hazard Zones in California, Special Publication 42.

California Division of Mines and Geology (CDMG), 1991, Special Studies Zones, La Jolla Quadrangle.

California Division of Mines and Geology (CDMG), 1980, Special Studies Zones, Pala Quadrangle.

California Geologic Survey (CGS), 2002, California Geomorphic Provinces, Note 36, 4p.

California Geological Survey (CGS), 2004 Division of Mines and Geology, "Recommended Criteria for Delineating Seismic Hazard Zones in California", California Geological Survey Special Publication 118, 12p.

California Geological Survey (CGS), 2005, Geologic Map of the Oceanside 30'x 60' Quadrangle, California.

Caltrans (1990a), "Trenching and Shoring Manual."

Campbell, K.W. and Bozorgnia, Y. (2003), "Updated Near-Source Ground Motion (Attenuation) Relations for the Horizontal and Vertical Components of Peak Ground Acceleration Response Spectra," Bulletin of the Seismological Society of America, Vol. 93, No. 1, pp. 314-331.

Cao, T., M.D. Petersen, and M.S. Reichle (1996), "Seismic Hazard Estimate from Background Seismicity in Southern California," Bulletin of the Seismological Society of America, Vol. 86, 1372-1381.

Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Wills, C.J. (2003), "The Revised 2002 California Probabilistic Seismic Hazards Maps," California Geological Survey, June 2003.

Cornell, C.A. (1968), "Engineering Seismic Risk Analysis," Bulletin of the Seismological Society of America, Vol. 58, No. 5.

Cotton, Shires & Associates, Inc. (June 2003), "Geotechnical Investigation for Proposed Special Care Nursing Facility, Casa de las Campanas, San Diego, California".

FEMA, National Flood Insurance Program, available online at <http://hazards.fema.gov/mapviewer/>.

Frankel, A.D., Mueller, C.S., Barnhard, T., Perkins, D.M., Leyendecker, E.V., Dickman, N., Hanson, S., and Hopper, M. (1996), "National Seismic Hazard Maps," USGS Open File Report 96-532, Denver CO, June 1996 Documentation.

Frankel, A.D., Petersen, M.D., Mueller, C.S., Haller, K.M., Wheeler, R.L., Leyendecker, E.V., Wesson, R.L., Harmsen, S.C., Cramer, C.H., Perkins, D.M., and Rukstales,

K.S. (2002), "Documentation for the 2002 Update of the National Seismic Hazard Maps," USGS Open File Report 02-420, Denver, Co.

The "Greenbook", Standard Specifications for Public Works Constructions, 2015 edition.

H.L. Land Development (July 21, 1986), "Rough Grading Report, Casa de las Campanas"

Hileman, J.A., Allen, C.R., and Nordquist, J.M. (1973), "Seismicity of Southern California Region, 1 January 1882 to 31 December 1972," California Institute of Technology, Seismological Laboratory Contribution 2385.

Jennings, C.W. and Bryant, W.A., 2010, Fault Activity Map of California, California Geological Survey, Scale 1 750,000, California Geologic Data Map No. 6.

Kanamori, H. (1977), "The Energy Release in Great Earthquakes," Journal of Geophysical Research, Vol. 82, pp. 2981-2987.

McGuire, R. (2004), "Seismic Hazard and Risk Analysis," Earthquake Engineering Research Institute, Second Monograph Series MNO-10.

- Merz, H.L. and Cornell, C.A. (1973), "Seismic Risk Analysis Based on a Quadratic Magnitude-Frequency Law," Bulletin of the Seismological Society of America, Vol. 63, No. 6.
- NAVFAC (Naval Facilities Engineering Command) (1986) Design Manual 7.02, Foundations and Earth Structures.
- Norris, R.M. and Webb R.W., 1990, Geology of California, Second Edition, John Wiley and Sons, Inc., pp. 169-190.
- Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P. (1996), "Probabilistic Seismic Hazard Assessment for the State of California," Division of Mines and Geology Open File Report 96-08.
- Real, C.R., Topozada, T.R., and Parke, D.L. (1978), "Earthquake Catalog of California, January 1, 1900 to December 31, 1974," First Edition, California Division of Mines and Geology, Special Publication 52.
- Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R. (1997), "Attenuation Relations for Shallow Crustal Earthquakes Based on California Strong Motion Data," Seismological Research Letters, Vol. 68, No. 1, January/February, pp. 180-189.
- Schwartz, D.P. and Coppersmith, K.J. (1984), "Fault Behavior and Characteristic Earthquakes: Examples from the Wasatch and San Andreas Fault Zones," Journal of Geophysical Research, Vol. 89, 5681-5698.
- Seeburger, D.A., and Bolt, B.A. (1976), "Earthquakes in California, 1769-1927," Seismicity Listing Prepared for National Oceanic and Atmospheric Administration, University of California, Berkeley.
- Tokimatsu, K. and H.B. Seed, 1987, Evaluation of Settlements in Sands Due to Earthquake Shaking: Journal of Geotechnical Engineering, Volume 113, No. 8, pp. 861-878.

- Toppozada, T.R., Parke, D.L., and Higgins, C.T. (1978), "Seismicity of California, 1900-1931," California Division of Mines and Geology Special Report 135.
- Toppozada, T.R., Real, C.R., and Parke, D.L. (1981), "Preparation of Isoseismal Maps and Summaries of Reported Effects for Pre-1900 California Earthquakes," California Division of Mines and Geology Open File Report 81-11 SAC.
- Toppozada, T.R., Branum, D., Petersen, M., Hallstrom, C., Cramer, C., and Reichle, M. (2000), "Epicenters of and Areas Damaged by $M \geq 5$ California Earthquakes, 1800-1999," Map Sheet 49, California Department of Conservation, Division of Mines and Geology.
- United States Department of Agriculture, 1953, Aerial Photographs, AXN-14M-80/81 (May 2, 1953), scale approximately 1:20,000.
- Weichert, D.H. (1980), "Estimation of Earthquake Recurrence Parameters for Unusual Observation Periods for Different Magnitudes," Bulletin of the Seismological Society of America, Vol. 70, 1337-1356.
- Wesnousky, S.G. (1994), "The Gutenberg-Richter or Characteristic Earthquake Distribution, Which Is It?," Bulletin of the Seismological Society of America, Vol. 84, pp. 1940-1959.
- Woodward-Clyde Consultants (June 21, 1984), "Geotechnical Investigation, Casa de las Campanas, Rancho Bernardo Area, San Diego, California", Project No. 531791-SI01.
- Working Group on California Earthquake Probabilities (1995), "Seismic Hazards in Southern California: Probable Earthquakes, 1994 to 2024," Bulletin of the Seismological Society of America, Vol. 85, pp. 379-439.

FIGURES



0 2,000 4,000 Feet

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P,



PROJECT NO. 20173187
DRAWN: 2/1/2017
DRAWN BY: JP
CHECKED BY: ST
FILE NAME: 20173187_vic.MXD

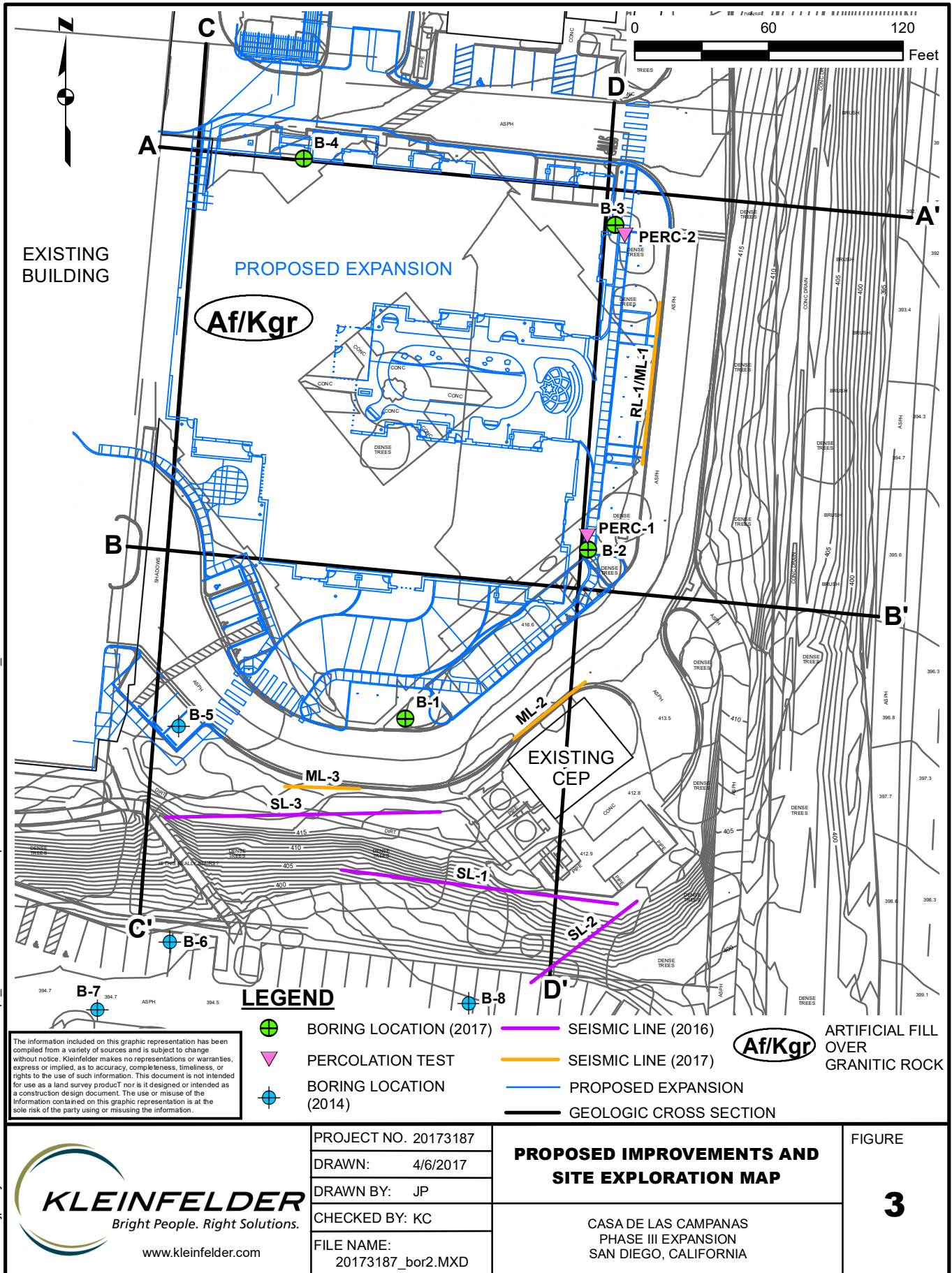
SITE LOCATION MAP

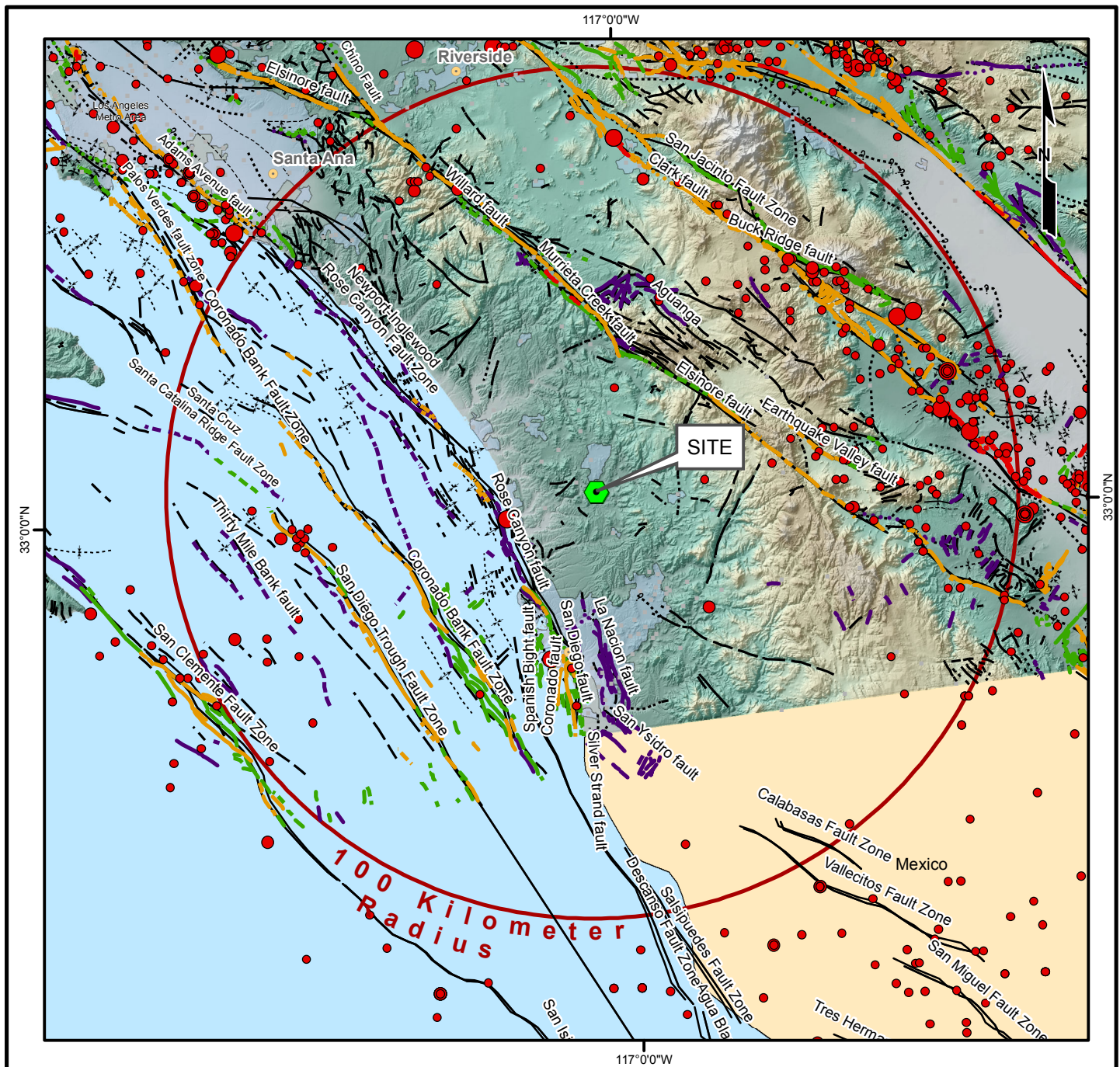
CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA

FIGURE

1







Quaternary Faults (Bryant, 2005; USGS, 2009)

Historic displacement (< 200 years)

- Mapped Fault Location
- - - Dashed were Approximated
- Concealed

Holocene displacement (< 11,000 years)

- Mapped Fault Location
- - - Dashed were Approximated
- Concealed

Late Quaternary displacement (< 750,000 years)

- Mapped Fault Location
- - - Dashed were Approximated
- Concealed

Quaternary displacement (< 1,600,000 years)

- Mapped Fault Location
- - - Dashed were Approximated
- Concealed

Faulting Legend

Pre-Quaternary Geologic Structures (CGS, 2000)

- fault, approx. located
- ?— fault, approx. located, queried
- fault, certain
- fault, concealed
- ?..... fault, concealed, queried
- ?— fault, inferred, queried

ANSS Earthquakes

Magnitude

- 4.0 - 4.9
- 5.0 - 5.9
- 6.0 - 6.9
- 7.0 - 7.9
- 8.0 - 8.9



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfielder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product, nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.



PROJECT NO. 20162077
 DRAWN: 3/29/2017
 DRAWN BY: JP
 CHECKED BY: KC
 FILE NAME:
 20173187_EQ.MXD

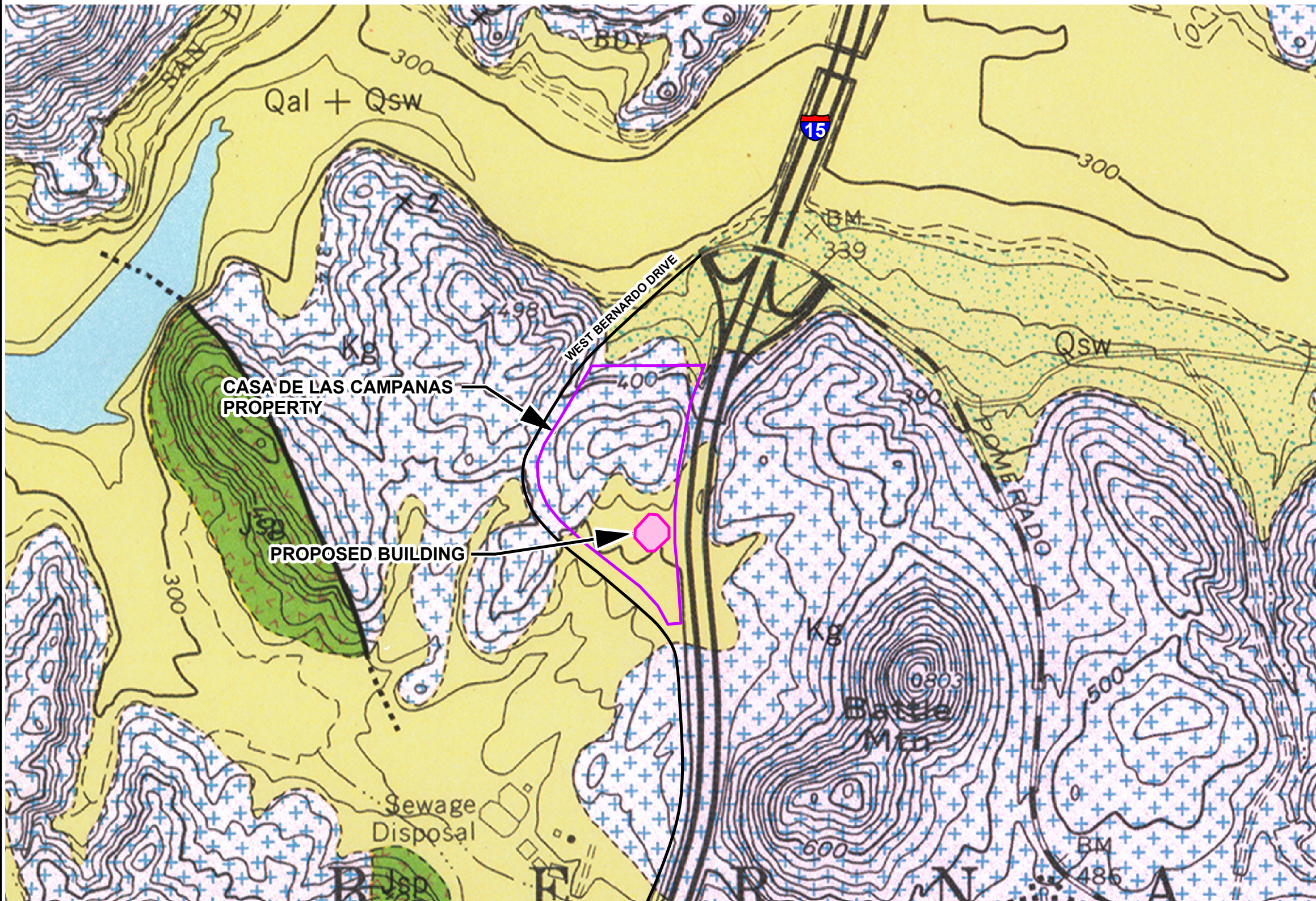
REGIONAL FAULT MAP AND EARTHQUAKE EPICENTERS (1800 - JUNE 2016)

CASA DE LAS CAMPANAS
 PHASE III EXPANSION
 SAN DIEGO, CALIFORNIA

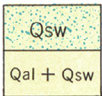
FIGURE

4

J:\clients\CasaDeLasCampanas\20173187\mxd\20173187_geo1.mxd



LEGEND



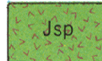
Alluvium and Slopewash

Qsw, Slopewash; Qal & Qsw, Alluvium and Slopewash undifferentiated.



Granite rocks

Undifferentiated granitic rocks of the southern California batholith.



Santiago Peak Volcanics

SYMBOLS

Contact

(dashed where approximately located; dotted where concealed)



Fault, showing dip

(dashed where approximately located; dotted where concealed; U, upthrown side; D, downthrown side).



NOT TO SCALE

SOURCE:

GEOLOGY OF THE SOUTHWEST QUARTER OF THE ESCONDIDO QUADRANGLE, SAN DIEGO COUNTY, CALIFORNIA 1975, BY M. KENNEDY

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.



PROJECT NO.	20173187
DRAWN:	3/29/2017
DRAWN BY:	JP
CHECKED BY:	KC
FILE NAME:	20173187_geo1.MXD

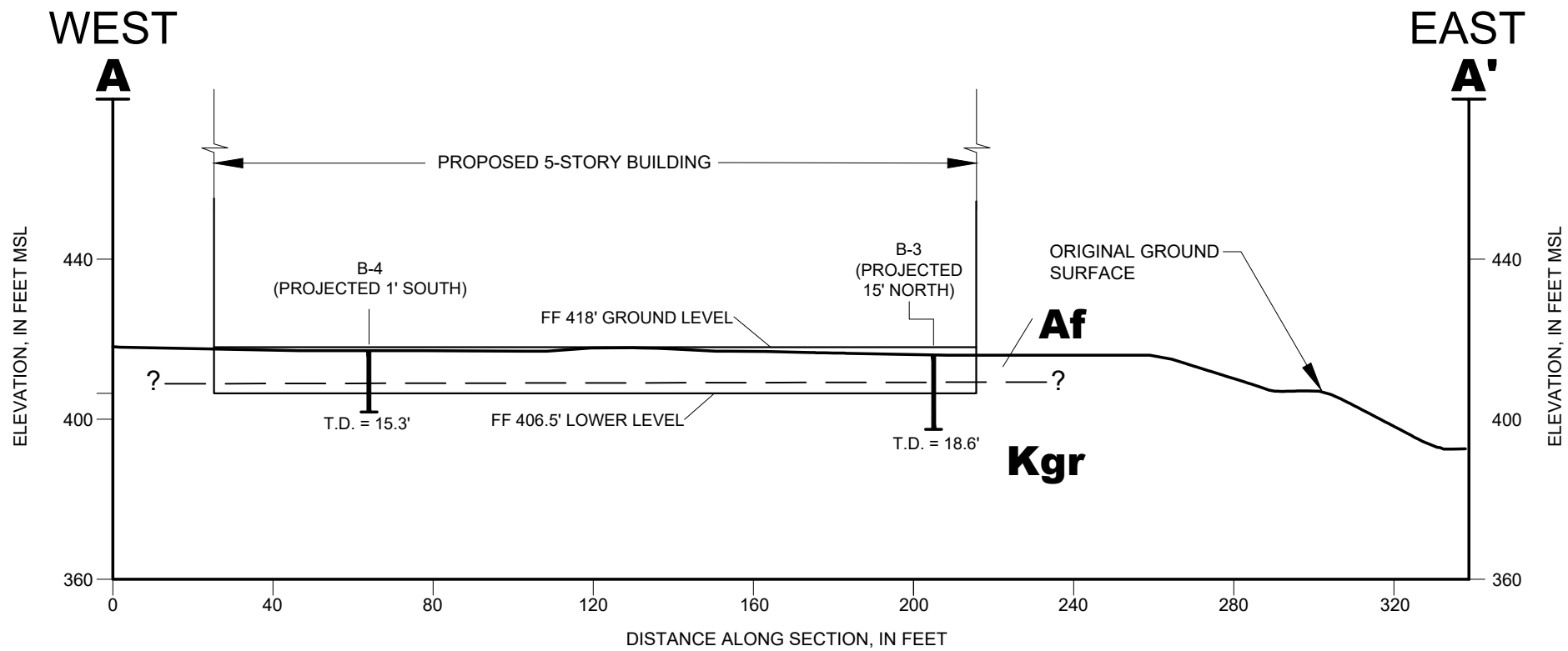
REGIONAL GEOLOGIC MAP

CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA

FIGURE

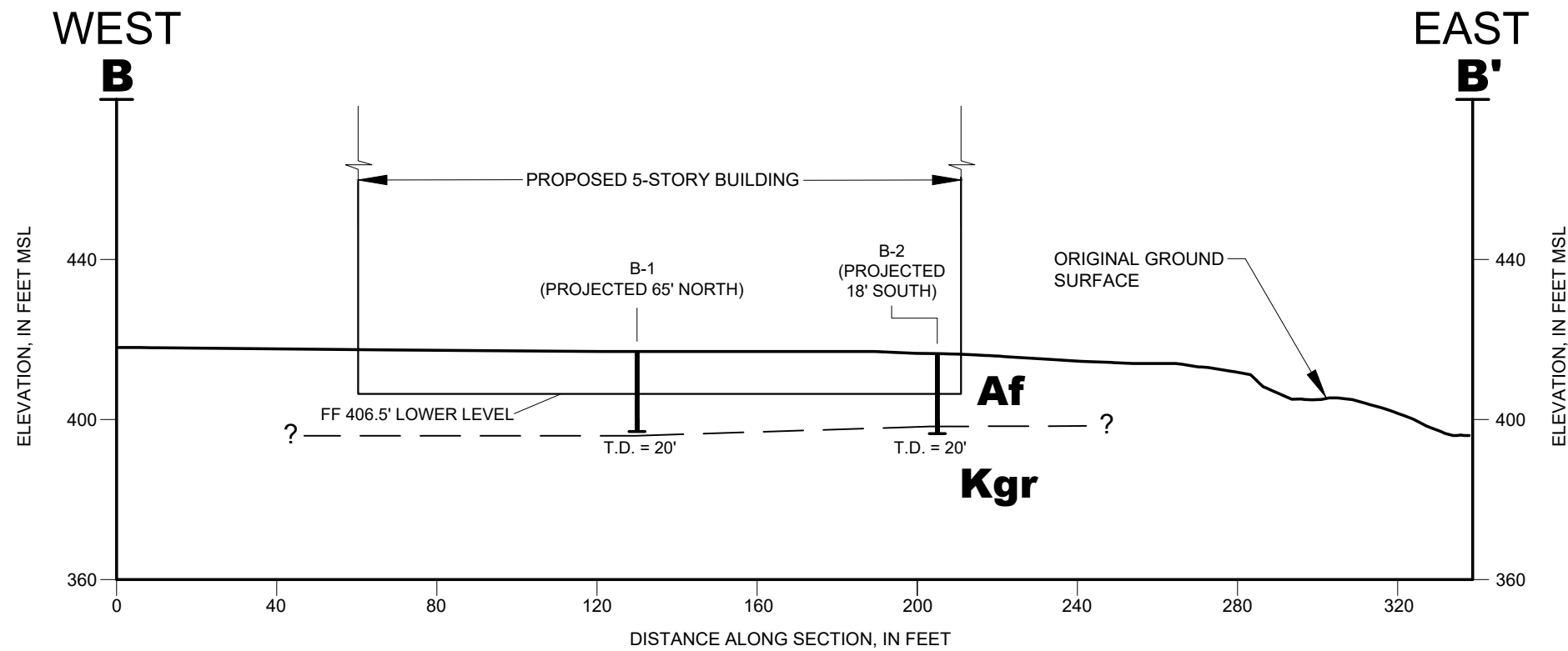
5

ATTACHED IMAGES: XRef: Aerial Survey - SNF
ATTACHED XREFS: XRef: Aerial Survey - SNF
CAD FILE: C:\Users\jpatay\OneDrive - Kleinfelder\Desktop\clients\CasaDeLasCampanas\20173187\mxd\PROJECT\2017_04_06.dwg
JPatay 4/6/2017, 6:12pm, JPatay



LEGEND

- Af** ARTIFICIAL FILL
- Kgr** GRANITIC ROCK (VARIABLY WEATHERED)
- ? APPROXIMATE LOCATION OF GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

40 20 0 40

APPROXIMATE HORIZONTAL AND VERTICAL SCALE (feet)



PROJECT NO.	20173187
DRAWN:	4/6/2017
DRAWN BY:	JP
CHECKED BY:	KC
FILE NAME:	20173187_Sect.dwg

GEOLOGIC CROSS SECTIONS A-A' AND B-B'

CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA

FIGURE

6

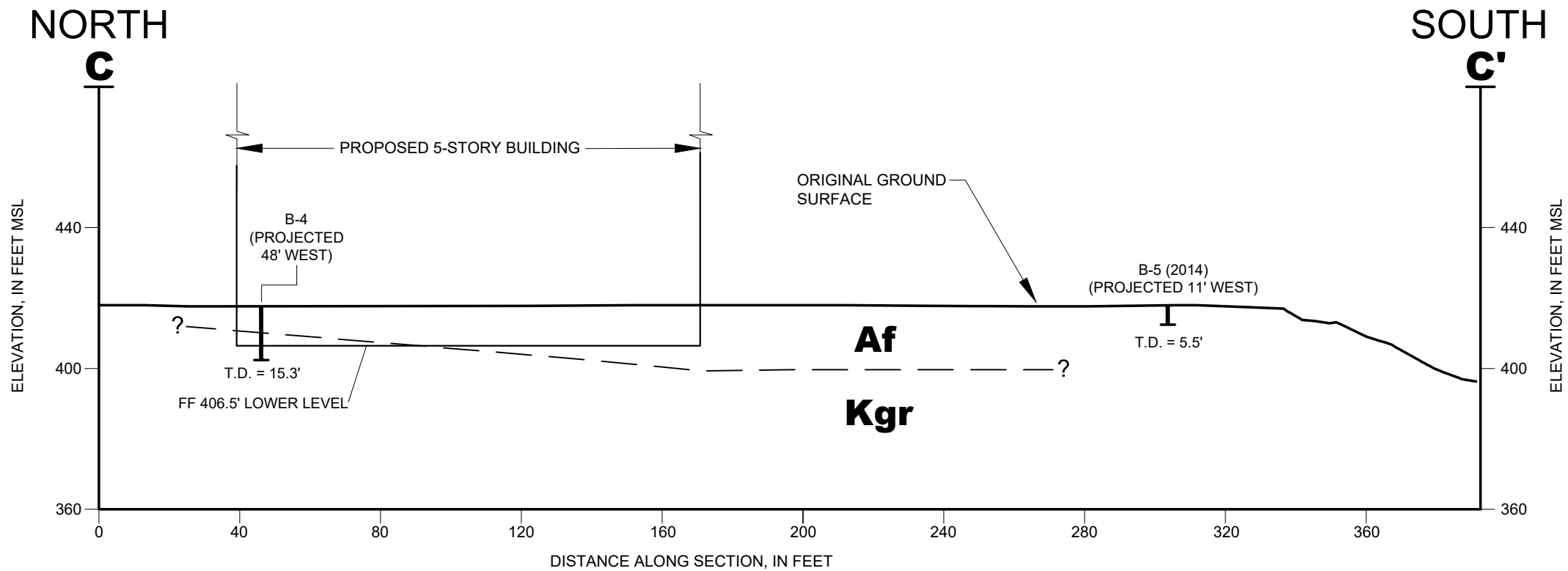
ATTACHED IMAGES:

ATTACHED XREFS: XRef: Aerial Survey - SNF

CAD FILE: J:_clients\CasaDeLasCampanas\20173187\msd\

LAYOUT: Layout 2

PLOTTED: 04 Apr 2017, 4:31pm, JPatay



LEGEND

Af

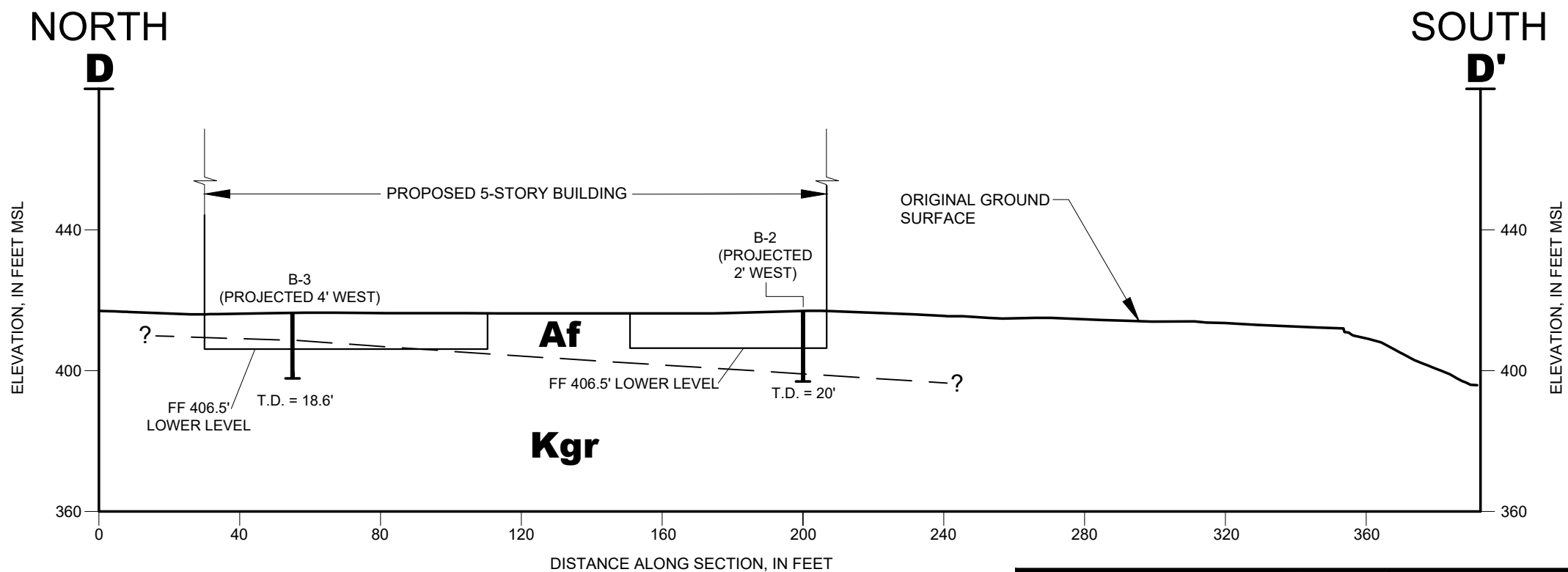
ARTIFICIAL FILL

Kgr

GRANITIC ROCK (VARIABLY WEATHERED)

?

APPROXIMATE LOCATION OF GEOLOGIC CONTACT, QUERIED WHERE UNCERTAIN



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

40 20 0 40

APPROXIMATE HORIZONTAL AND VERTICAL SCALE (feet)



PROJECT NO.	20173187
DRAWN:	4/4/2017
DRAWN BY:	JP
CHECKED BY:	KC
FILE NAME:	20173187_Sect.dwg

GEOLOGIC CROSS SECTIONS C-C' AND D-D'

CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA

FIGURE

7

APPENDIX A
Field Exploration and Boring Logs

APPENDIX A

FIELD EXPLORATION AND BORING LOGS

Prior to our subsurface exploration, Kleinfelder notified Underground Services Alert (USA) to clear proposed boring locations of conflicts with utilities. In addition, Kleinfelder subcontracted a private utility locating company (Cable, Pipe and Leak Detection, Inc.) to sweep the proposed boring locations for underground utilities at the site.

Our field investigation consisted of advancing six hollow-stem auger borings (B-1 to B-4 and Perc-1 to Perc-2). The approximate locations of the borings are shown on Figures 2 and 3. The hollow-stem borings were drilled to depths of 5 to 20 feet. Pacific Drilling Company of San Diego, California utilized a limited access Mole drill rig equipped with 6-inch-diameter hollow-stem augers. The borings were drilled on January 27, 2017.

Relatively undisturbed soil samples were obtained at the test boring locations using a California penetration sampler driven a total of 18-inches (or until practical refusal), into the undisturbed soil at the bottom of the boring. The soil sampled by the California sampler (3-inch) O.D., 2.4-inches I.D. was retained in a 6-inch long brass tube for laboratory testing. The sampler and associated rods (threaded) were driven into the ground with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are presented as field values. Note that these blow counts have not been adjusted for the effects of overburden pressure, input driving energy, rod length, sampler correction, or boring diameter correction. Bulk samples of selected earth materials were also obtained from the exploratory excavations. These samples were bagged, sealed, and transported to the laboratory for testing.

An engineer from our office coordinated the field operations and logged the borings. A Unified Soil Classification System (USCS) chart and a Boring Log Legend are presented as Figures A-1 and A-2, respectively. The logs of borings are also included in Appendix A as Figures A-3 through A-8. The Logs of Borings describe the earth materials encountered, samples obtained, and show field and laboratory tests performed. The logs also show the approximate elevation,

boring number, drilling date, and the names of the logger and drilling subcontractor. The boundaries shown between soil types on the logs are approximate as the transition between different soil layers may be gradual. Therefore, variations in the subsurface profile should be anticipated throughout the site.

Upon completion, borings performed in landscape areas were backfilled with soil cuttings.

SAMPLER AND DRILLING METHOD GRAPHICS

	BULK / GRAB / BAG SAMPLE
	MODIFIED CALIFORNIA SAMPLER (2 or 2-1/2 in. (50.8 or 63.5 mm.) outer diameter)
	CALIFORNIA SAMPLER (3 in. (76.2 mm.) outer diameter)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)
	HQ CORE SAMPLE (2.500 in. (63.5 mm.) core diameter)
	SHELBY TUBE SAMPLER
	HOLLOW STEM AUGER
	SOLID STEM AUGER
	WASH BORING
	SONIC CONTINUOUS SAMPLER

GROUND WATER GRAPHICS

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, i.e., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS

WOH - Weight of Hammer
WOR - Weight of Rod

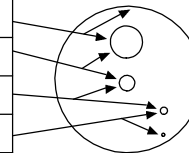
UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

GRAVELS (More than half of coarse fraction is larger than the #200 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		Cu < 4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	GRAVELS WITH 5% TO 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
COARSE GRAINED SOILS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		Cu < 6 and/or 1 > Cc > 3		SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
	SANDS WITH 5% TO 12% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		Cu < 6 and/or 1 > Cc > 3		SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
	SANDS WITH > 12% FINES			SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	SILTS AND CLAYS (Liquid Limit greater than 50)			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

 KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20173187	GRAPHICS KEY Casa de las Campanas Phase III Expansion San Diego, California	FIGURE A-1
	DRAWN BY: ST CHECKED BY: SHR DATE: 1/31/2017 REVISED: 4/3/2017		

GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller

**SECONDARY CONSTITUENT**

	AMOUNT	
Term of Use	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N ₆₀ (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q _u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP < 0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP < 1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP < 2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP < 4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

FROM TERZAGHI AND PECK, 1948; LAMBE AND WHITMAN, 1969; FHWA, 2002; AND ASTM D2488

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N ₆₀ (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit.
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.



PROJECT NO.: 20173187
 DRAWN BY: ST
 CHECKED BY: SHR
 DATE: 1/31/2017
 REVISED: 4/3/2017

SOIL DESCRIPTION KEY

Casa de las Campanas
 Phase III Expansion
 San Diego, California

FIGURE

A-2

PLOTTED: 04/03/2017 01:19 PM BY: MPalmer
PROJECT NUMBER: 20173187.003A
GINT FILE: KLF_gint_master_2017
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]



Date Begin - End:	1/27/2017	Drilling Company:	Pacific Drilling Company	BORING LOG B-1		
Logged By:	S.Tena	Drill Crew:	Toby & Rory			
Hor.-Vert. Datum:	Not Available	Drilling Equipment:	Mole		Hammer Type - Drop:	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	Drilling Method:	Hollow Stem Auger			
Weather:	Sunny	Auger Diameter:	6 in. O.D.			


Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS							
			Approximate Ground Surface Elevation (ft.): 417.00 Surface Condition: Bare Earth	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks
			Lithologic Description												
415 <															

	PROJECT NO.: 20173187	BORING LOG B-1		FIGURE A-3
	DRAWN BY: ST CHECKED BY: SHR DATE: 1/31/2017 REVISED: 4/3/2017	Casa de las Campanas Phase III Expansion San Diego, California		
PAGE: 1 of 1				

PLOTTED: 04/03/2017 01:19 PM BY: MPalmer

Date Begin - End: 1/27/2017	Drilling Company: Pacific Drilling Company	BORING LOG B-2
Logged By: S.Tena	Drill Crew: Toby & Rory	
Hor.-Vert. Datum: Not Available	Drilling Equipment: Mole	
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger	
Weather: Sunny	Auger Diameter: 6 in. O.D.	
		Hammer Type - Drop: 140 lb. Cathead - 30 in.


Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS								
			Approximate Ground Surface Elevation (ft.): 416.00 Surface Condition: Grass		Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lithologic Description													
415		 TOPSOIL: (6 inches)	S1													DIRECT SHEAR TEST= Peak Cohesion= 41 psf Peak Friction Angle= 37.3° ASTM D1557 Method A= Max. Dry Unit Wt.: 140.3 pcf Opt. Water Content: 6.8%
	5	ARTIFICIAL FILL (af) Clayey SAND (SC): dark grayish brown (10YR 4/2), moist, micaceous														
		brown (10YR 4/3), dense	S2		BC=15 16 19	18"		8.0	125.3							
410																
		Clayey SAND (SC): low plasticity, dark brown (7.5YR 3/2), moist, dense														
	10		S3		BC=8 13 21	16"	SC	13.3	124.4	100	44	30	11			DIRECT SHEAR TEST= Peak Cohesion= 898 psf Peak Friction Angle= 33.6°
405																
	15				BC=11 13 13	NR										
400																
		WEATHERED GRANITE (Kgr) EXCAVATED AS: Silty SAND (SM): dark yellowish brown (10YR 4/4), moist, very dense, micaceous	S4		BC=25 38 50/3"	15"										
20																
395		The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings on January 27, 2017.							<u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion. The exploration location and elevation are approximate and were estimated by Kleinfelder.							
25																
390																

	PROJECT NO.: 20173187	BORING LOG B-2	FIGURE
	DRAWN BY: ST		
	CHECKED BY: SHR	Casa de las Campanas Phase III Expansion San Diego, California	A-4
DATE: 1/31/2017			
REVISED: 4/3/2017			PAGE: 1 of 1

PROJECT NUMBER: 20173187.003A
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

PLOTTED: 04/03/2017 01:19 PM BY: MPalmer

Date Begin - End: 1/27/2017	Drilling Company: Pacific Drilling Company	BORING LOG B-3
Logged By: S.Tena	Drill Crew: Toby & Rory	
Hor.-Vert. Datum: Not Available	Drilling Equipment: Mole	
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger	
Weather: Sunny	Auger Diameter: 6 in. O.D.	
		Hammer Type - Drop: 140 lb. Cathead - 30 in.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS									
			Approximate Ground Surface Elevation (ft.): 416.00 Surface Condition: Grass		Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Lithologic Description														
415			TOPSOIL: (6 inches)		S1							96	22			R-Value= 57	
			ARTIFICIAL FILL (af) Silty Clayey SAND (SC-SM): very dark grayish brown (10YR 3/2), moist, micaceous														
	5		brown (10YR 4/3), medium dense		S2		BC=8 9 9	18"		12.3	120.5						
410																	
			WEATHERED GRANITE (Kgr) EXCAVATED AS: Silty SAND (SM): yellowish red (5YR 4/6), moist, very dense, micaceous														
	10				S3		BC=12 28 50	18"		9.0	124.8						
405																	
	15		gray (5YR 6/1)		S4		BC=50/4"	2"									
400																	
							BC=50/1"	NR									
20			The boring was terminated at approximately 18.5 ft. below ground surface. The boring was backfilled with auger cuttings on January 27, 2017.													<u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion. The exploration location and elevation are approximate and were estimated by Kleinfelder.	
395																	
	25																
390																	


PROJECT NUMBER: 20173187.003A
GINT FILE: Klf_gint_master_2017
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

PLOTTED: 04/03/2017 01:19 PM BY: MPalmer


Date Begin - End: 1/27/2017	Drilling Company: Pacific Drilling Company	BORING LOG B-4	
Logged By: S.Tena	Drill Crew: Toby & Rory		
Hor.-Vert. Datum: Not Available	Drilling Equipment: Mole		Hammer Type - Drop: 140 lb. Cathead - 30 in.
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger		
Weather: Sunny	Auger Diameter: 6 in. O.D.		

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS									
			Approximate Ground Surface Elevation (ft.): 417.00 Surface Condition: Bare Earth		Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Lithologic Description														
			TOPSOIL: (6 inches)		S1					10.7	124.3					pH= 7.6 Resistivity= 2400 ohm-cm Sulfates= 96 ppm Chlorides= 53 ppm	
415	5		ARTIFICIAL FILL (af) Silty SAND (SM): brown (7.5YR 4/2), moist, micaceous														
			Clayey SAND (SC): brown (7.5YR 4/4) to dark brown (7.5YR 3/2), dense, increase in Clay content		S2		BC=11 15 14	18"									
410			WEATHERED GRANITE (Kgr) EXCAVATED AS: Silty SAND (SM): brown (7.5YR 5/4), very dense, micaceous		S3		BC=50/6"	6"									
	10																
405					S4		BC=50/3"	3"									
	15		light brownish gray (10YR 6/2)														
400			The boring was terminated at approximately 15.5 ft. below ground surface. The boring was backfilled with auger cuttings on January 27, 2017.														GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. The exploration location and elevation are approximate and were estimated by Kleinfelder.
	20																
395																	
	25																
390																	

PROJECT NUMBER: 20173187.003A
GINT LIBRARY: 2017.GLB [KLF_BORING/TEST PIT SOIL LOG]
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB

 <p>KLEINFELDER Bright People. Right Solutions.</p>	PROJECT NO.: 20173187	BORING LOG B-4	FIGURE A-6
	DRAWN BY: ST CHECKED BY: SHR DATE: 1/31/2017 REVISED: 4/3/2017		
PAGE: 1 of 1			

Date Begin - End: 1/27/2017 - 1/30/2017 **Drilling Company:** Pacific Drilling Company
Logged By: S.Tena **Drill Crew:** Toby & Rory
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Mole **Hammer Type - Drop:** 140 lb. Cathead - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: Sunny **Auger Diameter:** 6 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS							
			Approximate Ground Surface Elevation (ft.): 416.00 Surface Condition: Grass	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
415			TOPSOIL: (6 inches) ARTIFICIAL FILL (af) Clayey SAND (SC): dark grayish brown (10YR 4/2), micaceous	S1						99	28				
5			<p>The boring was terminated at approximately 5 ft. below ground surface. The boring was not backfilled at time of drilling completion because percolation testing was performed. The boring was backfilled with auger cuttings on January 30, 2017.</p>												<p>GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. The exploration location and elevation are approximate and were estimated by Kleinfelder.</p>
410															
10															
405															
15															
400															
20															
395															
25															
390															



PROJECT NO.: 20173187
 DRAWN BY: ST
 CHECKED BY: SHR
 DATE: 1/31/2017
 REVISED: 4/3/2017


BORING LOG PERC-1

Casa de las Campanas
 Phase III Expansion
 San Diego, California

FIGURE

A-7

Date Begin - End: 1/27/2017 - 1/30/2017 **Drilling Company:** Pacific Drilling Company
Logged By: S.Tena **Drill Crew:** Toby & Rory
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Mole **Hammer Type - Drop:** 140 lb. Cathead - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: Sunny **Auger Diameter:** 6 in. O.D.

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								Additional Tests/Remarks
			Approximate Ground Surface Elevation (ft.): 416.00 Surface Condition: Grass	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
415			TOPSOIL: (6 inches) ARTIFICIAL FILL (af) Clayey SAND (SC): very dark grayish brown (10YR 3/2), micaceous	S1							94	29			
5			<p>The boring was terminated at approximately 5 ft. below ground surface. The boring was not backfilled at time of drilling completion because percolation testing was performed. The boring was backfilled with auger cuttings on January 30, 2017.</p> <p>GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. The exploration location and elevation are approximate and were estimated by Kleinfelder.</p>												
410															
10															
405															
15															
400															
20															
395															
25															
390															



PROJECT NO.: 20173187
 DRAWN BY: ST
 CHECKED BY: SHR
 DATE: 1/31/2017
 REVISED: 4/3/2017

BORING LOG PERC-2

Casa de las Campanas
 Phase III Expansion
 San Diego, California

FIGURE

A-8

**GEOPHYSICAL EVALUATION
18655 WEST BERNARDO DRIVE
SAN DIEGO, CALIFORNIA**

PREPARED FOR:

Kleinfelder, Inc.
550 West C Street
San Diego, CA 92101

PREPARED BY:

Southwest Geophysics, Inc.
8057 Raytheon Road, Suite 9
San Diego, CA 92111

February 24, 2017
Project No. 116664b

February 24, 2017
Project No. 116664b

Mr. Scott Rugg
Kleinfelder, Inc.
550 West C Street
San Diego, CA 92101


Subject: Geophysical Evaluation
18655 West Bernardo Drive
San Diego, California


Dear Mr. Rugg:

In accordance with your authorization, we have performed a geophysical seismic evaluation pertaining to the proposed addition at the Casa De Las Campanas facility located at 18655 West Bernardo Drive in San Diego, California. The primary purpose of our study was to characterize the subsurface geologic conditions through the collection of seismic surface waves. Specifically, our services included the performance of a refraction microtremor (ReMi) profile and three Multichannel Analysis of Surface Wave (MASW) profiles at the site. This report presents the survey methodology, equipment used, analysis, and findings.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.


Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist


Hans van de Vrugt, C.E.G., P.Gp.
Principal Geologist/Geophysicist

PFL/HV/hv

Distribution: Addressee (electronic)



TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
2. SCOPE OF SERVICES	1
3. SITE DESCRIPTION	1
4. SURVEY METHODOLOGY AND ANALYSIS	1
4.1. ReMi Survey	2
4.2. MASW Survey	2
5. RESULTS	3
6. LIMITATIONS	4
7. SELECTED REFERENCES	5

Figures

Figure 1	– Site Location Map
Figure 2	– Line Location Map
Figure 3	– Site Photographs
Figure 4	– ReMi Results, RL-1
Figure 5a	– MASW Results, ML-1
Figure 5b	– MASW Results, ML-2
Figure 5c	– MASW Results, ML-3

1. INTRODUCTION

In accordance with your authorization, we have performed a geophysical seismic evaluation pertaining to the proposed addition at the Casa De Las Campanas facility located at 18655 West Bernardo Drive in San Diego, California (Figure 1). The primary purpose of our study was to characterize the subsurface geologic conditions through the collection of seismic surface waves. Specifically, our services included the performance of a refraction microtremor (ReMi) profile and three Multichannel Analysis of Surface Wave (MASW) profiles at the site. This report presents the survey methodology, equipment used, analysis, and findings.

2. SCOPE OF SERVICES

Our scope of services included:

- Review of background project materials provided by your office.
- Performance of one ReMi profile (RL-1).
- Performance of three MASW profiles (ML-1 through ML-3).
- Compilation and geophysical analysis of the collected data.
- Preparation of this illustrated report presenting our findings.

3. SITE DESCRIPTION

The project site is located at 18655 West Bernardo Drive in San Diego, California (Figure 1). The property is occupied by the Casa De Las Campanas facility. Our study areas included the paved parking and driveways south and west of the facility (see Figure 2). Improvements at the property include several buildings, paved parking and driveways, planters, and underground utilities. Figures 2 and 3 depict the general site conditions in the area of the seismic traverses.

4. SURVEY METHODOLOGY AND ANALYSIS

As previously indicated, the primary purpose of our services was to characterize the subsurface conditions at pre-selected locations through the collection of seismic surface wave data. The following sections provide an overview of the methodologies used during our study.

4.1. ReMi Survey

The refraction microtremor technique uses recorded surface waves (specifically Rayleigh waves) which are contained in the background noise to develop a shear wave velocity profile of the site down to a depth, in this case, up to approximately 50 feet. Fifteen records, 32 seconds long were collected with a 24-channel Geometrics Geode seismograph and 4.5-Hz vertical component geophones. The ReMi method does not require an increase of material velocity with depth; therefore, low velocity zones (velocity inversions) are detectable with ReMi. The depth of exploration is dependent on the length of the line and the frequency content of the background noise. The results of the ReMi method are displayed as a one dimensional sounding which represents the average condition across the length of the line.

One ReMi profile was conducted at the site (see Figure 2). The length of the line was 161 feet. In the paved areas the geophones were coupled to the ground surface by drilling small holes ($< \frac{1}{4}$ inch diameter) into the pavement. In non-paved areas the geophones were pressed into the soil.

The collected ReMi data were processed using SeisOpt® ReMi™ software (© Optim LLC, 2005), which uses the refraction microtremor method (Louie, 2001). The program generates phase-velocity dispersion curves for each record and provides an interactive dispersion modeling tool where the users determines the best fitting model. The result is a one-dimensional shear-wave velocity model of the site.

4.2. MASW Survey

The MASW method also uses recorded surface waves (specifically Rayleigh waves) that are contained in the background noise as well as those generated from an active source to develop a shear wave velocity profile of the study area. The active source or “shot” included impacting an aluminum plate with a 20-pound hammer. The data were acquired using the same equipment as that used for the ReMi survey. The geophones were spaced 4 feet apart for array lengths of 92 feet for ML-1, ML-2, and ML-3. Following the collection of data, the arrays were moved linearly a distance of 8 feet in what is referred to as a roll-along method. Both passive and active signals were recorded for each array position or “move.” Three 1-second long records at a sample rate of 0.5 milliseconds were recorded for each move and later stacked during processing in order to enhance the signal. Prior to the acquisition of data, a preferred shot distance was evaluated by conducting multiple recordings at various distances from the end of the geophone array ranging from 12 to 32 feet. The data were processed in the field and evaluated for both near and far field effects. Based on these results, the optimum shot offset was selected at 32 feet.

Ten, six, and five array positions were recorded for profile line lengths of 72, 40, and 32 feet for ML-1, ML-2, and ML-3, respectively. The primary purpose of the MASW lines were to provide detailed near surface information. In general, the data quality was good to excellent.

The collected data were processed using SurfSeis© which uses the Multichannel Analysis of Surface Waves technique (MASW). The recorded data (time series waveforms) are pro-

cessed in SurfSeis© and corresponding dispersions curve images are created which depict the waveform energy in a plot of phase velocity verse frequency. These images are then analyzed and fundamental-mode dispersion curves are extracted and a one-dimensional (1-D) model is created for each array position through an inversion algorithm. The 1-D model represents the midpoint of the array. SurfSeis© then integrates the 1-D solutions into a 2-D S-wave model.

5. RESULTS

As previously discussed, the purpose of our study was to characterize the subsurface geologic conditions through the collection of seismic surface wave data. Figure 4 and Table 1 present the ReMi results and Figures 5a through 5c present the results for the MASW surveys.

Please note that the models depicted on Figures 5a through 5c start at Station 46 (half of the array length) due to the midpoint solutions. As with the ReMi method, the average shear wave velocity is calculated across the length of the line and the resulting 1-D model represents the center or midpoint point of the line. As previously discussed, SurfSeis then integrates the 1-D solutions into a 2-D S-wave model. Due to the smaller geophone spacings used in the MASW surveys, the MASW results provide better near surface resolution than the ReMi method.

The results for RL-1 and ML-1 appear to be fairly consistent revealing the presence of a velocity inversion at roughly 20 to 25 feet deep. A velocity inversion is also observed along ML-2 at roughly a 20-foot depth. A similar condition is evident along the east end of ML-3.

Based on our results it appears that there is a relatively sharp increase in velocity roughly at a 30- to 40-foot depth. This increase in velocity may represent bedrock. Figures 5a through 5c illustrate the possible location of the bedrock contact. Also revealed in the MASW models are the presence of irregular pockets of low and high velocity materials in the near surface.

TABLE 1 ReMi Results		
Line No.	Depth (feet)	Shear Wave Velocity (feet/second)
RL-1	0 – 3	364
	3 – 7	1131
	7 – 10	1459
	10 – 13	1628
	13 – 24	2802
	24 – 40	1628
	40 – 50	4188

6. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, Inc. should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

7. SELECTED REFERENCES

Golden Software, Inc., 2002, Surfer, Surface Mapping System: Version 8.00.

Iwata, T., Kawase, H., Satoh, T., Kakehi, Y., Irikura, K., Louie, J. N., Abbott, R. E., and Anderson, J. G., 1998, Array Microtremor Measurements at Reno, Nevada, USA (abstract): Eos, Trans. Amer. Geophys. Union, v. 79, suppl. to no. 45, p. F578.

Kansas Geological Survey, 2010, SurfSeis[®] 5 MASW (Multichannel Analysis of Surface Waves): Version 5.3.0.8.

Louie, J. N., 2001, Faster, Better, Shear-Wave Velocity to 100 Meters Depth From Refraction Microtremor Arrays: Bulletin of the Seismological Society of America, v. 91, p. 347-364.

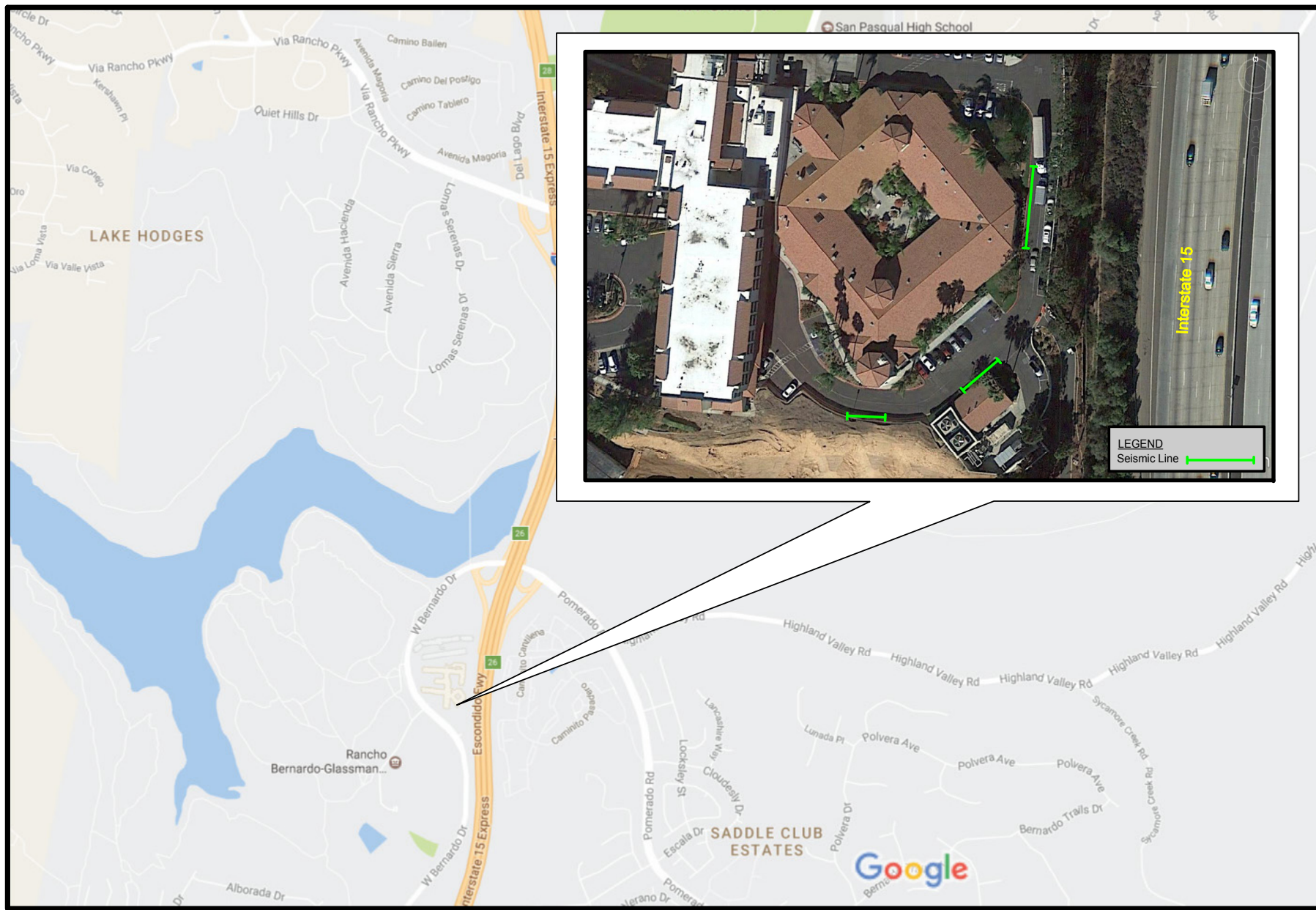
Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

Saito, M., 1979, Computations of Reflectivity and Surface Wave Dispersion Curves for Layered Media; I, Sound wave and SH wave: Butsuri-Tanko, v. 32, no. 5, p. 15-26.

Saito, M., 1988, Compound Matrix Method for the Calculation of Spheroidal Oscillation of the Earth: Seismol. Res. Lett., v. 59, p. 29.

Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press. Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press.

Xia, J., Miller, R. D., and Park, C. B., 1999, Estimation of Near-Surface Shear-Wave Velocity by Inversion of Rayleigh Wave: Geophysics, v. 64, p. 691-7.




SITE LOCATION MAP



18655 West Bernardo Drive
San Diego, California

Project No.: 116664b

Date: 02/17

 **SOUTHWEST**
GEOPHYSICS INC.
Figure 1



SITE PHOTOGRAPHS

18655 West Bernardo Drive
San Diego, California

Project No.: 116664b

Date: 02/16



Figure 3

Vs Model



**ReMi RESULTS
RL-1**

18655 West Bernardo Drive
San Diego, California

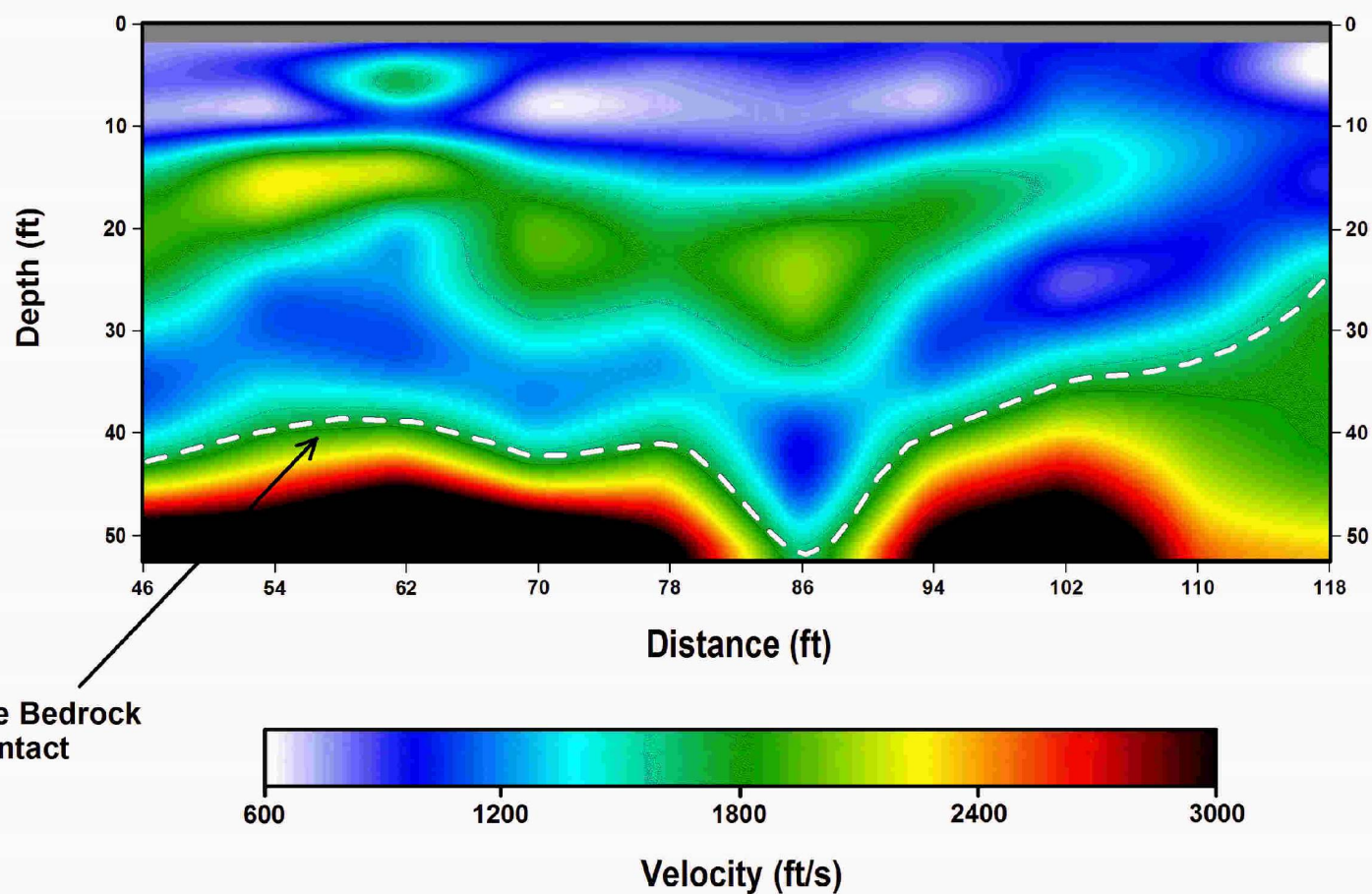
Project No.: 116664b

Date: 02/17



Figure 4

S-WAVE VELOCITY MODEL



**S-WAVE SECTION
ML-1**

18655 West Bernardo Drive
San Diego, California

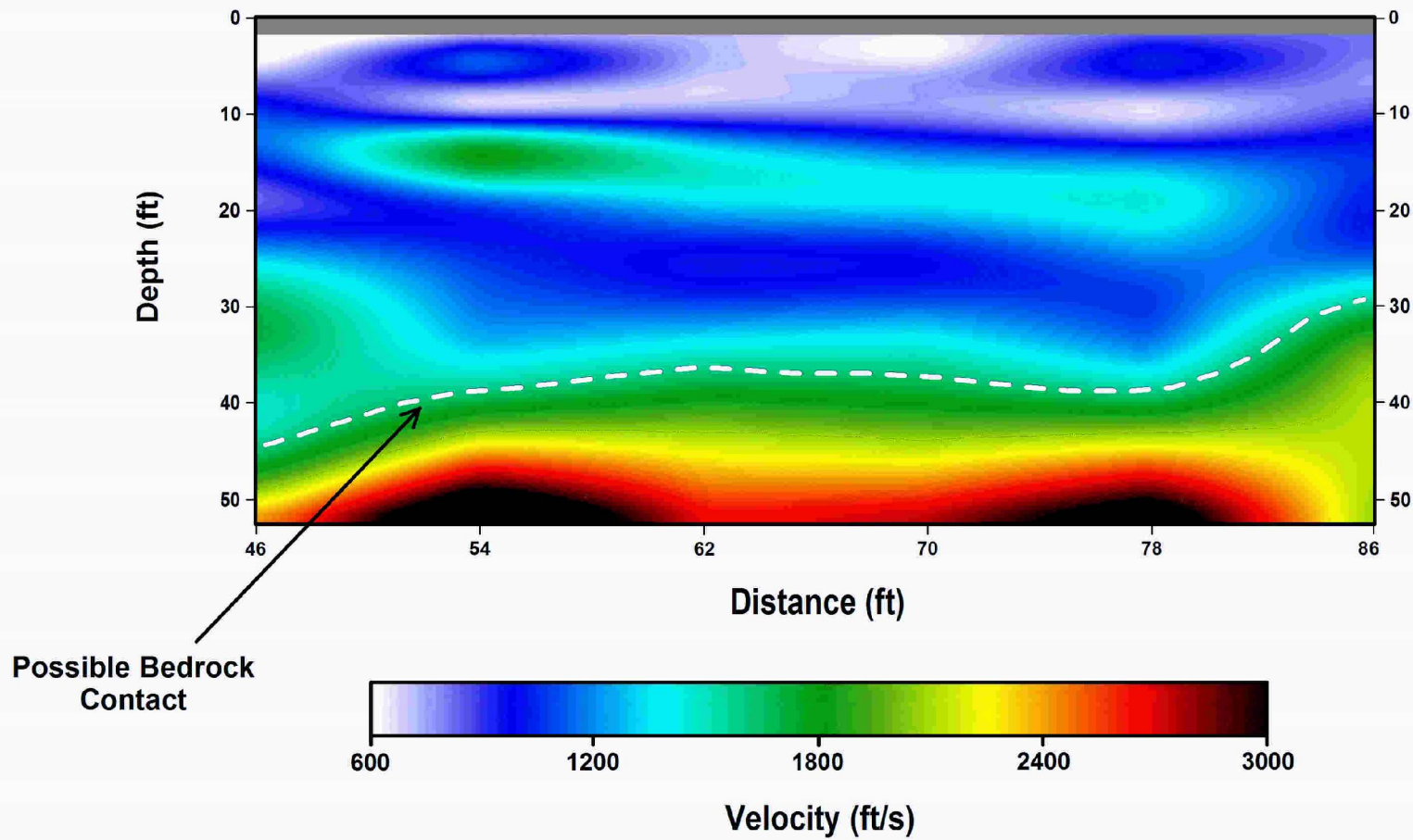
Project No.: 116664b

Date: 02/17



Figure 5a

S-WAVE VELOCITY MODEL



**S-WAVE SECTION
ML-2**

18655 West Bernardo Drive
San Diego, California

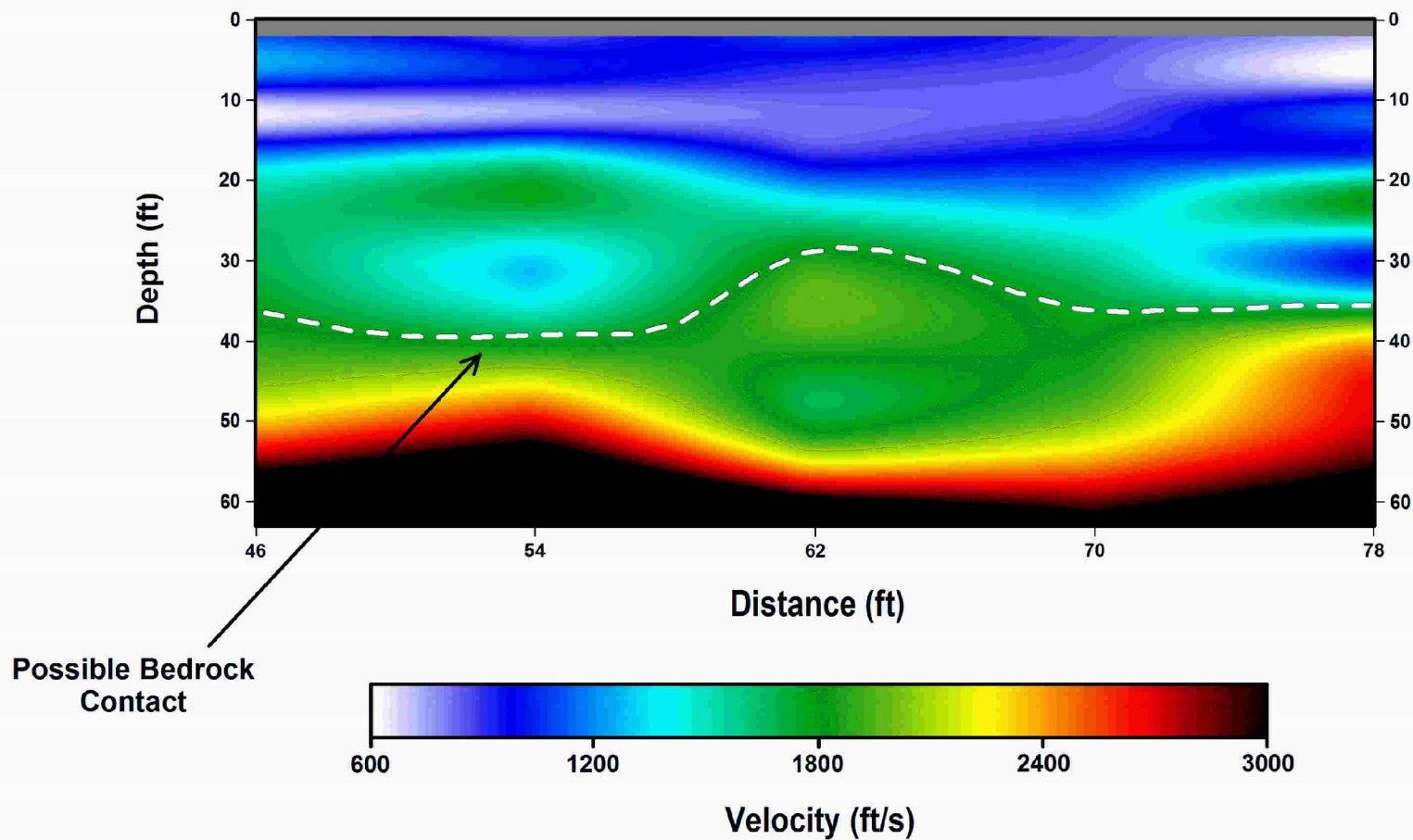
Project No.: 116664b

Date: 02/17



Figure 5b

S-WAVE VELOCITY MODEL



**S-WAVE SECTION
ML-3**

18655 West Bernardo Drive
San Diego, California

Project No.: 116664b

Date: 02/17



Figure 5c

**SEISMIC REFRACTION SURVEY
CASA DE LAS CAMPANAS
ESCONDIDO, CALIFORNIA**

PREPARED FOR:

Kleinfelder, Inc.
550 West C Street
San Diego, CA 92101

PREPARED BY:

Southwest Geophysics, Inc.
8057 Raytheon Road, Suite 9
San Diego, CA 92111

July 13, 2016
Project No. 116298

July 13, 2016
Project No. 116298

Mr. Trampus Grindstaff
Kleinfelder, Inc.
550 West C Street
San Diego, CA 92101

Subject: Seismic Refraction Survey
Casa De Las Campanas
Escondido, California

Dear Mr. Grindstaff:

In accordance with your authorization, we have performed a seismic refraction survey pertaining to the proposed retaining wall project at the Casa De Las Campanas facility located in Escondido, California. Specifically, our survey consisted of performing three seismic refraction traverses at the project site. The purpose of our study was to develop subsurface velocity profiles of the areas surveyed, and to assess the apparent rippability of the subsurface materials. Our services were conducted on July 1, 2016. This data report presents our survey methodology, equipment used, analysis, and results.

We appreciate the opportunity to be of service on this project. Should you have any questions please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.



Patrick Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist



Hans van de Vrugt, C.E.G., P.Gp.
Principal Geologist/Geophysicist

PFL/HV/hv

Distribution: Addressee (electronic)



TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
2. SCOPE OF SERVICES	1
3. SITE DESCRIPTION	1
4. SURVEY METHODOLOGY	1
5. ANALYSIS AND RESULTS.....	3
6. CONCLUSIONS AND RECOMMENDATIONS	4
7. LIMITATIONS.....	4
8. SELECTED REFERENCES	5

Table

Table 1 – Rippability Classification	3
--	---

Figures

Figure 1 – Site Location Map	
Figure 2 – Line Location Map	
Figure 3 – Site Photographs	
Figure 4a – Seismic Profile, SL-1	
Figure 4b – Seismic Profile, SL-2	
Figure 4c – Seismic Profile, SL-3	

1. INTRODUCTION

In accordance with your authorization, we have performed a seismic refraction survey pertaining to the proposed retaining wall project at the Casa De Las Campanas facility located in Escondido, California (Figure 1). Specifically, our survey consisted of performing three seismic refraction traverses at the project site. The purpose of our study was to develop subsurface velocity profiles of the areas surveyed, and to assess the apparent rippability of the subsurface materials. Our services were conducted on July 1, 2016. This data report presents our survey methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of three seismic P-wave refraction lines at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results, conclusions and recommendations.

3. SITE DESCRIPTION

The project site is located between West Bernardo Drive and Interstate 15 in Escondido, California (Figure 1). The site is an active nursing home facility with associated parking lots, driveways, and planters. Vegetation in the area consists of trees, ground cover, and decorative plants. Figures 2 and 3 depict the site conditions in the area of the seismic traverses. Based on our discussions with you it is our understanding that the project involves the construction of new retaining wall along an existing slope.

4. SURVEY METHODOLOGY

A seismic P-wave (compression wave) refraction survey was conducted at the site to evaluate the rippability characteristics of the subsurface materials and to develop subsurface velocity profiles of the areas surveyed. The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of

surface vertical component 14-Hz geophones and recorded with a 24-channel Geometrics Geode seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Three seismic lines (SL-1 through SL-3) were conducted in the study area. The general locations and lengths of the lines were selected by your office. Shot points (signal generation locations) were conducted along the lines at the ends, midpoint, and intermediate points between the ends and the midpoint.

The seismic refraction theory requires that subsurface velocities increase with depth. A layer having a velocity lower than that of the layer above will not generally be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, lateral variations in velocity, such as those caused by core stones, intrusions or boulders can also result in the misinterpretation of the subsurface conditions.

In general, seismic wave velocities can be correlated to material density and/or rock hardness. The relationship between rippability and seismic velocity is empirical and assumes a homogeneous mass. Localized areas of differing composition, texture, and/or structure may affect both the measured data and the actual rippability of the mass. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

The rippability values presented in Table 1 are based on our experience with similar materials and assume that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristics, such as fracture spacing and orientation, play a significant role in determining rock rippability. These characteristics may also vary with location and depth.

For trenching operations, the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In

addition, the presence of boulders, which can be troublesome in a narrow trench, should be anticipated.

Table 1 – Rippability Classification	
Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook (Caterpillar, 2011). Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

5. ANALYSIS AND RESULTS

As previously indicated, three seismic traverses were conducted as part of our study. The collected data were processed using SIPwin (Rimrock Geophysics, 2003), a seismic interpretation program, and analyzed using SeisOpt Pro (Optim, 2008). SeisOpt Pro uses first arrival picks and elevation data to produce subsurface velocity models through a nonlinear optimization technique called adaptive simulated annealing. The resulting velocity model provides a tomography image of the estimated geologic conditions. Both vertical and lateral velocity information is contained in the tomography model. Changes in layer velocity are revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

Figures 4a through 4c present the velocity models generated from our study. The approximate locations of the seismic refraction traverses are shown on the Line Location Map (Figure 2). In general, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth the length of the traverse.

6. CONCLUSIONS AND RECOMMENDATIONS

The results from our seismic survey reveal distinct layers/zones in the near surface that likely represent soil overlying crystalline bedrock with varying degrees of weathering. Distinct vertical and lateral velocity variations are evident in the models. These inhomogeneities are likely related to the presence of remnant boulders, intrusions and differential weathering of the bedrock materials. It is also evident in the tomography models that the depth to bedrock is highly variable across the site.

Based on the refraction results, variability in the excavatability (including depth of rippability) of the subsurface materials should be expected across the project area. Furthermore, blasting may be required depending on the excavation depth, location, equipment used, and desired rate of production. In addition, oversized materials should be expected. A contractor with excavation experience in similar difficult conditions should be consulted for expert advice on excavation methodology, equipment and production rate.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, Inc. should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

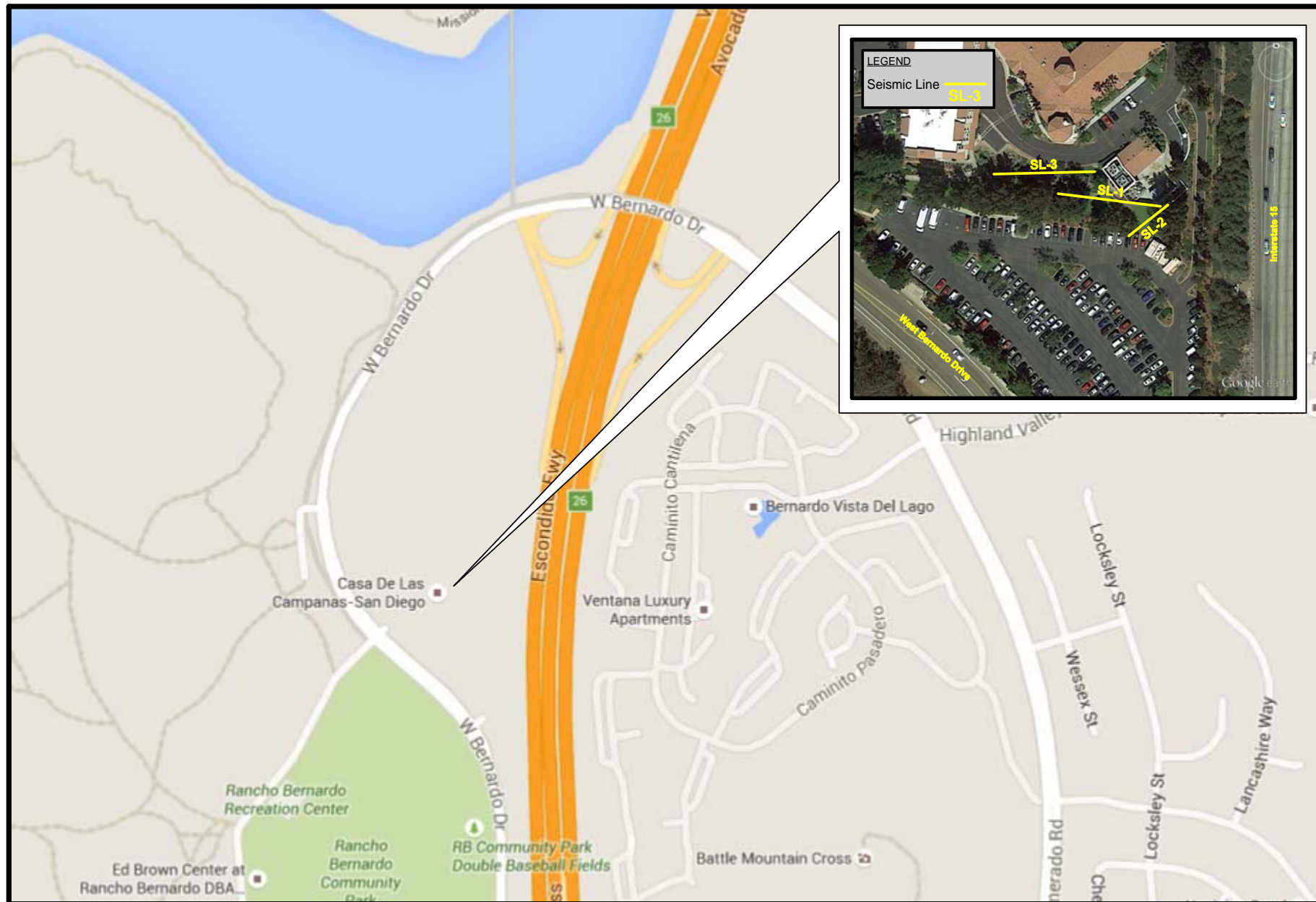
Caterpillar, Inc., 2011, Caterpillar Performance Handbook, Edition 41, Caterpillar, Inc., Peoria, Illinois.

Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

Optim, Inc., 2008, SeisOpt Pro, V-5.0.

Rimrock Geophysics, 2003, Seismic Refraction Interpretation Program (SIPwin), V-2.76.

Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press.



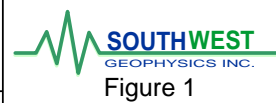
SITE LOCATION MAP



Casa De Las Campanas
Escondido, California

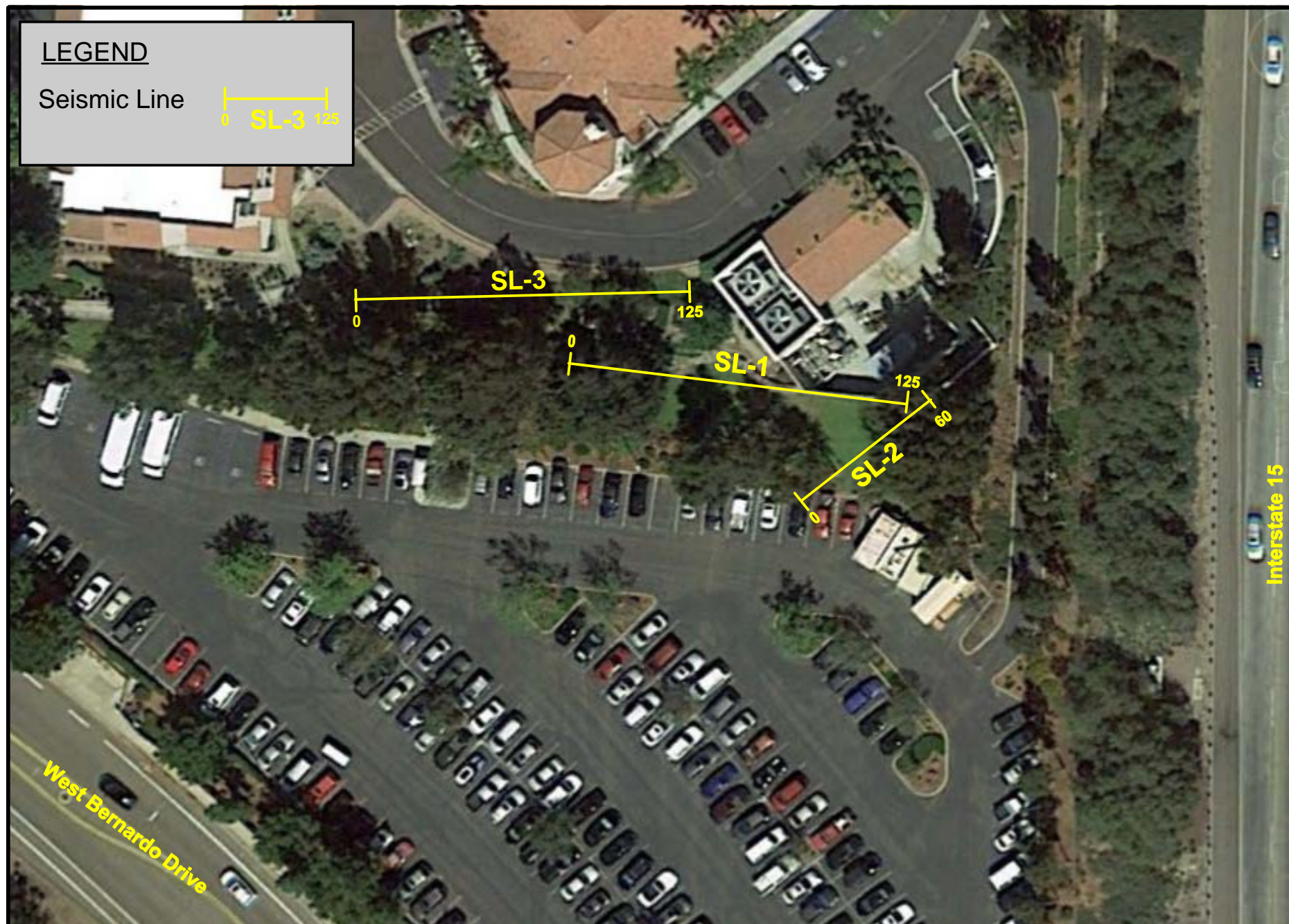
Project No.: 116298

Date: 07/16



LEGEND

Seismic Line



LINE LOCATION MAP



Casa De Las Campanas
Escondido, California

Project No.: 116298

Date: 07/16

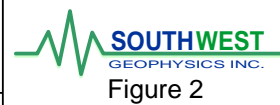
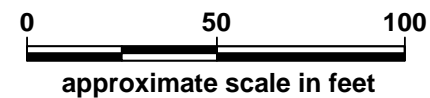


Figure 2



approximate scale in feet



SITE PHOTOGRAPHS

Casa De Las Campanas
Escondido, California

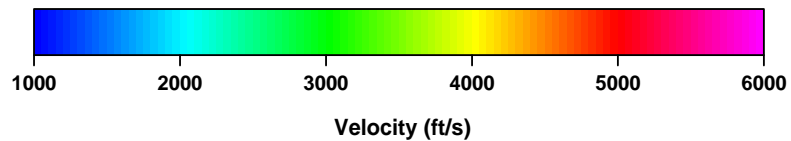
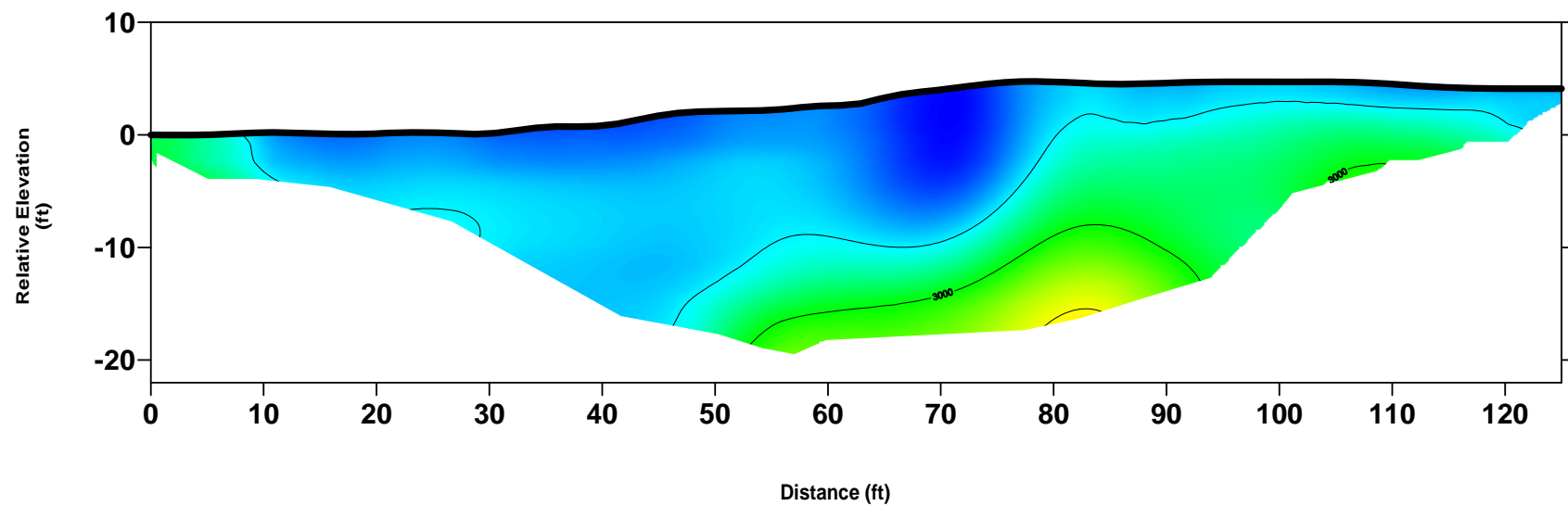
Project No.: 116298

Date: 07/16



Figure 3

TOMOGRAPHY MODEL



**SEISMIC PROFILE
SL-1**

Casa De Las Campanas
Escondido, California

Project No.: 116298

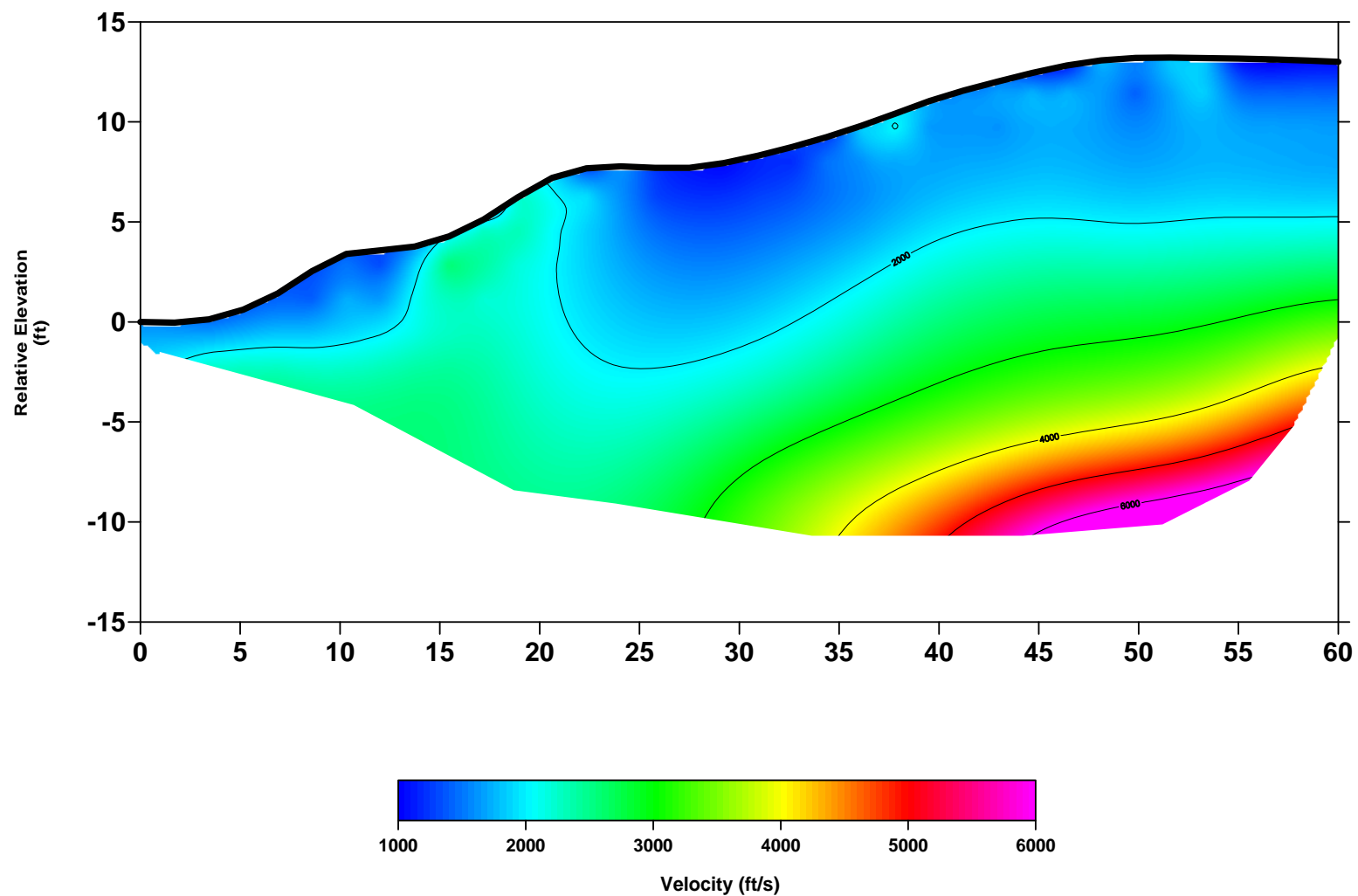
Date: 07/16



Figure 4a

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL



**SEISMIC PROFILE
SL-2**

Casa De Las Campanas
Escondido, California

Project No.: 116298

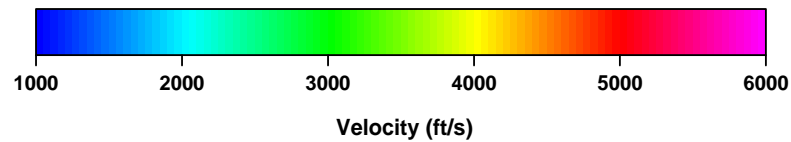
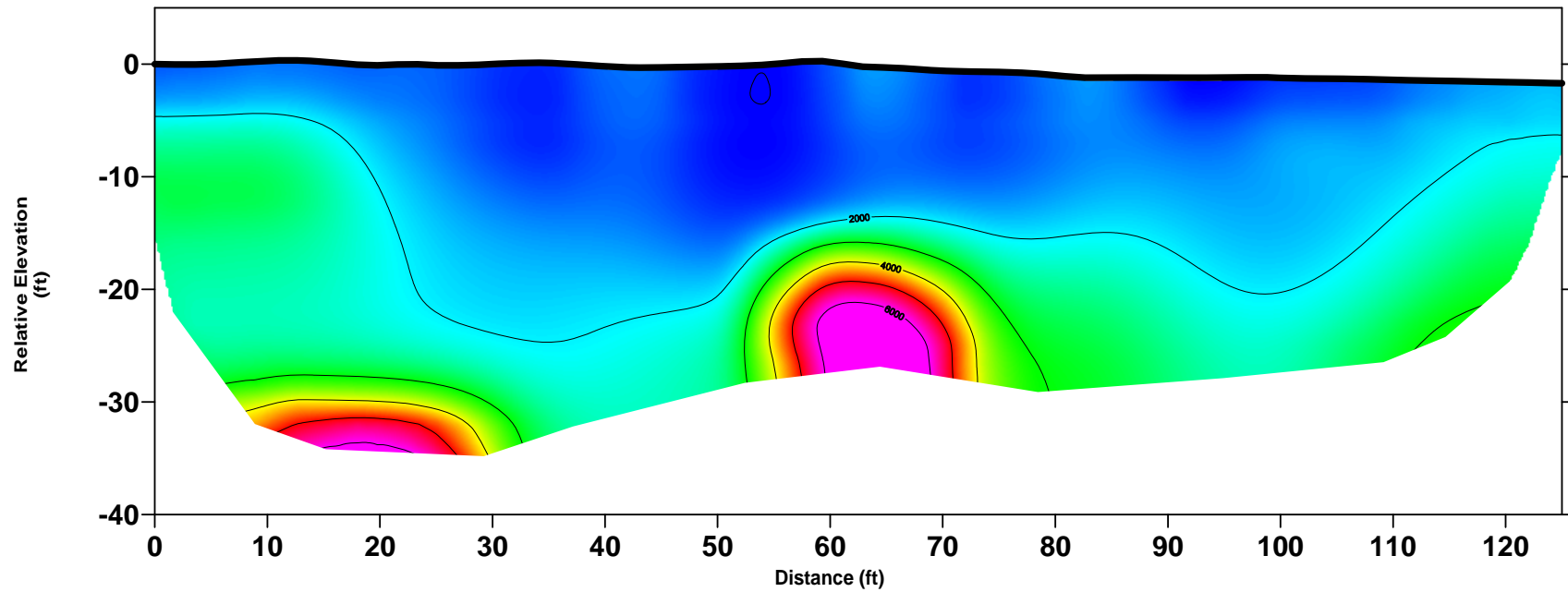
Date: 07/16



Figure 4b

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL



**SEISMIC PROFILE
SL-3**

Casa De Las Campanas
Escondido, California

Project No.: 116298

Date: 07/16



Figure 4c

Note: Contour Interval = 1,000 feet per second

APPENDIX B
Laboratory Test Results

APPENDIX B

LABORATORY TEST RESULTS

Kleinfelder performed laboratory testing on soil samples collected during our field exploration. The following sections describe the laboratory tests performed on soil samples.

GEOTECHNICAL SOIL TESTING

Laboratory tests were performed on selected samples as an aid in classifying the soils and to evaluate physical properties of the soils that may affect project design and construction procedures. A description of our laboratory testing is presented below.

MOISTURE CONTENT AND DRY UNIT WEIGHT

Natural moisture content and dry unit weight tests were performed on selected drive samples collected from the boreholes in general accordance with ASTM D2216 and D2937, respectively. Results are presented on the boring logs.

SIEVE ANALYSES

Sieve analyses were performed on representative samples of the materials encountered at the site to evaluate the gradation characteristics of the soil and to aid in classification. The tests were performed in general accordance with ASTM Test Method D6913. The results of the test are presented on Figure B-1 through B-6.

ATTERBEG LIMITS TEST

Atterberg limits test consist of the evaluation of liquid limit, plastic limit, and plasticity index. The test was used to classify the plasticity of the fine materials and was performed in general accordance with ASTM Standard Test Method D-4318. The results of the test are presented on Figure B-7.

DIRECT SHEAR TEST

Two direct shear tests were performed on selected soil samples to evaluate the shear strength of soils. The soil samples were tested for three different normal pressures in general accordance with ASTM Test Method D3080. The direct shear tests were performed at displacement rates that approximate undrained loading conditions. The test results are presented on Figures B-8 and B-9.

COMPACTION TEST

One laboratory soil compaction test was performed on a bulk sample obtained from the cuttings taken from borings B-2 at a depth of 0.5 to 4.5 feet. The sample tested in general accordance with ASTM Test Method D 1557 Method A. The results of the test are presented on Figure B-10.

R-Value

R-Value test was performed on a selected soil sample to evaluate resistance value of the near surface soils. The tests was performed in general accordance with ASTM Test Method D6913. The result is presented in Table B-1.

Table B-1
Results of R-Value Test

Boring #	Sample Depth (ft)	R-value
B-3	1 - 4	57

SOIL AGGRESSIVITY TESTS

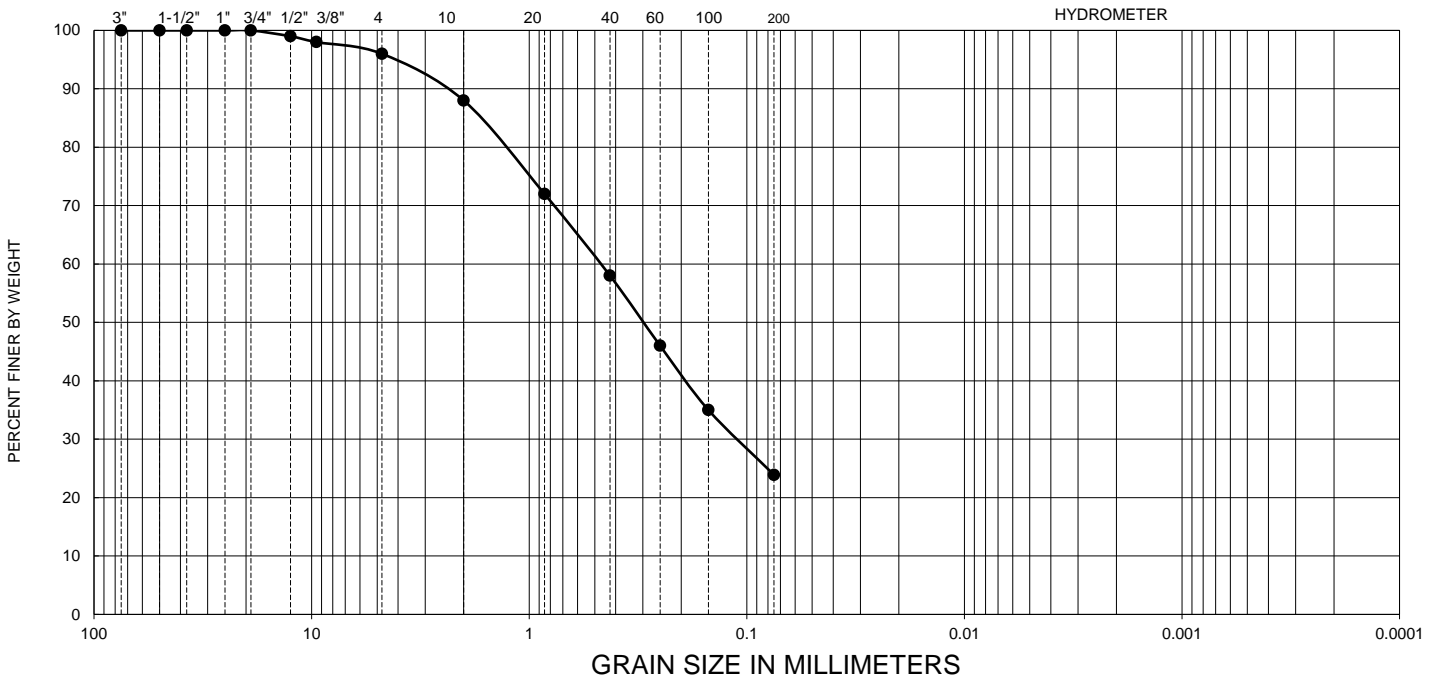
Soil aggressivity tests were performed on two soil samples obtained, in general accordance with Caltrans Test (CT) 643. The chloride content of selected samples was evaluated in general accordance with CT 422. The sulfate content of selected samples was evaluated in general accordance with CT 417. The tests were performed by Clarkson Laboratory and Supply Inc. The preliminary soil aggressivity test results are presented as Figures B-11 and B-12.

Date Tested: 2/6/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B1	S1	0.5-4	23.9	SC

Sample Description	Clayey sand
--------------------	-------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	99
	3/8"	9.5 mm	98
	No. 4	4.75 mm	96
	No. 10	2.0 mm	88
	No. 20	0.85 mm	72
	No. 40	0.425 mm	58
	No. 60	0.25 mm	46
	No. 100	0.15 mm	35
	No. 200	.075 mm	23.9

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-1

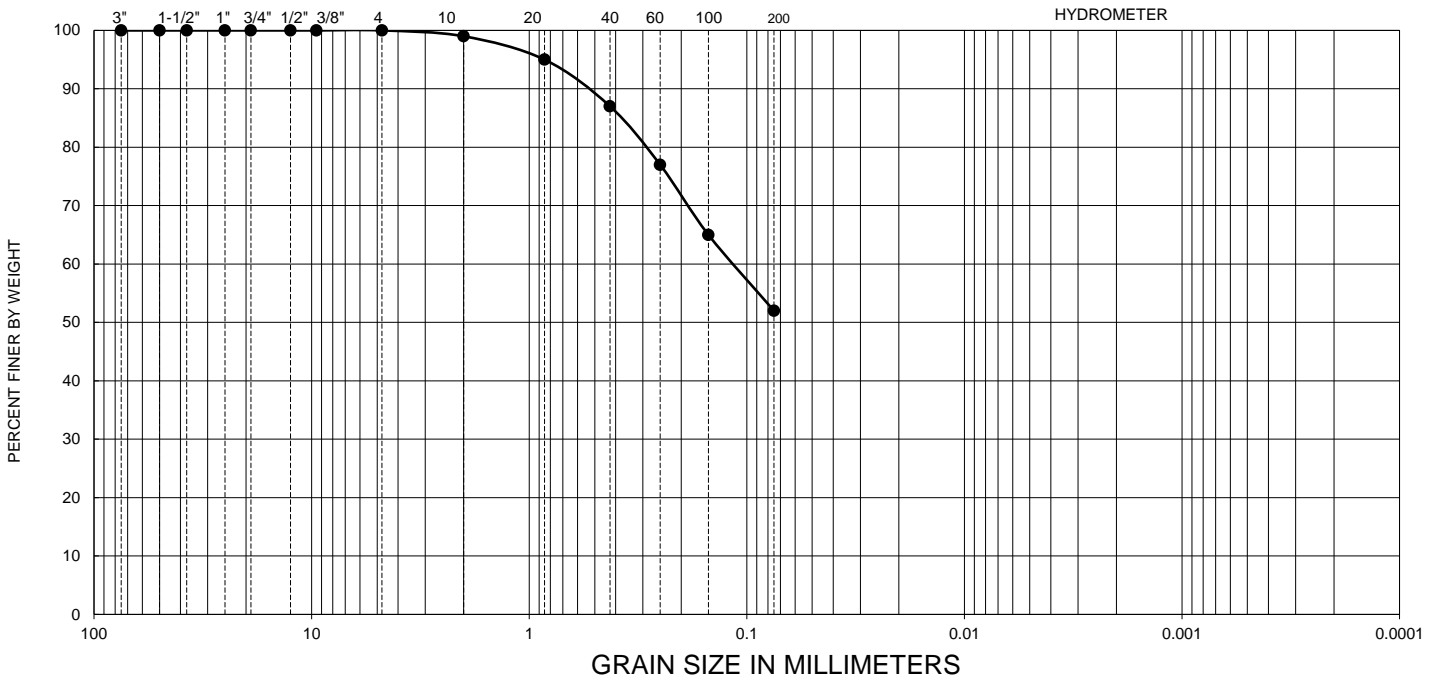
Checked by:	S.Tena	Tech:	Uly
Project No.	20173187.003A	Date:	8-Feb-17

Date Tested: 2/6/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B1	S4	15-16.5	52.0	CL

Sample Description	Sandy lean clay
--------------------	-----------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	100
	3/8"	9.5 mm	100
	No. 4	4.75 mm	100
	No. 10	2.0 mm	99
	No. 20	0.85 mm	95
	No. 40	0.425 mm	87
	No. 60	0.25 mm	77
	No. 100	0.15 mm	65
	No. 200	.075 mm	52.0

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-2

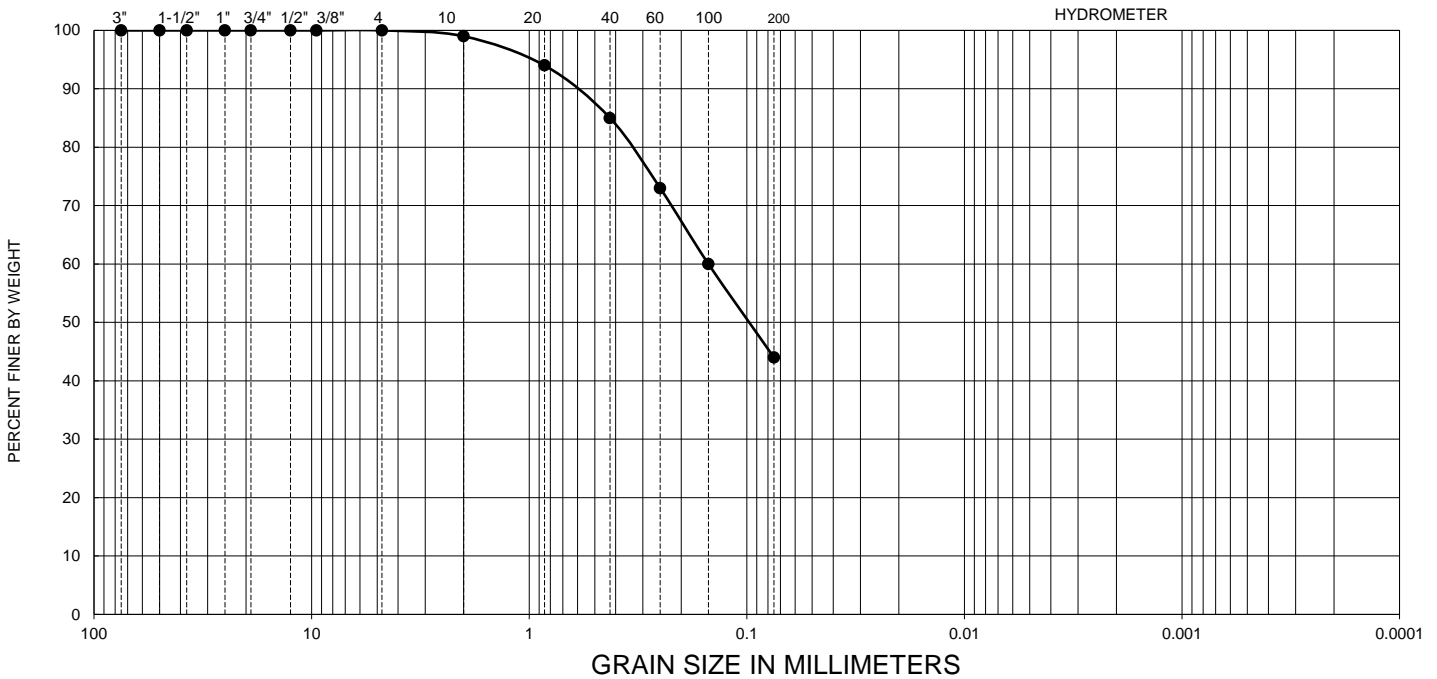
Checked by:	S.Tena	Tech:	Uly
Project No.	20173187.003A	Date:	8-Feb-17

Date Tested: 2/7/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B2	S3	10-11.5	44.0	SC

Sample Description	Clayey sand
--------------------	-------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	100
	3/8"	9.5 mm	100
	No. 4	4.75 mm	100
	No. 10	2.0 mm	99
	No. 20	0.85 mm	94
	No. 40	0.425 mm	85
	No. 60	0.25 mm	73
	No. 100	0.15 mm	60
	No. 200	.075 mm	44.0

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-3

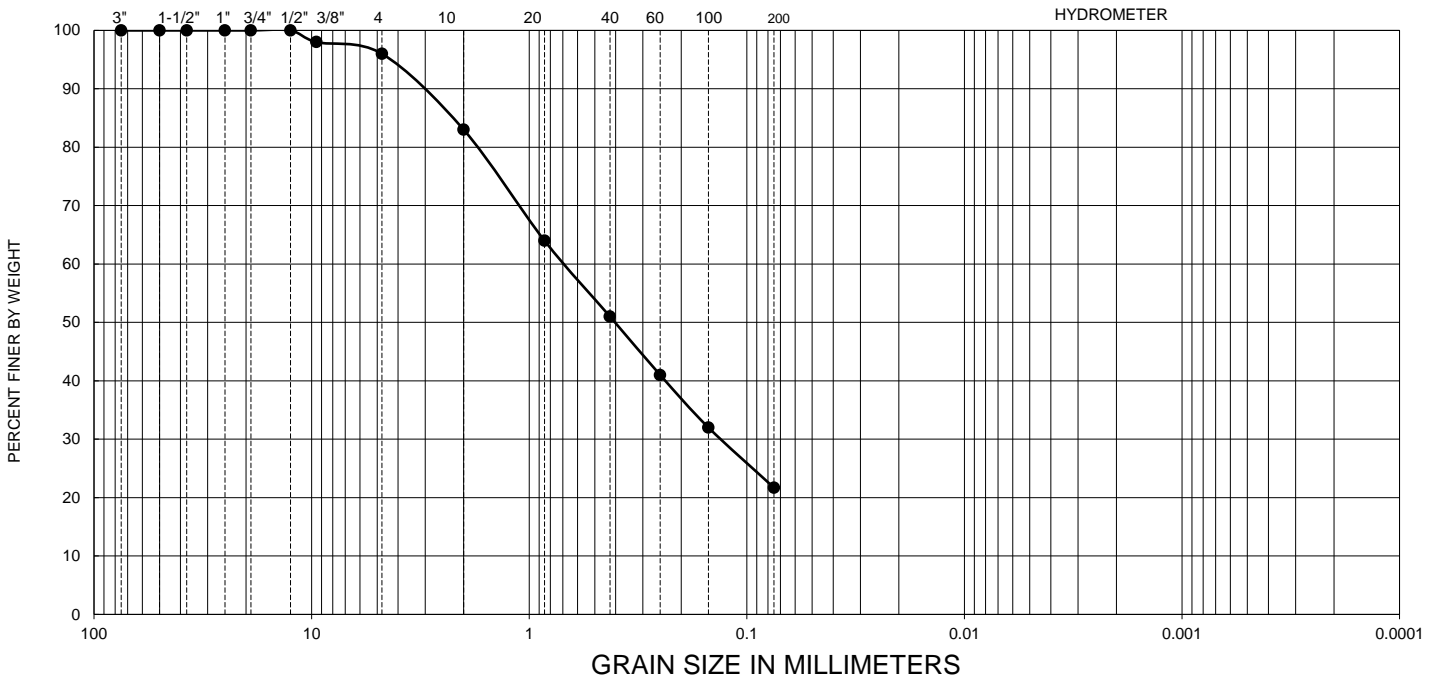
Checked by:	S.Tena	Tech:	Uly
Project No.	20173178.003A	Date:	8-Feb-17

Date Tested: 2/6/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
B3	S1	0.5-4.5	21.7	SC-SM

Sample Description	Silty, clayey sand
--------------------	--------------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	100
	3/8"	9.5 mm	98
	No. 4	4.75 mm	96
	No. 10	2.0 mm	83
	No. 20	0.85 mm	64
	No. 40	0.425 mm	51
	No. 60	0.25 mm	41
	No 100	0.15 mm	32
	No 200	.075 mm	21.7

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-4

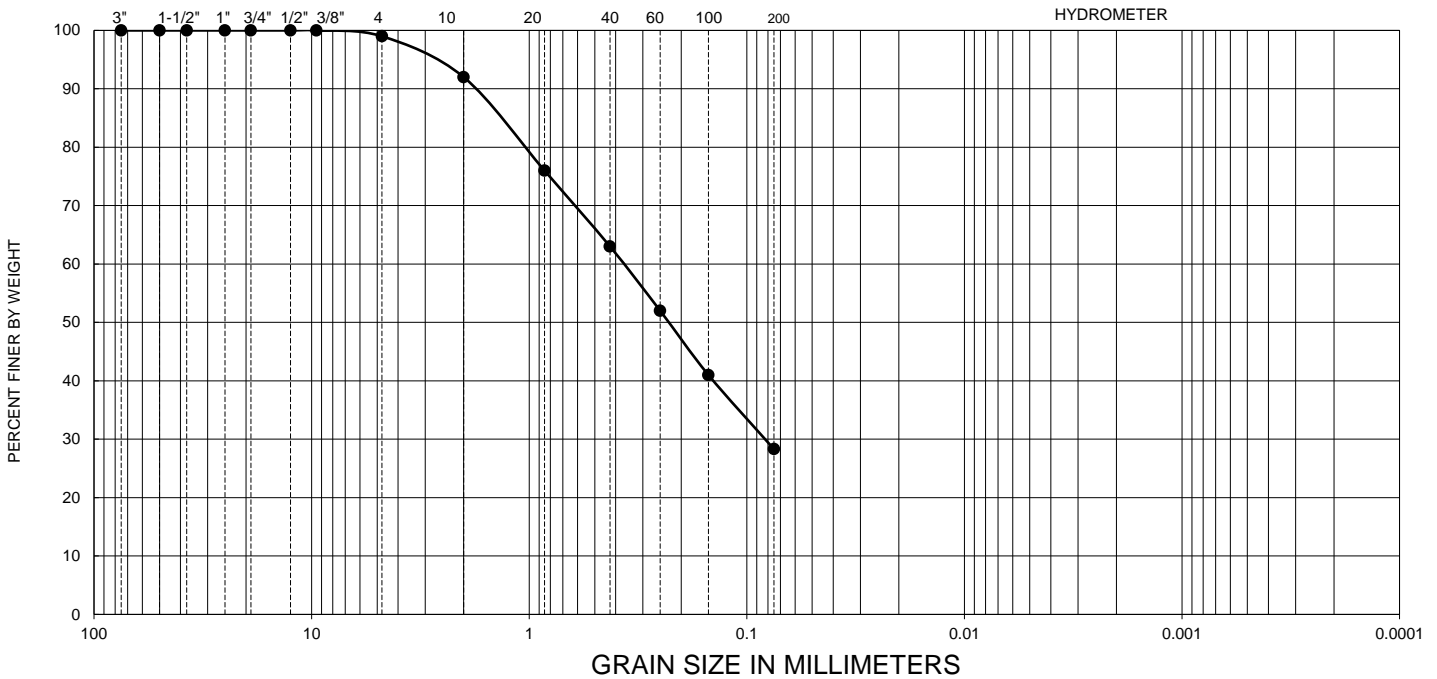
Checked by:	S.Tena	Tech:	Uly
Project No.	20173178.003A	Date:	8-Feb-17

Date Tested: 2/7/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
PERC 1	S1	3-5	28.3	SC

Sample Description	Clayey sand
--------------------	-------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	100
	3/8"	9.5 mm	100
	No. 4	4.75 mm	99
	No. 10	2.0 mm	92
	No. 20	0.85 mm	76
	No. 40	0.425 mm	63
	No. 60	0.25 mm	52
	No. 100	0.15 mm	41
	No. 200	.075 mm	28.3

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-5

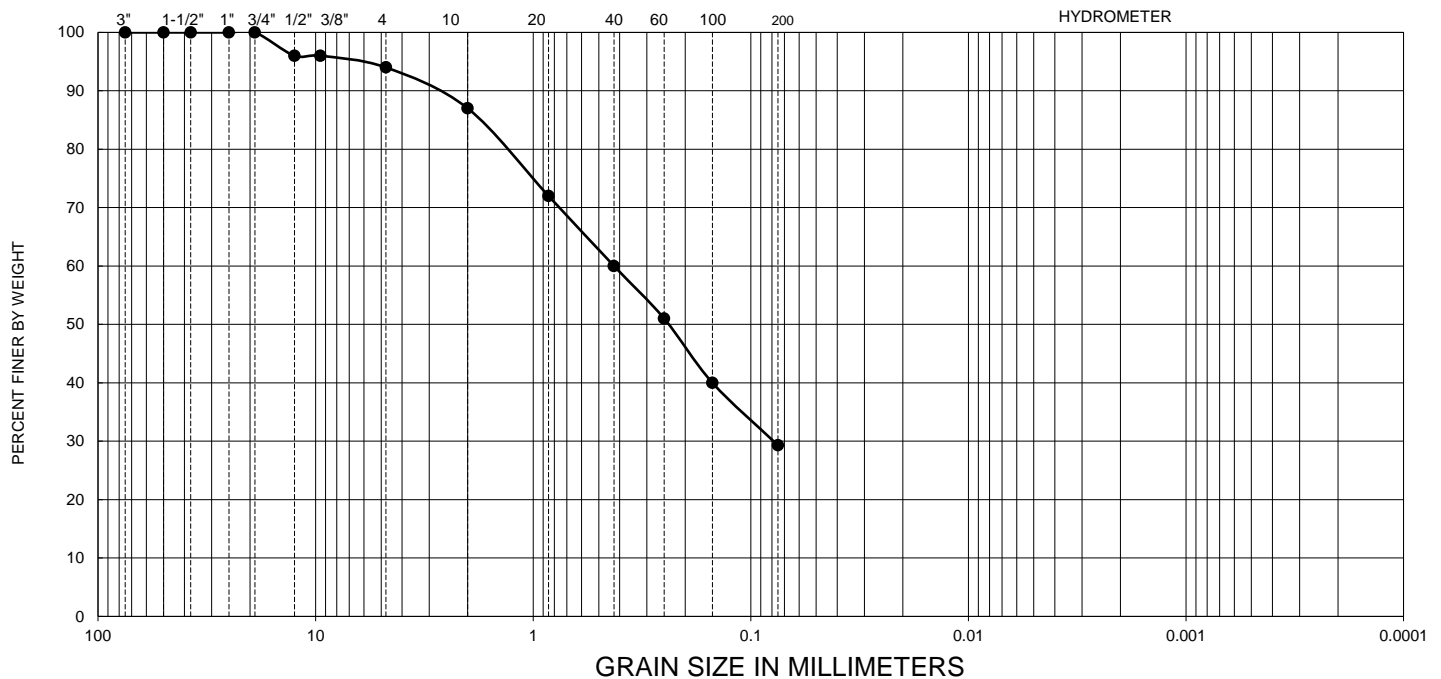
Checked by:	S.Tena	Tech:	Uly
Project No.	20173178.003A	Date:	8-Feb-17

Date Tested: 2/7/2017

USCS

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

U.S. STANDARD SIEVE NUMBERS



Boring No.	Sample No.	Depth (ft)	Passing 200 (%)	USCS Classification
PERC 2	S1	3-5	29.3	SC

Sample Description	Clayey sand
--------------------	-------------

Sieve Analysis	Sieve Size		% Passing
	3"	75 mm	100
	2"	50 mm	100
	1.5"	37.5 mm	100
	1"	25 mm	100
	3/4"	19 mm	100
	1/2"	12.5 mm	96
	3/8"	9.5 mm	96
	No. 4	4.75 mm	94
	No. 10	2.0 mm	87
	No. 20	0.85 mm	72
	No. 40	0.425 mm	60
	No. 60	0.25 mm	51
	No. 100	0.15 mm	40
	No. 200	.075 mm	29.3

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913



GRADATION TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

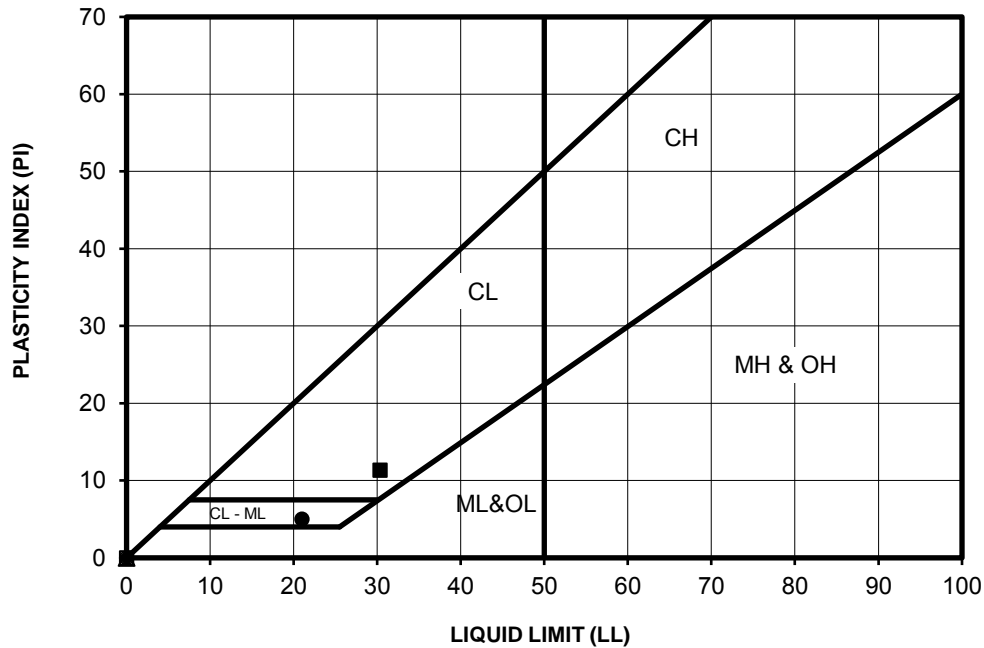
FIGURE

B-6

Checked by:	S.Tena	Tech:	Uly
Project No.	20173178.003A	Date:	8-Feb-17

Date Tested : 2/7/2017

SYMBOL	SAMPLE NAME	DEPTH (ft)	LL	PL	PI	USCS CLASSIFICATION (Minus No. 40 Sieve Fraction)	USCS (Entire Sample)
●	B1/S3	10-11.5	21	16	5	CL-ML	CL-ML
■	B2/S3	10-11.5	30	19	11	CL	SC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

Limitations: Pursuant to applicable codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specification were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided. This report may not be reproduced, except in full, without written approval of Kleinfelder.



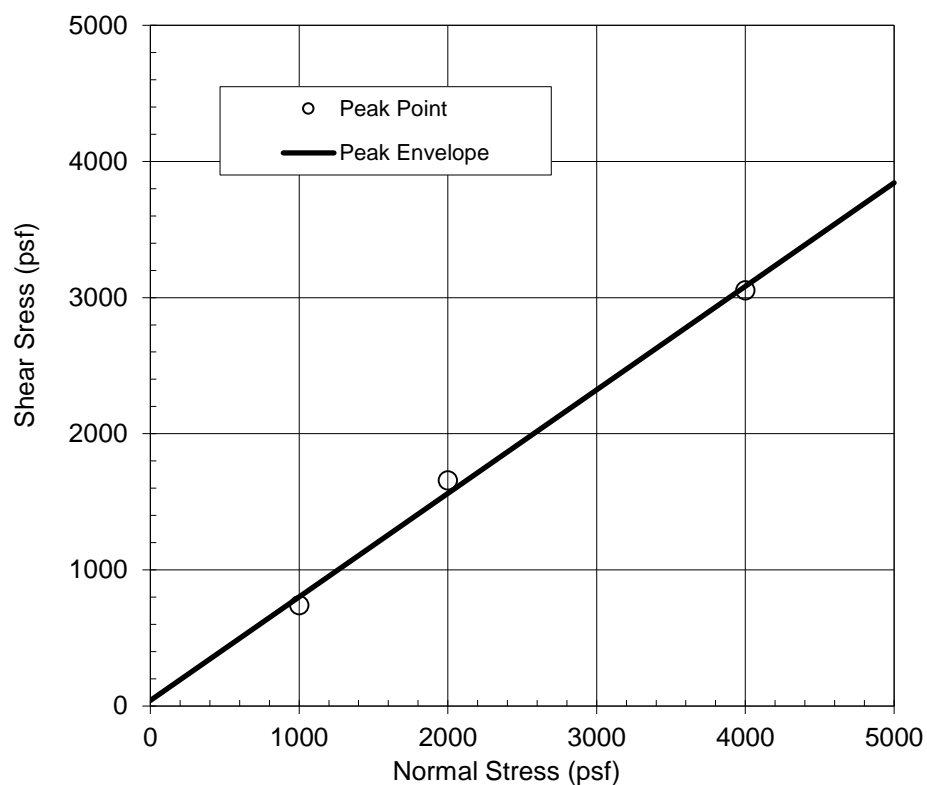
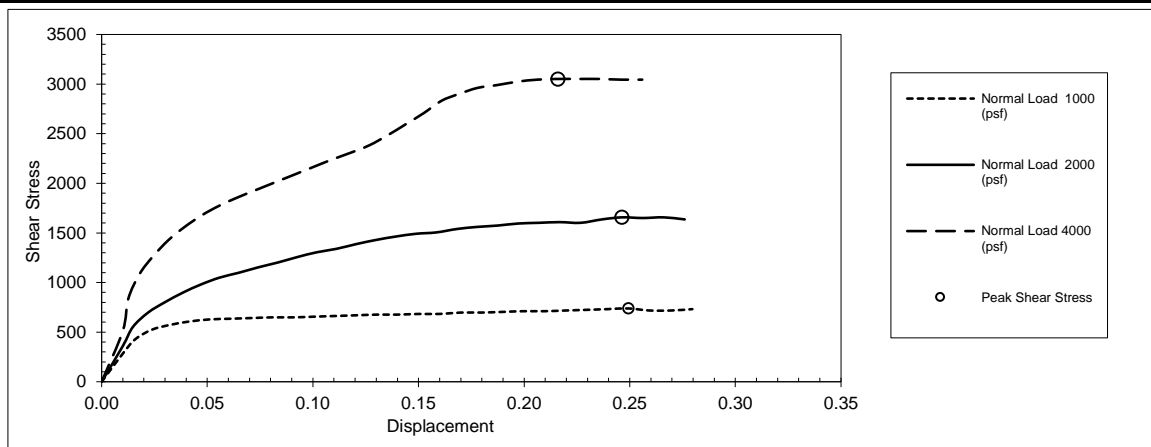
ATTERBERG LIMITS TEST RESULTS

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

FIGURE

B-7

Checked by	S.Tena	TECH:Uly
PROJECT NO:	20173187.003A	8-Feb-17



Strain Rate = 0.00945 inch/min
Date Tested: 2/7/2017

				Interpreted Shear Strength			
				Peak			
Boring No.	Sample No.	Depth	UCSC	Cohesion (psf)	Friction Angle (deg)		
B2	S1	0.5'-4.5'	SC	41	37.3		

Sample description: clayey sand



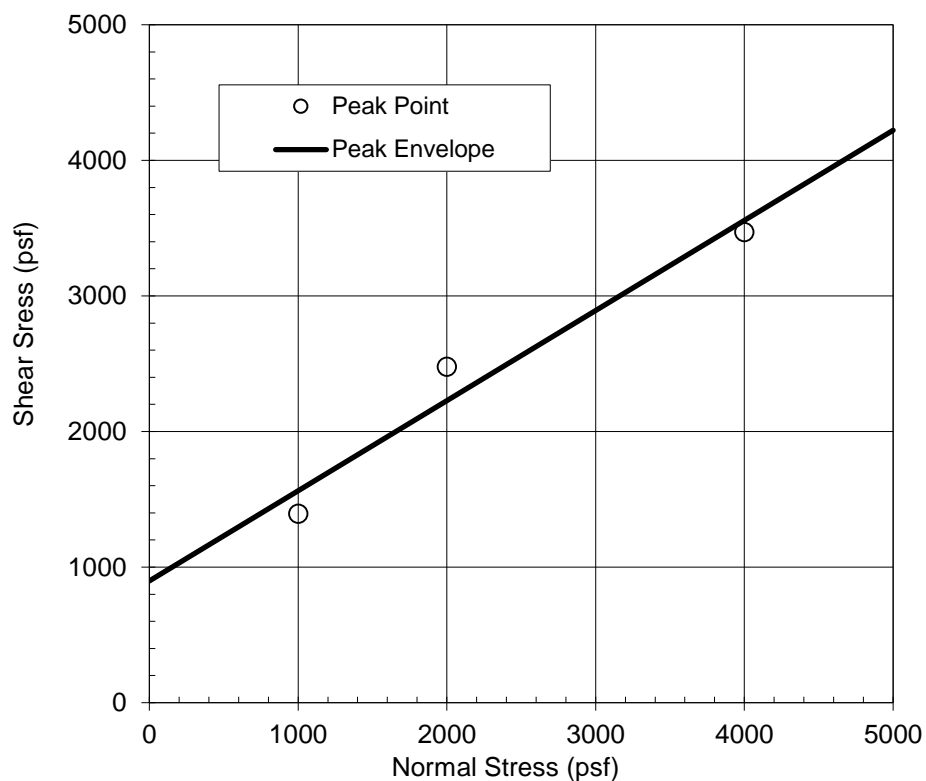
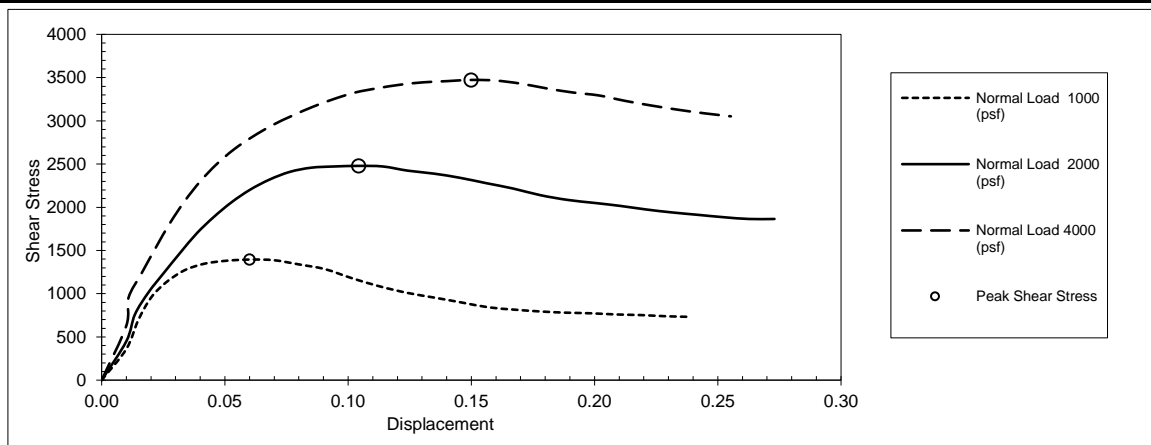
Checked | S.Tena
Project # 20173187.003A
Tech : Uly
8-Feb-17

Remolded Direct Shear Test Results (ASTM D 3080)

**CASA DE LAS CAMPANAS
PHASE III EXPANSION
SAN DIEGO, CALIFORNIA**

Figure

B-8




Strain Rate = 0.00945 inch/min

Date Tested: 2/3/2017

				Interpreted Shear Strength			
				Peak			
Boring No.	Sample No.	Depth	UCSC	Cohesion (psf)	Friction Angle (deg)		
B2	S3	11'-11.5'	SC	898	33.6		

Sample description: clayey sand

		Direct Shear Test Results (ASTM D 3080)		Figure
		CASA DE LAS CAMPANAS PHASE III EXPANSION SAN DIEGO, CALIFORNIA		B-9
Checked S.Tena	Tech : Uly			
Project # 20173187.003A	8-Feb-17			

Laboratory Compaction Characteristics of Soil Using Modified Effort ASTM D 1557

Report To:

Casa de Las Companas
Dominy, Kim
18655 West Bernado Drive
San Diego, CA 92127

Report Date:

2/3/2017

Project No.:

20173187.003A

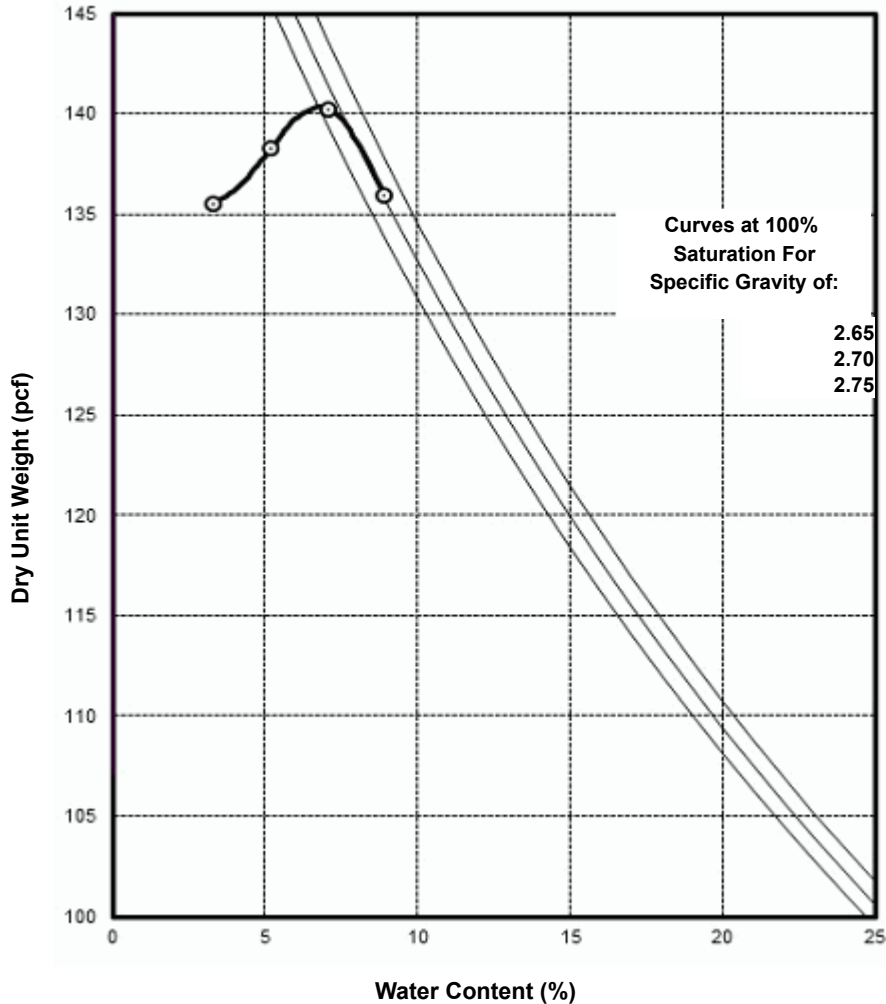
Project:

Casa de las Campanas: Phase III Geotech

Task:

02-000L Lab Testing

TEST RESULTS



Sample No.: SD_20173187_B2S1

Date Sampled: 1/27/2017

Sample Location:

B2 / S1 @ 0.5'-4.5'

Material Description:

clayey sand

Compaction Test Method:

ASTM D 1557 Method A

Maximum Dry Unit Weight (pcf): 140.3

Optimum Water Content (%): 6.8

Remarks: B2/S1 @ 0.5'-4.5'

Reviewed on 2/3/2017 by:



Ulysses Panuncialman

Laboratory Manager

Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided. This report may not be reproduced, except in full, without written approval of Kleinfelder.

L A B O R A T O R Y R E P O R T

Telephone (619) 425-1993

Fax 425-7917

Established 1928

C L A R K S O N L A B O R A T O R Y A N D S U P P L Y I N C.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
A N A L Y T I C A L A N D C O N S U L T I N G C H E M I S T S

Date: February 8, 2017

Purchase Order Number: PROJ#20173187.003A

Sales Order Number: 34564

Account Number: KLE

To:

Kleinfelder Inc.

550 West C Street Ste 1200

San Diego, CA 92101

Attention: Uly Panuncialman

Laboratory Number: S06289-1

Customers Phone: 831-4600

Fax: 831-4619

Sample Designation:

One soil sample received on 02/07/17 at 11:28am,
taken on 1/27/17 from Casa de las Campanas Phase II
Proj# 20173187.003A marked as B1 @ 0.5'-4' Sample S1.

Analysis By California Test 643, 1999, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 7.6

Water Added (ml)

Resistivity (ohm-cm)

5	4100
5	2600
5	1800
5	1500
5	1500
5	1600
5	1800

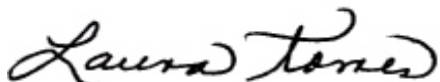
36 years to perforation for a 16 gauge metal culvert.
47 years to perforation for a 14 gauge metal culvert.
65 years to perforation for a 12 gauge metal culvert.
83 years to perforation for a 10 gauge metal culvert.
101 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417

0.028% (280ppm)

Water Soluble Chloride Calif. Test 422

0.007% (75ppm)



Laura Torres
LT/ram

FIGURE B-11

L A B O R A T O R Y R E P O R T

Telephone (619) 425-1993

Fax 425-7917

Established 1928

C L A R K S O N L A B O R A T O R Y A N D S U P P L Y I N C.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
A N A L Y T I C A L A N D C O N S U L T I N G C H E M I S T S

Date: February 8, 2017

Purchase Order Number: PROJ#20173187.003A

Sales Order Number: 34564

Account Number: KLE

To:

Kleinfelder Inc.

550 West C Street Ste 1200

San Diego, CA 92101

Attention: Uly Panuncialman

Laboratory Number: S06289-2

Customers Phone: 831-4600

Fax: 831-4619

Sample Designation:

One soil sample received on 02/07/17 at 11:28am,
taken on 1/27/17 from Casa de las Campanas Phase II
Proj# 20173187.003A marked as B4 @ 0.5'-4.5' Sample S1.

Analysis By California Test 643, 1999, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 7.6

Water Added (ml)

Resistivity (ohm-cm)

5	7200
5	4300
5	3100
5	2800
5	2600
5	2400
5	2700
5	3100

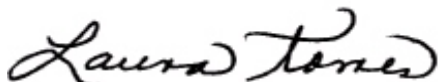
44 years to perforation for a 16 gauge metal culvert.
57 years to perforation for a 14 gauge metal culvert.
79 years to perforation for a 12 gauge metal culvert.
101 years to perforation for a 10 gauge metal culvert.
123 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417

0.010% (96ppm)

Water Soluble Chloride Calif. Test 422

0.005% (53ppm)



Laura Torres

LT/ram

FIGURE B-12

APPENDIX C

Infiltration Study

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteri	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.49 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are rocky sandy loam. This material is designated as being of the Hydrologic Soils Group "C" which is defined as having a low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.25 inches per hour assuming a Safety Factor of 2. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: Site specific test results indicate a raw infiltration rate of 0.49 inches per hour and a factored rate of 0.25 in/hr, therefore an rate greater than 0.5 in/hr is not feasible. The proposed building and perimeter access road will occupy the vast majority of the site area, with the new building located adjacent to existing buildings supported on shallow foundations, descending slopes and retaining walls. The site is underlain by shallow compacted fill soils over very dense and weathered granitic rock. The underlying rock has very low porosity (very low void ratio) and therefore lower permeability characteristics than the fill. The overlying fill has the potential to settle with an increase in moisture content due to infiltration and could have a reduction in bearing pressure below the building foundations and floor slab when wetted. Settlement or reduction of bearing below the proposed 5-story building or existing buildings is not acceptable. Infiltrated water could also have an adverse impact on retaining walls for the subterranean level and access ramp by increasing lateral pressures. Infiltrated water could also have an adverse impact on stability of nearby descending slopes. This is a particular hazard at this site since there are numerous utility trenches surrounding the building and in proximity to the proposed BMPs, and infiltrated water can travel laterally through the more permeable utility trench backfill or along the fill and rock interface.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	
<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
<p>Part 1 Result*</p>	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>NO</p>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.49 inches per hour and a factored rate of 0.25 in/hr. The site soils have been classified as "Class C" indicating low infiltration. We understand 0.25 in/hr is considered an appreciable rate.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
---	---	--	---

Provide basis:

As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration could increase risk hazards due to the presence of fill below the adjacent 5-story building, shallow rock on the north side, proximity of subterranean basement walls and nearby descending slopes, infiltration would create a geotechnical hazard. Infiltration within the fill soils could induce settlement below the building and reach the retaining walls as the building occupies the vast majority of project site areas. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with utility trench plugs or cut-off walls.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>		No Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.49	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.19	
Supporting Data					
<p>Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.</p>					

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.38 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are Bonsall sandy loam. This material is designated as being of the Hydrologic Soils Group "D" which is defined as having a very low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.19 inches per hour assuming a Safety Factor of 2. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: Site specific test results indicate a raw infiltration rate of 0.38 inches per hour and a factored rate of 0.19 in/hr, therefore an rate greater than 0.5 in/hr is not feasible. The proposed building and perimeter access road will occupy the vast majority of the site area, with the new building located adjacent to existing buildings supported on shallow foundations, descending slopes and retaining walls. The site is underlain by shallow compacted fill soils over very dense and weathered granitic rock. The underlying rock has very low porosity (very low void ratio) and therefore lower permeability characteristics than the fill. The overlying fill has the potential to settle with an increase in moisture content due to infiltration and could have a reduction in bearing pressure below the building foundations and floor slab when wetted. Settlement or reduction of bearing below the proposed 5-story building or existing buildings is not acceptable. Infiltrated water could also have an adverse impact on retaining walls for the subterranean level and access ramp by increasing lateral pressures. Infiltrated water could also have an adverse impact on stability of nearby descending slopes. This is a particular hazard at this site since there are numerous utility trenches surrounding the building and in proximity to the proposed BMPs, and infiltrated water can travel laterally through the more permeable utility trench backfill or along the fill and rock interface.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	
<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
<p>Part 1 Result*</p>	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>NO</p>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria			
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	
<p>Provide basis:</p> <p>The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.38 inches per hour and a factored rate of 0.19 in/hr. The site soils have been classified as "Class C" indicating very low infiltration . We understand 0.19 in/hr is considered an appreciable rate.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
<p>Provide basis:</p> <p>As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration could increase risk hazards due to the presence of fill below the adjacent 5-story building, shallow rock on the north side, proximity of subterranean basement walls and nearby descending slopes, infiltration would create a geotechnical hazard. Infiltration within the fill soils could induce settlement below the building and reach the retaining walls as the building occupies the vast majority of project site areas. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with utility trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>		No Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.38	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.14	
Supporting Data					
<p>Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.</p>					

Soil Map—San Diego County Area, California




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

2/3/2017
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California

Survey Area Data: Version 10, Sep 12, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Diego County Area, California (CA638)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BIC	Bonsall sandy loam, 2 to 9 percent slopes	13.6	22.1%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded	12.7	20.7%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	3.8	6.1%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	10.4	17.0%
FeC	Fallbrook rocky sandy loam, 5 to 9 percent slopes	7.7	12.6%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	7.8	12.7%
RaD2	Ramona sandy loam, 9 to 15 percent slopes, eroded	4.5	7.3%
StG	Steep gullied land	0.9	1.4%
Totals for Area of Interest		61.2	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
BIC—Bonsall sandy loam, 2 to 9 percent slopes														
Bonsall	85	D	0-10	Sandy loam	SM	A-2, A-4	0- 0- 0	0- 0- 0	100-100-100	90-95-100	50-63-75	30-40-50	20-25-30	NP-3 -5
			10-27	Clay, clay loam	CH, CL	A-7	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			27-38	Clay, clay loam	CH, CL	A-7	0- 0- 0	0- 0- 0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			38-60	Sandy clay loam, sandy loam	SC	A-2, A-6	0- 0- 0	0- 0- 0	100-100-100	95-98-100	70-75-80	25-38-50	30-35-40	10-15-20
			60-89	Sandy loam	SM	A-2, A-4	0- 0- 0	0- 0- 0	95-98-100	90-95-100	50-58-65	25-33-40	20-25-30	NP-3 -5
CmE2—Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded														
Cieneba	60	D	0-8	Coarse sandy loam	SM	A-2	0- 0- 0	0- 0- 0	90-95-100	75-85-95	50-55-60	25-30-35	0-0 -0	NP
			8-12	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	30	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties--San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
FaD2—Fallbrook sandy loam, 9 to 15 percent slopes, eroded														
Fallbrook	85	C	0-6	Sandy loam	SM	A-4	0- 0- 0	0- 0- 0	95-98-100	85-93-100	60-68-75	35-43-50	20-25-30	NP-3 -5
			6-12	Sandy loam, loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	95-98-100	85-93-100	75-78-80	40-50-60	25-30-35	5-8 -10
			12-28	Clay loam, sandy clay loam	CL, SC	A-6	0- 0- 0	0- 0- 0	95-98-100	85-93-100	70-75-80	45-55-65	25-33-40	10-15-20
			28-47	Sandy loam, loam	SC-SM, SM	A-4	0- 0- 0	0- 0- 0	95-98-100	85-93-100	65-75-85	40-50-60	25-30-35	5-8 -10
			47-51	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
FaE2—Fallbrook sandy loam, 15 to 30 percent slopes, eroded														
Fallbrook	85	C	0-2	Sandy loam	SM	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3 -5
			2-24	Loam, sandy clay loam	CL, SC	A-6	0- 0- 0	0- 0- 0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-28	Sandy loam	SM	A-2, A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3 -5
			28-32	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties--San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
FeC—Fallbrook rocky sandy loam, 5 to 9 percent slopes														
Fallbrook	70	C	0-6	Sandy loam	SM	A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3 -5
			6-24	Loam, sandy clay loam	CL, SC	A-6	0- 0- 0	0- 0- 0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-32	Sandy loam	SM	A-2, A-4	0- 0- 0	0- 0- 0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3 -5
			32-36	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	20	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—
PeC—Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19														
Placentia	85	C	0-4	Sandy loam	SC	A-4	0- 0- 0	0- 0- 0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			4-13	Sandy loam	SC	A-4	0- 0- 0	0- 0- 0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			13-21	Sandy clay	SC	A-7-6	0- 0- 0	0- 0- 0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			21-34	Sandy clay	SC	A-7-6	0- 0- 0	0- 0- 0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			34-53	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0- 0- 0	0- 0- 0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25
			53-63	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0- 0- 0	0- 0- 0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25

Engineering Properties--San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
RaD2—Ramona sandy loam, 9 to 15 percent slopes, eroded														
Ramona	85	C	0-10	Sandy loam	SM	A-4	0- 0- 0	0- 0- 0	95-98-100	75-85-95	60-65-70	35-43-50	15-20-25	NP-3 -5
			10-60	Sandy clay loam, clay loam	CL, SC	A-6	0- 0- 0	0- 0- 0	95-98-100	85-90-95	75-78-80	35-45-55	25-30-35	10-15-20
			60-74	Sandy clay loam, sandy loam	SC, SC-SM	A-6	0- 0- 0	0- 0- 0	95-98-100	75-85-95	60-65-70	35-43-50	20-28-35	5-10-15
StG—Steep gullied land														
Steep gullied land	85		0-60	Variable	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: San Diego County Area, California

Survey Area Data: Version 10, Sep 12, 2016



APPENDIX D

Response to City of San Diego LDR-Geology Cycle 3 Review Comments

APPENDIX D

Response to City of San Diego LDR-Geology Cycle 3 Review Comments

Kleinfelder is pleased to present this response to August 8, 2017 City of San Diego LDR-Geology Cycle 3 review comments. The responses have been incorporated into the final report. With the exception of the comments addressed below, the other review comments will be addressed by other consultants.

Issue 1: The project site is located within geologic hazard zone 53 as shown on the City's Seismic Safety Study Geologic Hazards Maps. Zone 53 is characterized by level or sloping to steep terrain with unfavorable geologic structure, low to moderate risk.

Issue 1 Response: *Confirming that reference to geologic hazard zone 53 has been incorporated into the final report.*

Issue 5: Currently, Criteria #2 and/or #6 of Worksheet C.4-1 includes a general statement of geotechnical hazard covering all BMPs on site. In order for the City to accept the current geotechnical hazard justification, the project's geotechnical consultant must address the specific geologic or geotechnical hazard associated with storm water infiltration that cannot be mitigated to an acceptable level for each proposed storm water BMP. The analyses and supporting documentation should be submitted for review.

Issue 5 Response: *The proposed building and perimeter access road will occupy the vast majority of the site area, with the new building located adjacent to existing buildings which are supported on shallow foundations, descending slopes and retaining walls. The site is underlain by shallow compacted fill soils over very dense and variably weathered granitic rock. The underlying rock has very low porosity (very low void ratio) and therefore lower permeability characteristics than the fill. The overlying fill has the potential to settle with an increase in moisture content due to infiltration and could have a reduction in bearing pressure below the building foundations and floor slab when wetted. Settlement or reduction of bearing below the proposed 5-story building or existing buildings is not acceptable. Infiltrated water could also have an adverse impact on retaining walls for the subterranean level and access ramp by increasing lateral pressures. Infiltrated water could also have an adverse impact on stability of nearby descending slopes. This is a particular hazard at this site since there are numerous utility trenches surrounding the building and in proximity to the proposed BMPs, and infiltrated water can travel laterally through the more permeable utility trench backfill or along the fill and rock interface.*

Issue 6: Per the SD BMP Help Desk, the current edition of Storm Water Standards defines the lower limit on infiltration that would be considered a no infiltration

condition to be less than 0.01 inches/hour. Note that the factored infiltration rate for Work Sheet C-4.1 is the field infiltration rate/2.

Issue 6 Response: *Confirming understanding that the factored infiltration rate for Work Sheet C-4.1 is the field infiltration rate/2. This has been incorporated into Section 5.12 of the final report.*

Issue 7: Clarify whether or not the existing engineered fill is considered suitable for the intended use.

Issue 7 Response: *Confirming that the existing engineered fill is considered suitable for the intended use. This statement is included in Section 3.5 of the report.*

Issue 8: Seismic Design criteria should be updated per the 2016 CBC.

Issue 8 Response: *Confirming that all references to CBC have been updated to 2016, including Section 4.2 for Seismic Design criteria.*

Issue 9: Indicate if unfavorable geologic structure exists at the site. Illustrate the geologic structure on the geologic map and geologic cross section.

Issue 9 Response: *Confirming that the weathered granitic rock below the fill does not have geologic structure, therefore, geologic structure cannot be depicted on the geologic map or cross sections and is not considered unfavorable. This issue is addressed in Sections 3.6 and 4.6 of the report.*

Issue 10: Clarify if the proposed development will be impacted by slope instability.

Issue 10 Response: *Based on our observations of the project site conditions, set back of proposed building from the slopes, inclination of the slopes and professional judgment, the hazard posed to the site by static and seismic slope stability is considered low and the proposed development will not be impacted by slope instability. This issue is addressed in Section 4.6 of the report.*

Issue 11: The geotechnical consultant must comment whether or not the proposed development as recommended will measurably destabilize neighboring properties or induce the settlement of adjacent structures.

Issue 11 Response: *The proposed development as recommended will not measurably destabilize neighboring properties or induce the settlement of adjacent structures. This statement is included in the second paragraph of Section 4 in the report.*



L64A-003B

Review Information

Cycle Type: 3 Submitted (Multi-Discipline)	Submitted: 07/19/2017	Deemed Complete on 07/19/2017
Reviewing Discipline: LDR-Geology	Cycle Distributed: 07/19/2017	
Reviewer: Thomas, Patrick	Assigned: 07/20/2017	
(619) 446-5296	Started: 08/23/2017	
pathomas@sandiego.gov	Review Due: 08/23/2017	
Hours of Review: 3.00	Completed: 08/23/2017	
Next Review Method: Submitted (Multi-Discipline)	Closed:	

- . The review due date was changed to 09/13/2017 from 08/28/2017 per agreement with customer.
- . The reviewer has indicated they want to review this project again. Reason chosen by the reviewer: New Document Required.
- . The reviewer has requested more documents be submitted.
- . Your project still has 12 outstanding review issues with LDR-Geology (all of which are new).

546769-3 (8/23/2017)

Information

<u>Cleared?</u>	<u>Issue Num</u>	<u>Issue Text</u>
<input type="checkbox"/>	1	The project site is located within geologic hazard zone 53 as shown on the City's Seismic Safety Study Geologic Hazards Maps. Zone 53 is characterized by level or sloping to steep terrain with unfavorable geologic structure, low to moderate risk. (New Issue)
<input type="checkbox"/>	2	The project consultants could note that a NPDES permit may be required by the Regional Water Quality Control Board for ground water discharged through garage basement wall drains and pumped to a storm water conveyance system. The Geology Section will defer to LDR-Engineering for discharge permit requirements. (New Issue)

References

<u>Cleared?</u>	<u>Issue Num</u>	<u>Issue Text</u>
<input type="checkbox"/>	3	Draft Geotechnical Engineering Investigation, Phase III Expansion, Casa de las Campanas, 18655 West Bernardo Drive, San Diego, California, prepared by Kleinfelder, Inc., dated April 7, 2017 (their project no. 20173187.003A)
		Site Plan, Casa de las Campanas, Phase III Expansion, 18655 W Bernardo Drive, Rancho Bernardo, CA 92127, prepared by Pasco Laret Suiter & Associates, dated March 29, 2017. (New Issue)

Draft Comments

<u>Cleared?</u>	<u>Issue Num</u>	<u>Issue Text</u>
<input type="checkbox"/>	4	The following comments are considered "Draft" pending submittal and review of the referenced "Draft" geotechnical report in final form. (New Issue)
<input type="checkbox"/>	5	Currently, Criteria #2 and/or #6 of Worksheet C.4-1 includes a general statement of geotechnical hazard covering all BMPs on site. In order for the City to accept the current geotechnical hazard justification, the project's geotechnical consultant must address the specific geologic or geotechnical hazard associated with storm water infiltration that cannot be mitigated to an acceptable level for each proposed storm water BMP. The analyses and supporting documentation should be submitted for review. (New Issue)
<input type="checkbox"/>	6	Per the SD BMP Help Desk, the current edition of Storm Water Standards defines the lower limit on infiltration that would be considered a no infiltration condition to be less than 0.01 inches/hour. Note that the factored infiltration rate for Work Sheet C-4.1 is the field infiltration rate/2. (New Issue)
<input type="checkbox"/>	7	Clarify whether or not the existing engineered fill is considered suitable for the intended use. (New Issue)
<input type="checkbox"/>	8	Seismic Design criteria should be updated per the 2016 CBC. (New Issue)
<input type="checkbox"/>	9	Indicate if unfavorable geologic structure exists at the site. Illustrate the geologic structure on the geologic map and geologic cross section. (New Issue)
<input type="checkbox"/>	10	Clarify if the proposed development will be impacted by slope instability. (New Issue)
<input type="checkbox"/>	11	The geotechnical consultant must comment whether or not the proposed development as recommended will measurably destabilize neighboring properties or induce the settlement of adjacent structures. (New Issue)
<input type="checkbox"/>	12	Submit original quality prints and digital copies (on CD/DVD/or USB data storage device) of the requested finalized geotechnical document for our records. (New Issue)



APPENDIX E
Geotechnical Business Council Insert

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org

DRAINAGE STUDY

CASA DE LAS CAMPANAS PHASE III EXPANSION

PTS#: 162330

APN: 272-740-08
18655 WEST BERNARDO DRIVE
San Diego, California 92127

Prepared By:



A handwritten signature in black ink, appearing to read "Michael H. Smith".

Michael H. Smith, PE

RCE 65090

Pasco Laret Suiter & Associates, Inc.
535 N. Highway 101, Suite A
Solana Beach, CA 92075

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

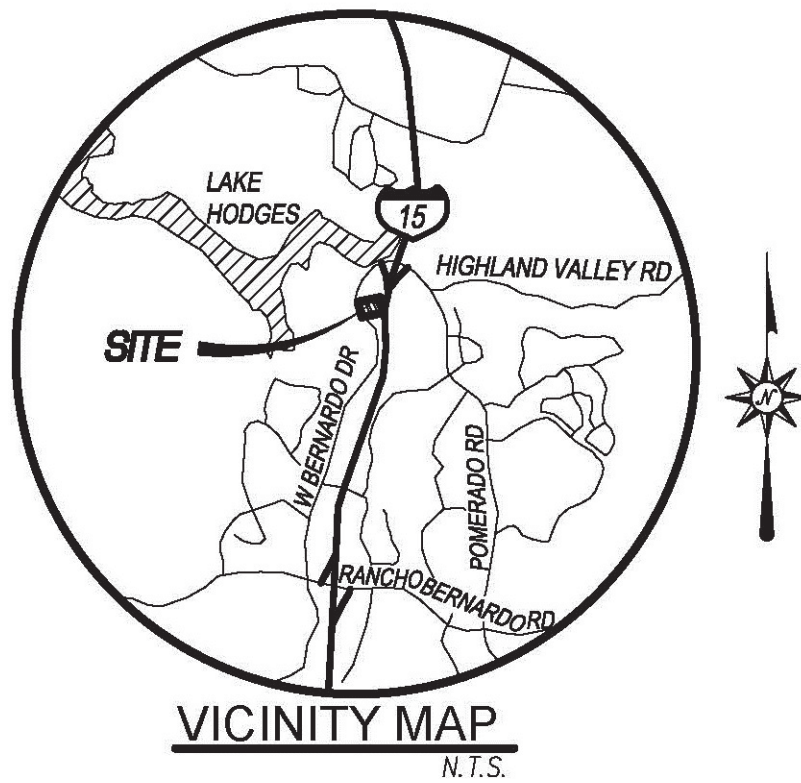
Prepared for:
Casa De Las Campanas, Inc.
18655 West Bernardo Drive,
San Diego, CA 92127

March 29, 2017
Revised November 14, 2017

TABLE OF CONTENTS

1. INTRODUCTION.....	4
1.1 Project Description	4
1.2 Existing Conditions	4
1.3 Proposed Conditions	4
2. METHODOLOGY.....	5
2.1 Rational Method	5
2.2 Runoff Coefficient	5
2.3 Rainfall Intensity.....	6
2.4 Tributary Areas.....	6
3. CALCULATIONS/RESULTS	6
3.1 Pre & Post Development Peak Flow Comparison	6
3.2 Storm Water Quality	Error! Bookmark not defined.
4. CONCLUSION	8
Appendix 1	Pre & Post-Project Hydrology Calculations
Appendix 2.....	Existing and Proposed Drainage Exhibits
Appendix 3.....	Pervious/Impervious Map for Existing and Proposed Conditions

Figure 1 Vicinity Map



1. INTRODUCTION

3.1 Project Description

The 22.3-acre site is located at 18655 West Bernardo Drive. The site exists today as a developed site and functions as a retirement community that includes housing, parking and entertainment amenities. The proposed project includes the demolition of one (1) existing structure and replacing it with a new multi-family residential building. The proposed project also includes new improvements around the building which include sidewalk, landscaping and storm water treatment facilities. The project has been designed to meet the requirements set by the City of San Diego Drainage Design Manual, dated April, 1984 and the City of San Diego Storm Water Standards Manual, dated January, 2016.

The federal Clean Water Act (CWA) is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers, and coastal areas. Section 401 of the CWA requires that any applicant for a federal permit to conduct any activity, including the construction or operation of a facility, which may result in the discharge of any pollutant, must obtain certification from the state. Section 404 of the CWA establishes a permit program to regulate the discharge of dredged material into waters of the U.S. Since the proposed project is not subject to regulations set forth in the CWA 401/404, the project is not required to obtain approval from the Regional Water Quality Control Board prior to permit issuance.

3.2 Existing Conditions

The overall site is 22.3 acres. The total drainage area tributary to an existing on-site storm drain inlet is 4.54 acres; however the project area (limit of work) is only 1.13 acres. The site is relatively flat and sheet flows storm water runoff to the southeast where it is collected by a storm drain inlet located near the southeasterly limits of the project area. The storm water then continues south via a public storm drain pipe in West Bernardo Drive and ultimately discharges into a stream that is tributary to Lake Hodges. The peak storm water runoff was calculated using the Rational Method equation, $Q=CiA$. The 4.4 in/hr intensity was determined from Appendix H of the City of San Diego Drainage Design Manual using the minimum allowable time of concentration of 5 minutes. This resulted in a peak pre-project run-off for the site at $Q=17.52$ CFS using a weighted runoff coefficient of 0.87 based on 84% of existing imperviousness.

3.3 Proposed Conditions

The project proposes the redevelopment of a new multi-family residential building and surface improvements (i.e. asphalt paving and concrete sidewalk) to support the proposed building. The proposed impervious areas will include asphalt paving, concrete sidewalk and building roof area. The project also proposes the construction of an underground detention vault and a biofiltration basin for storm water treatment and hydromodification purposes.

The drainage area for hydrology considerations is the same as the pre-project drainage area of 4.54 acres. The limit of work is smaller at an area of approximately 1.13 acres. The proposed project will result in a slight decrease of impervious area and therefore will decrease the post-project peak runoff. The post-project condition has been delineated by two (2) Drainage Management Areas (DMAs) to model the post-project condition. DMA-1A represents the area tributary to the existing downstream inlet from area outside the limit of work. DMA-1B represents the area of work (project site) tributary to the proposed underground detention vault and biofiltration basin. The underground detention vault and basin are sized for storm water treatment and hydromodification storage. For a

more detailed discussion on water quality treatment and hydromodification requirements, please refer to the “Storm Water Quality Management Plan for Casa de las Campanas” by Pasco Laret Suiter & Associates for detailed calculations.

The post-project combined flow of 17.46 CFS was calculated using the Rational Method $Q=CiA$ where the intensity was derived from the San Diego Drainage Design Manual assuming a 5-minute time of concentration (T_c) which is the shortest T_c allowable. A table summarizing the pre-project and post-project peak flows is provided at the end of this study.

2. METHODOLOGY

The proposed project has been analyzed to determine the peak runoff flow for 100 year, 6 hour rainfall event using the Rational Method per the City of San Diego Drainage Design Manual (Section 1-102.3). The Runoff Coefficient, C , for the existing and proposed conditions was selected using Table 2 of page 82 of the City of San Diego Drainage Design Manual, Revised C Method. The time of concentration (T_c) for all existing and proposed drainage areas was calculated using the minimum T_c of 5 minutes which yields an intensity of 4.4 inches per hour.

The site soil quantity is predominantly Type D, with a small region of Type C soil. For the purpose of this report, the entire project site will be modeled with Type D soil.

The proposed project site has been designed such that all runoff will be directed to pervious areas before ultimately discharging to the downstream storm drain system.

2.1 Rational Method

As mentioned above, runoff from the project site was calculated for the 100-year storm event. Runoff was calculated using the Rational Method which is given by the following equation:

$$Q = C \times i \times A$$

Where:

Q = Flow rate in cubic feet per second (cfs)

C = Runoff coefficient (Determined from Table 2, P. 82, City of San Diego Drainage Design Manual)

i = Rainfall Intensity in inches per hour (in/hr)

A = Drainage basin area in acres, (ac)

Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

2.2 Runoff Coefficient

The runoff coefficients for the project were calculated using Table 2 from the City of San Diego Drainage Design Manual (April, 1984), using the Revised C Method for the proposed condition. In accordance with City of San Diego standards, runoff coefficients were calculated based on land use and soil type. The soil conditions used in this study are consistent with Type D soil quantities. An appropriate runoff coefficient, C , for each type of land use in the subarea was selected from Table 2 of the City of San Diego Drainage Design Manual and multiplied by the percentage of total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient ($\sum[CA]$).

In the existing condition, the project site is an existing development. Per the City of San Diego Drainage Design Manual, the C value is 0.45 for pervious area and 0.95 for impervious area. The existing condition drainage characteristics are summarized in one (1) drainage area. The weighted runoff factor is calculated based on the actual percentage of impervious area. Please refer to Table 1 for a summary of the calculated C values.

In the proposed condition, approximately 2.89 acres or 83% of the total site area (4.54 acres) is impervious. The post-project runoff coefficient is calculated based on the actual percentage of impervious area. Please refer to Table 1 below.

2.3 Rainfall Intensity

Rainfall intensity was determined using the Rainfall Intensity Duration Frequency Curves from page 83 of the City of San Diego Drainage Design Manual (April, 1984). Based on a 5 minute time of concentration, an intensity of 4.4 inches per hour is used.

2.4 Tributary Areas

Drainage basins are delineated in the Hydrology Post-Project Workmap in Appendix 1 and graphically portray the tributary area for each drainage basin.

3. CALCULATIONS/RESULTS

3.1 Pre & Post Development Peak Flow Comparison

Below are a series of tables which summarize the calculations provided in the Appendix of this report. Table 1 shows the difference in the runoff coefficient, “C”, between the existing and proposed condition.

Table 1: Runoff Coefficient “C” Comparison

	TOTAL PROJECT AREA (ACRES)	% IMPERVIOUS SURFACES	TOTAL IMPERVIOUS AREA (ACRES)	C-VALUE FOR IMPERVIOUS AREA	TOTAL PERVIOUS AREA (ACRES)	C-VALUE FOR PERVIOUS AREA	WEIGHTED RUNOFF COEFFICIENT “C”
Existing	4.54	84%	3.81	0.95	0.73	0.45	0.870
Proposed	4.54	83%	3.78	0.95	0.76	0.45	0.867

Note: C values taken from Table 2 of the City of San Diego Drainage Design Manual, consistent with on-site existing soil types.

Table 2 lists the peak flow rates for the project site in the existing condition for the respective rainfall events.

Table 2: Existing Condition Peak Drainage Flow Rates

EXISTING DRAINAGE FLOWS			
DRAINAGE AREA	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	I ₁₀₀ (IN/HR)
DMA-1	4.54	17.52	4.4

Table 3 lists the peak flow rates for the project site for the proposed condition for the respective rainfall events.

Table 3: Proposed Condition Peak Drainage Flow Rates

PROPOSED DRAINAGE FLOWS			
DRAINAGE AREA	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	I ₁₀₀ (IN/HR)
DMA-1A&1B	4.54	17.46	4.4

Table 4 shows a comparison between the peak flow rates and precipitation volume for the proposed condition and the existing condition.

Table 4: Proposed Condition Peak Drainage Flow Rates

PEAK DRAINAGE FLOW COMPARISON				
CONDITION	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	V ₁₀₀ (CU-FT)	C
Existing	4.54	17.52	43,010	0.870
Proposed	4.54	17.46	42,854	0.867
Existing vs. Proposed Condition Comparison		-0.06	-157	

As shown in Table 4, the project does not increase the peak runoff rate and decreases the runoff volume for the design storm analyzed when comparing the pre-project runoff coefficient to the post-project runoff coefficient. In addition to decreasing the peak runoff flow, the comparison does not account for detention and routing through the project's BMPs. The comparison is considered conservative and the actual post project runoff, accounting for routing, will be much less than the pre-project peak runoff. For this project, the post-construction biofiltration basin and underground

detention vault are proposed for treatment control and hydromodification management only, as detention requirements for Q100 are not required since the project does not increase post-project flows.

4. CONCLUSION

As discussed previously, the proposed project's peak runoff is less than the existing condition peak runoff. The proposed project will not adversely affect downstream facilities since the overall peak flow rate will decrease when compared to the existing condition. The design of pervious areas to effectively receive, infiltrate and retain runoff from impervious surfaces will further mitigate runoff discharges and reduce volumes. Landscape areas are interspersed among the building and pavement areas to detain and retain runoff near the point where it is generated. These small collection techniques foster opportunities to maintain the natural hydrology and provide a much greater range of retention and detention practices.

It is our professional opinion that the storm drain and treatment systems as proposed in this report and on the grading plans herein are adequate to intercept, treat, contain and convey Q100.

PASCO LARET SUITER



& ASSOCIATES

CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

APPENDIX 1

PRE-PROJECT & POST-PROJECT

HYDROLOGY CALCULATIONS

PRE-PROJECT HYDROLOGY									
Drainage Area	Area Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Ac)	Total Impervious Area (sq-ft)	% Impervious	% Pervious	Weighted Runoff Coefficient	Peak Runoff Volume: (cu-ft)
DMA-1A	EX SITE	3.41	148543	2.89	126000	84.8%	15%	0.874	32461
DMA-1B	EX SITE	1.13	49214	0.92	40102	81.5%	19%	0.857	10549
TOTAL		4.54	197757	3.81	166102	84.0%	16%	0.870	43010

POST-PROJECT HYDROLOGY									
BMP Location	DMA Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Ac)	Total Impervious Area (sq-ft)	% Impervious	% Pervious	Weighted Runoff Coefficient	Peak Runoff Volume: (cu-ft)
DMA-1A	OFF-SITE AREA	3.41	148543	2.89	125820	84.7%	15%	0.874	32439
DMA-1B	PROJECT AREA	1.13	49214	0.90	39029	79.3%	21%	0.847	10415
TOTAL:		4.54	197757	3.78	164849	83.4%	17%	0.867	42854

Note:

1. 500 sq-ft of additional impervious area was included to account for unforeseen impervious areas (i.e. Pool and patio areas)

100 Yr Storm at 5 Min TC	
Intensity:	4.40 in/hr
Precip:	3.00 in

Runoff Coefficient	
Impervious	0.95
Landscape	0.45
Permeable Pavers	0.45

Detention Calculation:

Pre-Project Peak Runoff Volume:

Post-Project Peak Runoff Volume:

Delta Peak Runoff Volume (Post - Pre):

Volume Provided by BMP's:

43010 cu-ft

42854 cu-ft

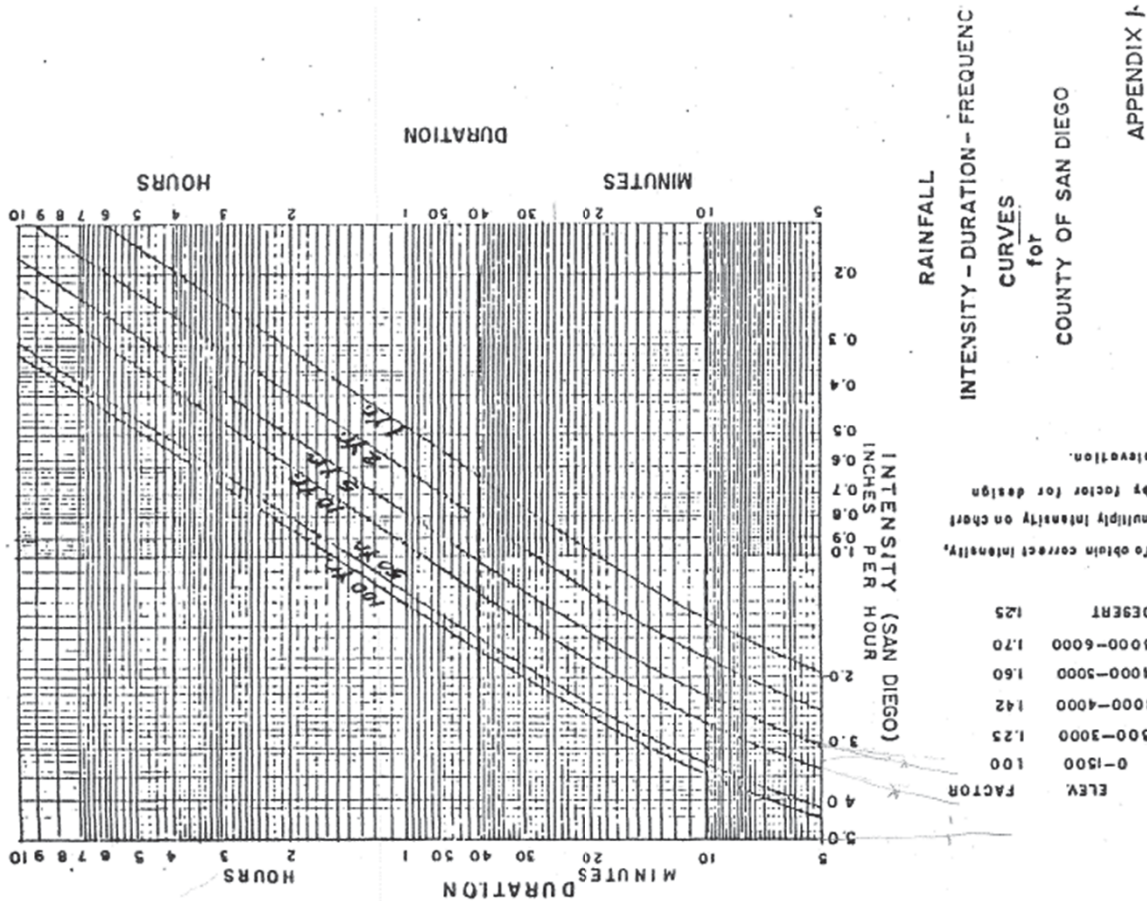
-157 cu-ft

4500 cu-ft

*From Underground Vault & Biofiltration Basin

4500 > -81 Therefore, Adequate Detention Provided

Results: The volume provided in the BMPs and the overall decrease of impervious areas results a smaller post project discharge Q. Therefore, detention is not required for Q100



PASCO LARET SUITER

& ASSOCIATES

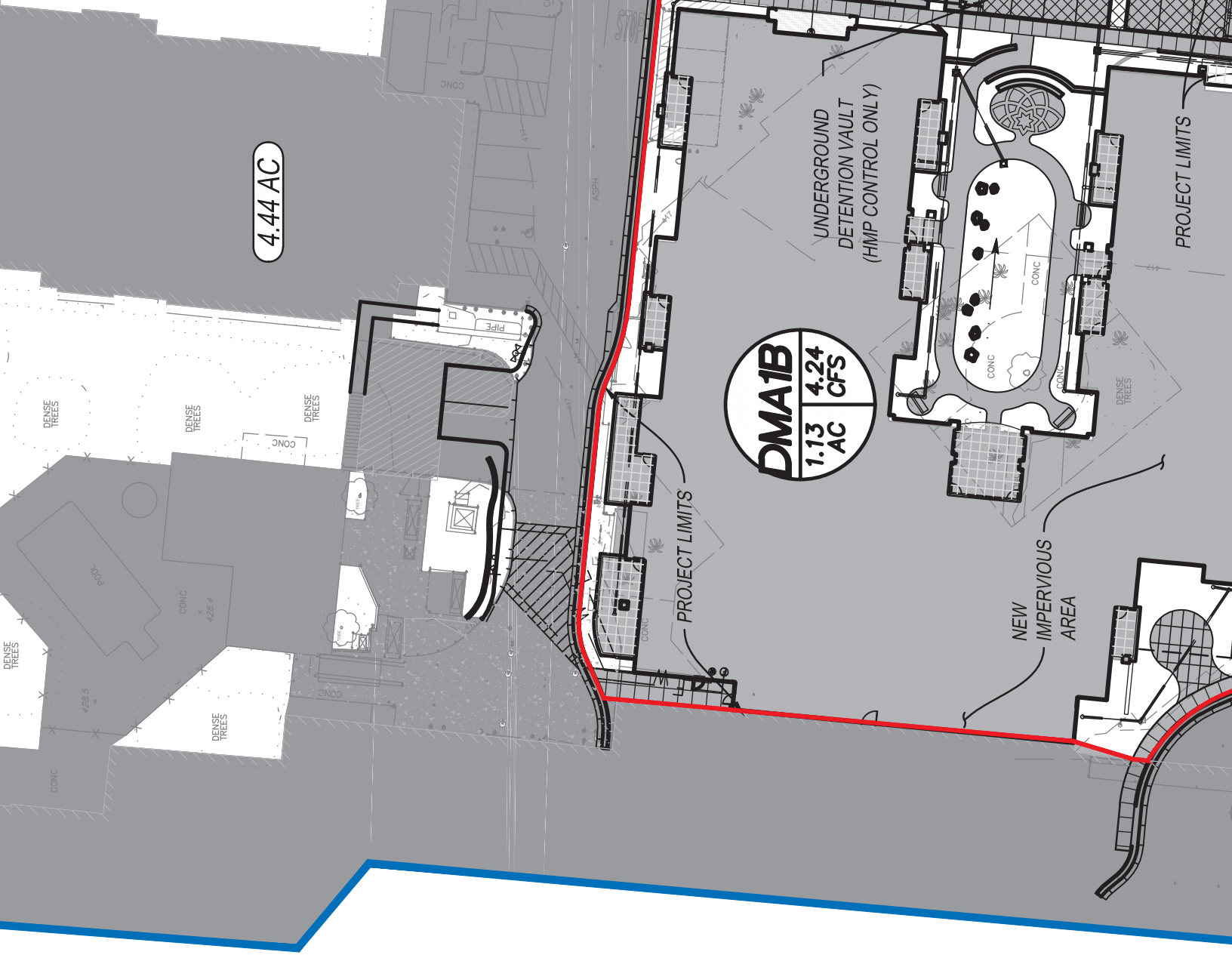
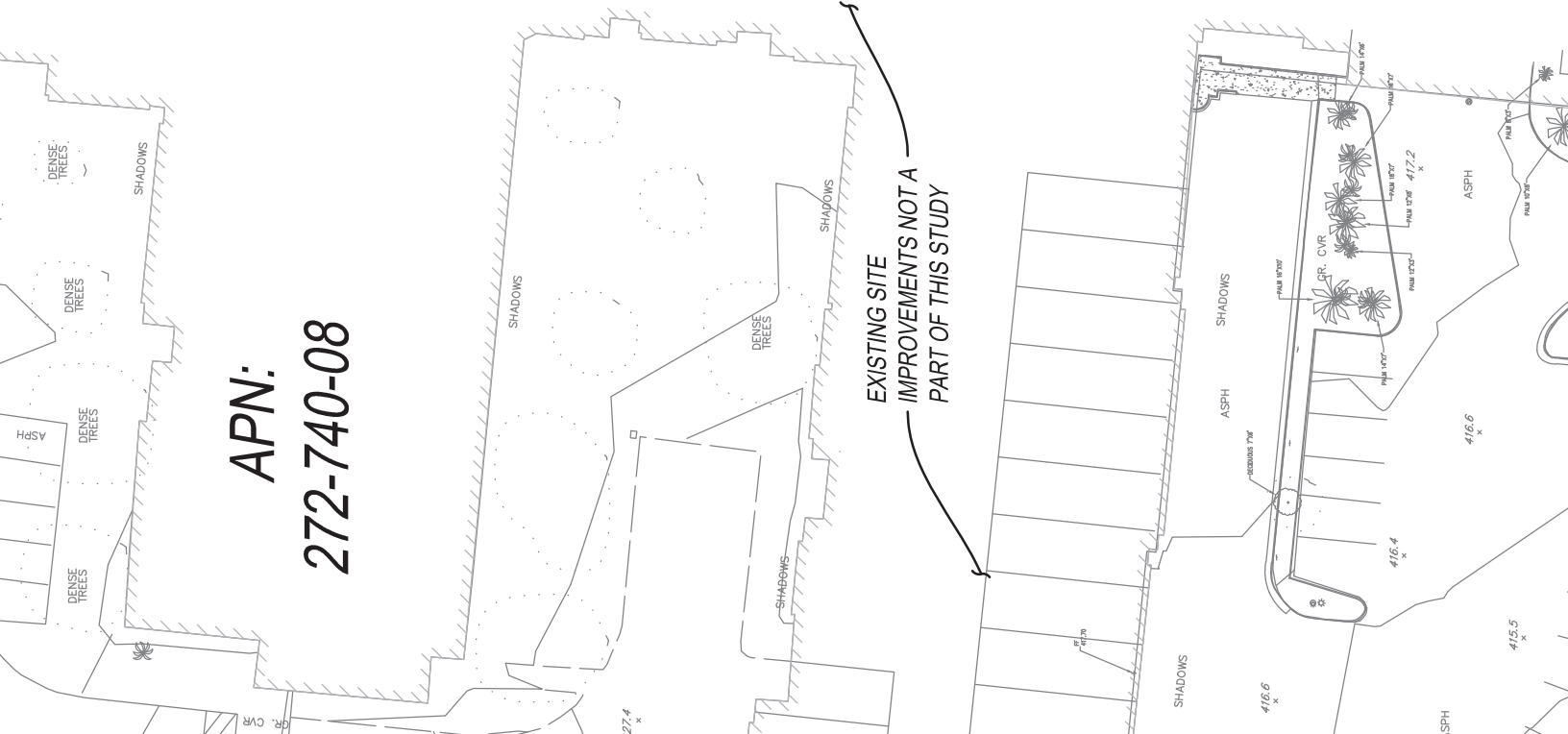
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

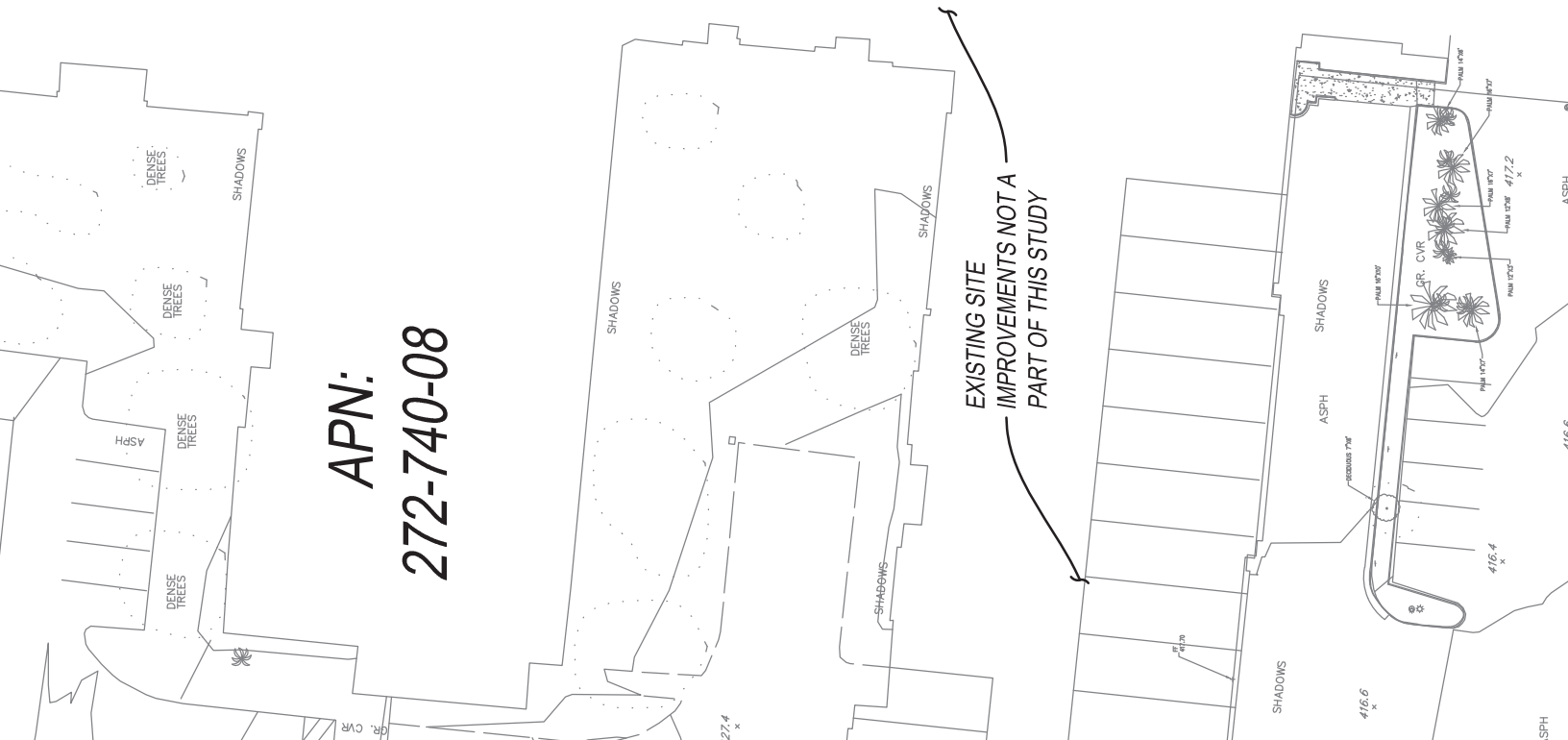
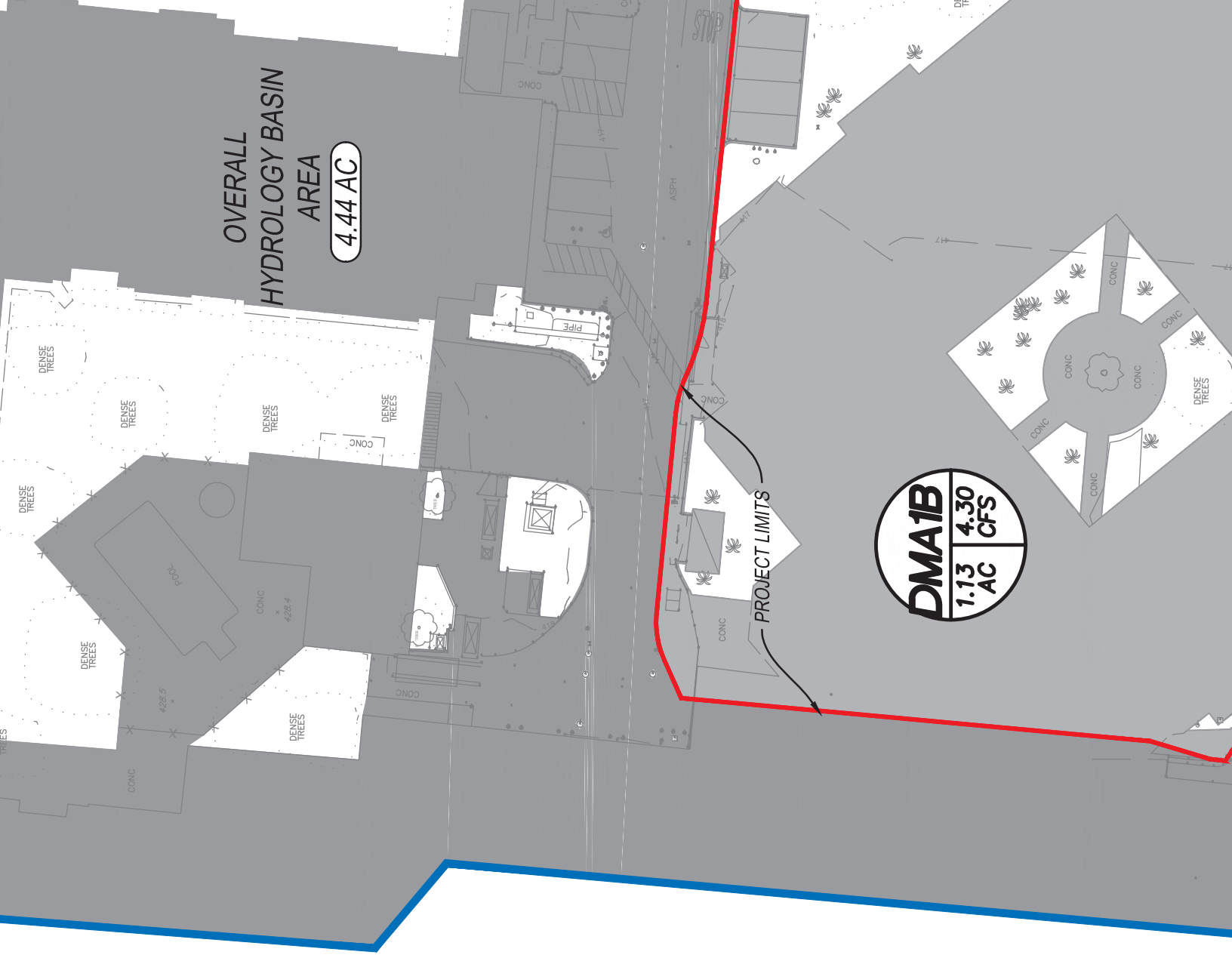
APPENDIX 2

EXISTING & PROPOSED

DRAINAGE EXHIBITS

APN:
272-740-08





PASCO LARET SUITER



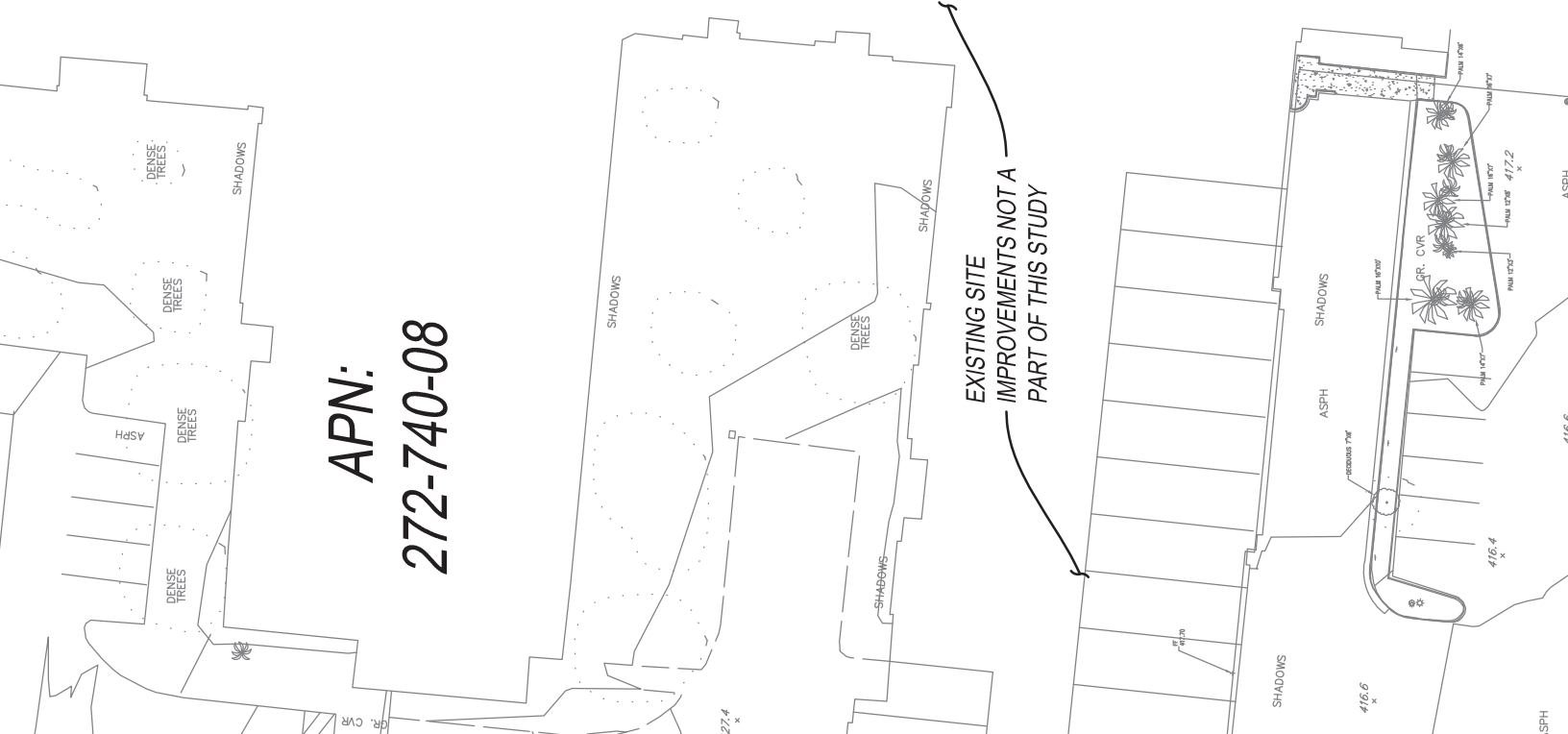
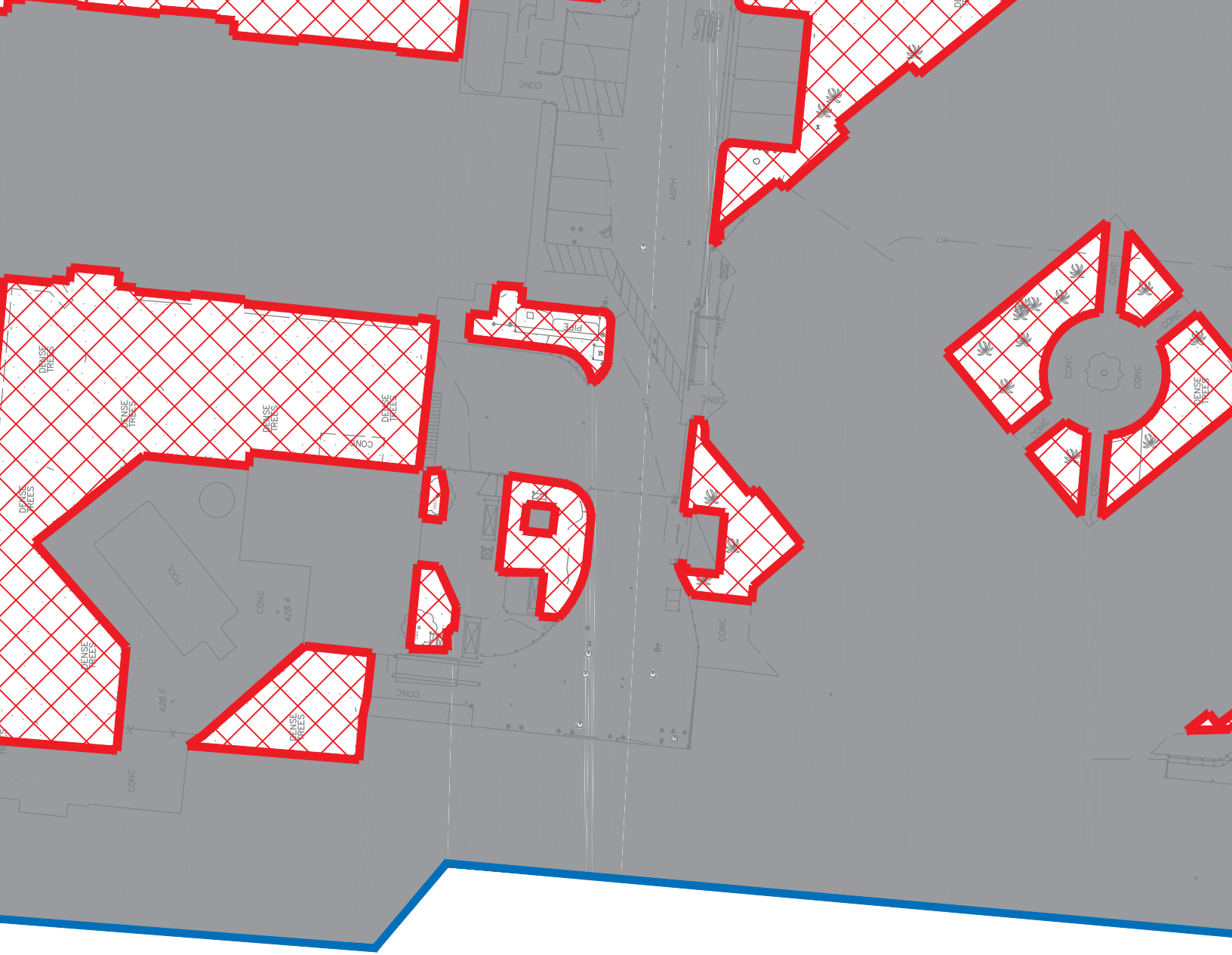
& ASSOCIATES

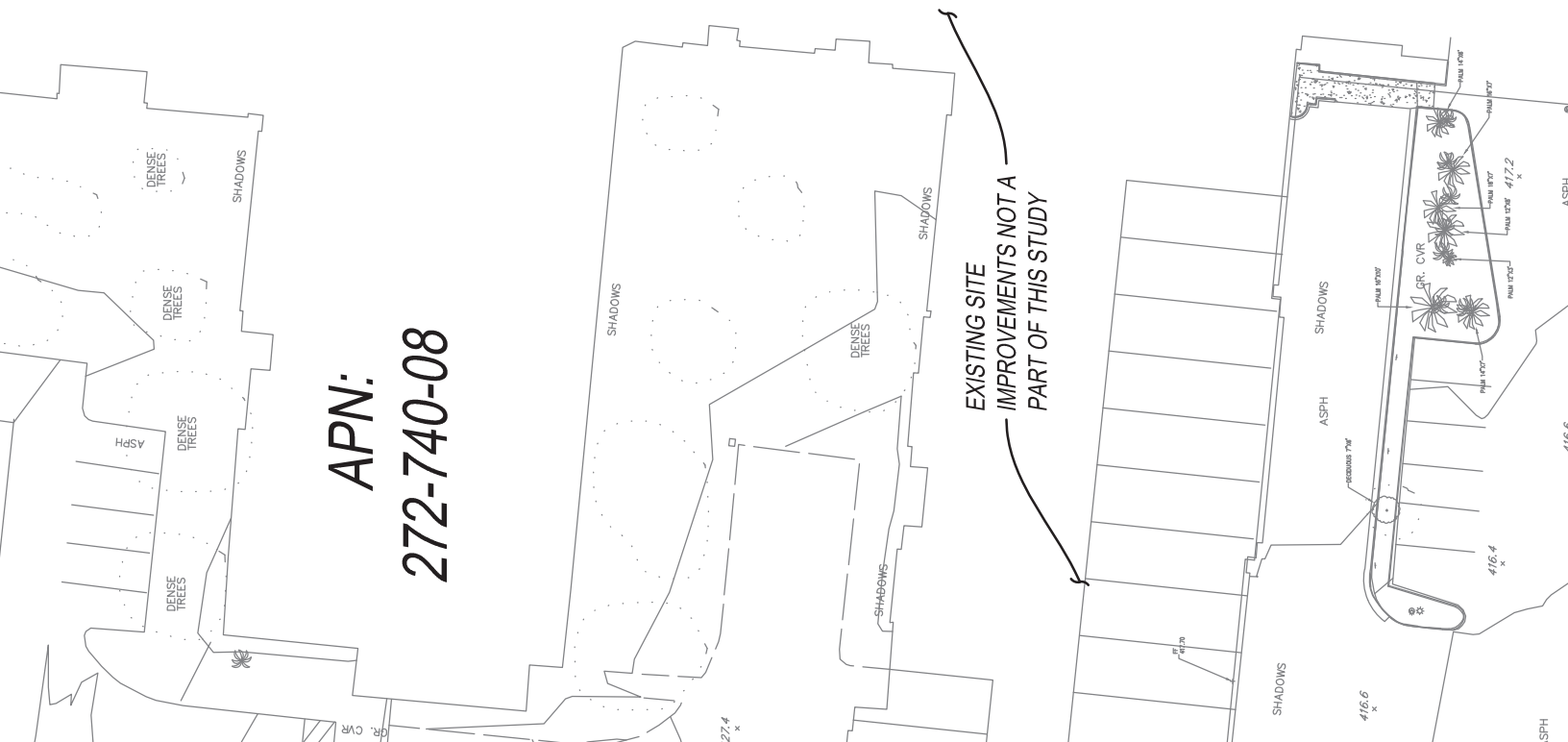
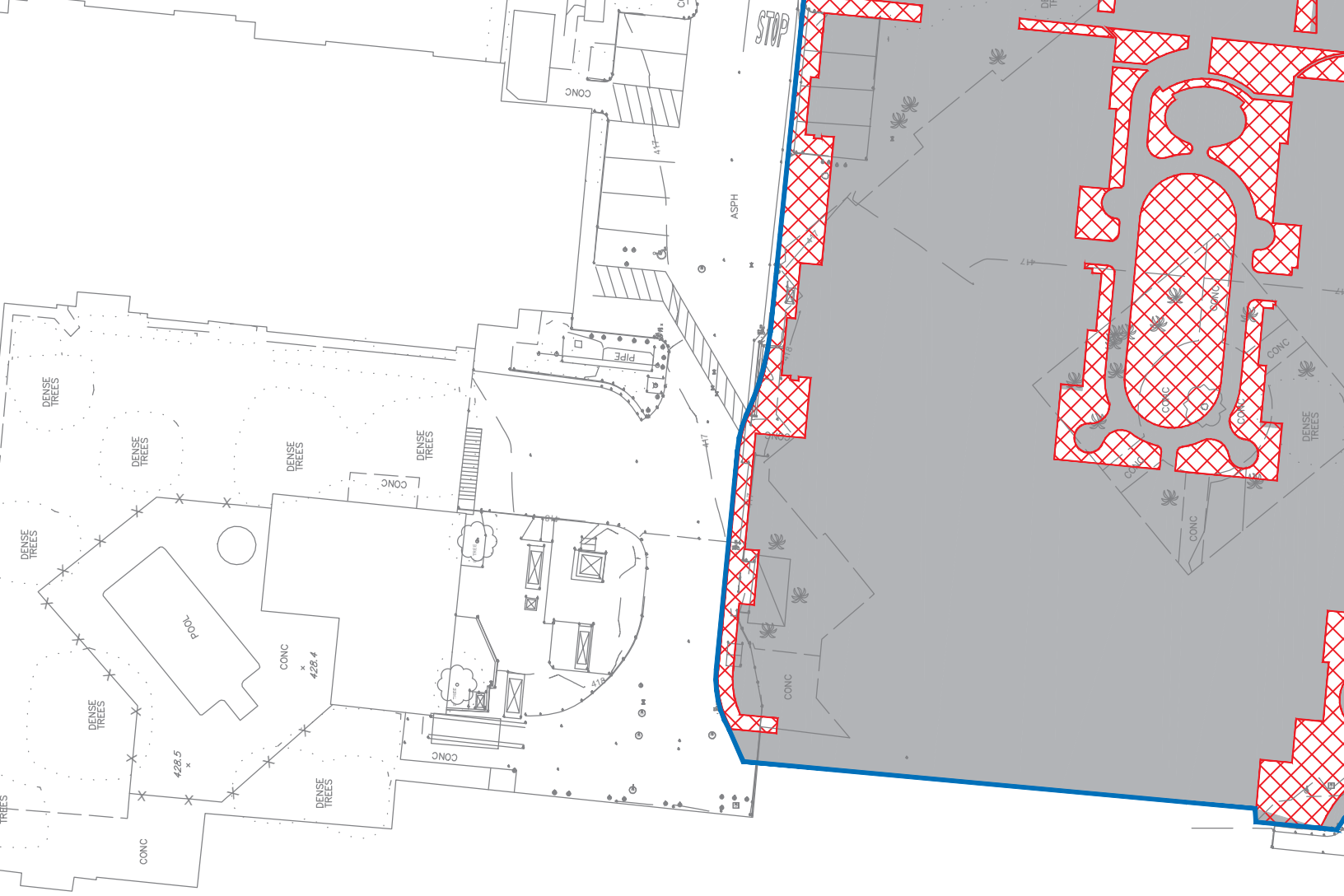
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

APPENDIX 3

PERVIOUS/IMPERVIOUS MAPS

FOR EXISTING & PROPOSED CONDITIONS





APN:
272-740-08

EXISTING SITE
IMPROVEMENTS NOT A
PART OF THIS STUDY



The City of San Diego

**PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT
PLAN (SWQMP) FOR**

CASA DE LAS CAMPANAS PHASE III EXPANSION
PTS 162330

ENGINEER OF WORK:

Michael H. Smith, PE #65090
Provide Wet Signature and Stamp Above Line

PREPARED FOR:

CASA DE LAS CAMPANAS, INC
18655 West Bernardo Drive
San Diego, CA 92127

PREPARED BY:

PASCO LARET SUITER
— & ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

Pasco Laret Suiter & Associates
535 N. Highway 101, Ste A
Solana Beach, CA 92175
858-259-8212

DATE:

November 10, 2017

Approved by: City of San Diego

Date

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



TABLE OF CONTENTS

- Acronyms
- Certification Page
- Submittal Record
- Project Vicinity Map
- FORM DS-560: Storm Water Applicability Checklist
- FORM I-1: Applicability of Permanent, Post-Construction Storm Water BMP Requirements
- FORM I-3B: Site Information Checklist for PDPs
- FORM I-4: Source Control BMP Checklist for All Development Projects
- FORM I-5: Site Design BMP Checklist for All Development Projects
- FORM I-6: Summary of PDP Structural BMPs
- FORM DS-563: Permanent BMP Construction, Self Certification Form
- Attachment 1: Backup for PDP Pollutant Control BMPs
 - Attachment 1a: DMA Exhibit
 - Attachment 1b: Tabular Summary of DMAs and Design Capture Volume Calculations
 - Attachment 1c: Harvest and Use Feasibility Screening (when applicable)
 - Attachment 1d: Categorization of Infiltration Feasibility Condition (when applicable)
 - Attachment 1e: Pollutant Control BMP Design Worksheets / Calculations
- Attachment 2: Backup for PDP Hydromodification Control Measures
 - Attachment 2a: Hydromodification Management Exhibit
 - Attachment 2b: Management of Critical Coarse Sediment Yield Areas
 - Attachment 2c: Geomorphic Assessment of Receiving Channels
 - Attachment 2d: Flow Control Facility Design
- Attachment 3: Structural BMP Maintenance Plan
 - Attachment 3a: Structural BMP Maintenance Thresholds and Actions
 - Attachment 3b: Draft Maintenance Agreement (when applicable)
- Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs
- Attachment 5: Project's Drainage Report
- Attachment 6: Project's Geotechnical and Groundwater Investigation Report

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

CERTIFICATION PAGE

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION
Permit Application Number: PTS 162330

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.



PE 65090; EXP. 9-30-2019

Engineer of Work's Signature, PE Number & Expiration Date

Michael H. Smith, PE

Print Name

Pasco Laret Suiter & Associates

Company

March 29, 2017

Date



Engineer's Stamp

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1	3/29/17	<input checked="" type="checkbox"/> Preliminary Design/Planning/CEQA <input checked="" type="checkbox"/> Final Design	Initial Submittal
2	11/14/17	<input checked="" type="checkbox"/> Preliminary Design/Planning/CEQA <input checked="" type="checkbox"/> Final Design	Revision to Initial Submittal
3	Enter a date.	<input checked="" type="checkbox"/> Preliminary Design/Planning/CEQA <input checked="" type="checkbox"/> Final Design	Click here to enter text.
4	Enter a date.	<input checked="" type="checkbox"/> Preliminary Design/Planning/CEQA <input checked="" type="checkbox"/> Final Design	Click here to enter text.

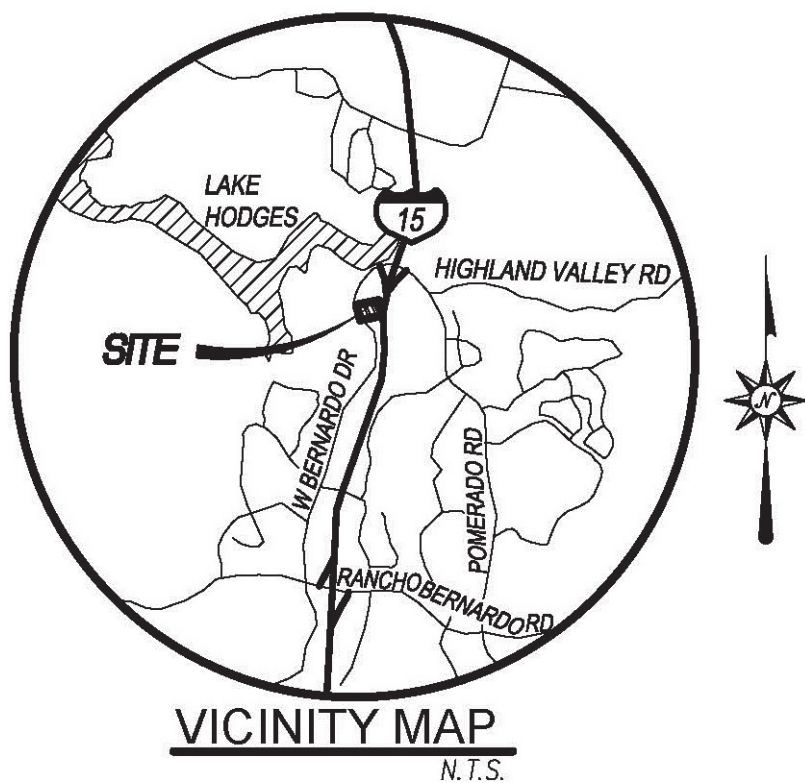
THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION


PROJECT VICINITY MAP

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION
Permit Application Number: PTS 162330



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



 THE CITY OF SAN DIEGO	City of San Diego Development Services 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	<h2 style="margin: 0;">Storm Water Requirements Applicability Checklist</h2>	FORM DS-560 February 2016
Project Address: 18655 West Bernardo Drive		Project Number <i>(for the City Use Only)</i> : Click here to enter project number	
SECTION 1. Construction Storm Water BMP Requirements: All construction sites are required to implement construction BMPs in accordance with the performance standards in the <u>Storm Water Standards Manual</u> . Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP) ¹ , which is administrated by the State Water Resources Control Board.			
For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.			
PART A: Determine Construction Phase Storm Water Requirements.			
1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with construction activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <input checked="" type="radio"/> Yes; SWPPP required, skip questions 2-4 <input type="radio"/> No; next question </div>			
2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity that results in ground disturbance and contact with storm water runoff? <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <input checked="" type="radio"/> Yes; WPCP required, skip questions 3-4 <input type="radio"/> No; next question </div>			
3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (projects such as pipeline/utility replacement) <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <input checked="" type="radio"/> Yes; WPCP required, skip questions 4 <input type="radio"/> No; next question </div>			
4. Does the project only include the following Permit types listed below? <ul style="list-style-type: none"> Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit. Individual Right of Way Permits that exclusively include one of the following activities and associated curb/sidewalk repair: water services, sewer lateral, storm drain lateral, or dry utility service. Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, curb and gutter replacement, and retaining wall encroachments. <div style="margin-top: 10px;"> <input type="checkbox"/> Yes; no document required </div>			
Check one of the boxes to the right, and continue to PART B: <div style="margin-top: 10px;"> <input type="checkbox"/> If you checked "Yes" for question 1, a SWPPP is REQUIRED. Continue to PART B </div> <div style="margin-top: 10px;"> <input checked="" type="checkbox"/> If you checked "No" for question 1, and checked "Yes" for question 2 or 3, a WPCP is REQUIRED. If the project processes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. Continue to PART B. </div> <div style="margin-top: 10px;"> <input type="checkbox"/> If you checked "No" for all question 1-3, and checked "Yes" for question 4 PART B does not apply and no document is required. Continue to Section 2. </div> <div style="margin-top: 20px; font-size: small;"> More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/swguide/constructing.shtml </div>			

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Page 2 of 4 City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist	
<p>PART B: Determine Construction Site Priority. This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk. Determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. NOTE: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.</p>	
<p>Complete PART B and continued to Section 2</p>	
<p>1. <input type="checkbox"/> ASBS a. Projects located in the ASBS watershed. A map of the ASBS watershed can be found here <i><placeholder for ASBS map link></i></p>	
<p>2. <input type="checkbox"/> High Priority a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed. b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.</p>	
<p>3. <input type="checkbox"/> Medium Priority a. Projects 1 acre or more but not subject to an ASBS or high priority designation. b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.</p>	
<p>4. <input checked="" type="checkbox"/> Low Priority a. Projects not subject to ASBS, high or medium priority designation.</p>	
<p>SECTION 2. Permanent Storm Water BMP Requirements. Additional information for determining the requirements is found in the Storm Water Standards Manual.</p>	
<p>PART C: Determine if Not Subject to Permanent Storm Water Requirements. Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.</p>	
<p>If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".</p>	
<p>If "no" is checked for all of the numbers in Part C continue to Part D.</p>	
1. Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	<input checked="" type="radio"/> Yes <input type="radio"/> No
2. Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	<input checked="" type="radio"/> Yes <input type="radio"/> No
3. Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	<input checked="" type="radio"/> Yes <input type="radio"/> No



City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist		Page 3 of 4
PART D: PDP Exempt Requirements. <p>PDP Exempt projects are required to implement site design and source control BMPs.</p> <p>If “yes” was checked for any questions in Part D, continue to Part F and check the box labeled “PDP Exempt.”</p> <p>If “no” was checked for all questions in Part D, continue to Part E.</p>		
1.	Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that: <ul style="list-style-type: none"> • Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or; • Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or; • Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual? 	<input checked="" type="radio"/> Yes; PDP exempt requirements apply <input checked="" type="radio"/> No; next question
2.	Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual ?	<input checked="" type="radio"/> Yes; PDP exempt requirements apply <input checked="" type="radio"/> No; PDP not exempt. PDP requirements apply.
PART E: Determine if Project is a Priority Development Project (PDP). Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP). <p>If “yes” is checked for any number in PART E, continue to PART F and check the box labeled “Priority Development Project”.</p> <p>If “no” is checked for every number in PART E, continue to PART F and check the box labeled “Standard Project”.</p>		
1.	New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	<input checked="" type="radio"/> Yes <input checked="" type="radio"/> No
2.	Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	<input checked="" type="radio"/> Yes <input checked="" type="radio"/> No
3.	New development or redevelopment of a restaurant. Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	<input checked="" type="radio"/> Yes <input checked="" type="radio"/> No
4.	New development or redevelopment on a hillside. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	<input checked="" type="radio"/> Yes <input checked="" type="radio"/> No



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Page 4 of 4 City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist	
5. New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	<input checked="" type="radio"/> Yes <input type="radio"/> No
6. New development or redevelopment of streets, roads, highways, freeways, and driveways. The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	<input checked="" type="radio"/> Yes <input type="radio"/> No
7. New development or redevelopment discharging directly to an Environmentally Sensitive Area. The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging- directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	<input checked="" type="radio"/> Yes <input type="radio"/> No
8. New development or redevelopment projects of a retail gasoline outlet that creates and/or replaces 5,000 square feet of impervious surface. The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic of 100 or more vehicles per day.	<input checked="" type="radio"/> Yes <input type="radio"/> No
9. New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces. Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	<input checked="" type="radio"/> Yes <input type="radio"/> No
10. Other Pollutant Generating Project. The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.	<input checked="" type="radio"/> Yes <input type="radio"/> No
PART F: Select the appropriate category based on the outcomes of PART C through PART E.	
1. The project is NOT SUBJECT TO STORM WATER REQUIREMENTS.	<input type="checkbox"/>
2. The project is a STANDARD PROJECT. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	<input type="checkbox"/>
3. The project is PDP EXEMPT. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	<input type="checkbox"/>
4. The project is a PRIORITY DEVELOPMENT PROJECT. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires hydromodification management.	<input type="checkbox"/>
Name of Owner or Agent (<i>Please Print</i>): Click here to enter name.	Title: Click here to enter title
Signature:	Date: Insert Date



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)		Form I-1
Project Identification		
Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION		
Permit Application Number: PTS 162330		Date: 11/14/17
Determination of Requirements		
<p>The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short <u>summary</u> of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.</p> <p>Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to Part 1 of Storm Water Standards sections and/or separate forms referenced in each step below.</p>		
Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	<input checked="" type="radio"/> Yes	Go to Step 2.
	<input type="radio"/> No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
<p>Discussion / justification if the project is <u>not</u> a "development project" (e.g., the project includes <u>only</u> interior remodels within an existing building):</p> <p>Click or tap here to enter text.</p>		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual (Part 1 of Storm Water Standards) <u>in its entirety</u> for guidance, AND complete Storm Water Requirements Applicability Checklist.	<input type="radio"/> Standard Project	Stop. Standard Project requirements apply.
	<input checked="" type="radio"/> PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	<input type="radio"/> PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.
<p>Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:</p> <p>Click or tap here to enter text.</p>		

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Form I-1 Page 2		
Step	Answer	Progression
<p>Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.</p>	<input type="radio"/> Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	<input checked="" type="radio"/> No	BMP Design Manual PDP requirements apply. Go to Step 4.
<p>Discussion / justification of prior lawful approval, and identify requirements (<u>not</u> required if prior lawful approval does not apply): Click or tap here to enter text.</p>		
<p>Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.</p>	<input checked="" type="radio"/> Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	<input type="radio"/> No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
<p>Discussion / justification if hydromodification control requirements do <u>not</u> apply: Click or tap here to enter text.</p>		
<p>Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.</p>	<input type="radio"/> Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	<input checked="" type="radio"/> No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
<p>Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: The project is currently 100% developed in an urban area. According to the GIS map shape provided by the San Diego WMAA, the site does not have Potential Critical Coarse Sediment Yield Areas (PCCSYAs) within the project limits. An exhibit is provided in attachment 2 showing the nearest PCCSYAs to the project site.</p>		

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Site Information Checklist For PDPs		Form I-3B
Project Summary Information		
Project Name	CASA DE LAS CAMPANAS PHASE III EXPANSION	
Project Address	18655 WEST BERNARDO DRIVE	
Assessor's Parcel Number(s) (APN(s))	272-740-08-00	
Permit Application Number	162330	
Project Watershed	Select One: <input checked="" type="radio"/> San Dieguito River <input type="radio"/> Penasquitos <input type="radio"/> Mission Bay <input type="radio"/> San Diego River <input type="radio"/> San Diego Bay <input type="radio"/> Tijuana River	
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	DEL DIOS, 905.21	
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	22.3 Acres ([SQFT] Square Feet)	
Area to be disturbed by the project (Project Footprint)	1.13 Acres (49,214 Square Feet)	
Project Proposed Impervious Area (subset of Project Footprint)	0.9 Acres (39,029 Square Feet)	
Project Proposed Pervious Area (subset of Project Footprint)	0.23 Acres (10,185 Square Feet)	
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.		
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	Decrease 0.6 %	

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
<p>Current Status of the Site (select all that apply):</p> <p><input checked="" type="checkbox"/> Existing development</p> <p><input type="checkbox"/> Previously graded but not built out</p> <p><input type="checkbox"/> Agricultural or other non-impervious use</p> <p><input type="checkbox"/> Vacant, undeveloped/natural</p> <p>Description / Additional Information:</p> <p>The site is currently developed. The project proposes demolishing an existing building and replacing it with a new building.</p>
<p>Existing Land Cover Includes (select all that apply):</p> <p><input type="checkbox"/> Vegetative Cover</p> <p><input type="checkbox"/> Non-Vegetated Pervious Areas</p> <p><input checked="" type="checkbox"/> Impervious Areas</p> <p>Description / Additional Information:</p> <p>Click or tap here to enter text.</p>
<p>Underlying Soil belongs to Hydrologic Soil Group (select all that apply):</p> <p><input type="checkbox"/> NRCS Type A</p> <p><input type="checkbox"/> NRCS Type B</p> <p><input checked="" type="checkbox"/> NRCS Type C</p> <p><input checked="" type="checkbox"/> NRCS Type D</p>
<p>Approximate Depth to Groundwater (GW):</p> <p><input checked="" type="radio"/> GW Depth < 5 feet</p> <p><input type="radio"/> 5 feet < GW Depth < 10 feet</p> <p><input type="radio"/> 10 feet < GW Depth < 20 feet</p> <p><input type="radio"/> GW Depth > 20 feet</p>
<p>Existing Natural Hydrologic Features (select all that apply):</p> <p><input type="checkbox"/> Watercourses</p> <p><input type="checkbox"/> Seeps</p> <p><input type="checkbox"/> Springs</p> <p><input type="checkbox"/> Wetlands</p> <p><input checked="" type="checkbox"/> None</p> <p>Description / Additional Information:</p> <p>Click or tap here to enter text.</p>

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage:

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

1. Whether existing drainage conveyance is natural or urban;
2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site;
3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Description / Additional Information:

The site exists today as a senior living community and is mostly developed therefore the existing drainage is urban. The overall site is 22.3 acres. The total drainage area tributary to an existing on-site storm drain inlet is 4.5 acres; however the project area to be redeveloped is only 1.1 acres. The site is relatively flat and sheet flows storm water runoff to the southeast where it is collected by a storm drain inlet located near the southeasterly limits of the project area. The storm water then continues south via a public storm drain pipe in West Bernardo Drive and ultimately discharges into a stream that is tributary to Lake Hodges. The peak storm water run-off was calculated using the rational method equation ($Q=CiA$). The 4.4 in/hr intensity was determined from the City of San Diego Drainage Design Manual's Appendix H. using the minimum allowable time of concentration of 5 minutes. This resulted in a peak pre-project run-off for the site at $Q=17.68$ CFS using a weighted runoff coefficient of 0.89 based on 87% of existing imperviousness.

The existing project area is predominantly soil Type D with a small region of Type C soil. Type C soils are located within DMA-1B and make up approximately 18% of the total DMA soil condition. See NRCS Web Soil survey included in Attachment 2.



Form I-3B Page 4 of 11

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project proposes a new mixed use commercial and multi-family residential building with covered parking. The project will also improve the hardscaping around the proposed building which will include sidewalk, landscaping, permeable pavement and concrete paving. Proposed drainage improvements consist of storm drain pipes, catch basins and an underground detention vault and biofiltration basin for storm water treatment and hydromodification purposes. The biofiltration planter area is designed to treat and detain post-project runoff to meet the DCV treatment and Hydromodification Management Plan (HMP) criteria. The project will not change or increase the runoff characteristics observed in the existing condition.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

The project proposes the redevelopment of a new multi-family residential building and the surface improvements (i.e. asphalt paving and concrete sidewalk) to support the proposed building. The proposed impervious areas will include asphalt paving, concrete sidewalk and building roof area.

List/describe proposed pervious features of the project (e.g., landscape areas):

The proposed pervious features of the project include landscape areas, permeable pavements, and a biofiltration basin area designed to treat the DCV generated by the project and mitigate increased flow durations. The permeable pavement area is designed to be self-retaining per SD-6B (Site Design BMP) fact sheet.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

The project does not propose changing the natural topography as in the existing condition. Minor grading will occur for new hardscaping and to direct on-site storm water to the proposed storm drain system, however the overall drainage characteristics will remain consistent with the existing condition.

Form I-3B Page 5 of 11

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

The project proposes a network of on-site private storm drain pipes & inlets that will collect the runoff from the project area. The runoff is then conveyed to an on-site underground detention vault which will capture and detain the required hydromodification management volume. The water is then pumped from the underground vault to a biofiltration basin where it will be treated for water quality prior to leaving the site. The peak storm events will overtop an emergency weir in the vault and gravity flow to the existing storm drain system that leaves the site. The emergency weir elevation in the vault is set at an elevation that allows for the treatment and detention of the 85th percentile storm event.

Form I-3B Page 6 of 11

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- ☒ On-site storm drain inlets
- ☒ Interior floor drains and elevator shaft sump pumps
- ☐ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☒ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Food service
- ☐ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☒ Fire Sprinkler Test Water
- ☐ Miscellaneous Drain or Wash Water
- ☒ Plazas, sidewalks, and parking lots
- ☐ Large Trash Generating Facilities
- ☐ Animal Facilities
- ☐ Plant Nurseries and Garden Centers
- ☐ Automotive-related Uses

Description / Additional Information:

Click or tap here to enter text.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
<p>Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)</p> <p>The project proposes the collection of onsite storm water runoff and conveying it through a treatment train facility that includes an underground detention vault and biofiltration basin. From the storm water treatment facilities the storm water will discharge to an existing 30" RCP pipe that conveys storm water south where it ultimately discharges to a natural drainage channel that is tributary to Lake Hodges.</p>
<p>Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. The beneficial uses of Lake Hodges include: AGR, COLD, IND, MUN, PROC, RARE, REC1, REC2, WARM, & WILD.</p>
<p>Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations.</p> <p>No ASBS areas downstream</p>
<p>Provide distance from project outfall location to impaired or sensitive receiving waters.</p> <p>The project is approximately 0.5 miles north of where it discharges to a natural drainage channel that is tributary to Lake Hodges.</p>
<p>Sumarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands</p> <p>The project is not adjacent to environmentally sensitive areas.</p>

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Form I-3B Page 8 of 11			
Identification of Receiving Water Pollutants of Concern			
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:			
303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant	
Green Valley Creek	Click or tap here to enter text.	Chloride, Manganese, PCP	
Green Valley Creek	Click or tap here to enter text.	Sulfates	
Lake Hodges	Click or tap here to enter text.	Color, Manganese, Mercury	
Lake Hodges	Click or tap here to enter text.	Nitrogen, pH, Phosphorus	
Lake Hodges	Click or tap here to enter text.	Turbidity	
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	
Identification of Project Site Pollutants*			
*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)			
Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see BMP Design Manual (Part 1 of Storm Water Standards) Appendix B.6):			
Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Heavy Metals	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Organic Compounds	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Trash & Debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Oxygen Demanding Substances	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Oil & Grease	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bacteria & Viruses	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Form I-3B Page 9 of 11

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

- ☒ Yes, hydromodification management flow control structural BMPs required.
- ☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

Click or tap here to enter text.

Critical Coarse Sediment Yield Areas*

*This Section only required if hydromodification management requirements apply

Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint?

- ☒ Yes
- ☐ No, No critical coarse sediment yield areas to be protected based on WMAA maps

Discussion / Additional Information:

According the GIS map published from the WMAA, the project does not have PCCSYA's within the project area. See exhibit in attachment 2 showing the project and the proximity to published PCCSYA's.

Form I-3B Page 10 of 11

Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply

List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.

The point of compliance is considered to be the south east corner of the Site where the proposed storm drain systems connects to the existing storm drain system. This location is chosen because the drainage characteristics are the same in the pre-project & post-project condition at that location.

Has a geomorphic assessment been performed for the receiving channel(s)?

- ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold)
- ☐ Yes, the result is the low flow threshold is 0.1Q2
- ☐ Yes, the result is the low flow threshold is 0.3Q2
- ☐ Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Click or tap here to enter text.

Discussion / Additional Information: (optional)

Click or tap here to enter text.

Form I-3B Page 11 of 11

Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

The project is proposing redevelopment of an existing senior residential care facility that is mostly impervious. The proposed redevelopment of the project area will increase the overall pervious area when counting the biofiltration areas proposed for treatment and landscape areas. EPA SWMM was used in order to demonstrate the proposed flow control will return flows below the required low flow thresholds.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Click or tap here to enter text.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Source Control BMP Checklist for All Development Projects		Form I-4	
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist.			
Answer each category below pursuant to the following.			
<ul style="list-style-type: none"> • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided. 			
Source Control Requirement		Applied?	
SC-1 Prevention of Illicit Discharges into the MS4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion / justification if SC-1 not implemented: Click or tap here to enter text.			
SC-2 Storm Drain Stenciling or Signage	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion / justification if SC-2 not implemented: Click or tap here to enter text.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion / justification if SC-3 not implemented: Click or tap here to enter text.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion / justification if SC-4 not implemented: Click or tap here to enter text.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Discussion / justification if SC-5 not implemented: Click or tap here to enter text.			



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Form I-4 Page 2 of 2			
Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Interior floor drains and elevator shaft sump pumps	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Interior parking garages	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Need for future indoor & structural pest control	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Landscape/Outdoor Pesticide Use	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Pools, spas, ponds, decorative fountains, and other water features	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Food service	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Refuse areas	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Industrial processes	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Outdoor storage of equipment or materials	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Vehicle/Equipment Repair and Maintenance	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Fuel Dispensing Areas	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Loading Docks	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Fire Sprinkler Test Water	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Miscellaneous Drain or Wash Water	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Plazas, sidewalks, and parking lots	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
SC-6A: Large Trash Generating Facilities	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
SC-6B: Animal Facilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
SC-6C: Plant Nurseries and Garden Centers	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
SC-6D: Automotive-related Uses	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
<p>Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.</p> <p>Click or tap here to enter text.</p>			

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Site Design BMP Checklist for All Development Projects		Form I-5	
Site Design BMPs			
All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.			
Answer each category below pursuant to the following.			
<ul style="list-style-type: none"> • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. 			
A site map with implemented site design BMPs must be included at the end of this checklist.			
Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Discussion / justification if SD-1 not implemented: No natural drainage pathways exist within the project site. The project does not propose street trees for reducing the overall DCV. The full DCV can be biofiltered within the biofiltration layers of the planter.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
1-2 Are street trees implemented? If yes, are they shown on the site map?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
1-3 Implemented street trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
1-4 Is street tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
SD-2 Have natural areas, soils and vegetation been conserved?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Discussion / justification if SD-2 not implemented: The project will protect existing trees as identified on the landscaping plans. Natural areas and soils will be conserved to the maximum extent possible.			



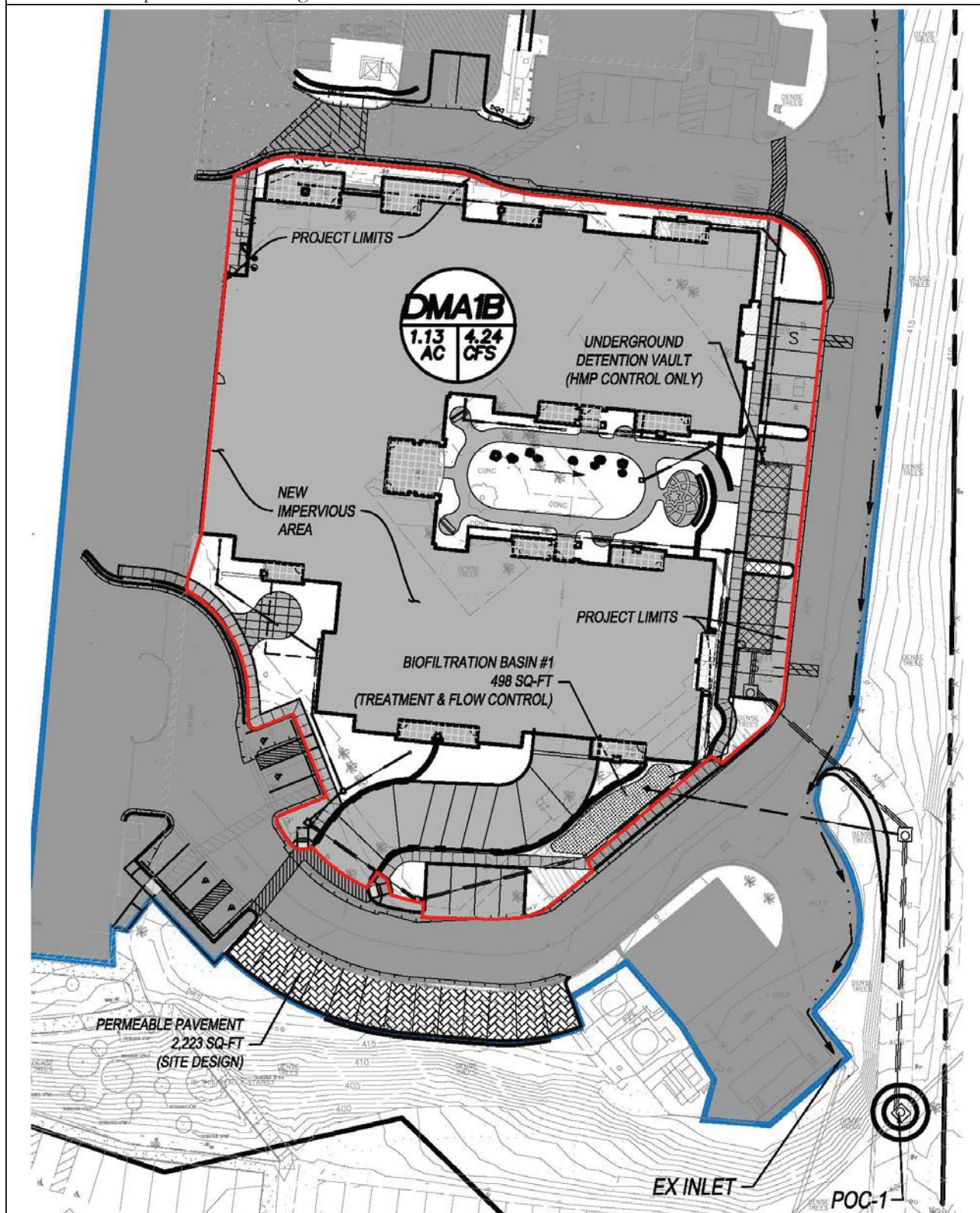
Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-3 not implemented: The project proposes to reduce impervious area in the post-project condition compared to the pre-project condition.</p>			
SD-4 Minimize Soil Compaction	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-4 not implemented: Soil compaction will be minimized in pervious areas to the maximum extent possible.</p>			
SD-5 Impervious Area Dispersion	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-5 not implemented: Landscape areas will effectively receive, infiltrate and treat runoff from impervious areas as much as possible.</p>			
5-1 Is the pervious area receiving runoff from impervious area identified on the site map?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-6 not implemented: Permeable pavement will be used for the proposed parking area. Permeable pavement contains small voids that allow water to pass through to a gravel base.</p>			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
SD-7 Landscaping with Native or Drought Tolerant Species	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-7 not implemented: Landscape areas will be planted with native or drought tolerant non-native plants.</p>			
SD-8 Harvesting and Using Precipitation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
<p>Discussion / justification if SD-8 not implemented: Harvest & use is considered to be infeasible per Form I-7</p>			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A



Insert Site Map with all site design BMPs identified:



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Summary of PDP Structural BMPs	Form I-6
PDP Structural BMPs	
<p>All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).</p> <p>PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).</p> <p>Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).</p>	
<p>Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.</p> <p>The overall strategy was to minimize impervious area where feasible and direct all storm water runoff to landscaping areas and permanent storm water treatment facilities. According to the recommendation made by the geotechnical engineer (Kleinfelder), infiltration is not feasible due to potential geotechnical hazards. Therefore a biofiltration (BF-1) treatment facility with no infiltration was selected for handling water quality requirements for the project's site runoff.</p> <p>Runoff from the developed project site is divided into one Drainage Management Area (DMA-1B) draining to an underground detention vault and biofiltration basin. The underground detention vault is responsible for handling Hydromodification Management Plan (HMP) requirements for POC-1. The vault has been sized to capture the required hydromodification management volume and provide flow control to meet HMP criteria. The vault has also been designed to capture the required Design Capture Volume (DCV) and pump the required treatment volume to the biofiltration facility.</p> <p>The biofiltration facility is responsible for handling water quality requirements for POC-1. In developed conditions, the basin will have a total surface depth of 1.4 feet and an internal outlet structure. Flows will discharge from the basin via the outlet structure or infiltrate through the base of the facility to the receiving amended soil and flow control orifice. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.</p> <p>The basin has been sized using the alternative sizing factors for BMPs downstream of a detention vault. See Worksheet B.5-4 included in Attachment 1.</p> <p>(Continue on page 2 as necessary.)</p>	



Form I-6 Page 2 of X

(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)

(Continued from page 1)

The underground detention vault was modeled using the Environmental Protection Agency (EPA) Storm Water Management Model (SWMM) version 5.1. EPA SWMM continuous simulation models were prepared to determine the required orifice diameter/pump flow rate to the biofiltration BMP. The model results shows that a 1"-dia orifice will achieve the required post-project flow durations; therefore the basin will include a 0.5"-dia orifice plate for flow control for the smaller events. An emergency weir will be constructed within the detention vault with the top of the weir set above the DCV elevation, such that high flows that exceed the DCV can be safely discharged to the existing storm drain system. Flows that bypass the biofiltration basin will not increase the peak discharge in post-project conditions since the overall imperviousness of the site is decreased and the vault and biofiltration basin provide additional detention.

The proposed parking area is designed with the site design BMP permeable pavement. Site design BMP permeable pavement areas are designed to be self-retaining and are designed primarily for direct rainfall. Since this area is designed to be self-retaining, structural BMPs are not required as the site design BMP effectively reduces the DCV.

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

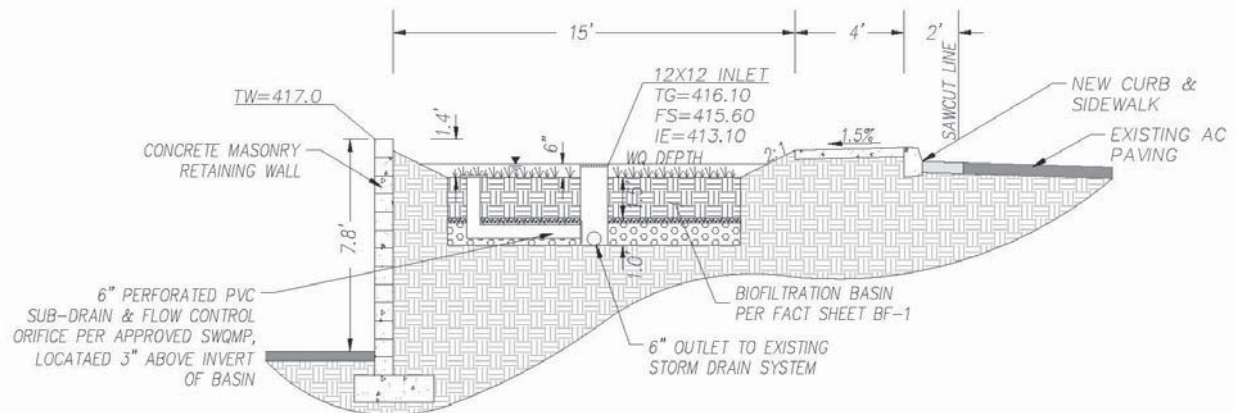
Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP #1	
Construction Plan Sheet No. C1.0	
<p>Type of structural BMP:</p> <p><input type="checkbox"/> Retention by harvest and use (HU-1)</p> <p><input type="checkbox"/> Retention by infiltration basin (INF-1)</p> <p><input type="checkbox"/> Retention by bioretention (INF-2)</p> <p><input type="checkbox"/> Retention by permeable pavement (INF-3)</p> <p><input type="checkbox"/> Partial retention by biofiltration with partial retention (PR-1)</p> <p><input checked="" type="checkbox"/> Biofiltration (BF-1)</p> <p><input type="checkbox"/> Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below)</p> <p>Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration</p> <p><input checked="" type="checkbox"/> BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below)</p> <p><input checked="" type="checkbox"/> Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion</p> <p><input checked="" type="checkbox"/> Detention pond or vault for hydromodification management</p> <p><input checked="" type="checkbox"/> Other (describe in discussion section below)</p>	
<p>Purpose:</p> <p><input type="checkbox"/> Pollutant control only</p> <p><input type="checkbox"/> Hydromodification control only</p> <p><input checked="" type="checkbox"/> Combined pollutant control and hydromodification control</p> <p><input type="checkbox"/> Pre-treatment/forebay for another structural BMP</p> <p><input type="checkbox"/> Other (describe in discussion section below)</p>	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Casa De Las Campanas, LLC
Who will be the final owner of this BMP?	Casa De Las Campanas, LLC
Who will maintain this BMP into perpetuity?	Casa De Las Campanas, LLC
What is the funding mechanism for maintenance?	Casa De Las Campanas, LLC



Structural BMP ID No. BMP #1

Construction Plan Sheet No. C1.00

Discussion (as needed):




B

SECTION:

PRIVATE BIOFILTRATION BASIN (BF-1)

NOT TO SCALE

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

 City of San Diego Development Services 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	Permenant BMP Construction Self Certification Form	FORM DS-563 January 2016
Date Prepared: Click here to enter text.		
Project No.: Click here to enter text.		
Project Applicant: Click here to enter text.		
Phone: Click here to enter text.		
Project Address: Click here to enter text.		
Project Engineer: Click here to enter text.		
Phone: Click here to enter text.		
<p>The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.</p> <p>This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.</p>		
<p>CERTIFICATION:</p> <p>As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and structural BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 of the San Diego Regional Water Quality Control Board.</p> <p>I understand that this BMP certification statement does not constitute an operation and maintenance verification.</p>		
<p>Signature: _____</p> <p>Date of Signature: <u> Insert Date </u></p> <p>Printed Name: <u> Click here to enter text. </u></p> <p>Title: <u> Click here to enter text. </u></p> <p>Phone No. <u> Click here to enter text. </u></p> <div style="border: 1px solid black; width: 300px; height: 150px; margin-left: auto; margin-top: 20px; text-align: center; vertical-align: middle;"><u>Engineer's Stamp</u></div>		

DS-563 (12-15)



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



ATTACHMENT 1 BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	<input checked="" type="checkbox"/> Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	<input checked="" type="checkbox"/> Included on DMA Exhibit in Attachment 1a <input checked="" type="checkbox"/> Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	<input checked="" type="checkbox"/> Included <input checked="" type="checkbox"/> Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	<input checked="" type="checkbox"/> Included <input checked="" type="checkbox"/> Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	<input checked="" type="checkbox"/> Included

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

- ☒ Underlying hydrologic soil group
- ☒ Approximate depth to groundwater
- ☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☒ Critical coarse sediment yield areas to be protected
- ☒ Existing topography and impervious areas
- ☒ Existing and proposed site drainage network and connections to drainage offsite
- ☒ Proposed grading
- ☒ Proposed impervious features
- ☒ Proposed design features and surface treatments used to minimize imperviousness
- ☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☒ Structural BMPs (identify location, type of BMP, and size/detail)

The site plan for DMA1B shows a project area outlined in red, labeled "PROJECT LIMITS". The overall hydrology basin area is 4.44 AC, and the project area is 1.13 AC. The project area includes a building, a pool, and various site features. The overall hydrology basin area includes the project area and surrounding areas. The site plan also shows a circular feature with a central area labeled "CONC" and surrounding areas labeled "DENSE TREES".

OVERALL HYDROLOGY BASIN AREA
4.44 AC

DMA1B
1.13 AC 4.30 CFS

PROJECT LIMITS

Site features include: POOL, DENSE TREES, CONC, ASPH, and various building footprints.

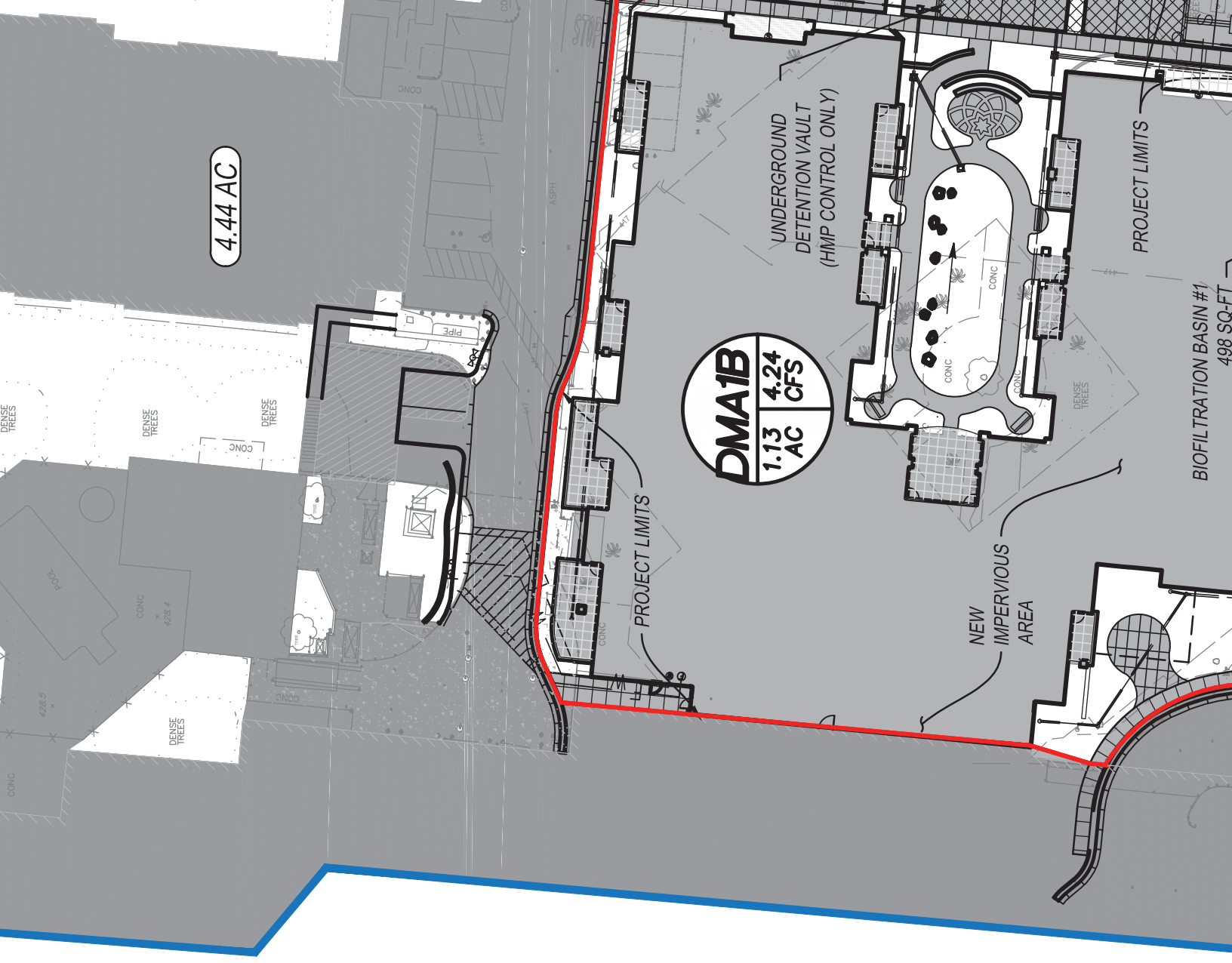
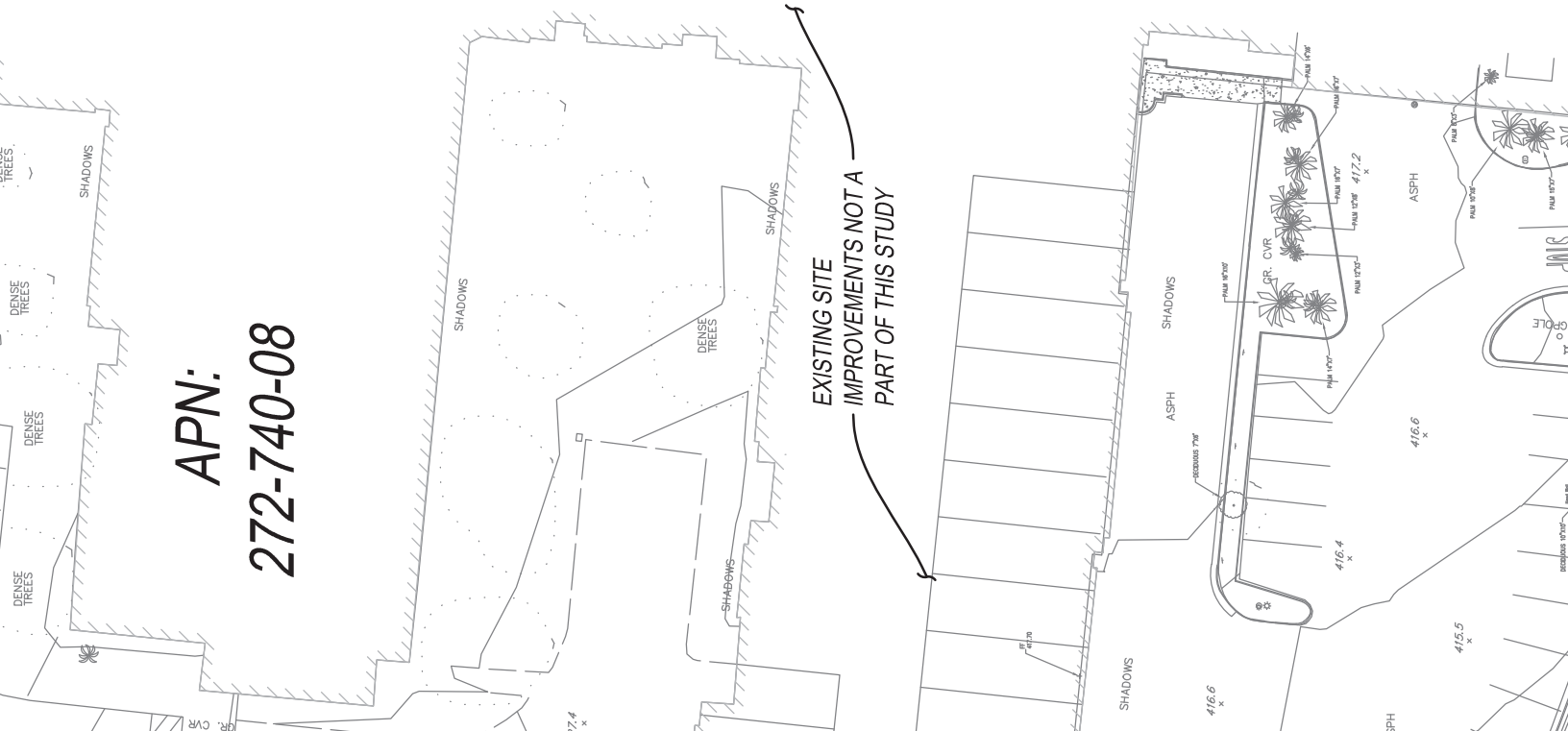
APN:
272-740-08

EXISTING SITE
IMPROVEMENTS NOT A
PART OF THIS STUDY

SHADOWS
DENSE TREES
ASPH
GR. CVR
IMPROVEMENTS NOT A PART OF THIS STUDY
416.6' x 416.4' x
417.2' x 417.2' x

EXISTING SITE
- IMPROVEMENTS NOT A
PART OF THIS STUDY

APN:
272-740-08



4.44 AC

BMP Sizing and DCV Summary Table

BMP Location	BMP Description	Total Area (sq-ft)	% Impervious	% Pervious	% Pavers	Weighted Runoff Factor	DCV (Cu-ft)	Minimum 3.0% Treatment Area (sq-ft)	Treatment Area Provided (sq-ft)	DCV Provided (Cu-Ft)	1.5xDCV from B.5-1 (cu-ft)	0.75xDCV from B.5-1 (cu-ft)
DMA-1B	BIOFILTRATION	49,214	79%	21%	0%	0.78	2036.4	1145	498.0	929.766	692	346.0
	PLANTER											

NOTE:

Runoff Factor	SUSMP Parameters	
Impervious	Intensity:	0.20 in/hr
Landscape	Precip:	0.64 in
Permeable Pavers	*Class "D" Soils	

Drawdown Time for Biofiltration Basin 1

Outlet Q:	0.05 cfs	*Based on the Low Flow Orifice
BMP Percolation Rate:	5 in/hr	0.0001 ft/sec
BMP Area:	498.0 sq-ft	
BMP Percolation Rate:	0.06 cfs	
Basin Volume:	930 cu-ft	
DCV/Average Q:	19037 secs	5.29 Hours

DMA 1B**Worksheet B.2-1: DCV****Design Capture Volume**

1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.64	inches
2	Area Tributary to BMP (s)	A=	1.13	acres
3	Area Weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.78	unitless
4	Trees Credit Volume	TCV=	0.00	cubic-feet
5	Rain Barrels Credit Volume	RCV=	0.00	cubic-feet
6	Calculate DCV = $(3630 \times C \times d \times A) - TCV - RCV$	DCV=	2036.4	cubic-feet

Harvest and Use Feasibility Checklist		Form I-7
<p>1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?</p> <p><input checked="" type="checkbox"/> Toilet and urinal flushing</p> <p><input type="checkbox"/> Landscape irrigation</p> <p><input type="checkbox"/> Other: _____</p>		
<p>2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.</p> <p>$(9.3\text{gal/person*day}) * (0.13368\text{ft}^3/\text{gal}) = (1.24\text{ft}^3/\text{person*day}) * (1.5\text{ days}) = 1.86\text{ft}^3/36\text{hr}$</p> <p>[Provide a summary of calculations here]</p> <p>78 units with 2 people/unit = 156 people Therefore: $(156\text{ people}) * (1.86\text{ft}^3/36\text{hr}) = 290\text{ ft}^3/36\text{hrs}$</p>		
<p>3. Calculate the DCV using worksheet B-2.1.</p> <p>DCV = <u>2050</u> (cubic feet)</p>		
<p>3a. Is the 36 hour demand greater than or equal to the DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No \Rightarrow</p> <p>\Downarrow</p>	<p>3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?</p> <p><input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No \Rightarrow</p> <p>\Downarrow</p>	<p>3c. Is the 36 hour demand less than 0.25DCV?</p> <p><input checked="" type="checkbox"/> Yes \Downarrow</p>
<p>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</p>	<p>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</p>	<p>Harvest and use is considered to be infeasible.</p>
<p>Is harvest and use feasible based on further evaluation?</p> <p><input type="checkbox"/> Yes, refer to Appendix E to select and size harvest and use BMPs.</p> <p><input checked="" type="checkbox"/> No, select alternate BMPs.</p>		

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteri	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.49 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are rocky sandy loam. This material is designated as being of the Hydrologic Soils Group "C" which is defined as having a low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.19 inches per hour assuming a Safety Factor of 2.6. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a raw infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. Due to the proximity of descending slopes, infiltration would create a geotechnical hazard. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	
<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
<p>Part 1 Result*</p>	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>NO</p>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria			
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
<p>Provide basis:</p> <p>The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.49 inches per hour. The site soils have been classified as "Class C" indicating low infiltration therefore is not feasible to consider substantial amount of water infiltrating the subject site.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
<p>Provide basis:</p> <p>As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration may occur which could increase risk hazards by inducing instability of slopes adjacent to the basin. Lateral flow into adjacent underground utility trenches may also occur. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>		No Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.49	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.19	
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.					

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteri	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.38 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are Bonsall sandy loam. This material is designated as being of the Hydrologic Soils Group "D" which is defined as having a very low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.14 inches per hour assuming a Safety Factor of 2.6. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a raw infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. Due to the proximity of descending slopes, infiltration would create a geotechnical hazard. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	
<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
Part 1 Result*	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	NO

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria			
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
<p>Provide basis:</p> <p>The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.38 inches per hour. The site soils have been classified as "Class D" indicating very low infiltration therefore is not feasible to consider substantial amount of water infiltrating the subject site.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
<p>Provide basis:</p> <p>As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration may occur which could increase risk hazards by inducing instability of slopes adjacent to the basin. Lateral flow into adjacent underground utility trenches may also occur. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

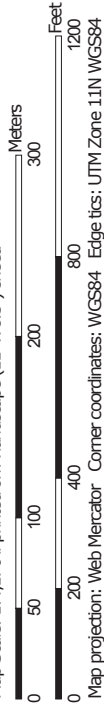
Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.38	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.14	
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.					

Soil Map—San Diego County Area, California



Map Scale: 1:4,170 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 10, Sep 12, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Diego County Area, California (CA638)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BIC	Bonsall sandy loam, 2 to 9 percent slopes	13.6	22.1%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded	12.7	20.7%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	3.8	6.1%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	10.4	17.0%
FeC	Fallbrook rocky sandy loam, 5 to 9 percent slopes	7.7	12.6%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	7.8	12.7%
RaD2	Ramona sandy loam, 9 to 15 percent slopes, eroded	4.5	7.3%
StG	Steep gullied land	0.9	1.4%
Totals for Area of Interest		61.2	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
BIC—Bonsall sandy loam, 2 to 9 percent slopes														
Bonsall	85 D	D	0-10	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	100-100-100	90-95-100	50-63-75	30-40-50	20-25-30	NP-3-5
			10-27	Clay, clay loam	CH, CL	A-7	0-0-0	0-0-0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			27-38	Clay, clay loam	CH, CL	A-7	0-0-0	0-0-0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			38-60	Sandy clay loam, sandy loam	SC	A-2, A-6	0-0-0	0-0-0	100-100-100	95-98-100	70-75-80	25-38-50	30-35-40	10-15-20
			60-89	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	90-95-100	50-58-65	25-33-40	20-25-30	NP-3-5
CmE2—Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded														
Cieneba	60 D	D	0-8	Coarse sandy loam	SM	A-2	0-0-0	0-0-0	90-95-100	75-85-95	50-55-60	25-30-35	0-0-0	NP
			8-12	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	30 D	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties--San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H
FaD2—Fallbrook sandy loam, 9 to 15 percent slopes, eroded														
Fallbrook	85	C	0-6	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	60-68-75	35-43-50	20-25-30	NP-3-5
			6-12	Sandy loam, loam	SC-SM, SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	75-78-80	40-50-60	25-30-35	5-8-10
			12-28	Clay loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	85-93-100	70-75-80	45-55-65	25-33-40	10-15-20
			28-47	Sandy loam, loam	SC-SM, SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	65-75-85	40-50-60	25-30-35	5-8-10
			47-51	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
FaE2—Fallbrook sandy loam, 15 to 30 percent slopes, eroded														
Fallbrook	85	C	0-2	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3-5
			2-24	Loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-28	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3-5
			28-32	Weathered bedrock	—	—	—	—	—	—	—	—	—	—


Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H
FeC—Fallbrook rocky sandy loam, 5 to 9 percent slopes														
Fallbrook	70	C	0-6	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3-5
			6-24	Loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-32	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3-5
			32-36	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	20	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—
PeC—Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19														
Placentia	85	C	0-4	Sandy loam	SC	A-4	0-0-0	0-0-0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			4-13	Sandy loam	SC	A-4	0-0-0	0-0-0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			13-21	Sandy clay	SC	A-7-6	0-0-0	0-0-0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			21-34	Sandy clay	SC	A-7-6	0-0-0	0-0-0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			34-53	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0-0-0	0-0-0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25
			53-63	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0-0-0	0-0-0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25


Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
RaD2—Ramona sandy loam, 9 to 15 percent slopes, eroded														
Ramona	85	C	0-10	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	75-85-95	60-65-70	35-43-50	15-20-25	NP-3-5
			10-60	Sandy clay loam, clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	85-90-95	75-78-80	35-45-55	25-30-35	10-15-20
			60-74	Sandy clay loam, sandy loam	SC, SC-SM	A-6	0-0-0	0-0-0	95-98-100	75-85-95	60-65-70	35-43-50	20-28-35	5-10-15
StG—Steep gullied land														
Steep gullied land	85		0-60	Variable	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 10, Sep 12, 2016



		Project Name		Casa de las Campanas	
		BMP ID		1	
Sizing Method for Volume Retention Criteria				Worksheet B.5-2	
1	Area draining to the BMP			49214	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)			0.78	
3	85 th percentile 24-hour rainfall depth			0.64	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]			2047	cu. ft.
BMP Parameters					
5	Footprint of the BMP			500	sq. ft.
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations			18	inches
7	Media retained pore space [50% of (FC-WP)]			0.05	in/in
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area			3	inches
9	Porosity of aggregate storage			0.4	in/in
Volume Retention Requirement					
10	Measured infiltration rate in the DMA			0.15	in/hr.
11	Factor of safety			2	
12	Reliable infiltration rate, for biofiltration BMP sizing [Line 10/ Line 11] Note: This worksheet is not applicable if Line 12 < 0.01 in/hr.			0.075	in/hr.
13	Average annual volume reduction target (Figure B.5-2) When Line 12 ≥ 0.01 in/hr. = Minimum (40, 166.9 x Line 12 +6.62)			19.1	%
14	Fraction of DCV to be retained (Figure B.5-3) $0.0000013 \times \text{Line } 13^3 - 0.000057 \times \text{Line } 13^2 + 0.0086 \times \text{Line } 13 - 0.014$			0.139	
15	Target volume retention [Line 14 x Line 4]			285	cu. ft.
Evapotranspiration: Average Annual Volume Retention					
16	Effective evapotranspiration depth [Line 6 x Line 7]			0.9	inches
17	Retained Pore Volume [(Line 16 x Line 5)/12]			38	cu. ft.
18	Fraction of DCV retained in pore spaces [Line 17/Line 4]			0.02	
19	Evapotranspiration average annual capture [ET nomographs in Figure B.5-5]			1.7	%
Infiltration: Average Annual Volume Retention					
20	Drawdown for infiltration storage [(Line 8 x Line 9)/Line 12]			16	hours
21	Equivalent DCV fraction from evapotranspiration (use Line 19 and Line 20 in Figure B.4-1; Refer to Appendix B.4.2.2)			0.01	
22	Infiltration volume storage [(Line 5 x Line 8 x Line 9)/12]			50	cu. ft.
23	Infiltration Storage Fraction of DCV [Line 22/Line 4]			0.02	
24	Total Equivalent Fraction of DCV [Line 21 + Line 23]			0.03	
25	Biofiltration BMP average annual capture [use Line 24 and 20 in Figure B.4-1]			6.24	%
Volume retention required from site design and other BMPs					
26	Fraction of DCV retained (Figure B.5-3) $0.0000013 \times \text{Line } 25^3 - 0.000057 \times \text{Line } 25^2 + 0.0086 \times \text{Line } 25 - 0.014$			0.038	
27	Remaining target DCV retention [(Line 14 – Line 26) x Line 4] Note: If Line 27 is equal to or smaller than 0 then the BMP meets the volume retention performance standard. If Line 27 is greater than 0, the applicant must implement site design and/or other BMPs within the DMA that will retain DCV equivalent to or greater than Line 27 to meet the volume retention performance standard			207	cu. ft.
Target Volume retention from site design and other BMPs = 207 cubic feet					

		Project Name		Casa de las Campanas	
		BMP ID		1	
Alternative Minimum Footprint Sizing Factor				Worksheet B.5-3	
1	Area draining to the BMP			49214	sq. ft.
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)			0.78	
3	Load to Clog			2	lb/sq. ft.
4	Allowable Period to Accumulate Clogging Load (T_L)			10	years
Volume Weighted EMC Calculation					
Land Use		Fraction of Total DCV	TSS EMC (mg/L)	Product	
Single Family Residential			123	0	
Commercial			128	0	
Industrial			125	0	
Education (Municipal)			132	0	
Transportation		0.145	78	11.31	
Multi-family Residential		0.145	40	5.8	
Roof Runoff		0.63	14	8.82	
Low Traffic Areas			50	0	
Open Space		0.08	216	17.28	
Other, specify:				0	
Other, specify:				0	
Other, specify:				0	
5	Volume Weighted EMC (sum of all products)			43.21	mg/L
Sizing Factor for Clogging					
6	Adjustment for pretreatment measures Where: Line 6 = 0 if no pretreatment; Line 6 = 0.25 when pretreatment is included; Line 6 = 0.5 if the pretreatment has an active Washington State TAPE approval rating for "pre-treatment."			0.25	
7	Average Annual Precipitation [Provide documentation of the data source in the discussion box; SanGIS has a GIS layer for average annual precipitation]			15	inches
8	Calculate the Average Annual Runoff (Line 7 x Line 1/12) x Line 2			47984	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 5 x (1 – Line 6))/10 ⁶			97	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3			485	sq. ft.
11	Calculate the Minimum Footprint Sizing Factor for Clogging [Line 10/ (Line 1 x Line 2)]			0.013	
Discussion:					

Worksheet B.5-4: Optimized Biofiltration BMP Footprint when Downstream of a Storage Unit

Optimized Biofiltration BMP Footprint when Downstream of a Storage Unit		Worksheet B.5-4	
1	Area draining to the storage unit and biofiltration BMP	49214	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.78	
3	Effective impervious area draining to the storage unit and biofiltration BMP [Line 1 x Line 2]	38387	sq. ft.
4	Remaining DCV after implementing retention BMPs	2036.4	cu. ft.
5	Design infiltration rate (measured infiltration rate / 2)	0	ft./hr.
6	Media Thickness [1.5 feet minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	1.5	ft.
7	Media filtration rate to be used for sizing (0.42 ft/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	0.42	ft./hr.
8	Media retained pore space	0.05	in./in.
Storage Unit Requirement			
9	Drawdown time of the storage unit, minimum(from the elevation that bypasses the biofiltration BMP, overflow elevation)	39	hours
10	Storage required to achieve greater than 92 percent capture (see Table B.5- 5)	1.575	fraction
11	Storage required in cubic feet (Line 4 x Line 10)	3207	cu. ft.
12	Storage provided in the design, minimum(from the elevation that bypasses the biofiltration BMP, overflow elevation)	4000	cu. ft.
13	Is Line 12 \geq Line 11. If no increase storage provided until this criteria is met	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Criteria 1: BMP Footprint Biofiltration Capacity			
14	Peak flow from the storage unit to the biofiltration BMP (using the elevation used to evaluate the percent capture)	0.058	cfs
15	Required biofiltration footprint [(3,600 x Line 14)/ Line 7]	497	sq. ft.
Criteria 2: Alternative Minimum Sizing Factor (Clogging)			
16	Alternative Minimum Footprint Sizing Factor [Line 11 of Worksheet B.5-3]	0.013	Fraction
17	Required biofiltration footprint [Line 3 x Line 16]	499	sq. ft.
Criteria 3: Retention requirement [Not applicable for No Infiltration Condition]			
18	Retention Target (Line 15 in Worksheet B.5-2)	283	cu. ft.
19	Average discharge rate from the storage unit to the biofiltration BMP	0.029	cfs
20	Depth retained in the optimized biofiltration BMP {Line 6 x Line 8} + {(Line 4)/(2400 x Line 19)} x Line 5	0.08	ft.
21	Required optimized biofiltration footprint (Line 18/Line 20)	3773	sq. ft.
Optimized Biofiltration Footprint			
22	Optimized biofiltration footprint, maximum(Line 15, Line 17, Line 21)	3773	sq. ft.

ATTACHMENT 2 BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Indicate which Items are Included:

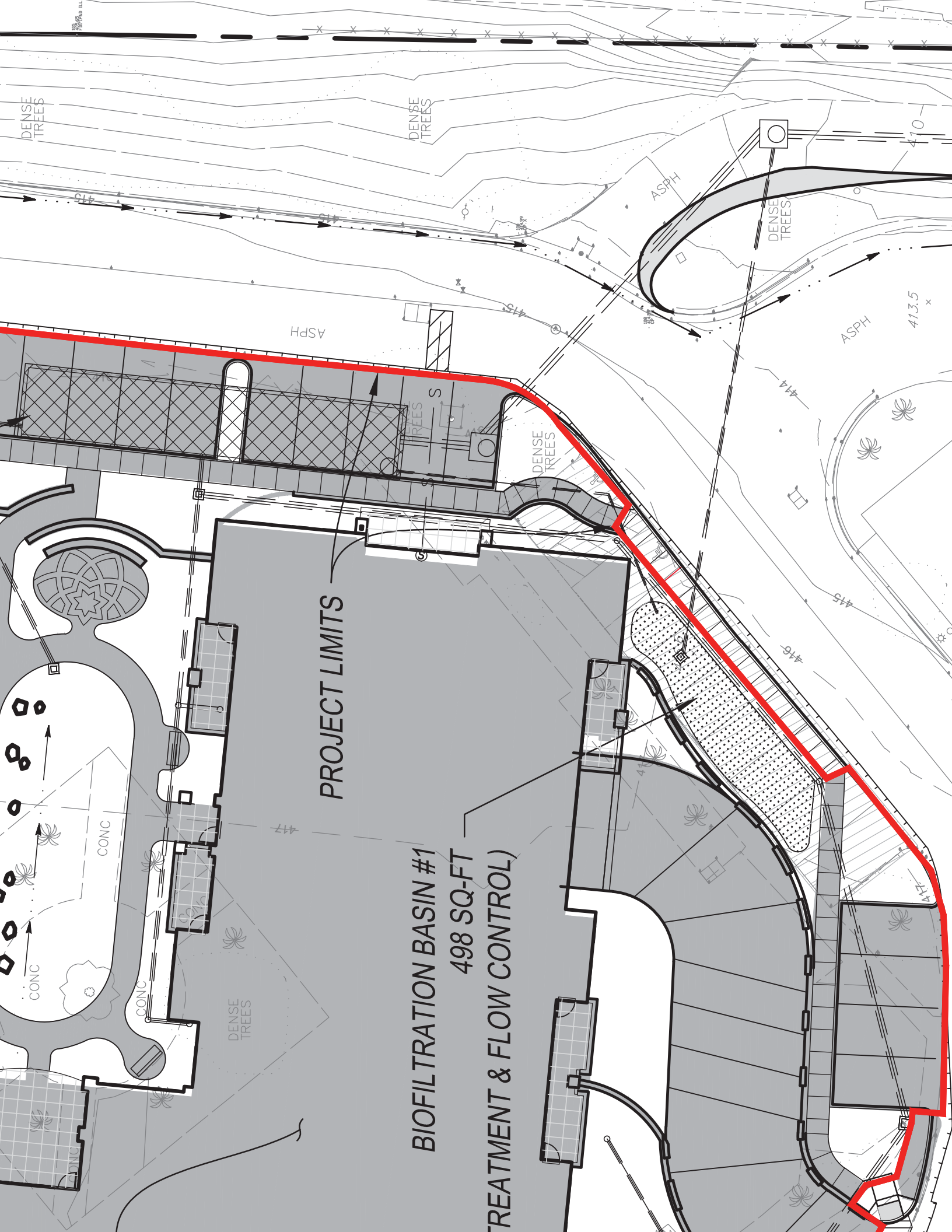
Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	<input checked="" type="checkbox"/> Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	<input checked="" type="checkbox"/> Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination <input type="checkbox"/> 6.2.1 Verification of Geomorphic Landscape Units Onsite <input type="checkbox"/> 6.2.2 Downstream Systems Sensitivity to Coarse Sediment <input type="checkbox"/> 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	<input type="checkbox"/> Not Performed <input type="checkbox"/> Included <input type="checkbox"/> Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	<input type="checkbox"/> Included <input type="checkbox"/> Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	<input type="checkbox"/> Included <input type="checkbox"/> Not required because BMPs will drain in less than 96 hours

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- ☒ Underlying hydrologic soil group
- ☒ Approximate depth to groundwater
- ☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☒ Critical coarse sediment yield areas to be protected
- ☒ Existing topography
- ☒ Existing and proposed site drainage network and connections to drainage offsite
- ☒ Proposed grading
- ☒ Proposed impervious features
- ☒ Proposed design features and surface treatments used to minimize imperviousness
- ☒ Point(s) of Compliance (POC) for Hydromodification Management
- ☒ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☒ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)



PROJECT LIMITS

BIOFILTRATION BASIN #1
498 SQ-FT
TREATMENT & FLOW CONTROL

DENSE TREES

DENSE TREES

ASPH

DENSE TREES

ASPH

413.5

420

414

415

416

417

417

CONC

CONC

CONC

DENSE TREES

SWMM MODEL INPUTS

PRE-PROJECT										
		Area (ac)	Width (Area/ Flow Length) (ft)	% Slope	% Impervious	% "C" Soils	% "D" Soils	Weighted Infiltration (in/hr):	Weighted Suction Head (in):	Weighted Initial Deficit:
DMA	Basin									
DMA-1B	1	1.13	351.53	8%	0%	18%	82%	0.029	8.463	0.328

Total: 1.13

POST-PROJECT												
				Area (ac)	Width (Area/ Flow Length) (ft)	% Impervious	% Slope	% "C" Soils	% "D" Soils	Weighted Infiltration (in/hr):	Weighted Suction Head (in):	Weighted Initial Deficit:
DMA	Basin											
DMA-1B	1	1	1.13	246.07	79%	2%	18%	82%	0.029	8.463	0.328	

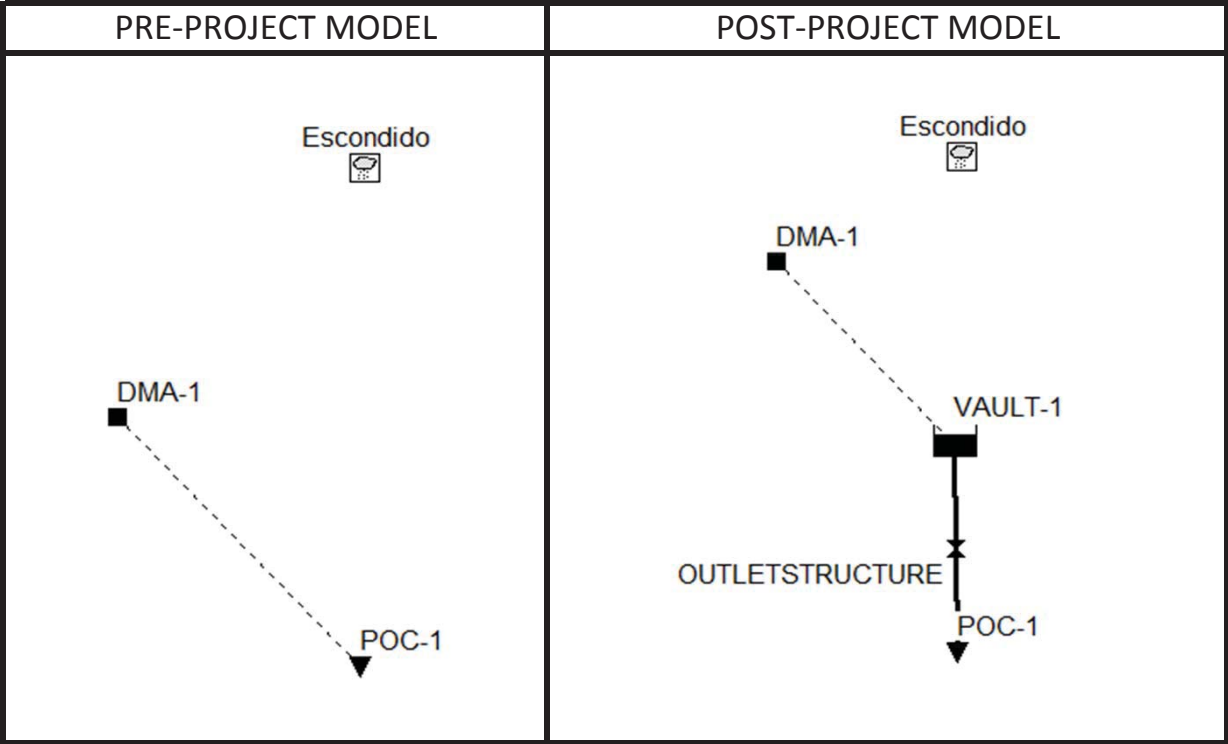
Total: 1.13

Infiltration:	
C:	0.1 in/hr
D:	0.025 in/hr

Suction Head:	
C:	6 in
D:	9 in

Initial Deficit	
C:	0.32
D:	0.33

SWMM MODEL SCHEMATICS FOR CASA DE LAS CAMPANAS
PH III EXPANSION



2616 Casa de las Campanas
PRE-PROJECT CONDITION

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS
Process Models:

Rainfall/Runoff YES

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing NO

Water Quality NO

Infiltration Method GREEN_AMPT

Starting Date 09/24/1964 13:00:00

Ending Date 05/23/2008 22:00:00

Antecedent Dry Days 0.0

Report Time Step 01:00:00

Wet Time Step 00:15:00

Dry Time Step 04:00:00

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation	57.547	611.120
Evaporation Loss	2.319	24.625
Infiltration Loss	44.771	475.440
Surface Runoff	12.081	128.292
Final Storage	0.000	0.000
Continuity Error (%)	-2.821	

Volume

```

Flow Routing Continuity
*****
Dry Weather Inflow ..... 0.000
Wet Weather Inflow ..... 12.081
Groundwater Inflow ..... 0.000
RDII Inflow ..... 0.000
External Inflow ..... 0.000
External Outflow ..... 12.081
Flooding Loss ..... 0.000
Evaporation Loss ..... 0.000
Exfiltration Loss ..... 0.000
Initial Stored Volume .... 0.000
Final Stored Volume ..... 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Subcatchment Runoff Summary
*****

```

	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
Subcatchment								
DMA-1	611.12	0.00	24.63	475.44	128.29	3.94	0.92	0.210

```

Analysis begun on:  Fri Nov 10 09:04:34 2017
Analysis ended on:  Fri Nov 10 09:04:44 2017
Total elapsed time: 00:00:10

```


2616 Casa de las Campanas
POST-PROJECT CONDITION

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CFS

Process Models:

Rainfall/Runoff YES

RDII NO

Snowmelt NO

Groundwater NO

Flow Routing YES

Ponding Allowed NO

Water Quality NO

Infiltration Method GREEN_AMPT

Flow Routing Method KINWAVE

Starting Date 09/24/1964 13:00:00

Ending Date 05/23/2008 22:00:00

Antecedent Dry Days 0.0

Report Time Step 01:00:00

Wet Time Step 00:15:00

Dry Time Step 04:00:00

Routing Time Step 60.00 sec

Runoff Quantity Continuity

Total Precipitation

Evaporation Loss

Infiltration Loss

Surface Runoff

Final Storage

Continuity Error (%)

Depth

inches

611.120

76.410

98.898

445.995

0.028

-1.671

```

*****
Flow Routing Continuity
*****
Dry Weather Inflow .....      0.000      0.000
Wet Weather Inflow .....    41.998    13.686
Groundwater Inflow .....      0.000      0.000
RDII Inflow .....          0.000      0.000
External Inflow .....        0.000      0.000
External Outflow .....     41.975    13.678
Flooding Loss .....         0.000      0.000
Evaporation Loss .....      0.000      0.000
Exfiltration Loss .....      0.000      0.000
Initial Stored Volume ....      0.000      0.000
Final Stored Volume .....    0.003      0.001
Continuity Error (%) .....    0.046

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step : 59.00 sec
Average Time Step : 60.00 sec
Maximum Time Step : 60.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

```

```

*****
Subcatchment Runoff Summary
*****

```

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff

VAULT-1 0.052 1 0 0 4.026 89 10332 03:16 0.96

Outfall Loading Summary

		Flow	Avg	Max	Total
		Freq	Flow	Flow	Volume
Outfall Node		Pcnt	CFS	CFS	10^6 gal
-----		-----			
POC-1	8.71	0.01	0.96	0.96	13.677
-----		-----			
System	8.71	0.01	0.96	0.96	13.677

Link Flow Summary

		Maximum	Time of	Max	Maximum	Max/
		Flow	Occurrence	Veloc	Full	Full
Link		Type	CFS	days hr:min	ft/sec	Depth
-----		-----				
OUTLETSTRUCTURE	DUMMY	0.96	10332	03:17		

Conduit Surge Summary

No conduits were surcharged.

Analysis begun on: Tue Nov 14 14:48:50 2017
Analysis ended on: Tue Nov 14 14:49:10 2017
Total elapsed time: 00:00:20

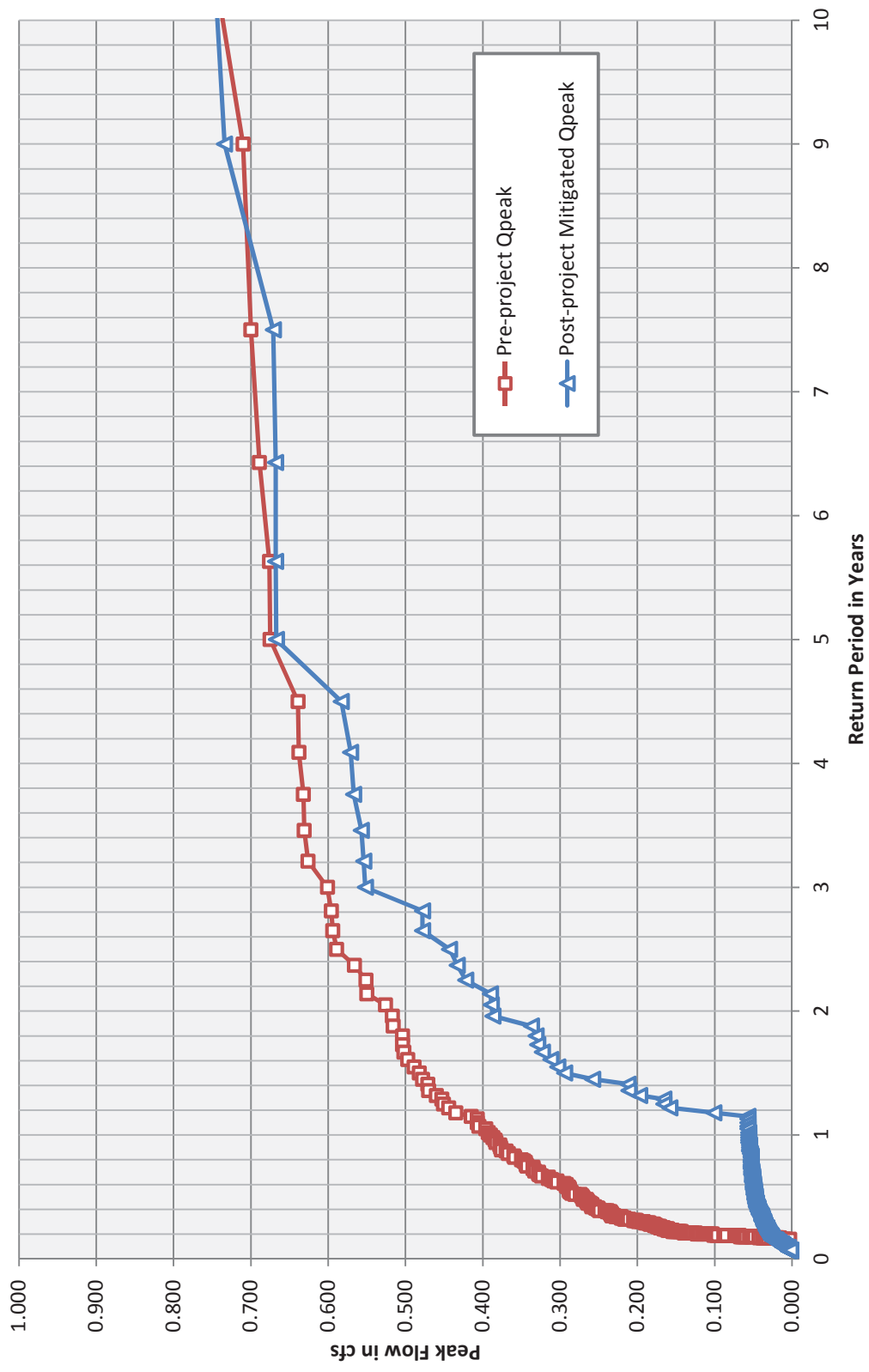
POC-1

Peak Flow Frequency Summary

Return Period	Pre-project Qpeak (cfs)	Post-project - Mitigated Q (cfs)
LF = 0.1xQ2	0.052	0.039
2-year	0.521	0.388
5-year	0.675	0.667
10-year	0.736	0.743

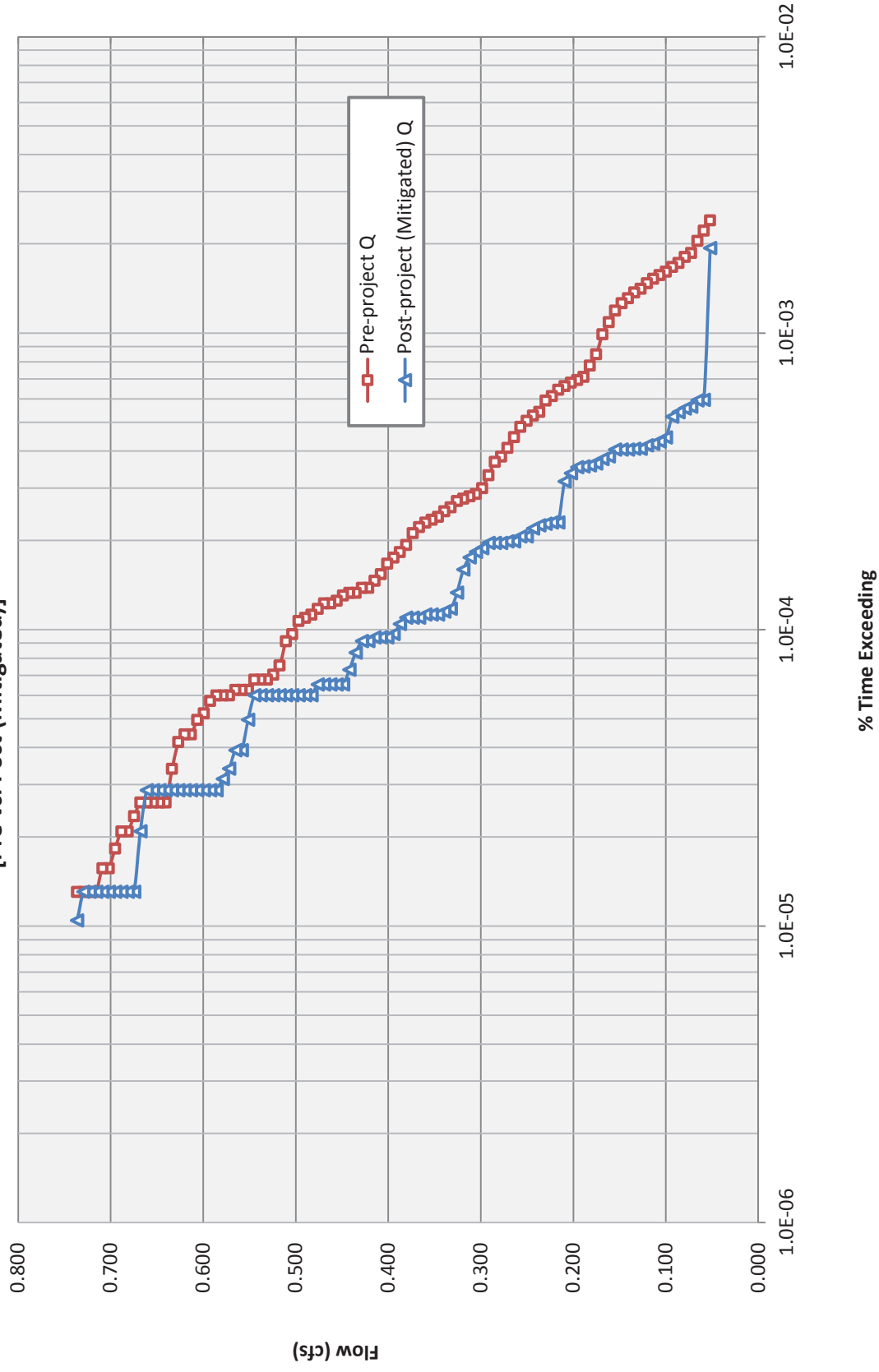
POC-1

Peak Flow Frequency Curves



POC-1

Flow Duration Curve
[Pre vs. Post (Mitigated)]



Low-flow Threshold: 10%

0.1xQ2 (Pre): 0.052 cfs

Q10 (Pre): 0.736 cfs

Ordinate #: 100

Incremental Q (Pre): 0.00684 cfs

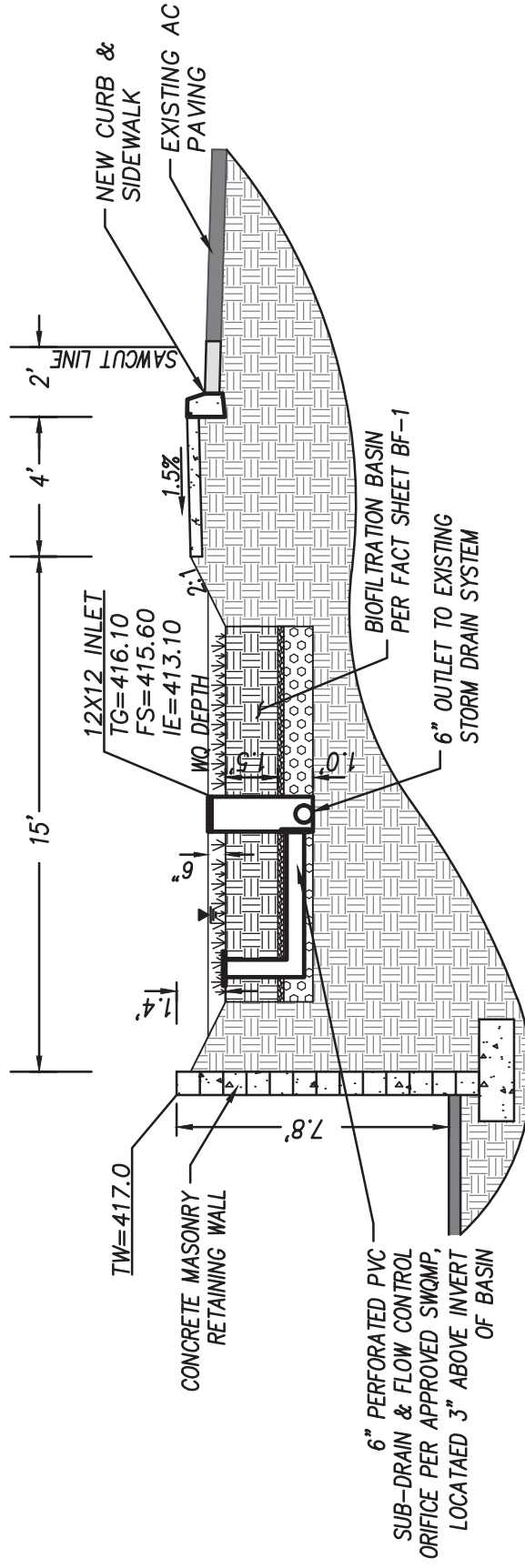
Total Hourly Data: 382736 hours

POC-1

The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.052	919	2.40E-03	740	1.93E-03	81%	Pass
1	0.059	850	2.22E-03	228	5.96E-04	27%	Pass
2	0.066	785	2.05E-03	227	5.93E-04	29%	Pass
3	0.073	714	1.87E-03	216	5.64E-04	30%	Pass
4	0.079	693	1.81E-03	213	5.57E-04	31%	Pass
5	0.086	661	1.73E-03	207	5.41E-04	31%	Pass
6	0.093	641	1.67E-03	200	5.23E-04	31%	Pass
7	0.100	617	1.61E-03	170	4.44E-04	28%	Pass
8	0.107	602	1.57E-03	165	4.31E-04	27%	Pass
9	0.114	585	1.53E-03	162	4.23E-04	28%	Pass
10	0.121	564	1.47E-03	160	4.18E-04	28%	Pass
11	0.127	541	1.41E-03	156	4.08E-04	29%	Pass
12	0.134	526	1.37E-03	156	4.08E-04	30%	Pass
13	0.141	502	1.31E-03	155	4.05E-04	31%	Pass
14	0.148	483	1.26E-03	155	4.05E-04	32%	Pass
15	0.155	456	1.19E-03	155	4.05E-04	34%	Pass
16	0.162	417	1.09E-03	147	3.84E-04	35%	Pass
17	0.168	380	9.93E-04	144	3.76E-04	38%	Pass
18	0.175	325	8.49E-04	139	3.63E-04	43%	Pass
19	0.182	298	7.79E-04	137	3.58E-04	46%	Pass
20	0.189	273	7.13E-04	136	3.55E-04	50%	Pass
21	0.196	266	6.95E-04	135	3.53E-04	51%	Pass
22	0.203	261	6.82E-04	129	3.37E-04	49%	Pass
23	0.209	254	6.64E-04	121	3.16E-04	48%	Pass
24	0.216	247	6.45E-04	88	2.30E-04	36%	Pass
25	0.223	235	6.14E-04	88	2.30E-04	37%	Pass
26	0.230	227	5.93E-04	87	2.27E-04	38%	Pass
27	0.237	208	5.43E-04	86	2.25E-04	41%	Pass
28	0.244	202	5.28E-04	84	2.19E-04	42%	Pass
29	0.250	194	5.07E-04	79	2.06E-04	41%	Pass
30	0.257	185	4.83E-04	79	2.06E-04	43%	Pass
31	0.264	171	4.47E-04	76	1.99E-04	44%	Pass
32	0.271	157	4.10E-04	76	1.99E-04	48%	Pass
33	0.278	147	3.84E-04	75	1.96E-04	51%	Pass
34	0.285	141	3.68E-04	75	1.96E-04	53%	Pass
35	0.292	127	3.32E-04	75	1.96E-04	59%	Pass
36	0.298	115	3.00E-04	72	1.88E-04	63%	Pass
37	0.305	110	2.87E-04	70	1.83E-04	64%	Pass
38	0.312	108	2.82E-04	67	1.75E-04	62%	Pass
39	0.319	106	2.77E-04	61	1.59E-04	58%	Pass
40	0.326	104	2.72E-04	51	1.33E-04	49%	Pass
41	0.333	99	2.59E-04	45	1.18E-04	45%	Pass
42	0.339	96	2.51E-04	44	1.15E-04	46%	Pass
43	0.346	92	2.40E-04	43	1.12E-04	47%	Pass
44	0.353	90	2.35E-04	43	1.12E-04	48%	Pass
45	0.360	88	2.30E-04	43	1.12E-04	49%	Pass
46	0.367	85	2.22E-04	42	1.10E-04	49%	Pass
47	0.374	81	2.12E-04	42	1.10E-04	52%	Pass
48	0.380	74	1.93E-04	42	1.10E-04	57%	Pass
49	0.387	70	1.83E-04	40	1.05E-04	57%	Pass
50	0.394	67	1.75E-04	37	9.67E-05	55%	Pass
51	0.401	64	1.67E-04	36	9.41E-05	56%	Pass
52	0.408	59	1.54E-04	36	9.41E-05	61%	Pass
53	0.415	56	1.46E-04	36	9.41E-05	64%	Pass
54	0.422	53	1.38E-04	35	9.14E-05	66%	Pass

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
55	0.428	53	1.38E-04	35	9.14E-05	66%	Pass
56	0.435	51	1.33E-04	32	8.36E-05	63%	Pass
57	0.442	51	1.33E-04	28	7.32E-05	55%	Pass
58	0.449	50	1.31E-04	25	6.53E-05	50%	Pass
59	0.456	48	1.25E-04	25	6.53E-05	52%	Pass
60	0.463	47	1.23E-04	25	6.53E-05	53%	Pass
61	0.469	47	1.23E-04	25	6.53E-05	53%	Pass
62	0.476	45	1.18E-04	25	6.53E-05	56%	Pass
63	0.483	43	1.12E-04	23	6.01E-05	53%	Pass
64	0.490	42	1.10E-04	23	6.01E-05	55%	Pass
65	0.497	41	1.07E-04	23	6.01E-05	56%	Pass
66	0.504	37	9.67E-05	23	6.01E-05	62%	Pass
67	0.510	35	9.14E-05	23	6.01E-05	66%	Pass
68	0.517	29	7.58E-05	23	6.01E-05	79%	Pass
69	0.524	27	7.05E-05	23	6.01E-05	85%	Pass
70	0.531	26	6.79E-05	23	6.01E-05	88%	Pass
71	0.538	26	6.79E-05	23	6.01E-05	88%	Pass
72	0.545	26	6.79E-05	23	6.01E-05	88%	Pass
73	0.552	24	6.27E-05	19	4.96E-05	79%	Pass
74	0.558	24	6.27E-05	15	3.92E-05	63%	Pass
75	0.565	24	6.27E-05	15	3.92E-05	63%	Pass
76	0.572	23	6.01E-05	13	3.40E-05	57%	Pass
77	0.579	23	6.01E-05	12	3.14E-05	52%	Pass
78	0.586	23	6.01E-05	11	2.87E-05	48%	Pass
79	0.593	22	5.75E-05	11	2.87E-05	50%	Pass
80	0.599	20	5.23E-05	11	2.87E-05	55%	Pass
81	0.606	19	4.96E-05	11	2.87E-05	58%	Pass
82	0.613	17	4.44E-05	11	2.87E-05	65%	Pass
83	0.620	17	4.44E-05	11	2.87E-05	65%	Pass
84	0.627	16	4.18E-05	11	2.87E-05	69%	Pass
85	0.634	13	3.40E-05	11	2.87E-05	85%	Pass
86	0.640	10	2.61E-05	11	2.87E-05	110%	Pass
87	0.647	10	2.61E-05	11	2.87E-05	110%	Pass
88	0.654	10	2.61E-05	11	2.87E-05	110%	Pass
89	0.661	10	2.61E-05	11	2.87E-05	110%	Pass
90	0.668	10	2.61E-05	8	2.09E-05	80%	Pass
91	0.675	9	2.35E-05	5	1.31E-05	56%	Pass
92	0.681	8	2.09E-05	5	1.31E-05	63%	Pass
93	0.688	8	2.09E-05	5	1.31E-05	63%	Pass
94	0.695	7	1.83E-05	5	1.31E-05	71%	Pass
95	0.702	6	1.57E-05	5	1.31E-05	83%	Pass
96	0.709	6	1.57E-05	5	1.31E-05	83%	Pass
97	0.716	5	1.31E-05	5	1.31E-05	100%	Pass
98	0.723	5	1.31E-05	5	1.31E-05	100%	Pass
99	0.729	5	1.31E-05	5	1.31E-05	100%	Pass
100	0.736	5	1.31E-05	4	1.05E-05	80%	Pass



B SECTION: PRIVATE BIOFILTRATION BASIN (BF-1)
NOT TO SCALE



Project Name	Casa de las Campanas		
Project No	2616	Date	3/27/2017
Vault Drawdown	39.0	hrs	

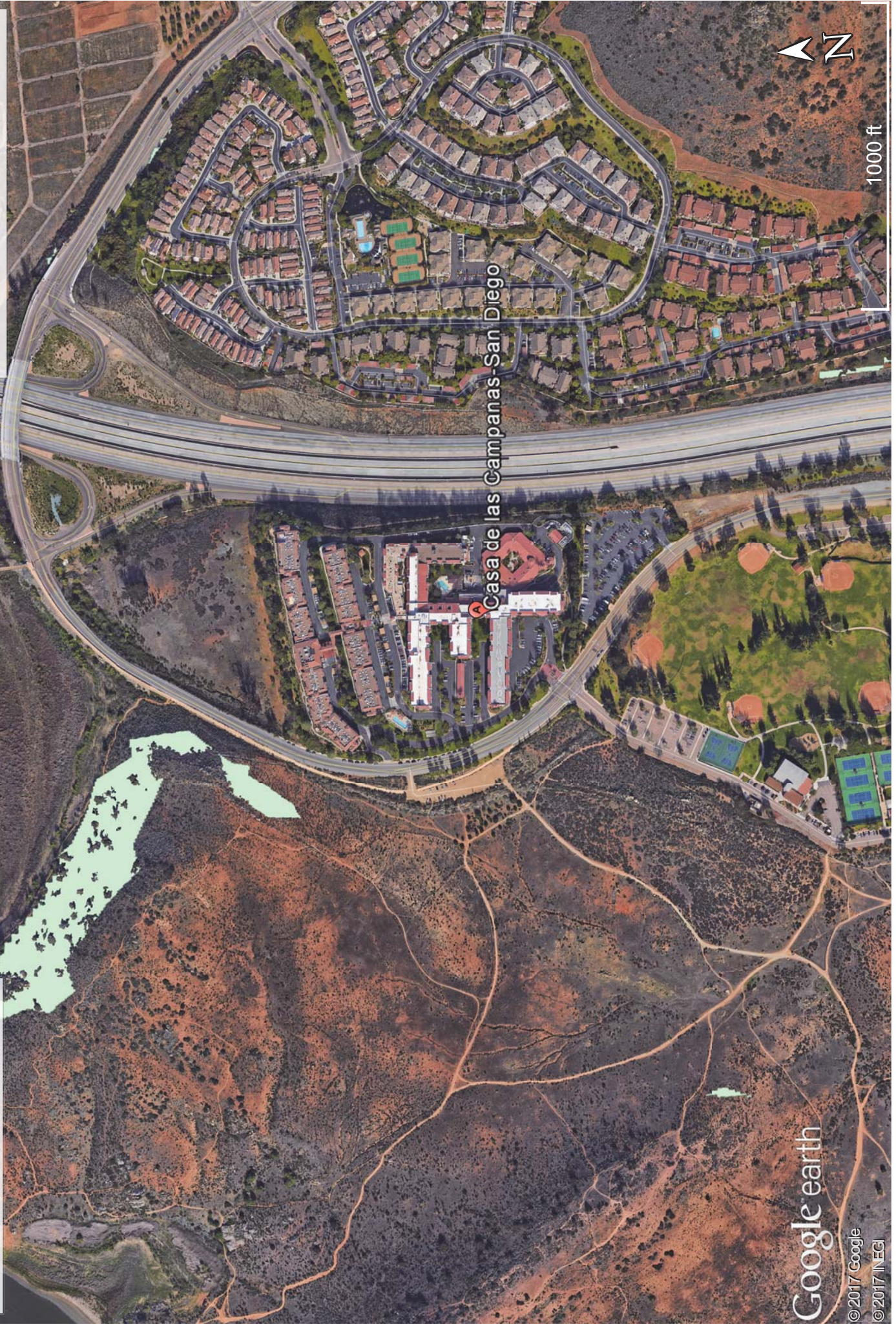
[illegible]

WMAA Map

Critical Coarse Sediment Yield Areas
Casa de las Campanas

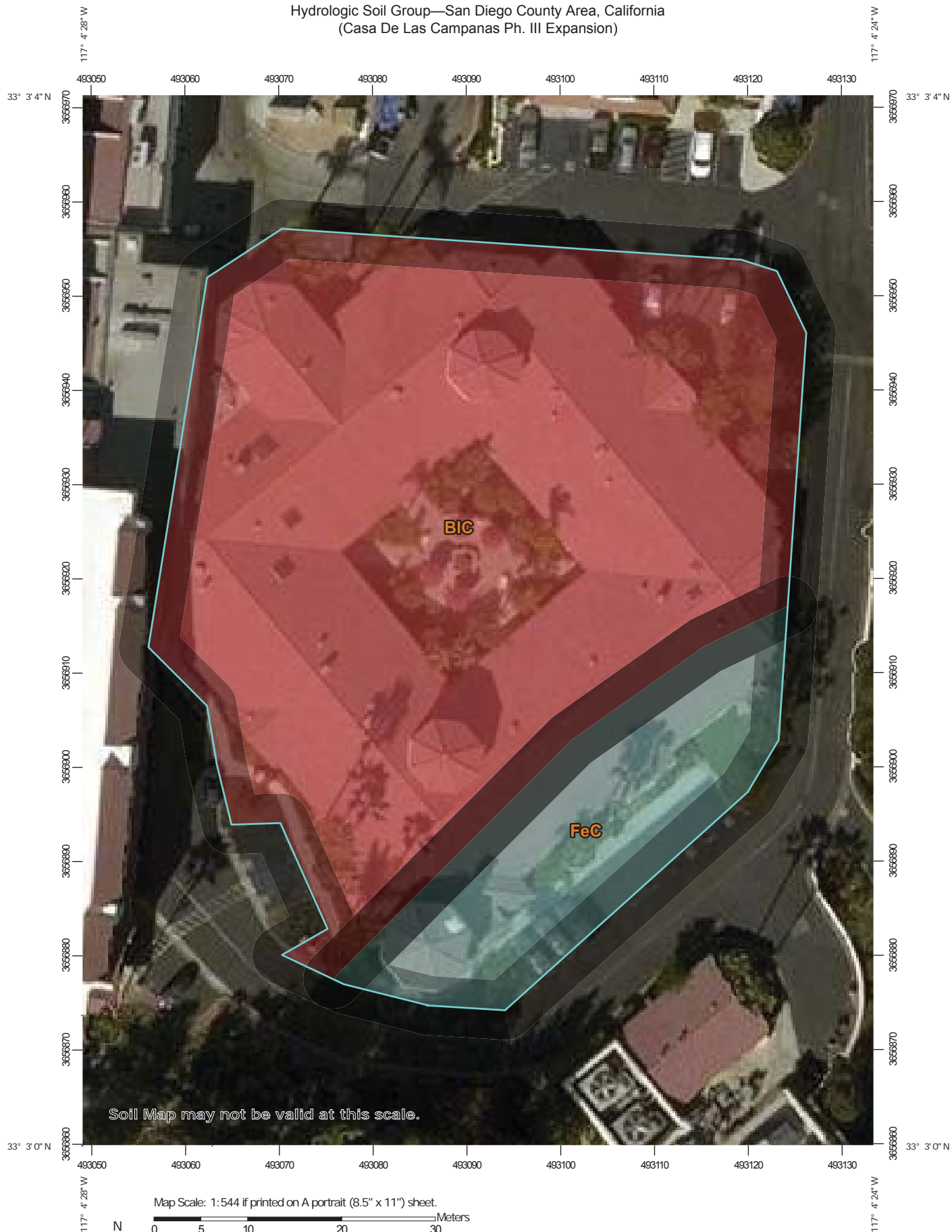
Legend

-  Casa de las Campanas-San Diego
-  Yes



Google earth

Hydrologic Soil Group—San Diego County Area, California (Casa De Las Campanas Ph. III Expansion)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: [Web Soil Survey](#)

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California

Survey Area Data: Version 10, Sep 12, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
B/C	Bonsall sandy loam, 2 to 9 percent slopes	D	0.9	82.1%
FeC	Fallbrook rocky sandy loam, 5 to 9 percent slopes	C	0.2	17.9%
Totals for Area of Interest			1.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 3 STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	<input checked="" type="checkbox"/> Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	<input checked="" type="checkbox"/> Included <input type="checkbox"/> Not Applicable

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:
 - ☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual
- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

- ☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ When applicable, frequency of bioretention soil media replacement
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☐ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION



NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):Click or tap here to enter text..
2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s)Click or tap here to enter text..
3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):Click or tap here to enter text.

(Owner Signature)

Click or tap here to enter text.

(Print Name and Title)

Click or tap here to enter text.

(Company/Organization Name)

Click or tap to enter a date.

(Date)

THE CITY OF SAN DIEGO

APPROVED:

(City Control engineer Signature)

(Print Name)

(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDGMENTS PER CIVIL CODE SEC. 1180 ET.SEQ



ATTACHMENT 4

COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Project Name: CASA DE LAS CAMPANAS PHASE III EXPANSION

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☐ All BMPs must be fully dimensioned on the plans
- ☐ When proprietry BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



ATTACHMENT 5 DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



DRAINAGE STUDY

CASA DE LAS CAMPANAS PHASE III EXPANSION

PTS#: 162330

APN: 272-740-08
18655 WEST BERNARDO DRIVE
San Diego, California 92127

Prepared By:



A handwritten signature in black ink, appearing to read "Michael H. Smith".

Michael H. Smith, PE

RCE 65090

Pasco Laret Suiter & Associates, Inc.
535 N. Highway 101, Suite A
Solana Beach, CA 92075

PASCO LARET SUITER
& ASSOCIATES
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

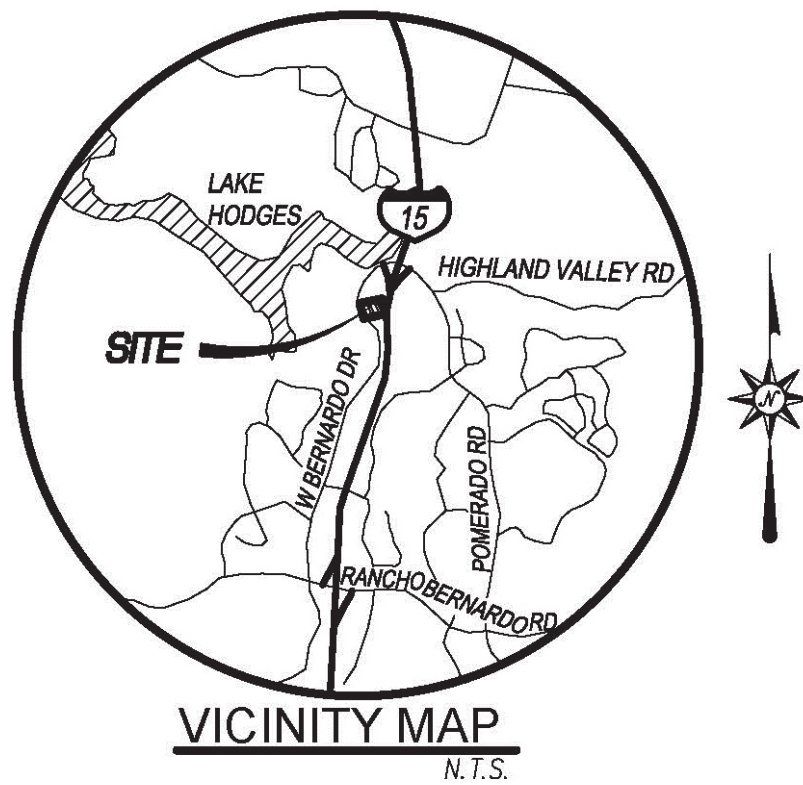
Prepared for:
Casa De Las Campanas, Inc.
18655 West Bernardo Drive,
San Diego, CA 92127

March 29, 2017
Revised November 14, 2017

TABLE OF CONTENTS

1. INTRODUCTION.....	4
1.1 Project Description	4
1.2 Existing Conditions	4
1.3 Proposed Conditions	4
2. METHODOLOGY.....	5
2.1 Rational Method	5
2.2 Runoff Coefficient	5
2.3 Rainfall Intensity.....	6
2.4 Tributary Areas.....	6
3. CALCULATIONS/RESULTS.....	6
3.1 Pre & Post Development Peak Flow Comparison	6
3.2 Storm Water Quality	Error! Bookmark not defined.
4. CONCLUSION	8
Appendix 1	Pre & Post-Project Hydrology Calculations
Appendix 2.....	Existing and Proposed Drainage Exhibits
Appendix 3.....	Pervious/Impervious Map for Existing and Proposed Conditions

Figure 1 Vicinity Map



1. INTRODUCTION

3.1 Project Description

The 22.3-acre site is located at 18655 West Bernardo Drive. The site exists today as a developed site and functions as a retirement community that includes housing, parking and entertainment amenities. The proposed project includes the demolition of one (1) existing structure and replacing it with a new multi-family residential building. The proposed project also includes new improvements around the building which include sidewalk, landscaping and storm water treatment facilities. The project has been designed to meet the requirements set by the City of San Diego Drainage Design Manual, dated April, 1984 and the City of San Diego Storm Water Standards Manual, dated January, 2016.

The federal Clean Water Act (CWA) is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers, and coastal areas. Section 401 of the CWA requires that any applicant for a federal permit to conduct any activity, including the construction or operation of a facility, which may result in the discharge of any pollutant, must obtain certification from the state. Section 404 of the CWA establishes a permit program to regulate the discharge of dredged material into waters of the U.S. Since the proposed project is not subject to regulations set forth in the CWA 401/404, the project is not required to obtain approval from the Regional Water Quality Control Board prior to permit issuance.

3.2 Existing Conditions

The overall site is 22.3 acres. The total drainage area tributary to an existing on-site storm drain inlet is 4.54 acres; however the project area (limit of work) is only 1.13 acres. The site is relatively flat and sheet flows storm water runoff to the southeast where it is collected by a storm drain inlet located near the southeasterly limits of the project area. The storm water then continues south via a public storm drain pipe in West Bernardo Drive and ultimately discharges into a stream that is tributary to Lake Hodges. The peak storm water runoff was calculated using the Rational Method equation, $Q=CiA$. The 4.4 in/hr intensity was determined from Appendix H of the City of San Diego Drainage Design Manual using the minimum allowable time of concentration of 5 minutes. This resulted in a peak pre-project run-off for the site at $Q=17.52$ CFS using a weighted runoff coefficient of 0.87 based on 84% of existing imperviousness.

3.3 Proposed Conditions

The project proposes the redevelopment of a new multi-family residential building and surface improvements (i.e. asphalt paving and concrete sidewalk) to support the proposed building. The proposed impervious areas will include asphalt paving, concrete sidewalk and building roof area. The project also proposes the construction of an underground detention vault and a biofiltration basin for storm water treatment and hydromodification purposes.

The drainage area for hydrology considerations is the same as the pre-project drainage area of 4.54 acres. The limit of work is smaller at an area of approximately 1.13 acres. The proposed project will result in a slight decrease of impervious area and therefore will decrease the post-project peak runoff. The post-project condition has been delineated by two (2) Drainage Management Areas (DMAs) to model the post-project condition. DMA-1A represents the area tributary to the existing downstream inlet from area outside the limit of work. DMA-1B represents the area of work (project site) tributary to the proposed underground detention vault and biofiltration basin. The underground detention vault and basin are sized for storm water treatment and hydromodification storage. For a

more detailed discussion on water quality treatment and hydromodification requirements, please refer to the “Storm Water Quality Management Plan for Casa de las Campanas” by Pasco Laret Suiter & Associates for detailed calculations.

The post-project combined flow of 17.46 CFS was calculated using the Rational Method $Q=CiA$ where the intensity was derived from the San Diego Drainage Design Manual assuming a 5-minute time of concentration (T_c) which is the shortest T_c allowable. A table summarizing the pre-project and post-project peak flows is provided at the end of this study.

2. METHODOLOGY

The proposed project has been analyzed to determine the peak runoff flow for 100 year, 6 hour rainfall event using the Rational Method per the City of San Diego Drainage Design Manual (Section 1-102.3). The Runoff Coefficient, C , for the existing and proposed conditions was selected using Table 2 of page 82 of the City of San Diego Drainage Design Manual, Revised C Method. The time of concentration (T_c) for all existing and proposed drainage areas was calculated using the minimum T_c of 5 minutes which yields an intensity of 4.4 inches per hour.

The site soil quantity is predominantly Type D, with a small region of Type C soil. For the purpose of this report, the entire project site will be modeled with Type D soil.

The proposed project site has been designed such that all runoff will be directed to pervious areas before ultimately discharging to the downstream storm drain system.

2.1 Rational Method

As mentioned above, runoff from the project site was calculated for the 100-year storm event. Runoff was calculated using the Rational Method which is given by the following equation:

$$Q = C \times i \times A$$

Where:

Q = Flow rate in cubic feet per second (cfs)

C = Runoff coefficient (Determined from Table 2, P. 82, City of San Diego Drainage Design Manual)

i = Rainfall Intensity in inches per hour (in/hr)

A = Drainage basin area in acres, (ac)

Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

2.2 Runoff Coefficient

The runoff coefficients for the project were calculated using Table 2 from the City of San Diego Drainage Design Manual (April, 1984), using the Revised C Method for the proposed condition. In accordance with City of San Diego standards, runoff coefficients were calculated based on land use and soil type. The soil conditions used in this study are consistent with Type D soil quantities. An appropriate runoff coefficient, C , for each type of land use in the subarea was selected from Table 2 of the City of San Diego Drainage Design Manual and multiplied by the percentage of total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient ($\sum[CA]$).

In the existing condition, the project site is an existing development. Per the City of San Diego Drainage Design Manual, the C value is 0.45 for pervious area and 0.95 for impervious area. The existing condition drainage characteristics are summarized in one (1) drainage area. The weighted runoff factor is calculated based on the actual percentage of impervious area. Please refer to Table 1 for a summary of the calculated C values.

In the proposed condition, approximately 2.89 acres or 83% of the total site area (4.54 acres) is impervious. The post-project runoff coefficient is calculated based on the actual percentage of impervious area. Please refer to Table 1 below.

2.3 Rainfall Intensity

Rainfall intensity was determined using the Rainfall Intensity Duration Frequency Curves from page 83 of the City of San Diego Drainage Design Manual (April, 1984). Based on a 5 minute time of concentration, an intensity of 4.4 inches per hour is used.

2.4 Tributary Areas

Drainage basins are delineated in the Hydrology Post-Project Workmap in Appendix 1 and graphically portray the tributary area for each drainage basin.

3. CALCULATIONS/RESULTS

3.1 Pre & Post Development Peak Flow Comparison

Below are a series of tables which summarize the calculations provided in the Appendix of this report. Table 1 shows the difference in the runoff coefficient, “C”, between the existing and proposed condition.

Table 1: Runoff Coefficient “C” Comparison

	TOTAL PROJECT AREA (ACRES)	% IMPERVIOUS SURFACES	TOTAL IMPERVIOUS AREA (ACRES)	C-VALUE FOR IMPERVIOUS AREA	TOTAL PERVIOUS AREA (ACRES)	C-VALUE FOR PERVIOUS AREA	WEIGHTED RUNOFF COEFFICIENT “C”
Existing	4.54	84%	3.81	0.95	0.73	0.45	0.870
Proposed	4.54	83%	3.78	0.95	0.76	0.45	0.867

Note: C values taken from Table 2 of the City of San Diego Drainage Design Manual, consistent with on-site existing soil types.

Table 2 lists the peak flow rates for the project site in the existing condition for the respective rainfall events.

Table 2: Existing Condition Peak Drainage Flow Rates

EXISTING DRAINAGE FLOWS			
DRAINAGE AREA	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	I ₁₀₀ (IN/HR)
DMA-1	4.54	17.52	4.4

Table 3 lists the peak flow rates for the project site for the proposed condition for the respective rainfall events.

Table 3: Proposed Condition Peak Drainage Flow Rates

PROPOSED DRAINAGE FLOWS			
DRAINAGE AREA	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	I ₁₀₀ (IN/HR)
DMA-1A&1B	4.54	17.46	4.4

Table 4 shows a comparison between the peak flow rates and precipitation volume for the proposed condition and the existing condition.

Table 4: Proposed Condition Peak Drainage Flow Rates

PEAK DRAINAGE FLOW COMPARISON				
CONDITION	DRAINAGE AREA (ACRES)	Q ₁₀₀ (CFS)	V ₁₀₀ (CU-FT)	C
Existing	4.54	17.52	43,010	0.870
Proposed	4.54	17.46	42,854	0.867
Existing vs. Proposed Condition Comparison		-0.06	-157	

As shown in Table 4, the project does not increase the peak runoff rate and decreases the runoff volume for the design storm analyzed when comparing the pre-project runoff coefficient to the post-project runoff coefficient. In addition to decreasing the peak runoff flow, the comparison does not account for detention and routing through the project's BMPs. The comparison is considered conservative and the actual post project runoff, accounting for routing, will be much less than the pre-project peak runoff. For this project, the post-construction biofiltration basin and underground

detention vault are proposed for treatment control and hydromodification management only, as detention requirements for Q100 are not required since the project does not increase post-project flows.

4. CONCLUSION

As discussed previously, the proposed project's peak runoff is less than the existing condition peak runoff. The proposed project will not adversely affect downstream facilities since the overall peak flow rate will decrease when compared to the existing condition. The design of pervious areas to effectively receive, infiltrate and retain runoff from impervious surfaces will further mitigate runoff discharges and reduce volumes. Landscape areas are interspersed among the building and pavement areas to detain and retain runoff near the point where it is generated. These small collection techniques foster opportunities to maintain the natural hydrology and provide a much greater range of retention and detention practices.

It is our professional opinion that the storm drain and treatment systems as proposed in this report and on the grading plans herein are adequate to intercept, treat, contain and convey Q100.

PASCO LARET SUITER

& ASSOCIATES

CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

APPENDIX 1

PRE-PROJECT & POST-PROJECT

HYDROLOGY CALCULATIONS

PRE-PROJECT HYDROLOGY									
Drainage Area	Area Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Ac)	Total Impervious Area (sq-ft)	% Impervious	% Pervious	Weighted Runoff Coefficient	Peak Runoff Volume: (cu-ft)
DMA-1A	EX SITE	3.41	148543	2.89	126000	84.8%	15%	0.874	32461
DMA-1B	EX SITE	1.13	49214	0.92	40102	81.5%	19%	0.857	10549
TOTAL		4.54	197757	3.81	166102	84.0%	16%	0.870	43010

POST-PROJECT HYDROLOGY									
BMP Location	DMA Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Ac)	Total Impervious Area (sq-ft)	% Impervious	% Pervious	Weighted Runoff Coefficient	Peak Runoff Volume: (cu-ft)
DMA-1A	OFF-SITE AREA	3.41	148543	2.89	125820	84.7%	15%	0.874	32439
DMA-1B	PROJECT AREA	1.13	49214	0.90	39029	79.3%	21%	0.847	10415
TOTAL:		4.54	197757	3.78	164849	83.4%	17%	0.867	42854

Note:

1. 500 sq-ft of additional impervious area was included to account for unforeseen impervious areas (i.e. Pool and patio areas)

100 Yr Storm at 5 Min TC	
Intensity:	4.40 in/hr
Precip:	3.00 in

Runoff Coefficient	
Impervious	0.95
Landscape	0.45
Permeable Pavers	0.45

Detention Calculation:

Pre-Project Peak Runoff Volume:

Post-Project Peak Runoff Volume:

Delta Peak Runoff Volume (Post - Pre):

Volume Provided by BMP's:

43010 cu-ft

42854 cu-ft

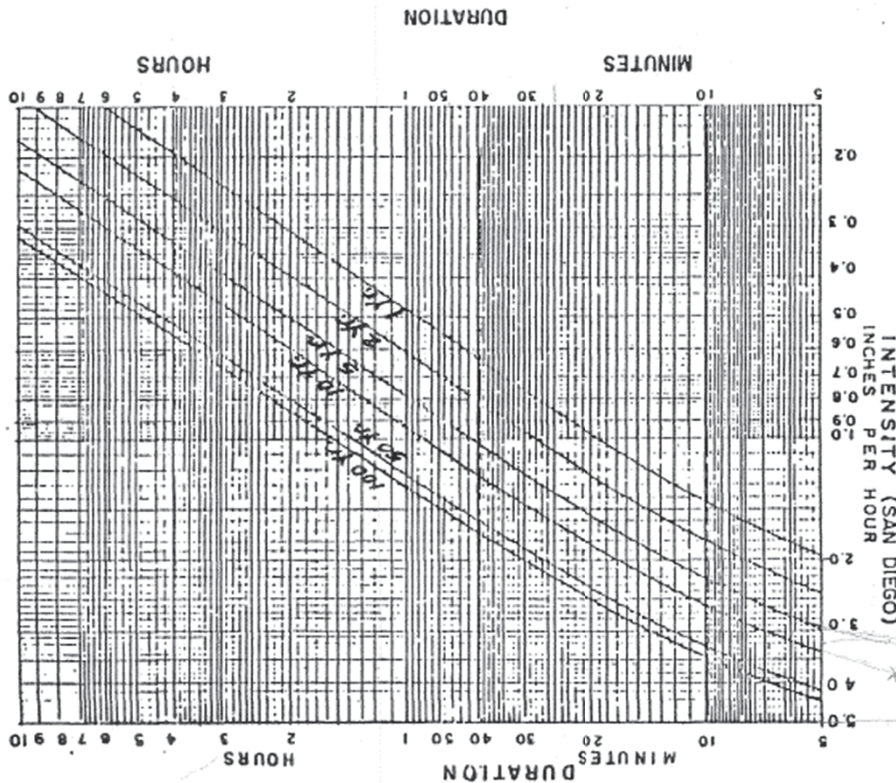
-157 cu-ft

4500 cu-ft

*From Underground Vault & Biofiltration Basin

4500 > -81 Therefore, Adequate Detention Provided

Results: The volume provided in the BMPs and the overall decrease of impervious areas results a smaller post project discharge Q. Therefore, detention is not required for Q100



ELEV.	FACTOR
0-1500	1.00
1500-3000	1.25
3000-4000	1.42
4000-5000	1.60
5000-6000	1.70
DESERT	1.25

To obtain correct intensity,
multiply intensity on chart
by factor for design
elevation.

PASCO LARET SUITER

& ASSOCIATES

CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

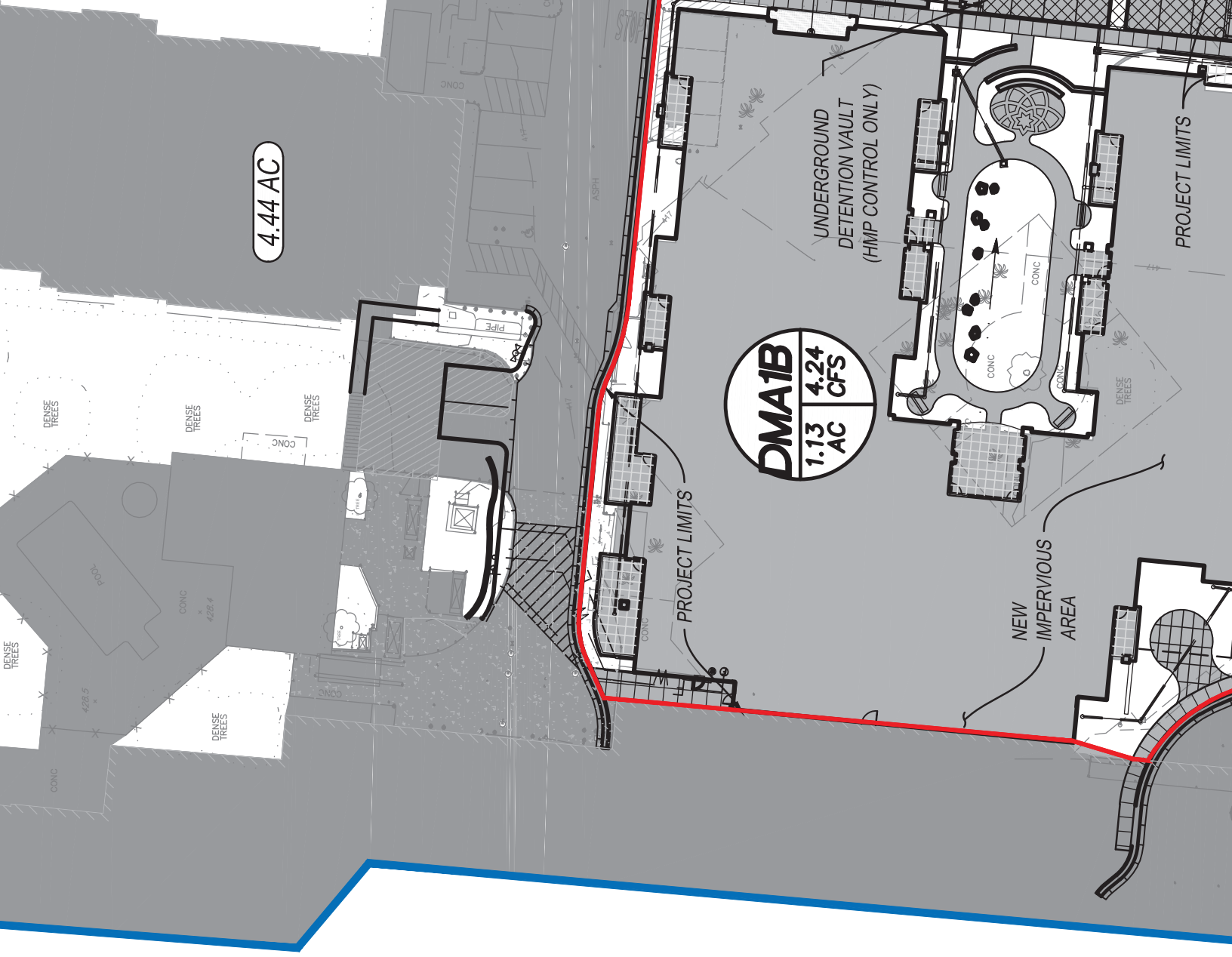
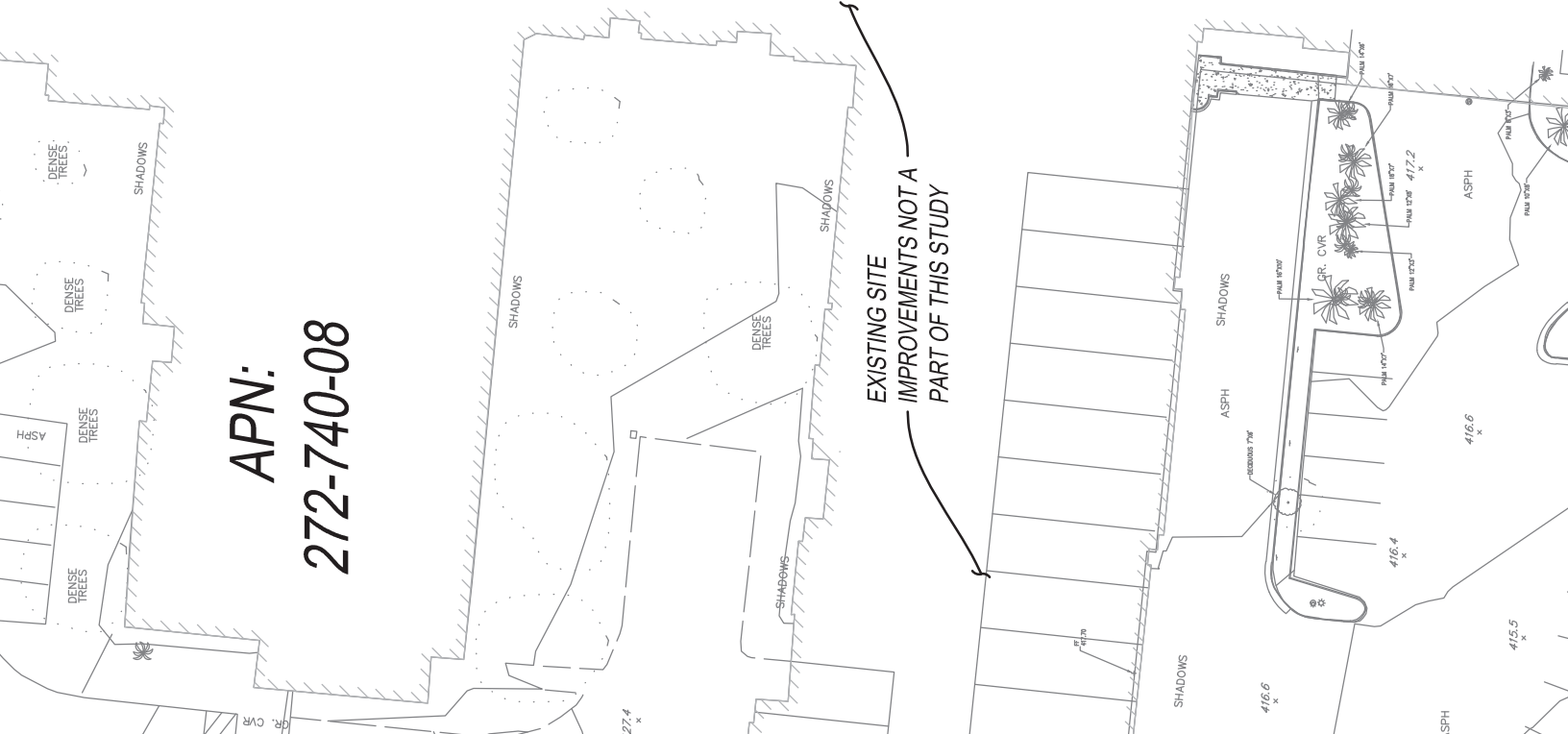
APPENDIX 2

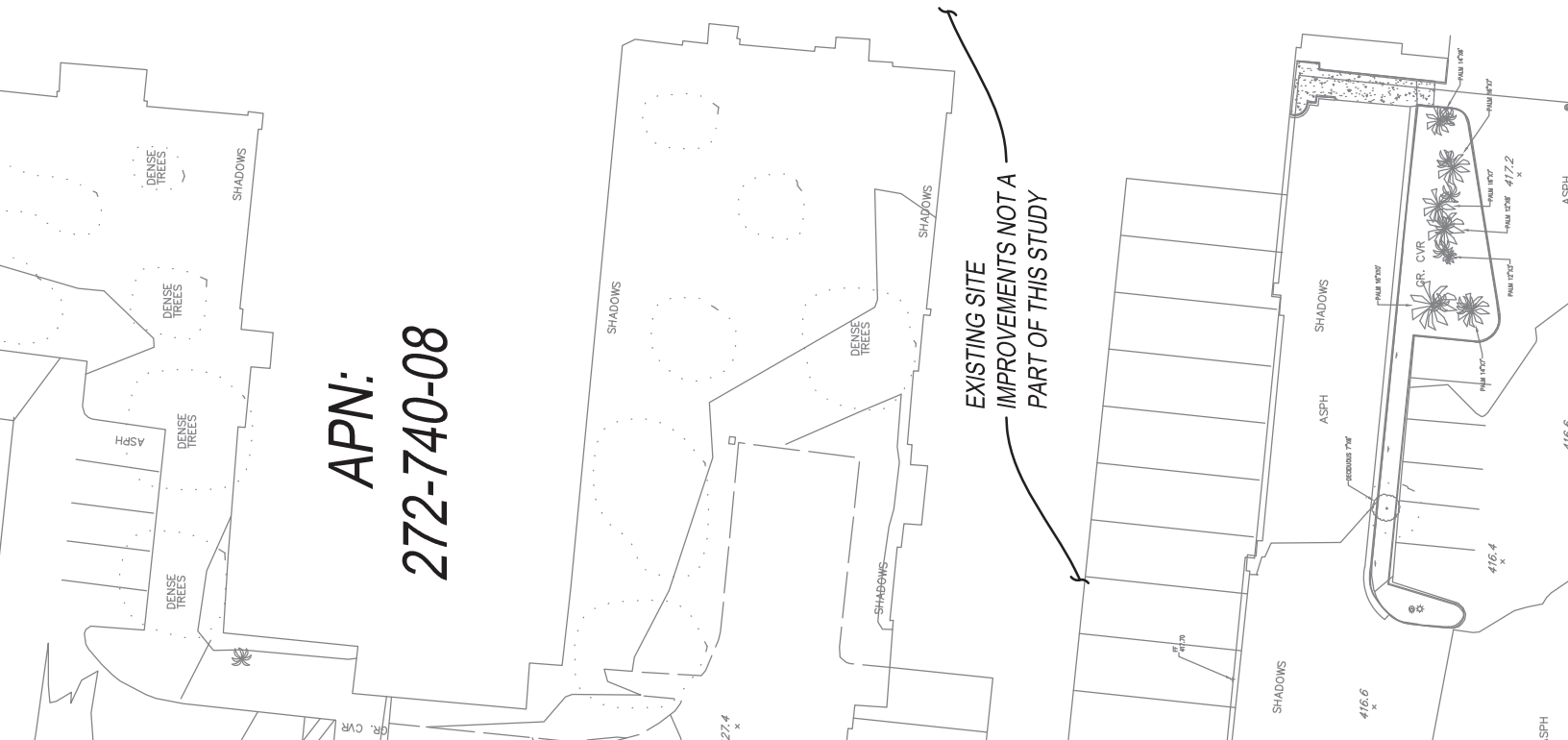
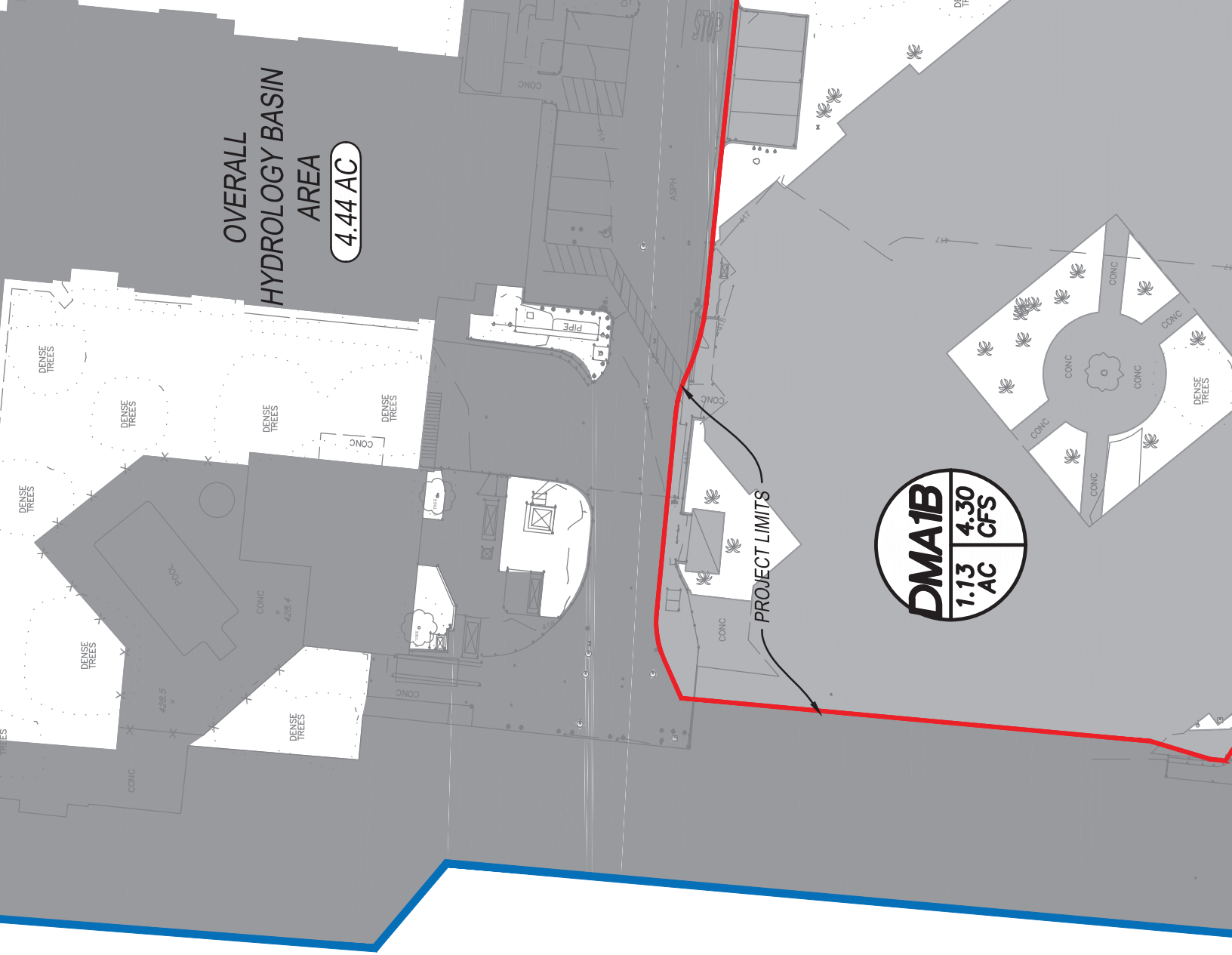
EXISTING & PROPOSED

DRAINAGE EXHIBITS

272-740-08

EXISTING SITE
- IMPROVEMENTS NOT A
PART OF THIS STUDY





PASCO LARET SUITER

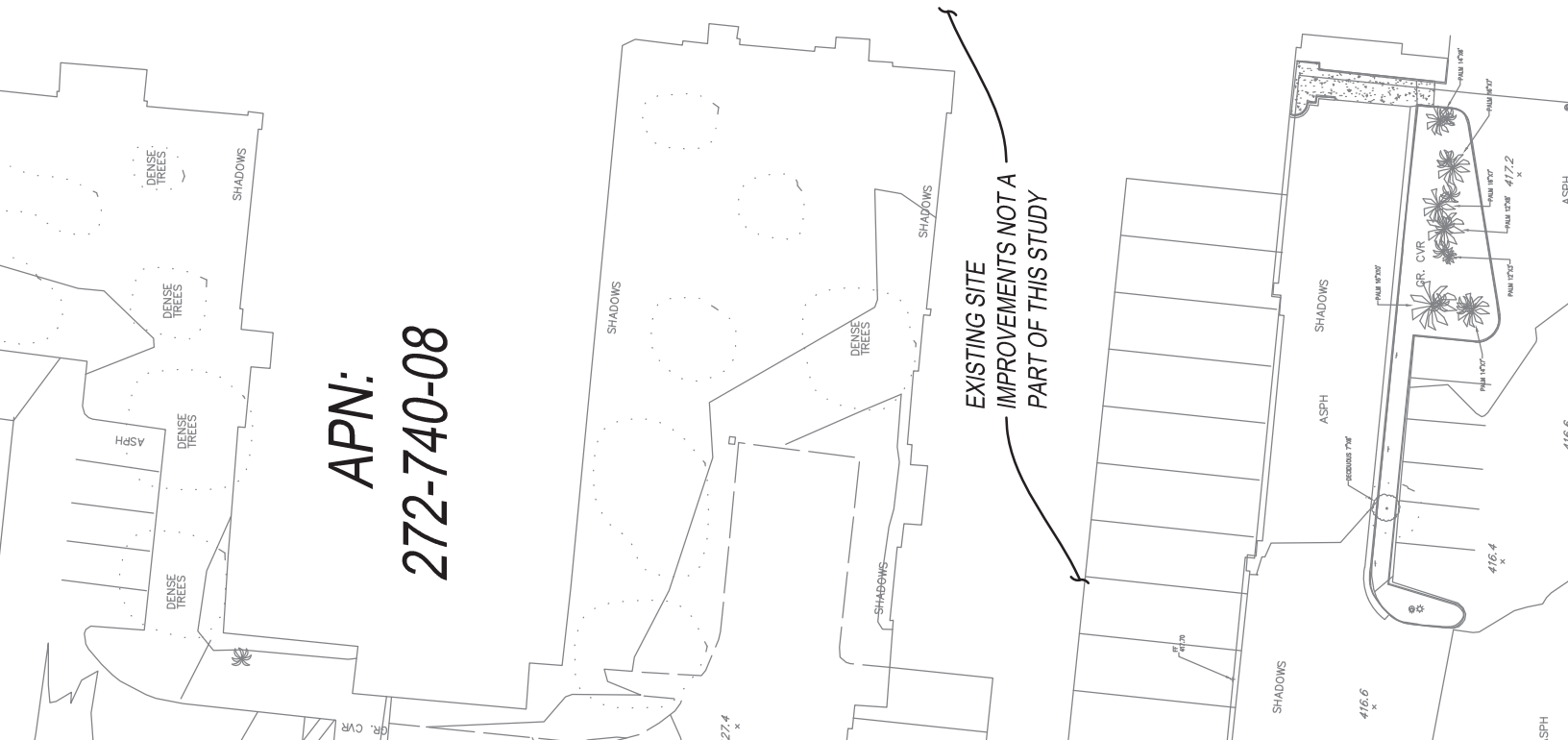
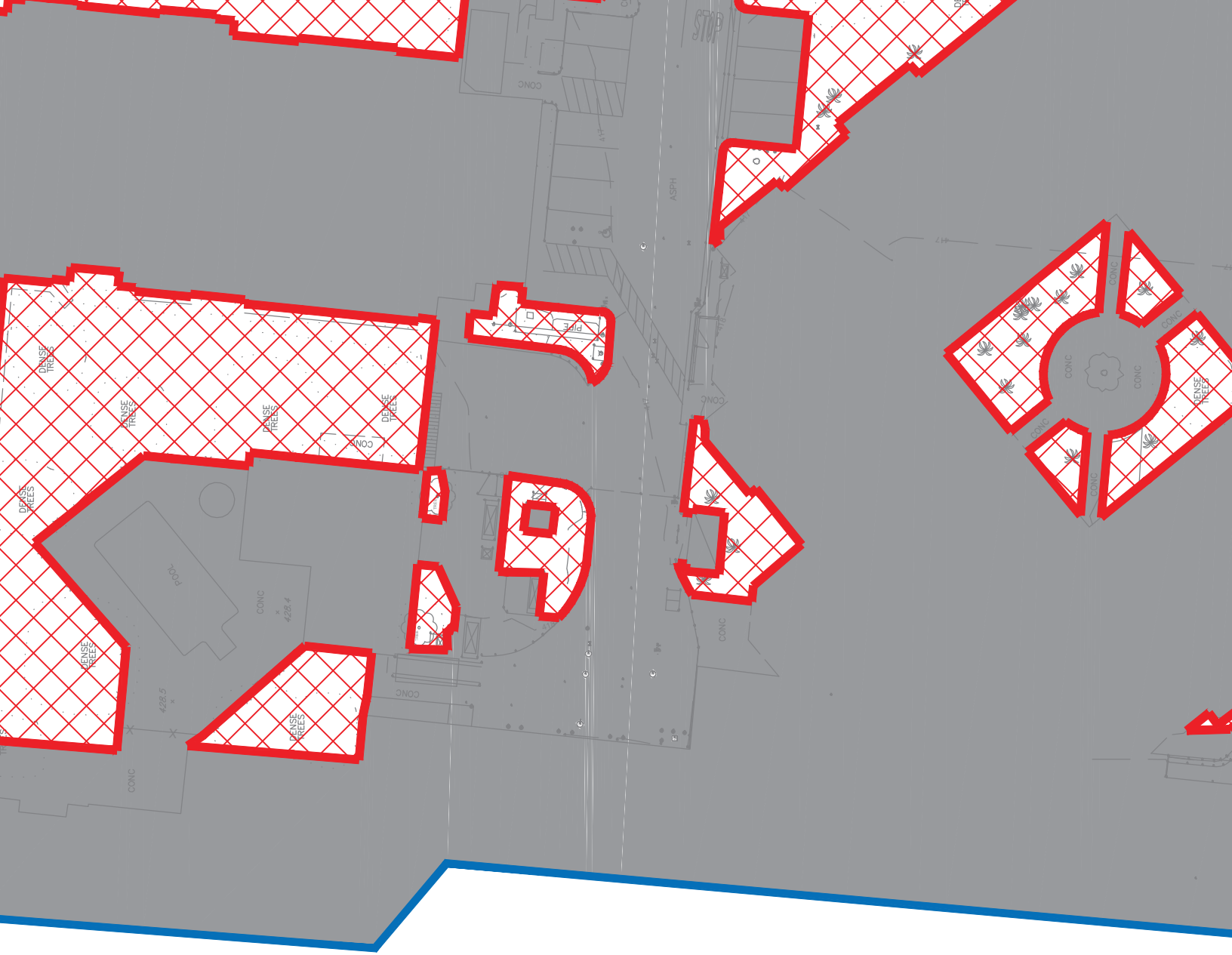
& ASSOCIATES

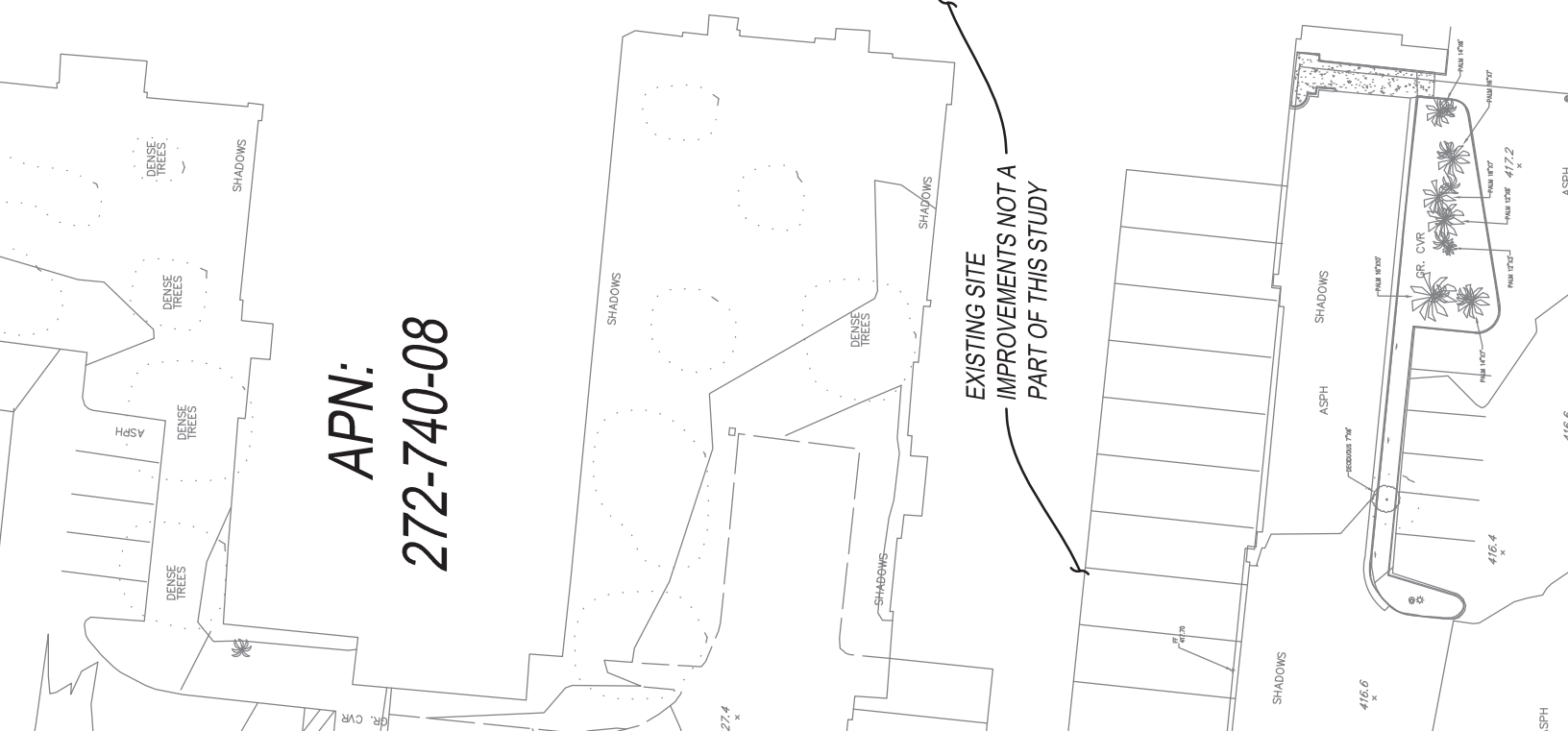
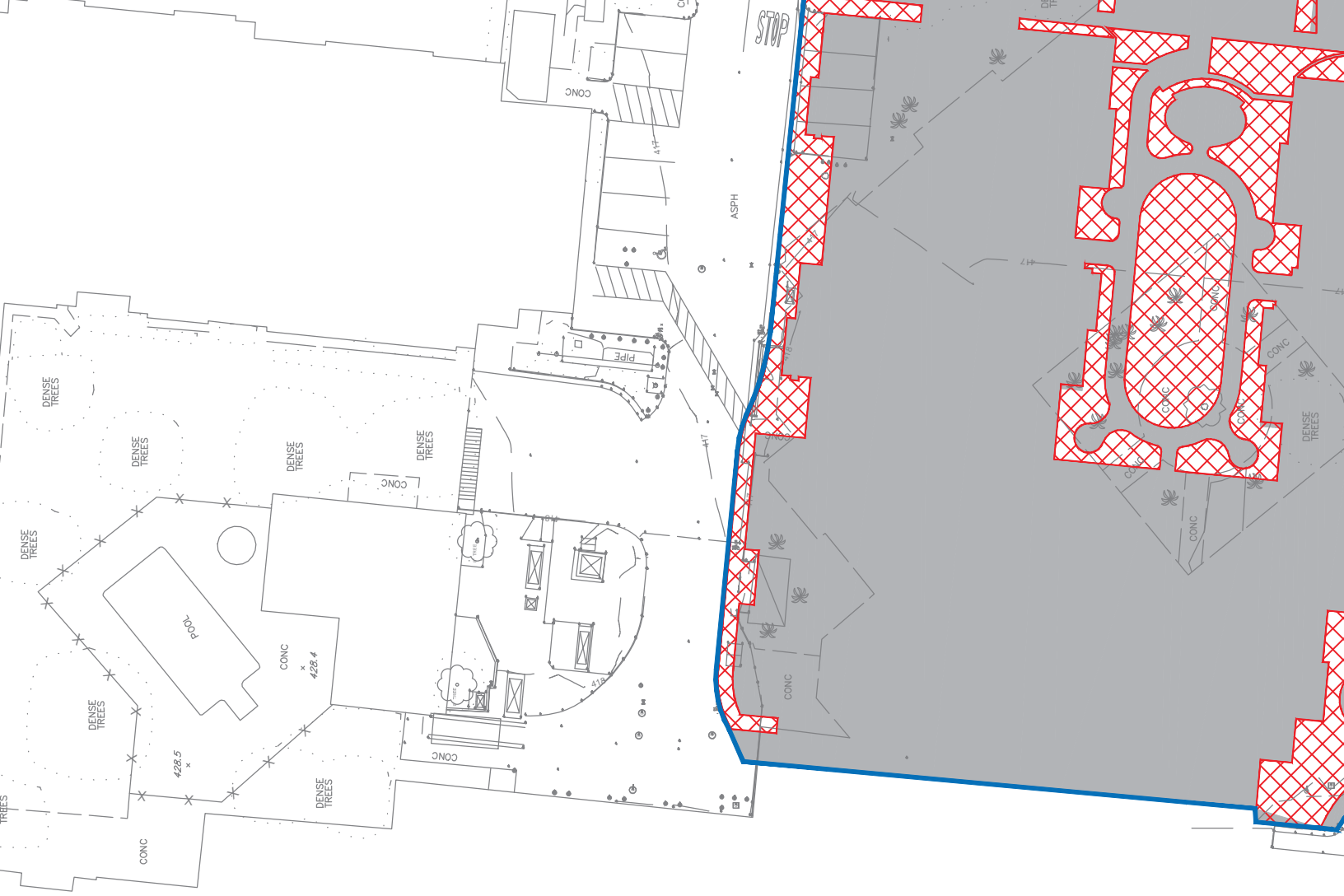
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

APPENDIX 3

PERVIOUS/IMPERVIOUS MAPS

FOR EXISTING & PROPOSED CONDITIONS





APN:
272-740-08

EXISTING SITE
IMPROVEMENTS NOT A
PART OF THIS STUDY

ATTACHMENT 6

GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

PERC TEST RESULTS AND FORMS ATTACHED.
REFER TO PROJECT SOILS REPORT TITLED:
"Geotechnical Investigation Phase III Expansion
Casa de las Campanas, 18655 West Bernardo Drive
San Diego, California." Dated 11-20-2017.
FOR COMPLETE SOILS AND GEOTECHNICAL
TESTING, RESULTS AND RECOMMENDATIONS

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteri	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.49 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are rocky sandy loam. This material is designated as being of the Hydrologic Soils Group "C" which is defined as having a low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.19 inches per hour assuming a Safety Factor of 2.6. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a raw infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. Due to the proximity of descending slopes, infiltration would create a geotechnical hazard. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	<p>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	
<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	<p>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</p>	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.49 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
<p>Part 1 Result*</p>	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>NO</p>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
<p>Provide basis:</p> <p>The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.49 inches per hour. The site soils have been classified as "Class C" indicating low infiltration therefore is not feasible to consider substantial amount of water infiltrating the subject site.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
<p>Provide basis:</p> <p>As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration may occur which could increase risk hazards by inducing instability of slopes adjacent to the basin. Lateral flow into adjacent underground utility trenches may also occur. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.49	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.19	
Supporting Data					
<p>Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.</p>					

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
<u>Part 1 - Full Infiltration Feasibility Screening Criteria</u> Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteri	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The geotechnical study performed at the site included percolation testing. The percolation test indicated raw (unfactored) infiltration rate of 0.38 inches per hour. In addition, our review of Natural Resources Conservation Service (NRCS) Soil Survey Maps (a.k.a. USDA Soil Maps) indicate the site soils are Bonsall sandy loam. This material is designated as being of the Hydrologic Soils Group "D" which is defined as having a very low infiltration rate (high runoff potential) when thoroughly wet. The factored infiltration rate is 0.14 inches per hour assuming a Safety Factor of 2.6. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

Provide basis:

As discussed in Criteria 1 above, site specific test results for the project indicate a raw infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. Due to the proximity of descending slopes, infiltration would create a geotechnical hazard. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Worksheet C.4-1 Page 2 of 4

Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade based on our study at the site. In this respect, the potential for contamination of the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	

Appendix C: Geotechnical and Groundwater Investigation Requirements

<p>Provide basis: As discussed in Criteria 1 above, site specific test results for the project indicate a unfactored infiltration rate of 0.38 inches per hour therefore an infiltration rate greater than 0.5 inches per hour is not feasible. However, it may be assumed that there is a very low probability of causing a potential water balance issue that would change seasonally ephemeral streams or increased discharge of contaminated groundwater to surface waters.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>		
<p>Part 1 Result*</p>	<p>If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration</p> <p>If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</p>	<p>NO</p>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria			
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
<p>Provide basis:</p> <p>The site conditions have been characterized as noted in Criteria 1 to have an unfactored infiltration rate of 0.38 inches per hour. The site soils have been classified as "Class D" indicating very low infiltration therefore is not feasible to consider substantial amount of water infiltrating the subject site.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
<p>Provide basis:</p> <p>As discussed previously, an infiltration rate greater than 0.5 inch/hour is not possible at the site. However, partial infiltration may occur which could increase risk hazards by inducing instability of slopes adjacent to the basin. Lateral flow into adjacent underground utility trenches may also occur. Nevertheless, a basin design could mitigate such infiltration induced hazards by implementing an impermeable liner in the bottom of the basin along with trench plugs or cut-off walls.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>As stated previously, the depth to the local groundwater table at the site is estimated to be at least 20 feet below existing site grade. In this respect, the potential risks to the local groundwater is considered low.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
<p>Provide basis:</p> <p>It does not appear that storm water infiltration would cause a violation of downstream water rights.</p> <p>This is not a geotechnical criterion and should be completed by the Storm Water Quality Management Plan (SWQMP) preparer or other qualified professional.</p> <p>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</p>			
Part 2 Result*	<p>If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.</p> <p>If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</p>	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Appendix D: Approved Infiltration Rate Assessment Methods

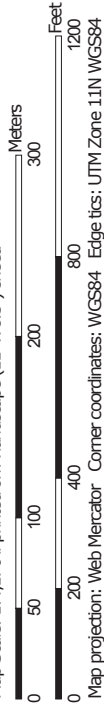
Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) $p = w \times v$
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$				2.6	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.38	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.14	
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: Percolation test was performed at the site location.					

Soil Map—San Diego County Area, California



Map Scale: 1:4,170 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 10, Sep 12, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Diego County Area, California (CA638)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BIC	Bonsall sandy loam, 2 to 9 percent slopes	13.6	22.1%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded	12.7	20.7%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	3.8	6.1%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	10.4	17.0%
FeC	Fallbrook rocky sandy loam, 5 to 9 percent slopes	7.7	12.6%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	7.8	12.7%
RaD2	Ramona sandy loam, 9 to 15 percent slopes, eroded	4.5	7.3%
StG	Steep gullied land	0.9	1.4%
Totals for Area of Interest		61.2	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
BIC—Bonsall sandy loam, 2 to 9 percent slopes														
Bonsall	85 D	D	0-10	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	100-100-100	90-95-100	50-63-75	30-40-50	20-25-30	NP-3-5
			10-27	Clay, clay loam	CH, CL	A-7	0-0-0	0-0-0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			27-38	Clay, clay loam	CH, CL	A-7	0-0-0	0-0-0	100-100-100	95-98-100	85-90-95	60-68-75	40-48-55	20-25-30
			38-60	Sandy clay loam, sandy loam	SC	A-2, A-6	0-0-0	0-0-0	100-100-100	95-98-100	70-75-80	25-38-50	30-35-40	10-15-20
			60-89	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	90-95-100	50-58-65	25-33-40	20-25-30	NP-3-5
CmE2—Cieneba rocky coarse sandy loam, 9 to 30 percent slopes , eroded														
Cieneba	60 D	D	0-8	Coarse sandy loam	SM	A-2	0-0-0	0-0-0	90-95-100	75-85-95	50-55-60	25-30-35	0-0-0	NP
			8-12	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	30 D	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H
FaD2—Fallbrook sandy loam, 9 to 15 percent slopes, eroded														
Fallbrook	85	C	0-6	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	60-68-75	35-43-50	20-25-30	NP-3-5
			6-12	Sandy loam, loam	SC-SM, SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	75-78-80	40-50-60	25-30-35	5-8-10
			12-28	Clay loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	85-93-100	70-75-80	45-55-65	25-33-40	10-15-20
			28-47	Sandy loam, loam	SC-SM, SM	A-4	0-0-0	0-0-0	95-98-100	85-93-100	65-75-85	40-50-60	25-30-35	5-8-10
			47-51	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
FaE2—Fallbrook sandy loam, 15 to 30 percent slopes, eroded														
Fallbrook	85	C	0-2	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3-5
			2-24	Loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-28	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3-5
			28-32	Weathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H
FeC—Fallbrook rocky sandy loam, 5 to 9 percent slopes														
Fallbrook	70	C	0-6	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	35-43-50	20-25-30	NP-3-5
			6-24	Loam, sandy clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	95-98-100	85-90-95	40-50-60	25-33-40	10-15-20
			24-32	Sandy loam	SM	A-2, A-4	0-0-0	0-0-0	95-98-100	95-98-100	60-65-70	30-35-40	20-25-30	NP-3-5
			32-36	Weathered bedrock	—	—	—	—	—	—	—	—	—	—
Rock outcrop	20	D	0-4	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—
PeC—Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19														
Placentia	85	C	0-4	Sandy loam	SC	A-4	0-0-0	0-0-0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			4-13	Sandy loam	SC	A-4	0-0-0	0-0-0	91-95-100	78-87-100	57-67-81	29-36-45	23-29-34	7-10-13
			13-21	Sandy clay	SC	A-7-6	0-0-0	0-0-0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			21-34	Sandy clay	SC	A-7-6	0-0-0	0-0-0	90-95-100	79-89-100	55-68-84	36-48-61	44-53-61	25-31-37
			34-53	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0-0-0	0-0-0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25
			53-63	Gravelly sandy clay loam, sandy clay loam	SC	A-6	0-0-0	0-0-0	91-95-100	69-84-100	45-60-79	26-38-52	30-38-46	13-19-25

Engineering Properties—San Diego County Area, California														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H	L-R-H
RaD2—Ramona sandy loam, 9 to 15 percent slopes, eroded														
Ramona	85	C	0-10	Sandy loam	SM	A-4	0-0-0	0-0-0	95-98-100	75-85-95	60-65-70	35-43-50	15-20-25	NP-3-5
			10-60	Sandy clay loam, clay loam	CL, SC	A-6	0-0-0	0-0-0	95-98-100	85-90-95	75-78-80	35-45-55	25-30-35	10-15-20
			60-74	Sandy clay loam, sandy loam	SC, SC-SM	A-6	0-0-0	0-0-0	95-98-100	75-85-95	60-65-70	35-43-50	20-28-35	5-10-15
StG—Steep gullied land														
Steep gullied land	85		0-60	Variable	—	—	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: San Diego County Area, California
 Survey Area Data: Version 10, Sep 12, 2016



CLIMATE ACTION PLAN CONSISTENCY CHECKLIST INTRODUCTION

In December 2015, the City adopted a Climate Action Plan (CAP) that outlines the actions that City will undertake to achieve its proportional share of State greenhouse gas (GHG) emission reductions. The purpose of the Climate Action Plan Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).¹

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

The Checklist may be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law.

¹ Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

This page intentionally left blank



CAP CONSISTENCY CHECKLIST SUBMITTAL APPLICATION

- ❖ The Checklist is required only for projects subject to CEQA review.²
- ❖ If required, the Checklist must be included in the project submittal package. Application submittal procedures can be found in [Chapter 11: Land Development Procedures](#) of the City's Municipal Code.
- ❖ The requirements in the Checklist will be included in the project's conditions of approval.
- ❖ The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Department.

Application Information

Contact Information

Project No./Name: _____

Property Address: _____

Applicant Name/Co.: _____

Contact Phone: _____ Contact Email: _____

Was a consultant retained to complete this checklist? ☐ Yes ☐ No If Yes, complete the following

Consultant Name: _____ Contact Phone: _____

Company Name: _____ Contact Email: _____

Project Information

1. What is the size of the project (acres)? _____

2. Identify all applicable proposed land uses:

☐ Residential (indicate # of single-family units): _____

☐ Residential (indicate # of multi-family units): _____

☐ Commercial (total square footage): _____

☐ Industrial (total square footage): _____

☐ Other (describe): _____

3. Is the project or a portion of the project located in a Transit Priority Area? ☐ Yes ☐ No

4. Provide a brief description of the project proposed: _____

² Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.



CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
A. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations? ³ <u>OR</u>		
B. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment, would the proposed amendment result in an increased density within a Transit Priority Area (TPA) ⁴ and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department? <u>OR</u>	<input type="checkbox"/>	<input type="checkbox"/>
C. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?		

If **"Yes,"** proceed to Step 2 of the Checklist. For question B above, complete Step 3. For question C above, provide estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation.

If **"No,"** in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

³ This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

⁴ This category applies to all projects that answered in the affirmative to question 3 on the previous page: Is the project or a portion of the project located in a transit priority area.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.⁵ All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the [Greenbook](#) (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
<p>1. <i>Cool/Green Roofs.</i></p> <ul style="list-style-type: none"> • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; <u>OR</u> • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; <u>OR</u> • Would the project include a combination of the above two options? <p>Check "N/A" only if the project does not include a roof component.</p> <div style="border: 1px solid black; height: 150px; width: 550px; margin-top: 10px;"></div>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

⁵ Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development, 2) permits allowing wireless communication facilities, 3) special events permits, 4) use permits or other permits that do not result in the expansion or enlargement of a building (e.g., decks, garages, etc.), and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

2. *Plumbing fixtures and fittings*

With respect to plumbing fixtures or fittings provided as part of the project, would those low-flow fixtures/appliances be consistent with each of the following:

Residential buildings:

- Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60 psi;
- Standard dishwashers: 4.25 gallons per cycle;
- Compact dishwashers: 3.5 gallons per cycle; and
- Clothes washers: water factor of 6 gallons per cubic feet of drum capacity?

Nonresidential buildings:

- Plumbing fixtures and fittings that do not exceed the maximum flow rate specified in [Table A5.303.2.3.1 \(voluntary measures\) of the California Green Building Standards Code](#) (See Attachment A); and
- Appliances and fixtures for commercial applications that meet the provisions of [Section A5.303.3 \(voluntary measures\) of the California Green Building Standards Code](#) (See Attachment A)?

Check "N/A" only if the project does not include any plumbing fixtures or fittings.

<div></div>	<div></div>	<div></div>	<div></div>
-------------	-------------	-------------	-------------

☐

☐

☐

Strategy 3: Bicycling, Walking, Transit & Land Use

3. Electric Vehicle Charging

- Multiple-family projects of 17 dwelling units or less: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents?
- Multiple-family projects of more than 17 dwelling units: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents?
- Non-residential projects: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use?

Check "N/A" only if the project is a single-family project or would not require the provision of listed cabinets, boxes, or enclosures connected to a conduit linking the parking spaces with electrical service, e.g., projects requiring fewer than 10 parking spaces.



Strategy 3: Bicycling, Walking, Transit & Land Use

(Complete this section if project includes non-residential or mixed uses)

4. Bicycle Parking Spaces

Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code ([Chapter 14, Article 2, Division 5](#))?⁶

Check "N/A" only if the project is a residential project.



⁶ Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

5. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the [California Green Building Standards Code](#) as shown in the table below?

Number of Tenant Occupants (Employees)	Shower/Changing Facilities Required	Two-Tier (12" X 15" X 72") Personal Effects Lockers Required
0-10	0	0
11-50	1 shower stall	2
51-100	1 shower stall	3
101-200	1 shower stall	4
Over 200	1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants	1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

☐
☐
☐

6. *Designated Parking Spaces*

If the project includes a nonresidential use in a TPA, would the project provide designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles in accordance with the following table?

Number of Required Parking Spaces	Number of Designated Parking Spaces
0-9	0
10-25	2
26-50	4
51-75	6
76-100	9
101-150	11
151-200	18
201 and over	At least 10% of total

This measure does not cover electric vehicles. See Question 4 for electric vehicle parking requirements.

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces. The required designated parking spaces are to be provided within the overall minimum parking requirement, not in addition to it.

Check "N/A" only if the project is a residential project, or if it does not include nonresidential use in a TPA.

☐

☐

☐

7. *Transportation Demand Management Program*

If the project would accommodate over 50 tenant-occupants (employees), would it include a transportation demand management program that would be applicable to existing tenants and future tenants that includes:

At least one of the following components:

- Parking cash out program
- Parking management plan that includes charging employees market-rate for single-occupancy vehicle parking and providing reserved, discounted, or free spaces for registered carpools or vanpools
- Unbundled parking whereby parking spaces would be leased or sold separately from the rental or purchase fees for the development for the life of the development

And at least three of the following components:

- Commitment to maintaining an employer network in the SANDAG iCommute program and promoting its RideMatcher service to tenants/employees
- On-site carsharing vehicle(s) or bikesharing
- Flexible or alternative work hours
- Telework program
- Transit, carpool, and vanpool subsidies
- Pre-tax deduction for transit or vanpool fares and bicycle commute costs
- Access to services that reduce the need to drive, such as cafes, commercial stores, banks, post offices, restaurants, gyms, or childcare, either onsite or within 1,320 feet (1/4 mile) of the structure/use?

Check "N/A" only if the project is a residential project or if it would not accommodate over 50 tenant-occupants (employees).

<div></div>	<div></div>	<div></div>	<div></div>
-------------	-------------	-------------	-------------

☐☐☐

Step 3: Project CAP Conformance Evaluation (if applicable)

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option B. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. In general, a project that would result in a reduction in density inside a TPA would not be consistent with Strategy 3. The following questions must each be answered in the affirmative and fully explained.

1. Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?

Considerations for this question:

- Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
- Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
- Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?

Considerations for this question:

- Does the proposed project support/incorporate identified transit routes and stops/stations?
- Does the project include transit priority measures?

3. Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?

Considerations for this question:

- Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
- Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?

Considerations for this question:

- Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
- Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?

Considerations for this question:

- Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
- Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
- Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?

Considerations for this question:

- Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
- Does the proposed project include policies or strategies for preserving existing trees?
- Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?



CLIMATE ACTION PLAN CONSISTENCY CHECKLIST ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Plan (CAP) Consistency Checklist measures.

Table 1 Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan				
Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
<p>Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 residential and non-residential voluntary measures shown in Tables A4.106.5.1 and A5.106.11.2.2, respectively. Roof installation and verification shall occur in accordance with the CALGreen Code.</p> <p>CALGreen does not include recommended values for low-rise residential buildings with roof slopes of ≤ 2:12 for San Diego's climate zones (7 and 10). Therefore, the values for climate zone 15 that covers Imperial County are adapted here.</p> <p>Solar Reflectance Index (SRI) equal to or greater than the values specified in this table may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.</p>				

Table 2 Fixture Flow Rates for Non-Residential Buildings related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan

Fixture Type	Maximum Flow Rate
Showerheads	1.8 gpm @ 80 psi
Lavatory Faucets	0.35 gpm @60 psi
Kitchen Faucets	1.6 gpm @ 60 psi
Wash Fountains	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering Faucets	0.18 gallons/cycle
Metering Faucets for Wash Fountains	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity Tank-type Water Closets	1.12 gallons/flush
Flushometer Tank Water Closets	1.12 gallons/flush
Flushometer Valve Water Closets	1.12 gallons/flush
Electromechanical Hydraulic Water Closets	1.12 gallons/flush
Urinals	0.5 gallons/flush

Source: Adapted from the [California Green Building Standards Code](#) (CALGreen) Tier 1 non-residential voluntary measures shown in Tables A5.303.2.3.1 and A5.106.11.2.2, respectively. See the [California Plumbing Code](#) for definitions of each fixture type.

Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

Acronyms:

gpm = gallons per minute

psi = pounds per square inch (unit of pressure)

in. = inch

Table 3 Standards for Appliances and Fixtures for Commercial Application related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan

Appliance/Fixture Type	Standard	
Clothes Washers	Maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the <i>California Code of Regulations</i> .	
Conveyor-type Dishwashers	0.70 maximum gallons per rack (2.6 L) (High-Temperature)	0.62 maximum gallons per rack (4.4 L) (Chemical)
Door-type Dishwashers	0.95 maximum gallons per rack (3.6 L) (High-Temperature)	1.16 maximum gallons per rack (2.6 L) (Chemical)
Undercounter-type Dishwashers	0.90 maximum gallons per rack (3.4 L) (High-Temperature)	0.98 maximum gallons per rack (3.7 L) (Chemical)
Combination Ovens	Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.	
Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)	Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and <ul style="list-style-type: none"> • Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate. • Be equipped with an integral automatic shutoff. • Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gallons per minute (0.08 L/s) or less. 	

Source: Adapted from the [California Green Building Standards Code](#) (CALGreen) Tier 1 non-residential voluntary measures shown in Section A5.303.3. See the [California Plumbing Code](#) for definitions of each appliance/fixture type.

Acronyms:

L = liter

L/h = liters per hour

L/s = liters per second

psi = pounds per square inch (unit of pressure)

kPa = kilopascal (unit of pressure)

MEMORANDUM

TO: Felipe Avila Zepeda, City of San Diego
FROM: Phuong Nguyen, PE; Chen Ryan Associates
DATE: March 28, 2019
RE: **Casa De Las Campanas – Access Analysis Study**

The purpose of this memorandum is to identify and document any potential traffic related impacts associated with the proposed Casa De Las Campanas – Phase III Project (the “Proposed Project”). The Proposed Project site is located at 18655 West Bernardo Drive, within the Rancho Bernardo Community Planning Area of the City of San Diego. The Proposed Project location is displayed in **Figure 1**.

1.0 Background

The project applicant (Casa De Las Campanas) is proposing to demolish an existing skilled nursing facility building and construct a 5-story elder care facility, comprised of 24 independent living units and 66 assisted living units. Access to the project site is currently provided via a signalized intersection at Rancho Bernardo Community Park Driveway & West Bernardo Drive. A right-in and right-out only emergency driveway controlled by a gate and bollards located along West Bernardo Drive (north of the Rancho Bernardo Community Park Driveway & West Bernardo Drive intersection) is also present. The Proposed Project’s site plan is provided in **Figure 2**.

It should be noted that the Casa de las Campanas project is currently constructing a separate skilled nursing facility (City of San Diego Permit No. 44039, Conditional Use Permit No. 1409096, and Planned Development Permit No. 1409097) with access via two driveways on West Bernardo Drive. This facility is currently under construction as of March 2019. Due to the site layout, it is reasonable to assume that none of the Proposed Project trips will utilize the skilled nursing driveways, so these driveways were not included as a part of this analysis. However, for a conservative analysis, trips from the skilled nursing facility were included as a part of the Near-term Year 2020 Base and Near-Term Year 2020 Base Plus Project Conditions. Additionally, it should be noted that the skilled nursing facility was not under construction as of November 2017, when the traffic counts were conducted.

As shown in Section 4.0 of this memo, the Proposed Project is anticipated to generate 294 daily trips. Based on *City of San Diego Land Use Code – Trip Generation Manual, May 2003* a redevelopment project of this size does not require to conduct any form of traffic impact or operations assessment.

Following this introductory section, this memo is organized in the following sections:

- 2.0 Analysis Methodology
- 3.0 Existing Conditions
- 4.0 Proposed Project
- 5.0 Existing Plus Project Conditions
- 6.0 Near-Term Year 2020 Base Conditions
- 7.0 Near-Term Year 2020 Base Plus Project Conditions
- 8.0 Findings and Conclusions

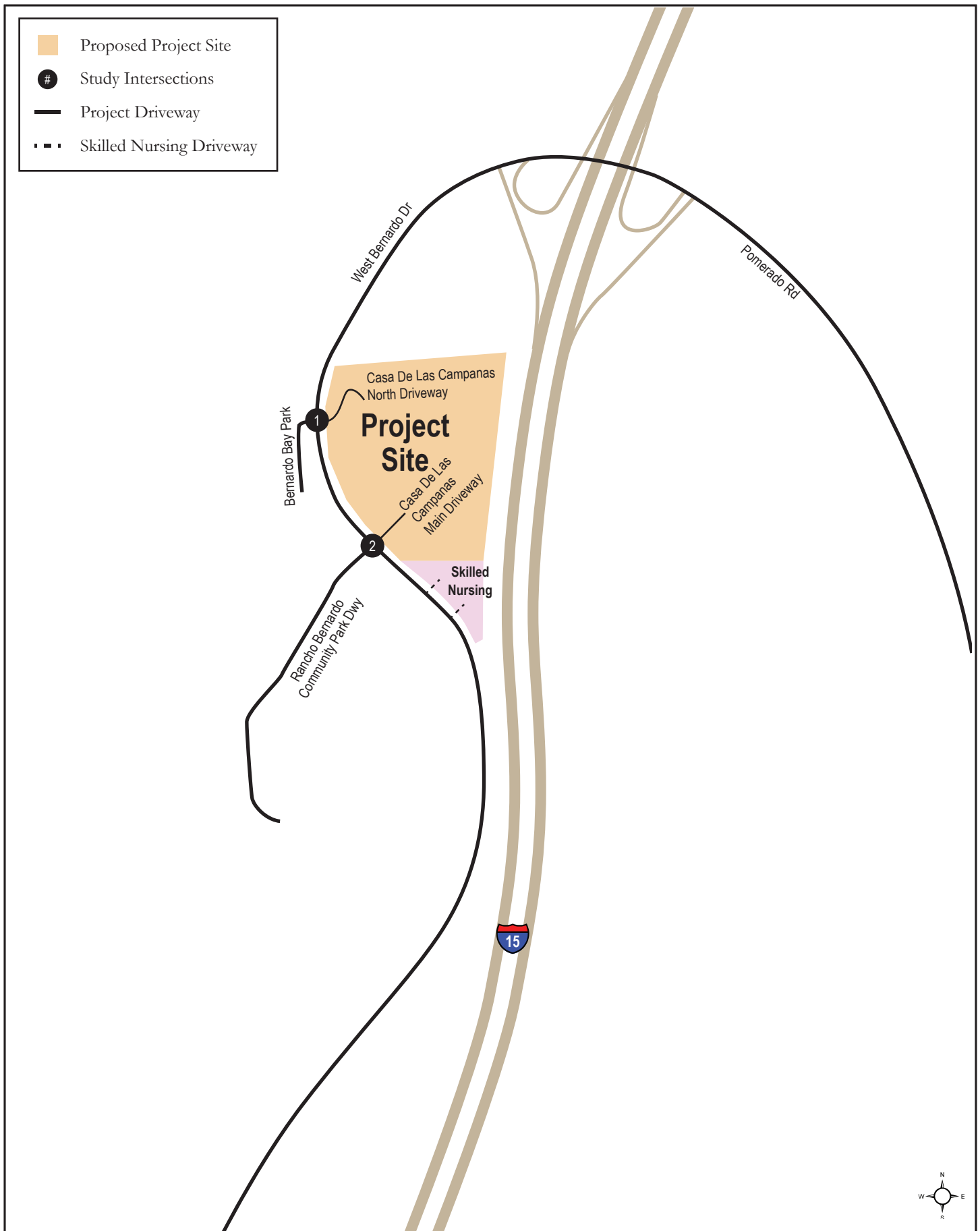




Figure 2

2.0 Analysis Methodology

Level of Service Definitions

Level of Service (LOS) is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations. **Table 2.2** describes generalized characteristics and criteria of the various LOS categories (A through F) as applied to signalized intersection operations.

Table 2.1 Roadway Level of Service Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: Highway Capacity Manual 2000

Table 2.2 Signalized Intersection LOS Criteria

Average Stopped Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
<10.0	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	LOS E is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 2010, TRB Special Report 209

The computerized analysis of roadway segment and intersection operations was performed utilizing the *SYNCHRO 10.0* traffic analysis software.

Roadway Segment Level of Service Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. The City of San Diego utilizes the standards and methods contained in the *City of San Diego Traffic Impact Study Manual (TISM) Standards* to determine roadway capacity and LOS. **Table 2.3** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report.

Table 2.3 City of San Diego Roadway Classifications and LOS Standards

Roadway Functional Classification	Level of Service				
	A	B	C	D	E
Expressway (6-lane)	< 30,000	< 42,000	< 60,000	< 70,000	< 80,000
Prime Arterial (6-lane)	< 25,000	< 35,000	< 50,000	< 55,000	< 60,000
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	< 45,000	< 50,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	< 35,000	< 40,000
Collector (4-lane w/ center lane)	< 10,000	< 14,000	< 20,000	< 25,000	< 30,000
Collector (4-lane w/o center lane)	< 5,000	< 7,000	< 10,000	< 13,000	< 15,000
Collector (2-lane w/ continuous left-turn lane)					
Collector (2-lane no fronting property)	< 4,000	< 5,500	< 7,500	< 9,000	< 10,000
Collector (2-lane w/ commercial fronting)	< 2,500	< 3,500	< 5,000	< 6,500	< 8,000
Collector (2-lane multi-family)					
Sub-Collector (2-lane single-family)	-	-	< 2,200	-	-

Source: City of San Diego Traffic Impact Study Manual (1998)

Note:

Bold numbers indicate the ADT thresholds for acceptable LOS.

Signalized Intersection Level of Service Standards and Thresholds

The City of San Diego's *Significance Determination Thresholds* defines project impact thresholds by facility type. These thresholds are generally based upon an acceptable increase in the Volume / Capacity (V/C) ratio for roadway and freeway segments, and upon increases in vehicle delays (in seconds) for intersections and ramps.

In the City of San Diego, LOS D is considered acceptable for roadway and intersection operations. A project is considered to have a significant impact if it degrades the operations of a roadway or intersection from an acceptable LOS (D or better) to an unacceptable LOS (E or F), or if it adds additional delay to a facility already operating an unacceptable level. **Table 2.4** summarizes the impact significance thresholds as identified by the City of San Diego beyond which mitigation measures are required for signalized intersections.

Table 2.4 Measure of Significant Project Traffic Impacts

Level of Service (LOS) with Project*	Allowable Change Due to Impact**					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec)	Delay (min.)
LOS E (or ramp meter delays > 15 min.)	0.010	1.0	0.02	1.0	2.0	2.0
LOS F (or ramp meter delays > 15 min.)	0.005	0.5	0.01	0.5	1.0	2.0

Source: City of San Diego, Significance Determination Thresholds (January 2011)

* All level of service (LOS) measurements are based upon HCM procedures for peak-hour conditions. However, vehicle to capacity (V/C) ratios for roadway segments may be estimated on an ADT/24-hour traffic volume basis (using Table 2.1 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

** If a Proposed Project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigation (within the Traffic Impact Study report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the Proposed Project becomes unacceptable (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

Table 2.5 summarizes the impact significance thresholds as identified by the City of San Diego beyond which mitigation measures are required for unsignalized intersections.

Table 2.5 Unsignalized Intersection LOS Criteria

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10	A
>10 and ≤15	B
>15 and ≤25	C
>25 and ≤35	D
>35 and ≤50	E
>50	F

Source: Highway Capacity Manual 2010

3.0 Existing Conditions

This section reviews the existing roadway network and roadway operations along West Bernardo Drive.

Existing Roadway Network

West Bernardo Drive is a north/south roadway that provides access between residential areas south of the Proposed Project site and the Pomerado Road overcrossing of Interstate 15. West Bernardo Drive is a two-lane roadway with striped median with a posted speed of 25 mph and has a curb-to-curb width of 60 feet. Parking is permitted intermittently on both sides of the roadway. Class II bike lanes are provided along both sides of the roadway. There are currently no transit stops along West Bernardo Drive within the project study area.

Existing Roadway Volumes

To understand the existing traffic demand within the study area, daily traffic counts were collected on West Bernardo Drive on Tuesday, November 7th, 2017 and intersection counts were collected on Wednesday, November 8th, 2017. **Figure 3** displays the existing traffic volumes along West Bernardo Drive and the existing roadway geometrics. Traffic count worksheets are provided in **Attachment A**.

Roadway Segment Analysis

Table 3.1 displays the daily traffic volumes and LOS analysis results for West Bernardo Drive under Existing conditions within the project study area.

Table 3.1 Roadway Segment Level of Service Results - Existing Conditions

Roadway	Segments	Functional Classification	ADT	Capacity	V/C	LOS
West Bernardo Drive	North of the northern Project Driveway	Collector (2-lane no fronting property)	7,559	10,000	0.756	D
	Between the northern Project Driveway and the Rancho Bernardo Community Park Driveway	Collector (2-lane no fronting property)	7,559	10,000	0.756	D
	South of the Rancho Bernardo Community Park Driveway	Collector (2-lane w/ commercial fronting)	6,695	8,000	0.837	E

Source: Accurate Video Count, Chen Ryan Associates; March 2019

Notes:

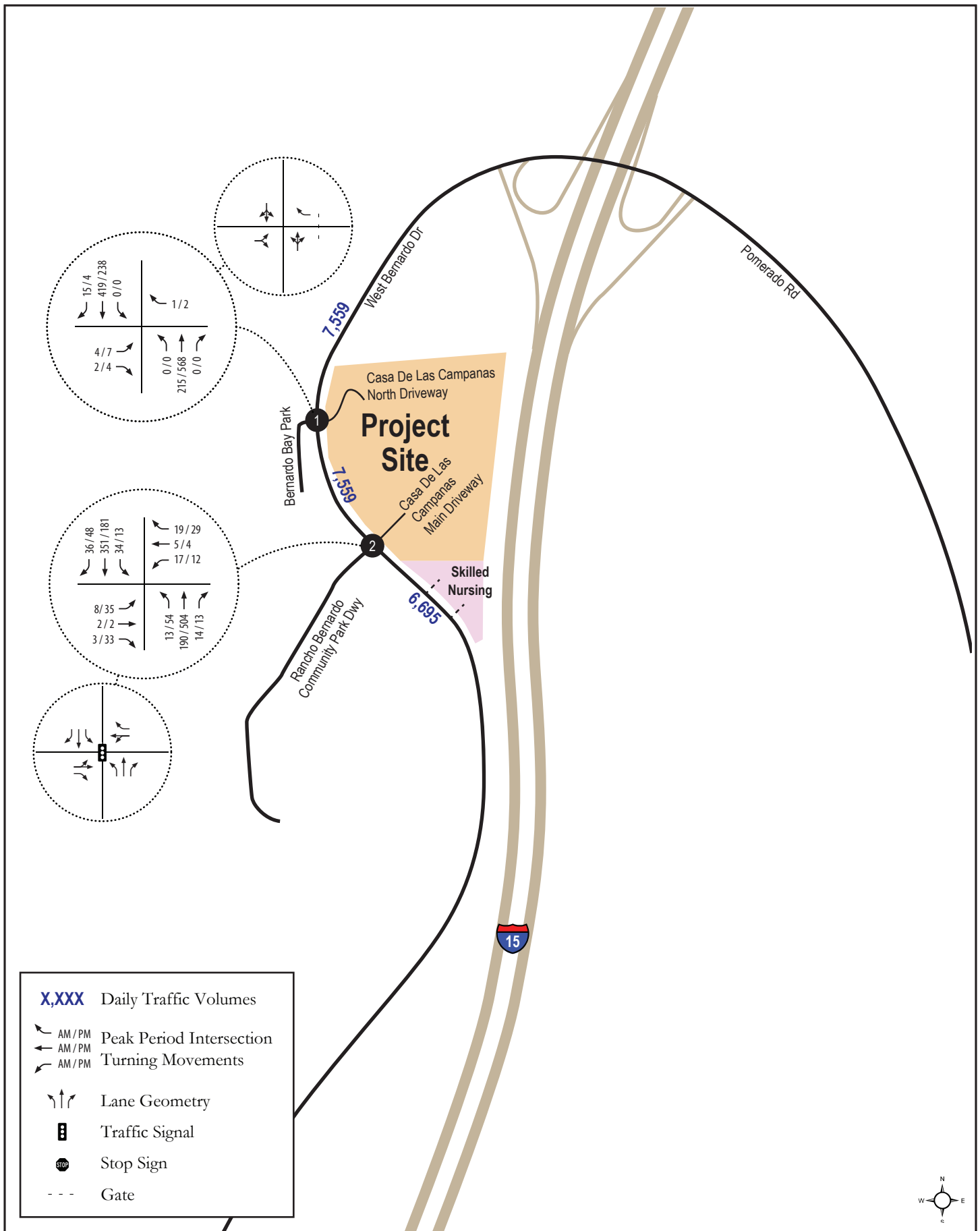
ADT = Average Daily Traffic,

V/C = Volume to Capacity Ratio

LOS = Level of Service

Bold letter indicated substandard LOS

As shown in Table 3.1, all of the study area roadway segments are currently operating at an acceptable LOS D or better, with the exception of West Bernardo Drive south of Rancho Bernardo Community Park Driveway which is currently operating at substandard LOS E.



Intersection Analysis

Table 3.2 displays intersection level of service and average vehicle delay results for the study area intersections under Existing conditions. Level of service calculation worksheets for Existing conditions are provided in **Attachment B**. As shown, both study area intersections are currently operating at an acceptable LOS A during both the AM and PM peak hours.

Table 3.2 Peak Hour Intersection LOS Results - Existing Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. West Bernardo Drive and San Dieguito River Park Driveway	SSSC	14.3	B	16.3	C
2. West Bernardo Drive and Rancho Bernardo Community Park Driveway	Signal	7.3	A	10.3	B

Source: Chen Ryan Associates; March 2019

Notes:

SSSC = Side Street Stop Controlled, the delay shown is the worst delay experienced by any of the approaches.

LOS = Level of Service

4.0 Proposed Project

This section analyzes and reviews the Proposed Project's trip generation, trip distribution patterns, and the resulting project trip assignment.

Project Trip Generation

Project trip generation estimates were derived utilizing the trip generation rates outlined in the *City of San Diego Land Use Code – Trip Generation Manual, May 2003*. **Table 4.1** displays the Proposed Project's trip generation.

Table 4.1 Proposed Project Trip Generation

Land Use	Quantity	Trip Rate	Daily Trips	AM Peak Hour		PM Peak Hour	
				%	Trips	%	Trips
Retirement/Senior Citizen Housing	24 DU	4 / DU	96	5%	5 (2-in / 3-out)	7%	7 (4-in / 3-out)
Convalescent/Nursing Hospital	66 Rooms	3 / Room	198	5%	10 (4-in / 6-out)	7%	14 (8-in / 6-out)
Total			294		15 (6-in / 9-out)	7%	21 (12-in / 9-out)

Source: City of San Diego Land Use Code – Trip Generation Manual, May 2003, Chen Ryan Associates; March 2019

As shown in **Table 4.1**, the Proposed Project is anticipated to generate a total of 294 daily trips, with 15 trips during the AM peak hour (6-inbound / 9-outbound) and 21 trips during the PM peak hour (12-inbound / 9-outbound).

Project Trip Distribution

The Proposed Project trip distribution was developed to reflect the existing project traffic turning movement proportions and existing travel patterns. **Figure 4** displays the trip distribution patterns associated with the Proposed Project.

Project Trip Assignment

Based upon the project trip generation and trip distribution pattern, daily project trips were assigned to the adjacent roadway network, as displayed in **Figure 5**.

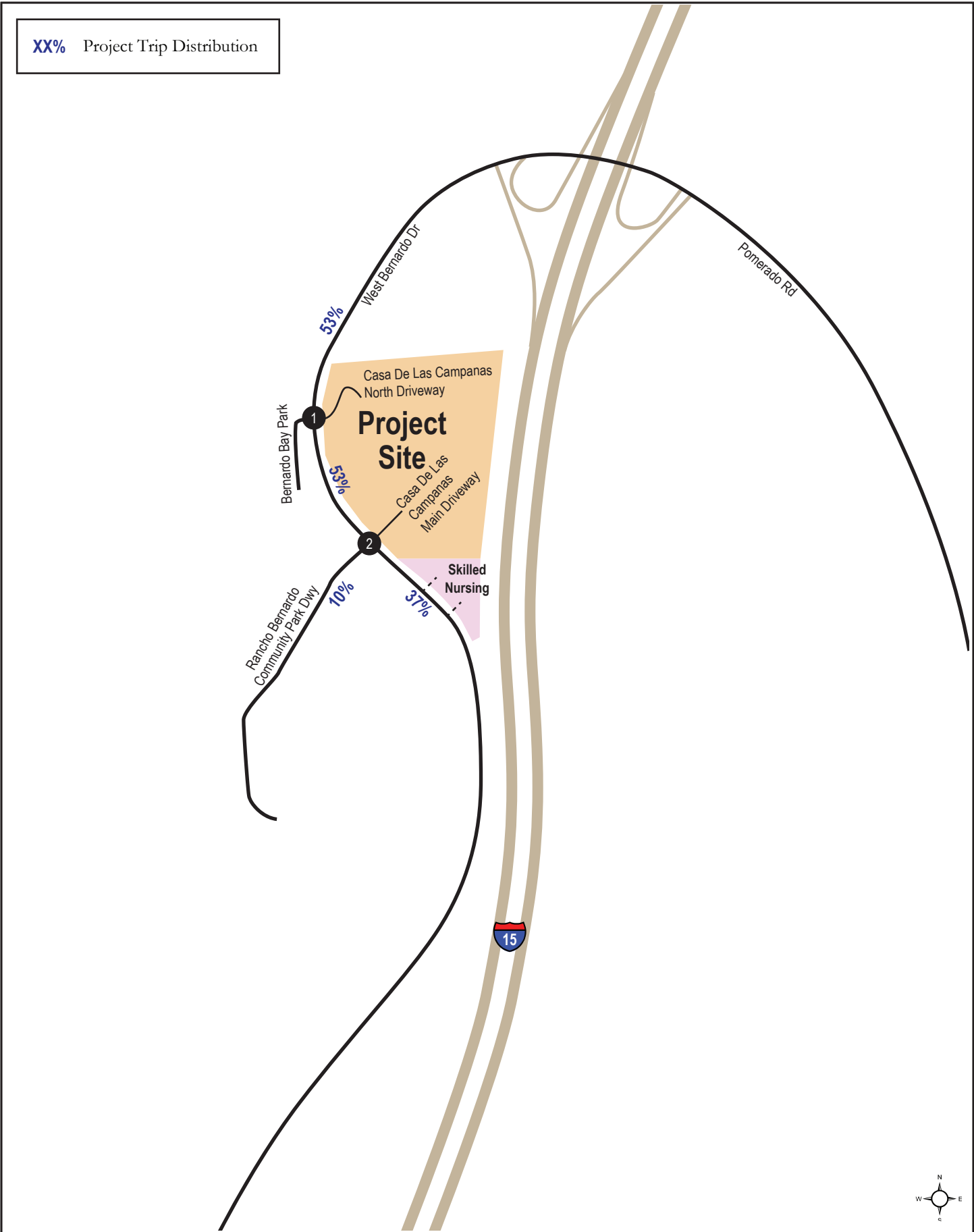
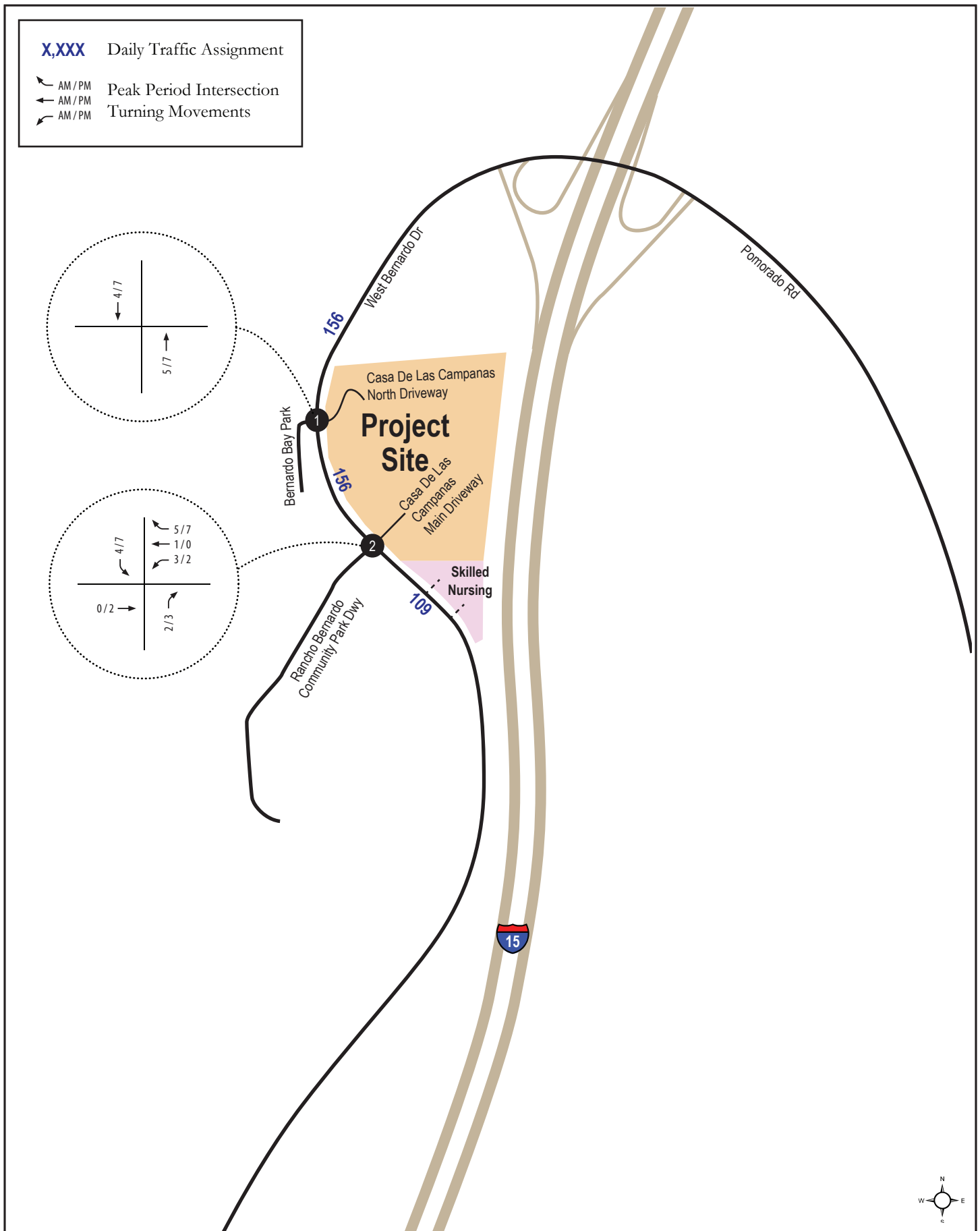


Figure 4
Project Trip Distribution



5.0 Existing Plus Project Conditions

This section provides an analysis of existing traffic conditions with the addition of traffic from the Proposed Project.

Existing Plus Project Roadway Network and Traffic Volumes

The roadway network under Existing Plus Project conditions was assumed to be identical to Existing conditions shown in Figure 3.

Existing Plus Project traffic volumes were derived by adding the project trip assignment volumes (shown in Figure 5) to existing roadway volumes (shown in Figure 3). Existing Plus Project traffic volumes are shown in **Figure 6**.

Existing Plus Project Traffic Analysis

Table 5.1 displays anticipated daily operations under Existing Plus Project Conditions for the study area segments along West Bernardo Drive.

Table 5.1 Roadway Segments Level of Service Analysis – Existing Plus Project Conditions

Roadway	Segment	Functional Classification	Cross-Section	ADT	Capacity (LOS E)	With Project		Without Project		Δ V/C	SI?
						V/C	LOS	V/C	LOS		
West Bernardo Drive	North of the northern Project Driveway	Collector (2-lane no fronting property)	2-Ln w / SM	7,715	10,000	0.771	D	0.756	D	0.015	No
	Between the northern Project Driveway and the Rancho Bernardo Community Park Driveway	Collector (2-lane no fronting property)	2-Ln w / SM	7,715	10,000	0.771	D	0.756	D	0.015	No
	South of the Rancho Bernardo Community Park Driveway	Collector (2-lane w/ commercial fronting)	2-Ln w / & w/o SM	6,833	8,000	0.854	C	0.837	E	0.017	No

Source: Chen Ryan Associates; March 2019

Notes:

ADT = Average Daily Traffic

V/C = Volume to Capacity Ratio

LOS = Level of Service

Bold letter indicated substandard LOS

As shown in Table 5.1, all study roadway segments along West Bernardo Drive are anticipated to continue to operate at an acceptable LOS D or better, with the exception of West Bernardo Drive south of Rancho Bernardo Community Park Driveway which is currently operating at substandard LOS E. Based on the impact criteria outlined in the *City of San Diego Significance Determination Thresholds (January 2011)* and described in Section 2 of this technical memorandum, the Proposed Project would not be associated with a significant traffic related impact.

Existing Plus Project Intersection Analysis

Table 5.2 displays intersection LOS and average vehicle delay results under Existing Plus Project conditions. Level of service calculation worksheets for Existing Plus Project conditions are provided in **Attachment C**.

Table 5.2 Peak Hour Intersection LOS Results – Existing Plus Project Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	Delay w/o Project AM/PM	Change in Delay (sec)	SI?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1. West Bernardo Drive and San Dieguito River Park Driveway	SSSC	14.4	B	16.5	C	14.3 / 16.3	B / C	0.1 / 0.2	No
2. West Bernardo Drive and Rancho Bernardo Community Park Driveway	Signal	7.3	A	11.2	B	7.3 / 10.3	A / B	0.0 / 0.9	No

Source: Chen Ryan Associates; March 2019

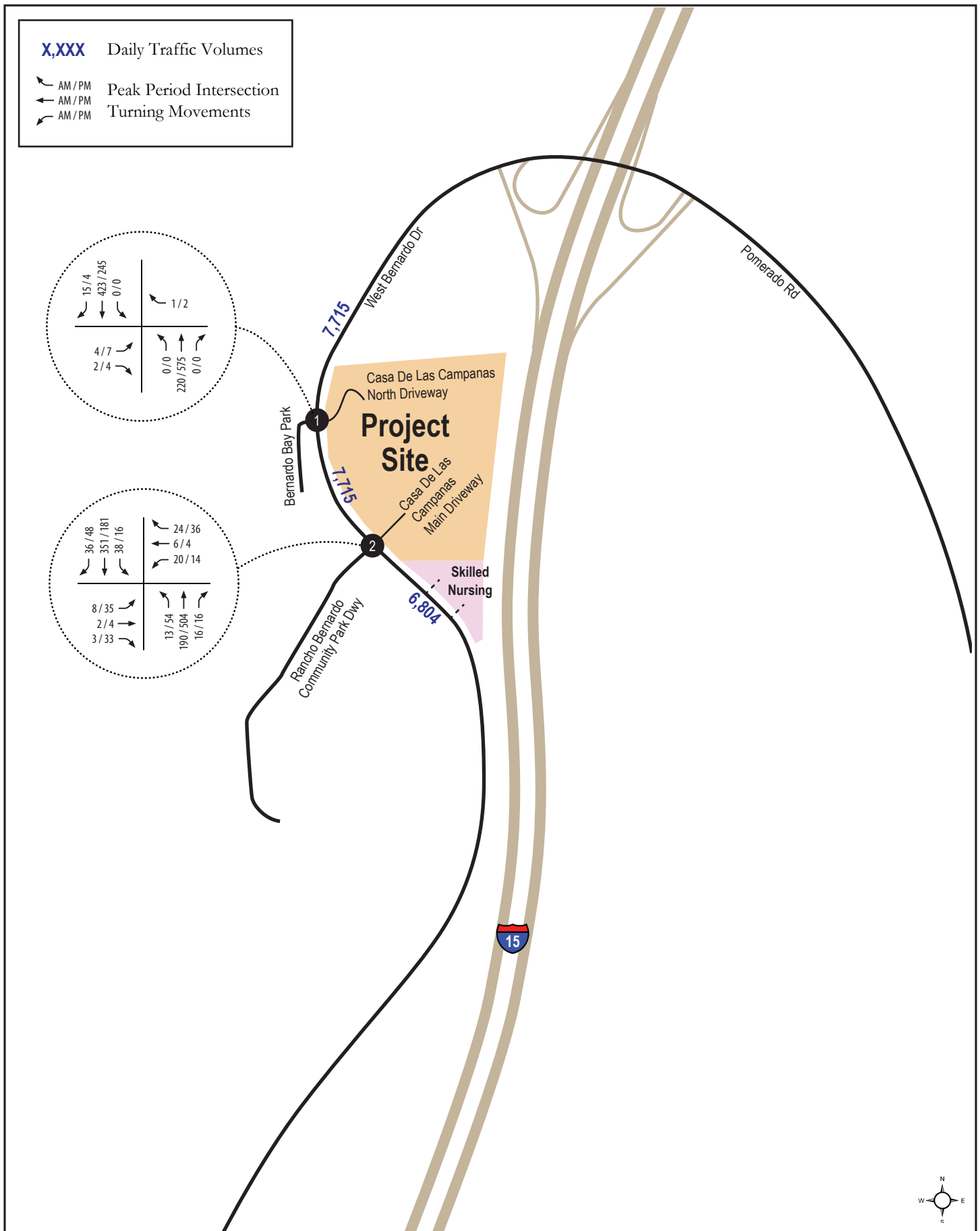
Notes:

SSSC = Side Street Stop Controlled, the delay shown is the worst delay experienced by any of the approaches.

LOS = Level of Service

SI? = Significant Impact?

As shown in Table 5.2, both of the study area intersections will continue to operate at an acceptable LOS A, during both the AM and PM peak hours, with the addition of project traffic. Therefore, based on the impact criteria outlined in the *City of San Diego Significance Determination Thresholds*, the Proposed Project would not be associated with a significant traffic related impact.



6.0 Near-Term Year 2020 Conditions

This section provides an analysis of Near-Term Year 2020 base traffic conditions to provide a platform for traffic impacts expected for the completion of the development project.

Near-Term Year 2020 Roadway Network and Traffic Volumes

The roadway network under Near-Term Year 2020 conditions was assumed to be identical to Existing conditions shown in Figure 3.

Near-Term Year 2020 traffic volumes were derived by adding cumulative project trips to the existing traffic volume. Based on discussion with City staff, the adjacent skilled-nursing facility (CUP #1409096 – includes in **Attachment D**) would add cumulative traffic to the Proposed Project study area. Table 6.1 displays the cumulative project traffic. Cumulative project trip generation estimates were derived utilizing the trip generation rates outlined in the *City of San Diego Land Use Code – Trip Generation Manual, May 2003*.

Table 6.1 Cumulative Project Trip Generation

Land Use	Quantity	Trip Rate	Daily Trips	AM Peak Hour		PM Peak Hour	
				%	Trips	%	Trips
Skilled Nursing Facility	72 Beds	3 / Bed	216	5%	11 (4-in / 7-out)	7%	16 (10-in / 6-out)

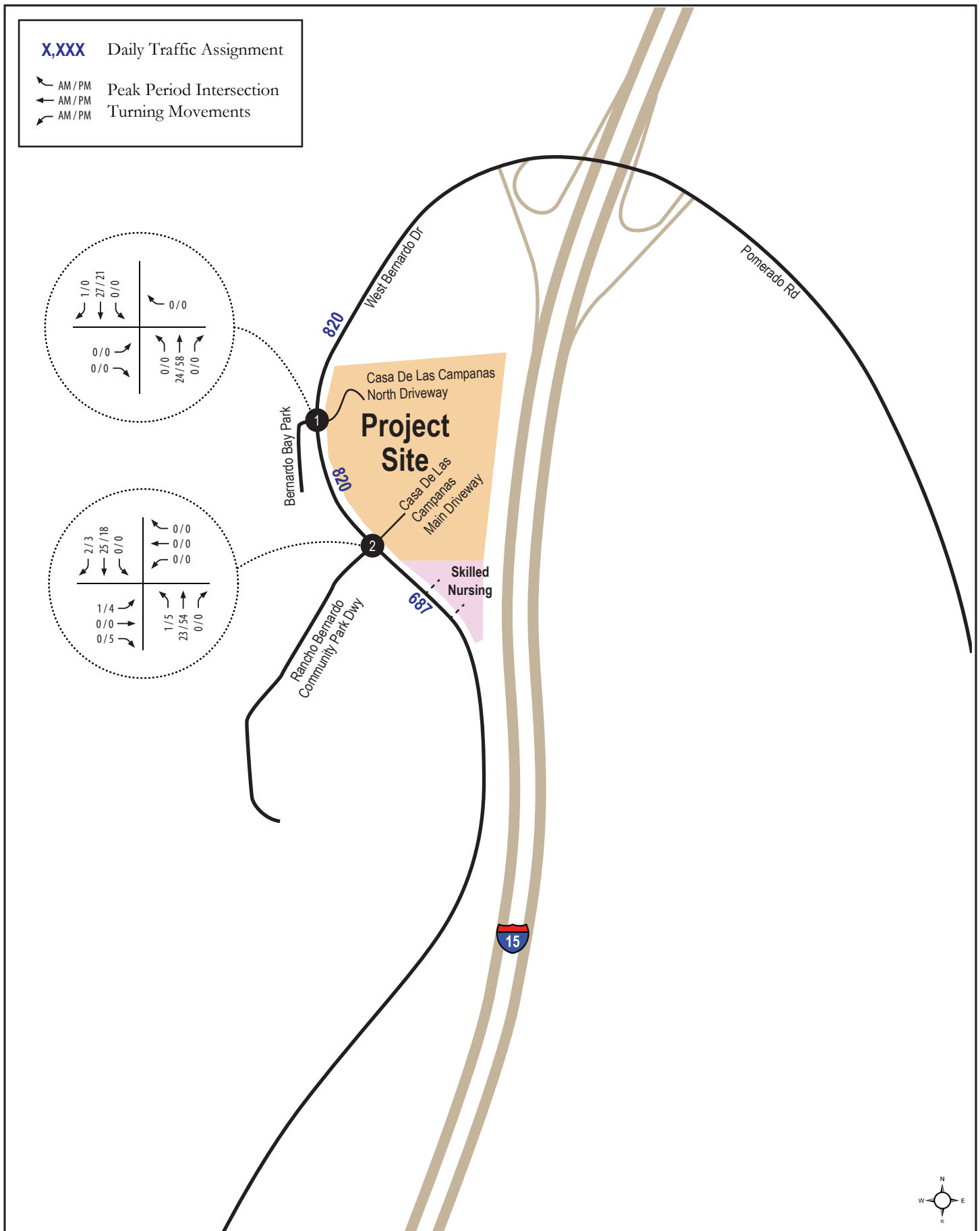
Source: *City of San Diego Land Use Code – Trip Generation Manual, May 2003, Chen Ryan Associates; March 2019*

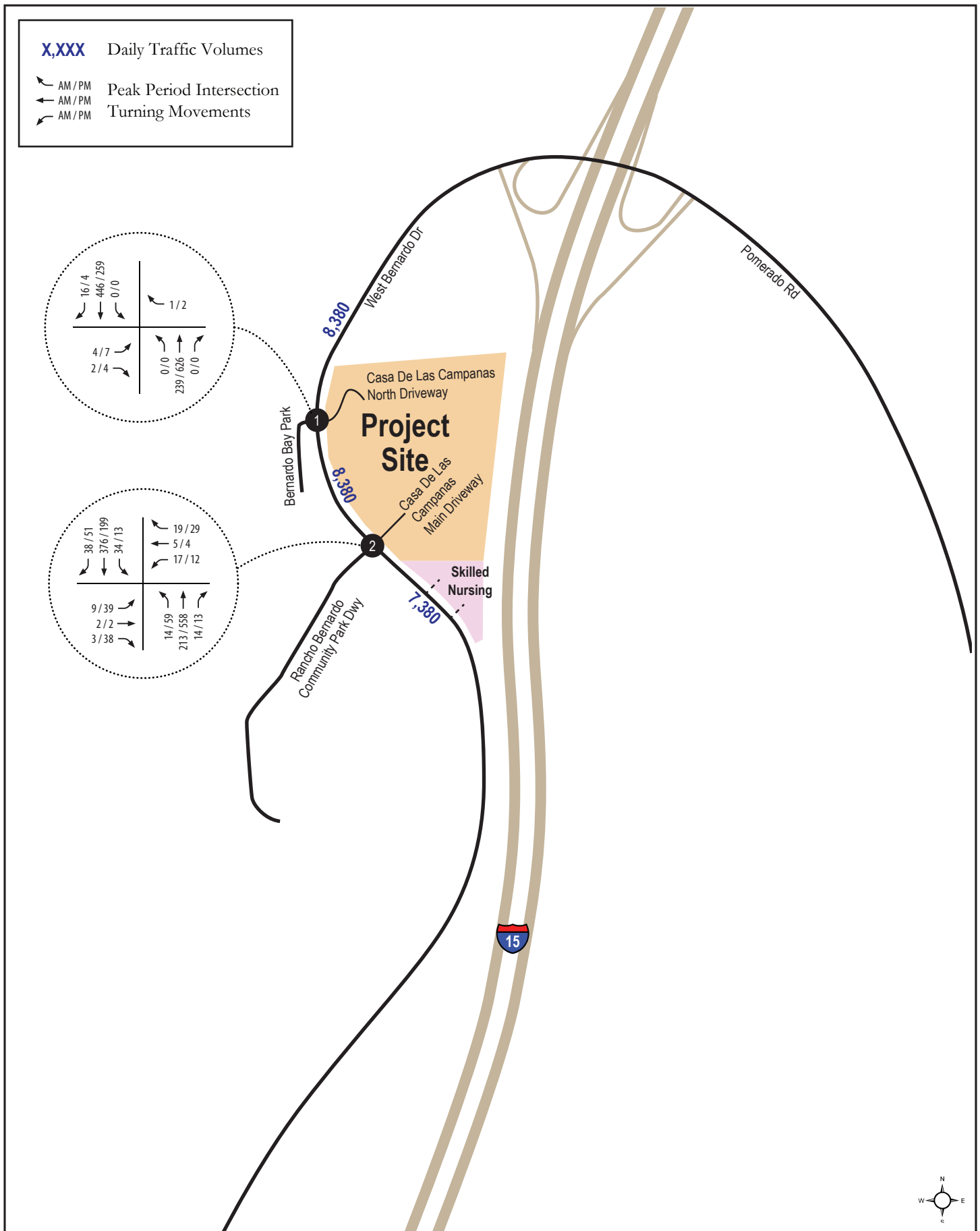
As shown in **Table 6.1**, the cumulative project is anticipated to generate a total of 216 daily trips, with 11 trips during the AM peak hour (4-inbound / 7-outbound) and 16 trips during the PM peak hour (10-inbound / 6-outbound).

An ambient growth factor was also applied to the existing traffic volume to account for the growth in regional traffic. The ambient growth factor was obtained by comparing the most recent (2011) Machine Count Traffic Volumes Chart (found in Attachment D) provided by the City of San Diego Development Services Engineering Division. The growth rates for the study segments were determined to be the following:

- 9.0% - North of the northern Project Driveway
- 9.0% - Between the northern Project Driveway and the Rancho Bernardo Community Park Driveway
- 6.2% - South of the Rancho Bernardo Community Park Driveway

Figure 7 displays the cumulative project and ambient growth traffic, **Figure 8** displays the Near-Term Year 2020 traffic volumes.





Near-Term Year 2020 Traffic Analysis

Table 6.2 displays anticipated daily operations under Near-Term Year 2020 Base Conditions for the study area segments along West Bernardo Drive.

Table 6.2 Roadway Segment Level of Service Results – Near-Term Year 2020 Base Conditions

Roadway	Segments	Functional Classification	ADT	Capacity	V/C	LOS
West Bernardo Drive	North of the northern Project Driveway	Collector (2-lane no fronting property)	8,420	10,000	0.842	D
	Between the northern Project Driveway and the Rancho Bernardo Community Park Driveway	Collector (2-lane no fronting property)	8,420	10,000	0.842	D
	South of the Rancho Bernardo Community Park Driveway	Collector (2-lane w/ commercial fronting)	7,387	8,000	0.923	E

Source: Chen Ryan Associates; March 2019

Notes:

ADT = Average Daily Traffic

V/C = Volume to Capacity Ratio

LOS = Level of Service

Bold letter indicated substandard LOS

As shown in Table 6.2, all study roadway segments along West Bernardo Drive are anticipated to operate at acceptable LOS D or better, with the exception of West Bernardo Drive south of Rancho Bernardo Community Park Driveway which is currently operating at substandard LOS E.

Table 6.3 displays intersection LOS and average vehicle delay results under Near-Term Year 2020 Base conditions. LOS calculation worksheets for the Near-Term Year 2020 Base conditions are provided in **Attachment E**.

Table 6.3 Peak Hour Intersection LOS Results – Near-Term Year 2020 Base Conditions

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1. West Bernardo Drive and San Dieguito River Park Driveway	SSSC	15.0	C	17.9	C
2. West Bernardo Drive and Rancho Bernardo Community Park Driveway	Signal	7.2	A	12.2	B

Source: Chen Ryan Associates; March 2019

Notes:

SSSC = Side Street Stop Controlled, the delay shown is the worst delay experienced by any of the approaches.

LOS = Level of Service

As shown in Table 6.3, all of the study area intersections are projected to operate at an acceptable LOS A during both the AM and PM peak hours, under Near-Term Year 2020 Base conditions.

7.0 Near-Term Year 2020 Base Plus Project Conditions

This section provides an analysis of Near-Term Year 2020 traffic conditions with the addition of traffic from the Proposed Project.

Near-Term Year 2020 Base Plus Project Roadway Network and Traffic Volumes

The roadway network under Near-Term Year 2020 Base Plus Project conditions was assumed to be identical to Existing conditions shown in Figure 3.

Near-Term Year 2020 Plus Project traffic volumes were derived by adding the project trip assignment volumes (shown in Figure 5) to the Near-Term Base Condition roadway volumes (shown in Figure 8). Near-Term Year 2020 Base Plus Project traffic volumes are shown in **Figure 9**.

Near-Term Year 2020 Base Plus Project Traffic Analysis

Table 7.1 displays anticipated daily operations under Near-Term Year 2020 Base Plus Project Conditions for the study area segments along West Bernardo Drive.

**Table 7.1 Roadway Segments Level of Service Analysis –
Near-Term Year 2020 Base Plus Project Conditions**

Roadway	Segment	Functional Classification	Cross-Section	ADT	Capacity (LOS E)	With Project		Without Project		Δ V/C	SI?
						V/C	LOS	V/C	LOS		
West Bernardo Drive	North of the northern Project Driveway	Collector (2-lane no fronting property)	2-Ln w / SM	8,567	10,000	0.857	D	0.842	D	0.015	No
	Between the northern Project Driveway and the Rancho Bernardo Community Park Driveway	Collector (2-lane no fronting property)	2-Ln w / SM	8,567	10,000	0.857	D	0.842	D	0.015	No
	South of the Rancho Bernardo Community Park Driveway	Collector (2-lane w/ commercial fronting)	2-Ln w / & w/o SM	7,534	8,000	0.941	D	0.923	E	0.018	No

Source: Chen Ryan Associates; March 2019

Notes:

ADT = Average Daily Traffic

V/C = Volume to Capacity Ratio

LOS = Level of Service

Bold letter indicated substandard LOS

As shown in Table 7.1, all study roadway segments along West Bernardo Drive are anticipated to continue to operate at acceptable LOS D or better, with the exception of West Bernardo Drive south of Rancho Bernardo Community Park Driveway which is currently operating at substandard LOS E. Based on the impact criteria outlined in the *City of San Diego Significance Determination Thresholds (January 2011)* and described in Section 2 of this technical memorandum, the Proposed Project would not be associated with a significant traffic related impact.

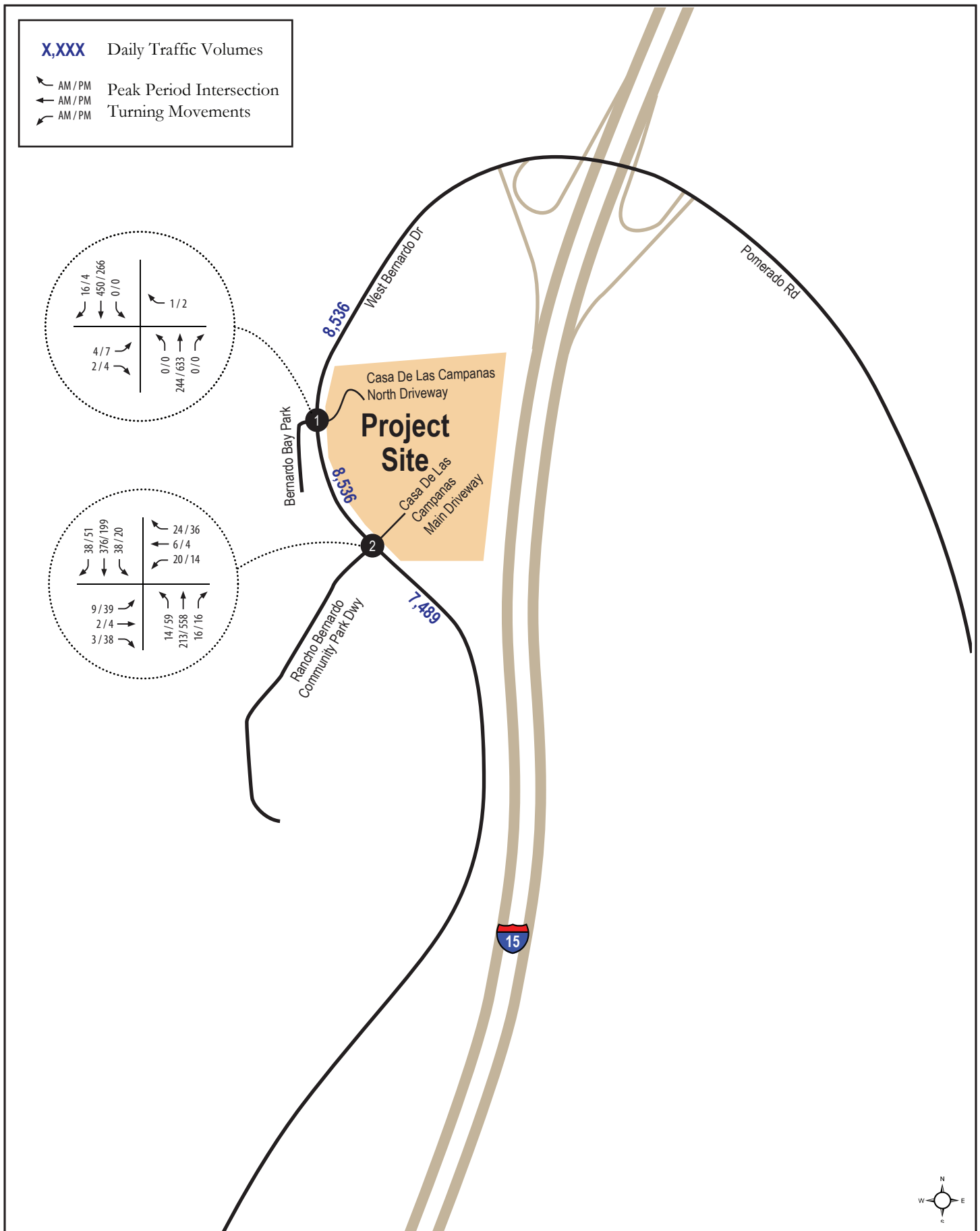


Table 7.2 displays intersection LOS and average vehicle delay results under Near-Term Year 2020 Base Plus Project conditions. LOS calculation worksheets for the Near-Term Year 2020 Base Plus Project conditions are provided in **Attachment F**.

**Table 7.2 Peak Hour Intersection LOS Results –
Near-Term Year 2020 Base Plus Project Conditions**

Intersection	Control	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	Delay w/o Project AM/PM	Change in Delay (sec)	SI?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1. West Bernardo Drive and San Dieguito River Park Driveway	SSSC	15.2	C	18.2	C	15.0/17.9	C/C	0.2/0.3	No
2. West Bernardo Drive and Rancho Bernardo Community Park Driveway	Signal	7.4	A	14.0	B	7.2/12.2	A/B	0.2/1.8	No

Source: Chen Ryan Associates; March 2019

Notes:

SSSC = Side Street Stop Controlled, the delay shown is the worst delay experienced by any of the approaches.

* = Decrease in delay due to improved flow

SI? = Significant Impact?

As shown in Table 7.2, both of the study area intersections are projected to operate at acceptable LOS C or better during both the AM and PM peak hours under Near-Term Year 2020 Base Plus Project conditions. Therefore, based on the impact criteria outlined in the *City of San Diego Significance Determination Thresholds*, the Proposed Project would not be associated with a significant traffic related impact.

8.0 Findings and Conclusion

As shown in Tables 5.1, 5.2, 7.1, and 7.2, all of the study area roadway segments are projected to operate at an acceptable LOS C or better with the addition of traffic from the proposed project under Existing and Existing Plus Project conditions, and operate at an acceptable LOS D or better with the addition of traffic from the proposed project under the Near-Term Year 2020 and Near-Term Year 2020 Plus Project conditions. All intersections are projected to operate at acceptable LOS C or better under all scenarios. Based upon the *City of San Diego Significance Determination Thresholds*, the Proposed Project would not cause any significant impacts to the transportation network.

Please feel free to contact me with any questions and/or comments.

Thank you,

Phuong Nguyen, PE
Chen Ryan Associates, Inc.
(619) 795-6086

pnguyen@chenryanmobility.com



Attachment A
Traffic Count Worksheets

24 Hour Segment Count



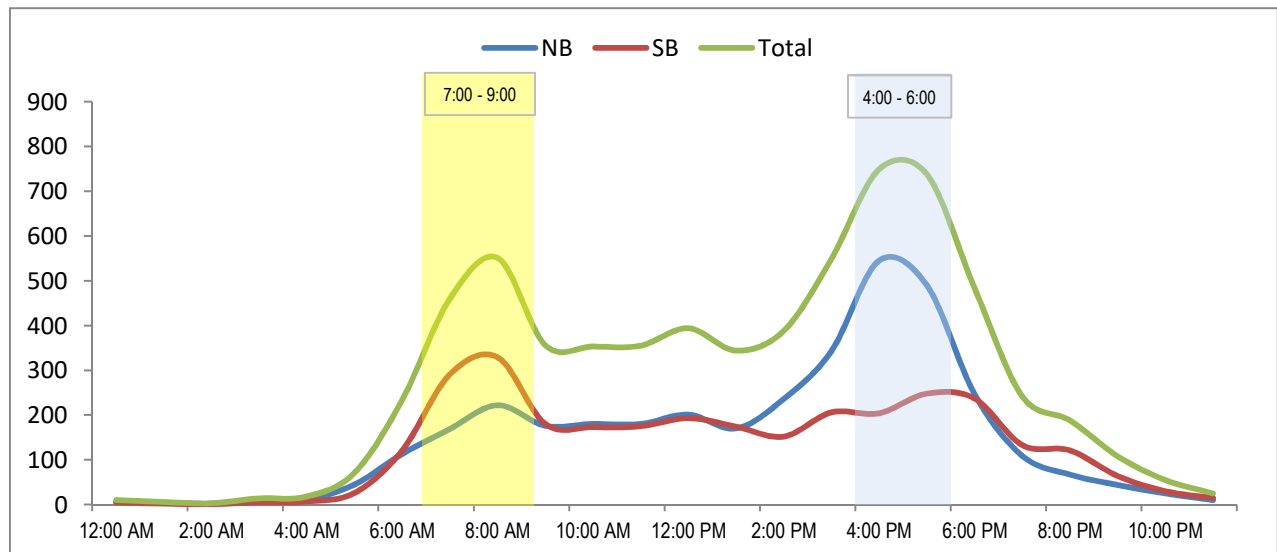
Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136



Location: 2. West Bernardo Drive between Rancho Bernardo Community Park Driveway and Aguamiel Road
Orientation: North-South
Date of Count: Tuesday, November 07, 2017
Analysts: DASH
Weather: Sunny
AVC Proj. No: 17-0782

24 Hour Segment Volume					6,695			
Time	Hourly Volume				Time	Hourly Volume		
	NB	SB	Total			NB	SB	Total
12:00 AM - 1:00 AM	5	5	10		12:00 PM - 1:00 PM	201	193	394
1:00 AM - 2:00 AM	4	2	6		1:00 PM - 2:00 PM	170	174	344
2:00 AM - 3:00 AM	2	1	3		2:00 PM - 3:00 PM	236	152	388
3:00 AM - 4:00 AM	9	5	14		3:00 PM - 4:00 PM	343	206	549
4:00 AM - 5:00 AM	11	7	18		4:00 PM - 5:00 PM	545	204	749
5:00 AM - 6:00 AM	45	26	71		5:00 PM - 6:00 PM	490	248	738
6:00 AM - 7:00 AM	113	121	234		6:00 PM - 7:00 PM	247	237	484
7:00 AM - 8:00 AM	169	291	460		7:00 PM - 8:00 PM	109	133	242
8:00 AM - 9:00 AM	222	329	551		8:00 PM - 9:00 PM	67	121	188
9:00 AM - 10:00 AM	176	180	356		9:00 PM - 10:00 PM	44	64	108
10:00 AM - 11:00 AM	180	173	353		10:00 PM - 11:00 PM	25	30	55
11:00 AM - 12:00 PM	180	175	355		11:00 PM - 12:00 AM	10	15	25
Total	1,116	1,315	2,431		Total	2,487	1,777	4,264

24-Hour	NB	Volume	3,603	24-Hour	SB	Volume	3,092
----------------	-----------	---------------	--------------	----------------	-----------	---------------	--------------





Location: Rancho Bernardo Community Park @ West Bernardo Drive

Date of Count: Wednesday, November 08, 2017

Analysts: LV/CD

Weather: Sunny

AVC Proj No: 17-0782





Location: ernardo Community Park Driveway @ West Bernardo Drive

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
7:00 AM	5	47	3	6	1	5	2	29	6	0	0	4	108
7:15 AM	7	67	7	8	0	0	4	37	1	1	1	2	135
7:30 AM	7	69	7	8	1	1	2	37	1	2	0	5	140
7:45 AM	4	95	10	2	0	5	5	42	5	0	0	2	170
8:00 AM	11	92	10	4	2	6	4	40	4	2	0	1	176
8:15 AM	10	84	3	6	2	3	3	52	1	0	1	2	167
8:30 AM	11	80	11	7	1	3	2	56	3	1	1	3	179
8:45 AM	11	52	6	9	2	4	9	46	5	6	2	5	157
Total	66	586	57	50	9	27	31	339	26	12	5	24	1,232

AM Intersection Peak Hour : **7:45 AM - 8:45 AM**

Intersection PHF : **0.97**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	36	351	34	19	5	17	14	190	13	3	2	8	692
PHF	0.82	0.92	0.77	0.68	0.63	0.71	0.70	0.85	0.65	0.38	0.50	0.67	0.97
Movement PHF		0.93			0.85			0.89			0.65		0.97

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
4:00 PM	7	34	4	10	1	2	10	115	9	5	1	12	210
4:15 PM	7	45	4	7	0	2	2	114	22	12	3	9	227
4:30 PM	14	45	2	10	1	3	3	141	13	4	1	9	246
4:45 PM	15	39	4	8	1	2	6	89	21	11	0	11	207
5:00 PM	5	54	2	5	1	5	3	117	9	11	0	9	221
5:15 PM	14	43	5	6	1	2	1	157	11	7	1	6	254
5:30 PM	15	47	1	5	0	1	4	93	8	9	1	21	205
5:45 PM	14	61	2	3	0	1	0	74	13	8	1	5	182
Total	91	368	24	54	5	18	29	900	106	67	8	82	1,752

PM Intersection Peak Hour : **4:30 PM - 5:30 PM**

Intersection PHF : **0.91**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	48	181	13	29	4	12	13	504	54	33	2	35	928
PHF	0.80	0.838	0.65	0.725	1	0.6	0.542	0.803	0.643	0.75	0.5	0.795	0.91
Movement PHF		0.98			0.80			0.84			0.80		0.91

24 Hour Segment Count



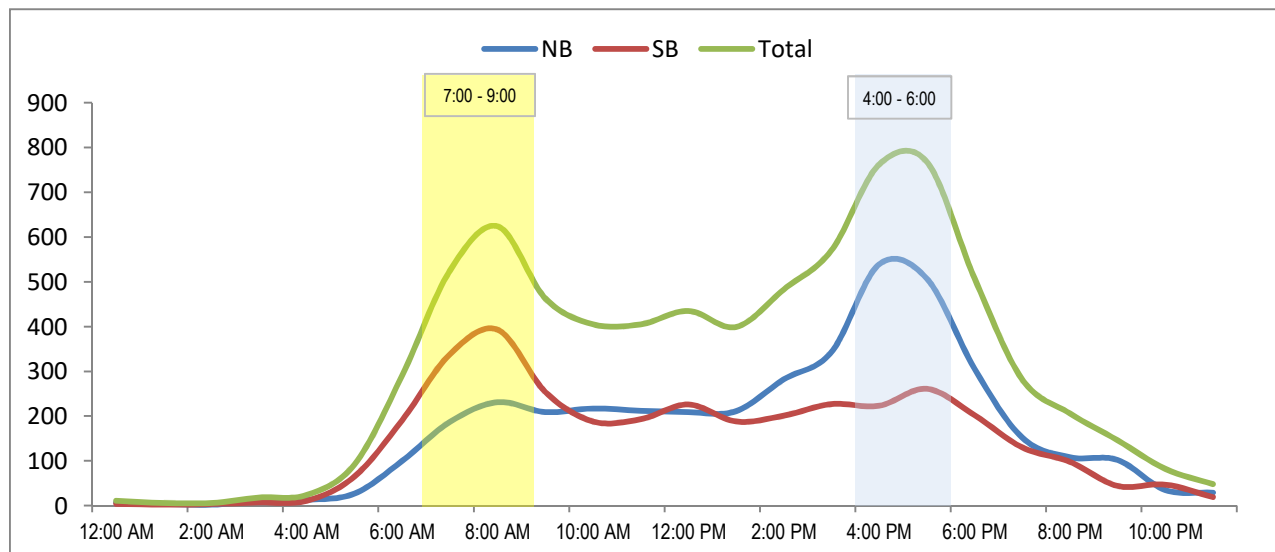
Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136



Location: 1. West Bernardo Drive between I-15 SB Ramps and Rancho Bernardo Community Park Driveway
Orientation: North-South
Date of Count: Tuesday, November 07, 2017
Analysts: DASH
Weather: Sunny
AVC Proj. No: 17-0782

24 Hour Segment Volume						7,559				
Time		Hourly Volume				Time		Hourly Volume		
		NB	SB	Total				NB	SB	Total
12:00 AM - 1:00 AM		7	4	11		12:00 PM - 1:00 PM		209	226	435
1:00 AM - 2:00 AM		4	2	6		1:00 PM - 2:00 PM		211	188	399
2:00 AM - 3:00 AM		2	4	6		2:00 PM - 3:00 PM		282	201	483
3:00 AM - 4:00 AM		11	7	18		3:00 PM - 4:00 PM		343	227	570
4:00 AM - 5:00 AM		13	11	24		4:00 PM - 5:00 PM		539	223	762
5:00 AM - 6:00 AM		27	65	92		5:00 PM - 6:00 PM		507	261	768
6:00 AM - 7:00 AM		100	191	291		6:00 PM - 7:00 PM		306	202	508
7:00 AM - 8:00 AM		187	338	525		7:00 PM - 8:00 PM		152	130	282
8:00 AM - 9:00 AM		231	393	624		8:00 PM - 9:00 PM		108	98	206
9:00 AM - 10:00 AM		209	254	463		9:00 PM - 10:00 PM		102	44	146
10:00 AM - 11:00 AM		217	188	405	10:00 PM - 11:00 PM		35	47	82	
11:00 AM - 12:00 PM		212	193	405	11:00 PM - 12:00 AM		29	19	48	
Total		1,220	1,650	2,870	Total		2,823	1,866	4,689	

24-Hour	NB	Volume	4,043	24-Hour	SB	Volume	3,516
----------------	-----------	---------------	--------------	----------------	-----------	---------------	--------------





Location: Casa De las Campanas Project Nc @ West Bernardo Drive

Date of Count: Wednesday, November 08, 2017

Analysts: LV/CD

Weather: Sunny

AVC Proj No: 17-0782





Location: mpanas Project Northern Driveway @ West Bernardo Drive

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
7:00 AM	1	55	0	0	0	0	0	38	1	0	0	2	97
7:15 AM	3	81	0	0	0	0	0	45	2	0	0	4	135
7:30 AM	3	83	1	0	0	0	0	50	0	0	0	1	138
7:45 AM	1	109	1	1	0	0	0	46	0	0	0	0	158
8:00 AM	6	112	0	0	0	0	0	44	1	1	0	1	165
8:15 AM	6	97	0	0	0	0	0	59	1	0	0	2	165
8:30 AM	2	101	0	0	0	0	0	66	0	1	0	1	171
8:45 AM	1	68	0	0	0	0	0	58	2	1	0	0	130
Total	23	706	2	1	0	0	0	406	7	3	0	11	1,159

AM Intersection Peak Hour : **7:45 AM - 8:45 AM**

Intersection PHF : **0.96**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	15	419	1	1	0	0	0	215	2	2	0	4	659
PHF	0.63	0.94	0.25	0.25	#####	#####	#####	0.81	0.50	0.50	#####	0.50	0.96
Movement PHF		0.92			0.25			0.82			0.75		0.96

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
4:00 PM	2	44	0	0	0	0	1	136	0	1	0	1	185
4:15 PM	1	55	0	1	0	0	2	126	2	1	0	3	191
4:30 PM	3	59	0	1	0	0	0	160	0	2	0	0	225
4:45 PM	1	58	0	0	0	0	0	108	0	0	0	3	170
5:00 PM	0	59	0	1	0	0	0	131	0	2	0	2	195
5:15 PM	0	62	0	0	0	0	0	169	0	0	0	2	233
5:30 PM	0	63	0	0	0	0	0	119	0	0	0	1	183
5:45 PM	0	77	0	0	0	0	0	82	0	0	0	0	159
Total	7	477	0	3	0	0	3	1,031	2	6	0	12	1,541

PM Intersection Peak Hour : **4:30 PM - 5:30 PM**

Intersection PHF : **0.88**


















	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Volume	4	238	0	2	0	0	0	568	0	4	0	7	823
PHF	0.33	0.96	#####	0.5	#####	#####	#####	0.84	#####	0.5	#####	0.583	0.88
Movement PHF		0.98			0.50			0.84			0.69		0.88

Attachment B
Existing Condition LOS Worksheets

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	0	0	1	0	215	0	0	419	15
Future Volume (vph)	4	0	2	0	0	1	0	215	0	0	419	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.995	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.75	0.75	0.75	0.25	0.25	0.25	0.82	0.82	0.82	0.92	0.92	0.92
Adj. Flow (vph)	5	0	3	0	0	4	0	262	0	0	455	16
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	5	0	3	0	0	4	0	262	0	0	471	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	






Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.0% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	2	0	0	1	0	215	0	0	419	15
Future Vol, veh/h	4	0	2	0	0	1	0	215	0	0	419	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	25	25	25	82	82	82	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	3	0	0	4	0	262	0	0	455	16

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	727	- 463	- - 262 471	0 0 262 0 0
Stage 1	463	- -	- -	- - -
Stage 2	264	- -	- -	- - -
Critical Hdwy	7.12	- 6.22	- - 6.22 4.12	- - 4.12 - -
Critical Hdwy Stg 1	6.12	- -	- -	- - -
Critical Hdwy Stg 2	6.12	- -	- -	- - -
Follow-up Hdwy	3.518	- 3.318	- - 3.318 2.218	- - 2.218 - -
Pot Cap-1 Maneuver	339	0 599	0 0 777 1091	- - 1302 - -
Stage 1	579	0 -	0 0 - -	- - - -
Stage 2	741	0 -	0 0 - -	- - - -
Platoon blocked, %				- - - -
Mov Cap-1 Maneuver	337	- 599	- - 777 1091	- - 1302 - -
Mov Cap-2 Maneuver	337	- -	- -	- - - -
Stage 1	579	- -	- -	- - - -
Stage 2	737	- -	- -	- - - -


Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	9.7	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	337	599	777	1302	-	-
HCM Lane V/C Ratio	-	-	-	0.016	0.004	0.005	-	-	-
HCM Control Delay (s)	0	-	-	15.9	11	9.7	0	-	-
HCM Lane LOS	A	-	-	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	3	17	5	19	13	190	14	34	351	36
Future Volume (vph)	8	2	3	17	5	19	13	190	14	34	351	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.962			0.962		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1792	1583	1770	1863	1583	1770	1863	1583
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1863	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.65	0.65	0.65	0.68	0.68	0.68	0.89	0.89	0.89	0.93	0.93	0.93
Adj. Flow (vph)	12	3	5	25	7	28	15	213	16	37	377	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	5	0	32	28	15	213	16	37	377	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6


Existing AM
Existing AM.syn

Synchro 9 Report

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	32.0	32.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	11.4%	45.7%	45.7%	11.4%	45.7%	45.7%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	4.0	27.0	27.0	4.0	27.0	27.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		5.7	5.7		6.6	6.6	4.2	24.8	24.8	4.2	24.8	24.8
Actuated g/C Ratio		0.18	0.18		0.21	0.21	0.13	0.78	0.78	0.13	0.78	0.78
v/c Ratio		0.04	0.01		0.08	0.07	0.06	0.15	0.01	0.16	0.26	0.03
Control Delay		12.8	0.0		12.7	0.3	15.8	4.6	0.0	16.6	5.1	1.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		12.8	0.0		12.7	0.3	15.8	4.6	0.0	16.6	5.1	1.0
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		9.6			6.9			5.0			5.7	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 31.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 40.5%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway


















03/28/2019

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	8	2	3	17	5	19	13	190	14	34	351	36				
Future Volume (veh/h)	8	2	3	17	5	19	13	190	14	34	351	36				
Number	7	4	14	3	8	18	5	2	12	1	6	16				
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00				
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863				
Adj Flow Rate, veh/h	12	3	5	25	7	28	15	213	16	37	377	39				
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1				
Peak Hour Factor	0.65	0.65	0.65	0.68	0.68	0.68	0.89	0.89	0.89	0.93	0.93	0.93				
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2				
Cap, veh/h	252	0	107	250	0	107	28	726	617	64	764	649				
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.02	0.39	0.39	0.04	0.41	0.41				
Sat Flow, veh/h	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583				
Grp Volume(v), veh/h	15	0	5	32	0	28	15	213	16	37	377	39				
Grp Sat Flow(s),veh/h/ln	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583				
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.4	0.2	2.0	0.2	0.5	3.8	0.4				
Cycle Q Clear(g_c), s	1.7	0.0	0.1	1.7	0.0	0.4	0.2	2.0	0.2	0.5	3.8	0.4				
Prop In Lane	0.80		1.00	0.78		1.00	1.00		1.00	1.00		1.00				
Lane Grp Cap(c), veh/h	252	0	107	250	0	107	28	726	617	64	764	649				
V/C Ratio(X)	0.06	0.00	0.05	0.13	0.00	0.26	0.53	0.29	0.03	0.58	0.49	0.06				
Avail Cap(c_a), veh/h	1618	0	1604	1651	0	1604	276	1960	1666	276	1960	1666				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Uniform Delay (d), s/veh	12.8	0.0	11.2	12.8	0.0	11.4	12.5	5.4	4.8	12.2	5.6	4.6				
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	1.3	5.8	0.3	0.0	3.0	0.6	0.0				
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.2	0.0	0.2	0.1	1.1	0.1	0.3	2.0	0.2				
LnGrp Delay(d),s/veh	12.9	0.0	11.3	13.1	0.0	12.6	18.3	5.7	4.9	15.2	6.2	4.6				
LnGrp LOS	B		B	B		B	B	A	A	B	A	A				
Approach Vol, veh/h	20				60				244		453					
Approach Delay, s/veh	12.5				12.9				6.4		6.8					
Approach LOS	B				B				A		A					
Timer	1	2	3	4	5	6	7	8								
Assigned Phs	1	2			4	5	6	8								
Phs Duration (G+Y+Rc), s	4.9	15.0			5.7	4.4	15.5	5.7								
Change Period (Y+Rc), s	4.0	5.0			4.0	4.0	5.0	4.0								
Max Green Setting (Gmax), s	4.0	27.0			26.0	4.0	27.0	26.0								
Max Q Clear Time (g_c+I1), s	2.5	4.0			3.7	2.2	5.8	3.7								
Green Ext Time (p_c), s	0.0	1.7			0.0	0.0	3.2	0.2								
Intersection Summary																
HCM 2010 Ctrl Delay				7.3												
HCM 2010 LOS				A												

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	4	0	0	2	0	568	0	0	238	4
Future Volume (vph)	7	0	4	0	0	2	0	568	0	0	238	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.998	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.69	0.69	0.69	0.50	0.50	0.50	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	10	0	6	0	0	4	0	676	0	0	243	4
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	10	0	6	0	0	4	0	676	0	0	247	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary






Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 46.6%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	4	0	0	2	0	568	0	0	238	4
Future Vol, veh/h	7	0	4	0	0	2	0	568	0	0	238	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	50	50	50	84	84	84	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	6	0	0	4	0	676	0	0	243	4

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	923	-	245	-	-	676	247	0
Stage 1	245	-	-	-	-	-	-	-
Stage 2	678	-	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218	-
Pot Cap-1 Maneuver	250	0	794	0	0	453	1319	-
Stage 1	759	0	-	0	0	-	-	-
Stage 2	442	0	-	0	0	-	-	-
Platoon blocked, %								
Mov Cap-1 Maneuver	248	-	794	-	-	453	1319	-
Mov Cap-2 Maneuver	248	-	-	-	-	-	-	-
Stage 1	759	-	-	-	-	-	-	-
Stage 2	438	-	-	-	-	-	-	-


Approach	EB	WB	NB	SB
HCM Control Delay, s	16.3	13	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1319	-	-	248	794	453	915	-	-
HCM Lane V/C Ratio	-	-	-	0.041	0.007	0.009	-	-	-
HCM Control Delay (s)	0	-	-	20.1	9.6	13	0	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	2	33	12	4	29	54	504	13	13	181	48
Future Volume (vph)	35	2	33	12	4	29	54	504	13	13	181	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.955			0.964		0.950			0.950		
Satd. Flow (prot)	0	1779	1583	0	1796	1583	1770	1863	1583	1770	1863	1583
Flt Permitted					0.946		0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1762	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	44	3	41	15	5	36	64	600	15	13	185	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	41	0	20	36	64	600	15	13	185	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6













Existing PM
Existing PM.syn

Synchro 9 Report

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	10.0	32.0	32.0	8.0	30.0	30.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	14.3%	45.7%	45.7%	11.4%	42.9%	42.9%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	6.0	27.0	27.0	4.0	25.0	25.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		6.0	6.0		6.3	6.3	5.7	26.8	26.8	4.2	24.5	24.5
Actuated g/C Ratio		0.16	0.16		0.17	0.17	0.16	0.73	0.73	0.11	0.67	0.67
v/c Ratio		0.15	0.12		0.07	0.10	0.23	0.44	0.01	0.07	0.15	0.05
Control Delay		16.9	1.9		16.4	1.1	18.9	6.6	0.0	19.5	6.9	1.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		16.9	1.9		16.4	1.1	18.9	6.6	0.0	19.5	6.9	1.5
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		9.9			6.6			7.6			6.5	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 36.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 7.5

Intersection LOS: A

Intersection Capacity Utilization 49.4%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019


















																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Traffic Volume (veh/h)	35	2	33	12	4	29	54	504	13	13	181	48						
Future Volume (veh/h)	35	2	33	12	4	29	54	504	13	13	181	48						
Number	7	4	14	3	8	18	5	2	12	1	6	16						
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0						
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00						
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863						
Adj Flow Rate, veh/h	44	2	41	15	5	36	64	600	15	13	185	49						
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98						
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2						
Cap, veh/h	201	5	274	179	35	274	93	837	712	24	765	650						
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.05	0.45	0.45	0.01	0.41	0.41						
Sat Flow, veh/h	24	28	1583	15	203	1583	1774	1863	1583	1774	1863	1583						
Grp Volume(v), veh/h	46	0	41	20	0	36	64	600	15	13	185	49						
Grp Sat Flow(s),veh/h/ln	52	0	1583	218	0	1583	1774	1863	1583	1774	1863	1583						
Q Serve(g_s), s	0.1	0.0	0.8	0.1	0.0	0.7	1.3	9.3	0.2	0.3	2.3	0.7						
Cycle Q Clear(g_c), s	6.2	0.0	0.8	6.2	0.0	0.7	1.3	9.3	0.2	0.3	2.3	0.7						
Prop In Lane	0.96		1.00	0.75		1.00	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	206	0	274	214	0	274	93	837	712	24	765	650						
V/C Ratio(X)	0.22	0.00	0.15	0.09	0.00	0.13	0.69	0.72	0.02	0.54	0.24	0.08						
Avail Cap(c_a), veh/h	969	0	1152	1021	0	1152	298	1407	1196	199	1303	1107						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	17.2	0.0	12.5	12.8	0.0	12.5	16.6	8.0	5.5	17.5	6.9	6.4						
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.2	0.0	0.2	3.4	1.5	0.0	7.0	0.2	0.1						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.3	0.2	0.0	0.3	0.7	5.0	0.1	0.2	1.2	0.3						
LnGrp Delay(d),s/veh	17.4	0.0	12.6	13.0	0.0	12.7	20.0	9.5	5.5	24.5	7.1	6.5						
LnGrp LOS	B		B	B		B	C	A	A	C	A	A						
Approach Vol, veh/h	87		56				679				247							
Approach Delay, s/veh	15.2		12.8				10.4				7.9							
Approach LOS	B		B				B				A							
Timer	1	2	3	4	5	6	7	8										
Assigned Phs	1	2			4	5	6	8										
Phs Duration (G+Y+Rc), s	4.5	21.1			10.3	5.9	19.7	10.3										
Change Period (Y+Rc), s	4.0	5.0			4.0	4.0	5.0	4.0										
Max Green Setting (Gmax), s	4.0	27.0			26.0	6.0	25.0	26.0										
Max Q Clear Time (g_c+I1), s	2.3	11.3			8.2	3.3	4.3	8.2										
Green Ext Time (p_c), s	0.0	4.8			0.2	0.0	1.5	0.1										
Intersection Summary																		
HCM 2010 Ctrl Delay																		
HCM 2010 LOS																		

Attachment C
Existing Plus Project Condition LOS Worksheets

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	0	0	1	0	220	0	0	423	15
Future Volume (vph)	4	0	2	0	0	1	0	220	0	0	423	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.995	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.75	0.75	0.75	0.25	0.25	0.25	0.82	0.82	0.82	0.92	0.92	0.92
Adj. Flow (vph)	5	0	3	0	0	4	0	268	0	0	460	16
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	5	0	3	0	0	4	0	268	0	0	476	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	






Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.2% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	2	0	0	1	0	220	0	0	423	15
Future Vol, veh/h	4	0	2	0	0	1	0	220	0	0	423	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	25	25	25	82	82	82	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	3	0	0	4	0	268	0	0	460	16

Major/Minor	Minor2	Minor1		Major1		Major2	
Conflicting Flow All	738	-	468	-	-	268	476
Stage 1	468	-	-	-	-	-	-
Stage 2	270	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218
Pot Cap-1 Maneuver	334	0	595	0	0	771	1086
Stage 1	575	0	-	0	0	-	-
Stage 2	736	0	-	0	0	-	-
Platoon blocked, %							
Mov Cap-1 Maneuver	332	-	595	-	-	771	1086
Mov Cap-2 Maneuver	332	-	-	-	-	-	-
Stage 1	575	-	-	-	-	-	-
Stage 2	732	-	-	-	-	-	-























Approach	EB	WB	NB	SB
HCM Control Delay, s	14.4	9.7	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1086	-	-	332	595	771	1296	-	-
HCM Lane V/C Ratio	-	-	-	0.016	0.004	0.005	-	-	-
HCM Control Delay (s)	0	-	-	16	11.1	9.7	0	-	-
HCM Lane LOS	A	-	-	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	3	20	6	24	13	190	16	38	351	36
Future Volume (vph)	8	2	3	20	6	24	13	190	16	38	351	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.962			0.963		0.950			0.950		
Satd. Flow (prot)	0	1792	1583	0	1794	1583	1770	1863	1583	1770	1863	1583
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1863	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93
Adj. Flow (vph)	12	3	5	24	7	28	15	213	18	41	377	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	5	0	31	28	15	213	18	41	377	39
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6













Existing Plus Project AM
Existing with Project AM.syn

Synchro 9 Report

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	32.0	32.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	11.4%	45.7%	45.7%	11.4%	45.7%	45.7%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	4.0	27.0	27.0	4.0	27.0	27.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		5.7	5.7		6.5	6.5	4.2	24.7	24.7	4.2	24.7	24.7
Actuated g/C Ratio		0.18	0.18		0.21	0.21	0.13	0.78	0.78	0.13	0.78	0.78
v/c Ratio		0.04	0.01		0.08	0.07	0.06	0.15	0.01	0.18	0.26	0.03
Control Delay		12.9	0.0		12.7	0.3	15.8	4.6	0.0	16.7	5.1	1.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		12.9	0.0		12.7	0.3	15.8	4.6	0.0	16.7	5.1	1.0
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		9.7			6.8			5.0			5.8	
Approach LOS		A			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 31.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 40.7%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway


















03/28/2019






												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	2	3	20	6	24	13	190	16	38	351	36
Future Volume (veh/h)	8	2	3	20	6	24	13	190	16	38	351	36
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	12	3	5	24	7	28	15	213	18	41	377	39
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	0	106	248	0	106	28	724	615	70	768	653
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.02	0.39	0.39	0.04	0.41	0.41
Sat Flow, veh/h	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	15	0	5	31	0	28	15	213	18	41	377	39
Grp Sat Flow(s),veh/h/ln	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.4	0.2	2.0	0.2	0.6	3.8	0.4
Cycle Q Clear(g_c), s	1.7	0.0	0.1	1.7	0.0	0.4	0.2	2.0	0.2	0.6	3.8	0.4
Prop In Lane	0.80		1.00	0.77		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	252	0	106	248	0	106	28	724	615	70	768	653
V/C Ratio(X)	0.06	0.00	0.05	0.12	0.00	0.26	0.54	0.29	0.03	0.59	0.49	0.06
Avail Cap(c_a), veh/h	1614	0	1599	1648	0	1599	276	1954	1661	276	1954	1661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	11.2	12.9	0.0	11.4	12.6	5.4	4.9	12.2	5.6	4.6
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	1.3	5.8	0.3	0.0	2.9	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.2	0.0	0.2	0.1	1.1	0.1	0.3	2.0	0.2
LnGrp Delay(d),s/veh	12.9	0.0	11.3	13.1	0.0	12.7	18.3	5.7	4.9	15.0	6.2	4.6
LnGrp LOS	B		B	B		B	B	A	A	B	A	A
Approach Vol, veh/h	20			59			246			457		
Approach Delay, s/veh	12.5			12.9			6.4			6.9		
Approach LOS	B			B			A			A		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.0	15.0		5.7	4.4	15.6		5.7				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	4.0	27.0		26.0	4.0	27.0		26.0				
Max Q Clear Time (g_c+I1), s	2.6	4.0		3.7	2.2	5.8		3.7				
Green Ext Time (p_c), s	0.0	1.7		0.0	0.0	3.2		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay	7.3											
HCM 2010 LOS	A											

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019


												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	4	0	0	2	0	575	0	0	245	4
Future Volume (vph)	7	0	4	0	0	2	0	575	0	0	245	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.998	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.69	0.69	0.69	0.50	0.50	0.50	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	10	0	6	0	0	4	0	685	0	0	250	4
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	10	0	6	0	0	4	0	685	0	0	254	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.9%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	4	0	0	2	0	575	0	0	245	4
Future Vol, veh/h	7	0	4	0	0	2	0	575	0	0	245	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	50	50	50	84	84	84	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	6	0	0	4	0	685	0	0	250	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	939	-	252	-	-	685	254	0	0	685	0	0
Stage 1	252	-	-	-	-	-	-	-	-	-	-	-
Stage 2	687	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	244	0	787	0	0	448	1311	-	-	908	-	-
Stage 1	752	0	-	0	0	-	-	-	-	-	-	-
Stage 2	437	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	242	-	787	-	-	448	1311	-	-	908	-	-
Mov Cap-2 Maneuver	242	-	-	-	-	-	-	-	-	-	-	-
Stage 1	752	-	-	-	-	-	-	-	-	-	-	-
Stage 2	433	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	16.5			13.1			0			0		
HCM LOS	C			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR			
Capacity (veh/h)	1311	-	-	242	787	448	908	-	-			
HCM Lane V/C Ratio	-	-	-	0.042	0.007	0.009	-	-	-			
HCM Control Delay (s)	0	-	-	20.5	9.6	13.1	0	-	-			
HCM Lane LOS	A	-	-	C	A	B	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-			

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	4	33	14	4	36	54	504	16	16	181	48
Future Volume (vph)	35	4	33	14	4	36	54	504	16	16	181	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.957			0.962		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1792	1583	1770	1863	1583	1770	1863	1583
Flt Permitted		0.999			0.938		0.950			0.950		
Satd. Flow (perm)	0	1861	1583	0	1747	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	44	5	41	18	5	45	64	600	19	16	185	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	49	41	0	23	45	64	600	19	16	185	49
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6













Existing Plus Project PM
Existing with Project PM.syn

Synchro 9 Report

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	10.0	32.0	32.0	8.0	30.0	30.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	14.3%	45.7%	45.7%	11.4%	42.9%	42.9%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	6.0	27.0	27.0	4.0	25.0	25.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		6.1	6.1		6.4	6.4	5.7	26.6	26.6	4.2	24.4	24.4
Actuated g/C Ratio		0.17	0.17		0.18	0.18	0.16	0.73	0.73	0.12	0.67	0.67
v/c Ratio		0.16	0.12		0.07	0.13	0.23	0.44	0.02	0.08	0.15	0.05
Control Delay		16.9	1.9		16.4	2.4	18.8	6.6	0.0	19.7	7.0	1.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		16.9	1.9		16.4	2.4	18.8	6.6	0.0	19.7	7.0	1.5
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		10.1			7.1			7.6			6.7	
Approach LOS		B			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 36.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 7.6

Intersection LOS: A

Intersection Capacity Utilization 49.5%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	4	33	14	4	36	54	504	16	16	181	48
Future Volume (veh/h)	35	4	33	14	4	36	54	504	16	16	181	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	44	5	41	18	5	45	64	600	19	16	185	49
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	12	322	174	28	322	91	817	694	29	752	639
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.05	0.44	0.44	0.02	0.40	0.40
Sat Flow, veh/h	38	59	1583	24	140	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	49	0	41	23	0	45	64	600	19	16	185	49
Grp Sat Flow(s),veh/h/ln	97	0	1583	164	0	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.2	0.0	0.8	0.1	0.0	0.9	1.4	10.2	0.3	0.3	2.5	0.7
Cycle Q Clear(g_c), s	7.8	0.0	0.8	7.7	0.0	0.9	1.4	10.2	0.3	0.3	2.5	0.7
Prop In Lane	0.90		1.00	0.78		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	199	0	322	202	0	322	91	817	694	29	752	639
V/C Ratio(X)	0.25	0.00	0.13	0.11	0.00	0.14	0.70	0.73	0.03	0.56	0.25	0.08
Avail Cap(c_a), veh/h	865	0	1082	892	0	1082	280	1321	1123	186	1224	1040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	12.4	12.9	0.0	12.4	17.8	8.8	6.1	18.6	7.5	7.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.2	0.0	0.2	3.7	1.7	0.0	6.2	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	0.2	0.0	0.4	0.8	5.5	0.1	0.2	1.3	0.3
LnGrp Delay(d),s/veh	17.5	0.0	12.5	13.1	0.0	12.6	21.5	10.5	6.1	24.8	7.7	7.1
LnGrp LOS	B		B	B		B	C	B	A	C	A	A
Approach Vol, veh/h		90			68			683			250	
Approach Delay, s/veh		15.2			12.8			11.4			8.7	
Approach LOS		B			B			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	21.8		11.9	6.0	20.4		11.9				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	4.0	27.0		26.0	6.0	25.0		26.0				
Max Q Clear Time (g_c+I1), s	2.3	12.2		9.8	3.4	4.5		9.7				
Green Ext Time (p_c), s	0.0	4.7		0.2	0.0	1.5		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			11.2									
HCM 2010 LOS			B									

Attachment D
Machine Count Traffic Volumes &
Conditional Use Permit #1409096

MACHINE COUNT TRAFFIC VOLUMES

FROM 01/01/2005 - 10/25/2017

CITY OF SAN DIEGO - TRAFFIC ENGINEERING	LIMITS	ALL	NORTHBOUND	SOUTHBOUND	EASTBOUND	WESTBOUND	TOTAL	FILE NO.	DATE
VOLTAIRE ST	BOLINAS ST - SOTO ST			5,030	4,870	9,900	0519-04	06/23/04	
VOLTAIRE ST	BOLINAS ST - SOTO ST			4,110	4,680	8,790	0327-07	06/26/07	
VOLTAIRE ST	BOLINAS ST - SOTO ST			4,480	5,185	9,665	0419-10	06/15/10	
VOLTAIRE ST	BOLINAS ST - SOTO ST			4,259	4,354	8,613	0526-13	06/04/13	
VOLTAIRE ST	CABLE ST - BACON ST			2,465	2,770	5,235	0554-10	06/15/10	
VOLTAIRE ST	CATALINA BL - EBERS ST			3,872	3,533	7,405	0268-17	08/22/17	
VOLTAIRE ST	EBERS ST - SUNSET CLIFFS BL			3,830	4,240	8,070	0555-10	06/15/10	
VOLTAIRE ST	EBERS ST - SUNSET CLIFFS BL			4,461	4,104	8,565	0528-13	06/04/13	
VOLTAIRE ST	POINSETTIA DR - WORDEN ST			4,880	5,460	10,340	0293-05	06/14/05	
VOLTAIRE ST	POINSETTIA DR - WORDEN ST			4,260	4,310	8,570	0308-08	08/19/08	
VOLTAIRE ST	SAN CLEMENTE ST - CATALINA BL	5,504	4,715			10,219	0190-16	06/30/16	
VOLTAIRE ST	SAN CLEMENTE ST - CATALINA BL	-				-	0767-03	06/11/03	
VOLTAIRE ST	SAN CLEMENTE ST - CATALINA BL			3,470	8,100	11,570	0064-06	06/14/06	
VOLTAIRE ST	SAN CLEMENTE ST - CATALINA BL			5,175	5,955	11,130	0422-09	09/16/09	
VOLTAIRE ST	SAN CLEMENTE ST - CATALINA BL			5,211	5,563	10,774	0728-12	08/14/12	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST	-				-	0759-03	06/12/03	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST			3,740	2,430	6,170	0109-06	06/22/06	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST			3,480	3,585	7,065	0423-09	06/16/09	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST			3,337	3,582	6,919	0434-12	05/30/12	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST			3,101	2,328	5,429	0478-15	06/17/15	
VOLTAIRE ST	SUNSET CLIFFS BL - CABLE ST			3,006	2,966	5,972	0212-16	06/08/16	
VOLTAIRE ST	WORDEN ST - LAS LOMAS ST			4,490	5,185	9,675	0556-10	06/15/10	
VOLTAIRE ST	WORDEN ST - LAS LOMAS ST			5,202	4,519	9,721	0529-13	06/04/13	
VY CTRE DR	EL CAMINO REAL - CARMEL VISTA RD			6,470	6,510	12,980	0583-04	08/31/04	
W BERNARDO DR	AGUAMIEL RD - SD 015 R-K	4,260	3,700			7,960	0147-05	03/17/05	
W BERNARDO DR	AGUAMIEL RD - SD 015 R-K	3,680	3,530			7,210	0114-08	02/27/08	
W BERNARDO DR	AGUAMIEL RD - SD 015 R-K	3,240	3,050			6,290	0277-11	05/24/11	
W BERNARDO DR	BERNARDO CTR DR - TECHNOLOGY DR			8,690	8,870	17,560	0088-07	02/08/07	
W BERNARDO DR	BERNARDO CTR DR - TECHNOLOGY DR			7,150	6,175	13,325	0047-10	02/11/10	
W BERNARDO DR	BERNARDO CTR DR - TECHNOLOGY DR			8,229	8,106	16,335	0059-13	01/29/13	
W BERNARDO DR	BERNARDO CTR DR - TECHNOLOGY DR			8,310	6,504	14,814	0015-17	02/15/17	
W BERNARDO DR	DUENDA RD - ALVEO WY	4,480	4,110			8,590	0298-03	03/19/03	
W BERNARDO DR	DUENDA RD - ALVEO WY	2,155	2,730			4,885	0565-10	06/16/10	
W BERNARDO DR	DUENDA RD - ALVEO WY	3,567	3,185			6,752	0530-13	05/23/13	
W BERNARDO DR	RANCHO BERNARDO RD - POBLADO RD	9,235	9,110			18,345	0566-10	06/16/10	
W BERNARDO DR	RANCHO BERNARDO RD - POBLADO RD	8,993	8,683			17,676	0531-13	05/23/13	
W BERNARDO DR	SD 015 R-K - POMERADO RD			11,500	2,680	14,180	0079-07	02/08/07	
W BERNARDO DR	SD 015 R-K - POMERADO RD			9,450	10,175	19,625	0040-10	02/10/10	
W BERNARDO DR	SD 015 R-K - POMERADO RD			9,193	9,809	19,002	0046-13	02/05/13	
W BERNARDO DR	SD 015 R-K - POMERADO RD			5,855	8,091	13,946	0008-17	02/09/17	
W BERNARDO DR	W BERNARDO CT - RANCHO BERNARDO CT	7,406	7,617			15,023	0071-16	02/16/16	
W BERNARDO DR	W BERNARDO CT - RANCHO BERNARDO RD	7,380	6,160			13,540	0080-07	02/09/07	
W BERNARDO DR	W BERNARDO CT - RANCHO BERNARDO RD	4,950	4,525			9,475	0052-10	02/11/10	
W BERNARDO DR	W BERNARDO CT - RANCHO BERNARDO RD	6,195	6,357			12,552	0060-13	01/17/13	
W BERNARDO DR	W BERNARDO CT - RHO BERNARDO RD	7,857	7,400			15,257	0020-17	02/15/17	
W BERNARDO DR	WEST BERNARDO CT - RANCHO BERNARDO RD	3,490				3,490	0178-03	02/07/03	

Development Services Department

Approval #1409096 - Conditional Use Permit

Application 01/12/2015 ➤ Issuance 02/12/2016 ➤ Inspection ➤ Completion

Approval Information

Status Issued

Issued 02/12/2016

Issued by Gargas, Glenn

Permit Holder David Johnson

Net Change DU 0

Valuation \$0.00

Sq. Footage 0

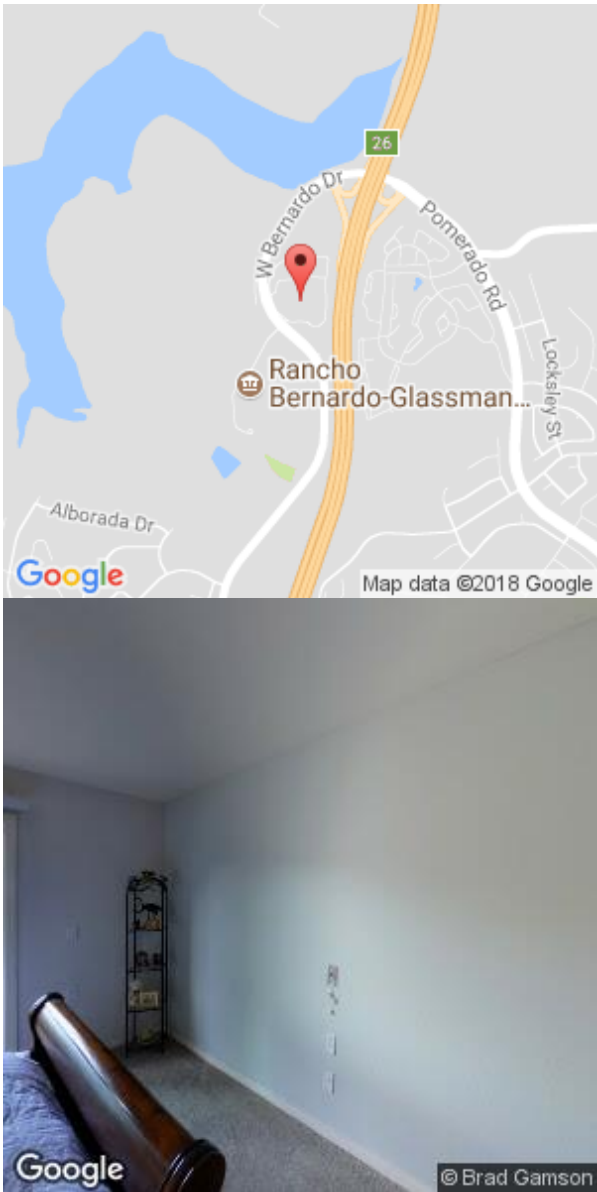
First Inspection

Complete Date

Scope CUP to Amend CUP No. 9867 to demo existing 33,320 sq. ft. skilled nursing facility and construct 72-bed, 96,019 sq. ft. skilled nursing facility on 22.29-acre property. Approved by City Council on Jan. 11, 2016.

Job

Map



Address 18655 WEST BERNARDO DR

APN 272-740-08-00

BC Codes

Project

Project ID 400695 (/Web/Projects/Details/400695)

Account 24005412

Admin No

Hold

Project Name Casa de las Campanas

Project Contact Gargas, Glenn
(619)446-5142
ggargas@sandiego.gov

Project Scope Rancho Bernardo (Process 5) Rezone, Planned Development Permit, and Amend CUP No. 9867 and 99-0747 to rezone 2.4 acres of AR-1-1 zone to RM-2-5 zone and construct a 96,019 sq ft skilled nursing building located at 18655 W. Bernardo Drive. The 22.29 acre site is located in the RM-2-5 and AR-1-1 zones in the Rancho Bernardo Community Plan Area. Council District 5.

Fees



Exceptions



Inspections



Issues



Dependent Approvals



Dependent Packages



Data TimeStamp: 01/09/2018 13:00:22


















Approval Status FAQ (<https://www.sandiego.gov/development-services/opendsd/approvalreports.shtml>)

Attachment E
Near-Term Year 2020 Base Condition
LOS Worksheets

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	0	0	1	0	239	0	0	446	16
Future Volume (vph)	4	0	2	0	0	1	0	239	0	0	446	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.995	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.75	0.75	0.75	0.25	0.25	0.25	0.82	0.82	0.82	0.92	0.92	0.92
Adj. Flow (vph)	5	0	3	0	0	4	0	291	0	0	485	17
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	5	0	3	0	0	4	0	291	0	0	502	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	







Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.4% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	2	0	0	1	0	239	0	0	446	16
Future Vol, veh/h	4	0	2	0	0	1	0	239	0	0	446	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	25	25	25	82	82	82	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	3	0	0	4	0	291	0	0	485	17

Major/Minor	Minor2	Minor1		Major1		Major2							
Conflicting Flow All	787	-	494	-	-	291	502	0	0	291	0	0	0
Stage 1	494	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	293	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-	-
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-	-
Pot Cap-1 Maneuver	309	0	575	0	0	748	1062	-	-	1271	-	-	-
Stage 1	557	0	-	0	0	-	-	-	-	-	-	-	-
Stage 2	715	0	-	0	0	-	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	307	-	575	-	-	748	1062	-	-	1271	-	-	-
Mov Cap-2 Maneuver	307	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	557	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	711	-	-	-	-	-	-	-	-	-	-	-	-























Approach	EB	WB	NB	SB
HCM Control Delay, s	15	9.8	0	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1062	-	-	307	575	748	1271	-	-
HCM Lane V/C Ratio	-	-	-	0.017	0.005	0.005	-	-	-
HCM Control Delay (s)	0	-	-	16.9	11.3	9.8	0	-	-
HCM Lane LOS	A	-	-	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway













03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	3	17	5	19	14	213	14	34	376	38
Future Volume (vph)	9	2	3	17	5	19	14	213	14	34	376	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.960			0.963		0.950			0.950		
Satd. Flow (prot)	0	1788	1583	0	1794	1583	1770	1863	1583	1770	1863	1583
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1863	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93
Adj. Flow (vph)	14	3	5	20	6	22	16	239	16	37	404	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	5	0	26	22	16	239	16	37	404	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	32.0	32.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	11.4%	45.7%	45.7%	11.4%	45.7%	45.7%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	4.0	27.0	27.0	4.0	27.0	27.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		5.6	5.6		6.4	6.4	4.2	25.3	25.3	4.2	25.3	25.3
Actuated g/C Ratio		0.18	0.18		0.20	0.20	0.13	0.79	0.79	0.13	0.79	0.79
v/c Ratio		0.05	0.01		0.07	0.06	0.07	0.16	0.01	0.16	0.27	0.03
Control Delay		13.4	0.0		13.3	0.3	16.2	4.5	0.0	16.9	4.9	1.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.4	0.0		13.3	0.3	16.2	4.5	0.0	16.9	4.9	1.0
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		10.3			7.3			4.9			5.5	
Approach LOS		B			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 32

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 5.6

Intersection LOS: A

Intersection Capacity Utilization 41.8%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway


















03/28/2019

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	9	2	3	17	5	19	14	213	14	34	376	38				
Future Volume (veh/h)	9	2	3	17	5	19	14	213	14	34	376	38				
Number	7	4	14	3	8	18	5	2	12	1	6	16				
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00				
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863				
Adj Flow Rate, veh/h	14	3	5	20	6	22	16	239	16	37	404	41				
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1				
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93				
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2				
Cap, veh/h	258	0	97	250	0	97	30	731	621	64	767	652				
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.02	0.39	0.39	0.04	0.41	0.41				
Sat Flow, veh/h	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583				
Grp Volume(v), veh/h	17	0	5	26	0	22	16	239	16	37	404	41				
Grp Sat Flow(s),veh/h/ln	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583				
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.3	0.2	2.3	0.2	0.5	4.2	0.4				
Cycle Q Clear(g_c), s	1.6	0.0	0.1	1.6	0.0	0.3	0.2	2.3	0.2	0.5	4.2	0.4				
Prop In Lane	0.82		1.00	0.77		1.00	1.00		1.00	1.00		1.00				
Lane Grp Cap(c), veh/h	258	0	97	250	0	97	30	731	621	64	767	652				
V/C Ratio(X)	0.07	0.00	0.05	0.10	0.00	0.23	0.54	0.33	0.03	0.58	0.53	0.06				
Avail Cap(c_a), veh/h	1641	0	1615	1675	0	1615	278	1973	1677	278	1973	1677				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Uniform Delay (d), s/veh	12.7	0.0	11.3	12.7	0.0	11.4	12.4	5.4	4.8	12.1	5.6	4.5				
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	1.2	5.5	0.3	0.0	3.0	0.7	0.1				
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.2	0.0	0.2	0.2	1.2	0.1	0.3	2.2	0.2				
LnGrp Delay(d),s/veh	12.8	0.0	11.3	12.9	0.0	12.6	17.9	5.7	4.8	15.1	6.4	4.6				
LnGrp LOS	B		B	B		B	B	A	A	B	A	A				
Approach Vol, veh/h	22		48				271			482						
Approach Delay, s/veh	12.5		12.8				6.4			6.9						
Approach LOS	B		B				A			A						
Timer	1	2	3	4	5	6	7	8								
Assigned Phs	1	2			4	5	6	8								
Phs Duration (G+Y+Rc), s	4.9	15.0			5.6	4.4	15.5	5.6								
Change Period (Y+Rc), s	4.0	5.0			4.0	4.0	5.0	4.0								
Max Green Setting (Gmax), s	4.0	27.0			26.0	4.0	27.0	26.0								
Max Q Clear Time (g_c+I1), s	2.5	4.3			3.6	2.2	6.2	3.6								
Green Ext Time (p_c), s	0.0	1.9			0.0	0.0	3.5	0.1								
Intersection Summary																
HCM 2010 Ctrl Delay	7.2															
HCM 2010 LOS	A															

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	4	0	0	2	0	626	0	0	259	4
Future Volume (vph)	7	0	4	0	0	2	0	626	0	0	259	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.998	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.69	0.69	0.69	0.50	0.50	0.50	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	10	0	6	0	0	4	0	745	0	0	264	4
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	10	0	6	0	0	4	0	745	0	0	268	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	






Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 49.6% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	4	0	0	2	0	626	0	0	259	4
Future Vol, veh/h	7	0	4	0	0	2	0	626	0	0	259	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	50	50	50	84	84	84	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	6	0	0	4	0	745	0	0	264	4

Major/Minor	Minor2	Minor1		Major1		Major2	
Conflicting Flow All	1013	-	266	-	-	745	268
Stage 1	266	-	-	-	-	-	-
Stage 2	747	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218
Pot Cap-1 Maneuver	217	0	773	0	0	414	1296
Stage 1	739	0	-	0	0	-	-
Stage 2	405	0	-	0	0	-	-
Platoon blocked, %							
Mov Cap-1 Maneuver	215	-	773	-	-	414	1296
Mov Cap-2 Maneuver	215	-	-	-	-	-	-
Stage 1	739	-	-	-	-	-	-
Stage 2	401	-	-	-	-	-	-

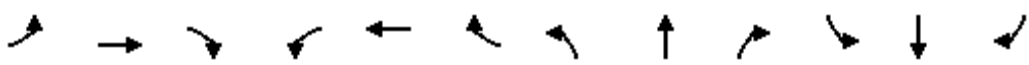
Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	13.8	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1296	-	-	215	773	414	863	-	-
HCM Lane V/C Ratio	-	-	-	0.047	0.007	0.01	-	-	-
HCM Control Delay (s)	0	-	-	22.6	9.7	13.8	0	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway













03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	2	38	12	4	29	59	558	13	13	199	51
Future Volume (vph)	39	2	38	12	4	29	59	558	13	13	199	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.955			0.964		0.950			0.950		
Satd. Flow (prot)	0	1779	1583	0	1796	1583	1770	1863	1583	1770	1863	1583
Flt Permitted					0.921		0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1716	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	49	3	48	15	5	36	70	664	15	13	203	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	48	0	20	36	70	664	15	13	203	52
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	11.0	32.0	32.0	8.0	29.0	29.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	15.7%	45.7%	45.7%	11.4%	41.4%	41.4%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	7.0	27.0	27.0	4.0	24.0	24.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		6.1	6.1		6.4	6.4	6.0	30.1	30.1	4.1	25.4	25.4
Actuated g/C Ratio		0.15	0.15		0.16	0.16	0.15	0.75	0.75	0.10	0.63	0.63
v/c Ratio		0.18	0.15		0.07	0.11	0.27	0.48	0.01	0.07	0.17	0.05
Control Delay		18.4	3.0		17.6	1.2	20.1	6.8	0.0	20.8	8.3	1.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		18.4	3.0		17.6	1.2	20.1	6.8	0.0	20.8	8.3	1.8
LOS		B	A		B	A	C	A	A	C	A	A
Approach Delay		11.0			7.0			7.9			7.6	
Approach LOS		B			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 40.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 8.1

Intersection LOS: A

Intersection Capacity Utilization 52.5%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019


















																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Traffic Volume (veh/h)	39	2	38	12	4	29	59	558	13	13	199	51						
Future Volume (veh/h)	39	2	38	12	4	29	59	558	13	13	199	51						
Number	7	4	14	3	8	18	5	2	12	1	6	16						
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0						
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00						
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863						
Adj Flow Rate, veh/h	49	2	48	15	5	36	70	664	15	13	203	52						
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1						
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98						
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2						
Cap, veh/h	180	4	334	158	32	334	94	857	729	24	783	666						
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.05	0.46	0.46	0.01	0.42	0.42						
Sat Flow, veh/h	41	19	1583	23	150	1583	1774	1863	1583	1774	1863	1583						
Grp Volume(v), veh/h	51	0	48	20	0	36	70	664	15	13	203	52						
Grp Sat Flow(s),veh/h/ln	60	0	1583	172	0	1583	1774	1863	1583	1774	1863	1583						
Q Serve(g_s), s	0.3	0.0	1.0	0.1	0.0	0.8	1.6	12.3	0.2	0.3	2.9	0.8						
Cycle Q Clear(g_c), s	8.7	0.0	1.0	8.6	0.0	0.8	1.6	12.3	0.2	0.3	2.9	0.8						
Prop In Lane	0.96		1.00	0.75		1.00	1.00		1.00	1.00		1.00						
Lane Grp Cap(c), veh/h	184	0	334	189	0	334	94	857	729	24	783	666						
V/C Ratio(X)	0.28	0.00	0.14	0.11	0.00	0.11	0.74	0.77	0.02	0.55	0.26	0.08						
Avail Cap(c_a), veh/h	761	0	999	797	0	999	301	1220	1037	172	1085	922						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
Uniform Delay (d), s/veh	20.0	0.0	13.2	13.7	0.0	13.1	19.2	9.3	6.1	20.2	7.8	7.2						
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.2	0.0	0.1	4.3	2.4	0.0	7.3	0.2	0.1						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.4	0.2	0.0	0.3	0.9	6.8	0.1	0.2	1.5	0.4						
LnGrp Delay(d),s/veh	20.3	0.0	13.3	14.0	0.0	13.3	23.5	11.7	6.1	27.5	8.0	7.2						
LnGrp LOS	C		B	B		B	C	B	A	C	A	A						
Approach Vol, veh/h	99				56		749				268							
Approach Delay, s/veh	16.9				13.5		12.7				8.8							
Approach LOS	B				B		B				A							
Timer	1	2	3	4	5	6	7	8										
Assigned Phs	1	2			4	5	6	8										
Phs Duration (G+Y+Rc), s	4.5	24.0			12.9	6.2	22.4	12.9										
Change Period (Y+Rc), s	4.0	5.0			4.0	4.0	5.0	4.0										
Max Green Setting (Gmax), s	4.0	27.0			26.0	7.0	24.0	26.0										
Max Q Clear Time (g_c+I1), s	2.3	14.3			10.7	3.6	4.9	10.6										
Green Ext Time (p_c), s	0.0	4.8			0.2	0.0	1.6	0.1										
Intersection Summary																		
HCM 2010 Ctrl Delay																		
HCM 2010 LOS																		

Attachment F
Near-Term Year 2020 Base Plus Project Condition
LOS Worksheets

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	0	0	1	0	244	0	0	450	16
Future Volume (vph)	4	0	2	0	0	1	0	244	0	0	450	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.995	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1853	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.75	0.75	0.75	0.25	0.25	0.25	0.82	0.82	0.82	0.92	0.92	0.92
Adj. Flow (vph)	5	0	3	0	0	4	0	298	0	0	489	17
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	5	0	3	0	0	4	0	298	0	0	506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	






Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.7% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	2	0	0	1	0	244	0	0	450	16
Future Vol, veh/h	4	0	2	0	0	1	0	244	0	0	450	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	25	25	25	82	82	82	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	3	0	0	4	0	298	0	0	489	17

Major/Minor	Minor2	Minor1		Major1		Major2	
Conflicting Flow All	798	-	498	-	-	298	506
Stage 1	498	-	-	-	-	-	-
Stage 2	300	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218
Pot Cap-1 Maneuver	304	0	572	0	0	741	1059
Stage 1	554	0	-	0	0	-	-
Stage 2	709	0	-	0	0	-	-
Platoon blocked, %							
Mov Cap-1 Maneuver	302	-	572	-	-	741	1059
Mov Cap-2 Maneuver	302	-	-	-	-	-	-
Stage 1	554	-	-	-	-	-	-
Stage 2	705	-	-	-	-	-	-























Approach	EB	WB	NB	SB
HCM Control Delay, s	15.2	9.9	0	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1059	-	-	302	572	741	1263	-	-
HCM Lane V/C Ratio	-	-	-	0.018	0.005	0.005	-	-	-
HCM Control Delay (s)	0	-	-	17.1	11.3	9.9	0	-	-
HCM Lane LOS	A	-	-	C	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway













03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	3	20	6	24	14	213	16	38	376	38
Future Volume (vph)	9	2	3	20	6	24	14	213	16	38	376	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.960			0.963		0.950			0.950		
Satd. Flow (prot)	0	1788	1583	0	1794	1583	1770	1863	1583	1770	1863	1583
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1863	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93
Adj. Flow (vph)	14	3	5	24	7	28	16	239	18	41	404	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	5	0	31	28	16	239	18	41	404	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	32.0	32.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	11.4%	45.7%	45.7%	11.4%	45.7%	45.7%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	4.0	27.0	27.0	4.0	27.0	27.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		5.7	5.7		6.5	6.5	4.2	25.4	25.4	4.2	25.4	25.4
Actuated g/C Ratio		0.18	0.18		0.20	0.20	0.13	0.79	0.79	0.13	0.79	0.79
v/c Ratio		0.05	0.01		0.08	0.07	0.07	0.16	0.01	0.18	0.27	0.03
Control Delay		13.3	0.0		13.2	0.3	16.4	4.5	0.0	17.2	5.0	1.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.3	0.0		13.2	0.3	16.4	4.5	0.0	17.2	5.0	1.1
LOS		B	A		B	A	B	A	A	B	A	A
Approach Delay		10.3			7.1			4.9			5.7	
Approach LOS		B			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 32.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 42.0%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

		
Ø1	Ø2	Ø4
8 s	32 s	30 s
		
Ø5	Ø6	Ø8
8 s	32 s	30 s

HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway


















03/28/2019






												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	3	20	6	24	14	213	16	38	376	38
Future Volume (veh/h)	9	2	3	20	6	24	14	213	16	38	376	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	14	3	5	24	7	28	16	239	18	41	404	41
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1
Peak Hour Factor	0.65	0.65	0.65	0.85	0.85	0.85	0.89	0.89	0.89	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	0	108	248	0	108	30	723	614	70	765	650
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.02	0.39	0.39	0.04	0.41	0.41
Sat Flow, veh/h	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	17	0	5	31	0	28	16	239	18	41	404	41
Grp Sat Flow(s),veh/h/ln	0	0	1583	0	0	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.4	0.2	2.3	0.2	0.6	4.2	0.4
Cycle Q Clear(g_c), s	1.8	0.0	0.1	1.8	0.0	0.4	0.2	2.3	0.2	0.6	4.2	0.4
Prop In Lane	0.82		1.00	0.77		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	255	0	108	248	0	108	30	723	614	70	765	650
V/C Ratio(X)	0.07	0.00	0.05	0.13	0.00	0.26	0.54	0.33	0.03	0.59	0.53	0.06
Avail Cap(c_a), veh/h	1604	0	1597	1644	0	1597	275	1951	1658	275	1951	1658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	11.2	12.9	0.0	11.4	12.6	5.5	4.9	12.2	5.7	4.6
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	1.3	5.5	0.3	0.0	2.9	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.2	0.0	0.2	0.2	1.2	0.1	0.3	2.3	0.2
LnGrp Delay(d),s/veh	12.9	0.0	11.3	13.1	0.0	12.6	18.0	5.9	4.9	15.0	6.4	4.6
LnGrp LOS	B		B	B		B	B	A	A	B	A	A
Approach Vol, veh/h	22				59		273				486	
Approach Delay, s/veh	12.6				12.9		6.5				7.0	
Approach LOS	B				B		A				A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2			4	5	6	8				
Phs Duration (G+Y+Rc), s	5.0	15.0			5.8	4.4	15.6	5.8				
Change Period (Y+Rc), s	4.0	5.0			4.0	4.0	5.0	4.0				
Max Green Setting (Gmax), s	4.0	27.0			26.0	4.0	27.0	26.0				
Max Q Clear Time (g_c+I1), s	2.6	4.3			3.8	2.2	6.2	3.8				
Green Ext Time (p_c), s	0.0	1.9			0.0	0.0	3.5	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			7.4									
HCM 2010 LOS			A									

Lanes, Volumes, Timings

1: W Bernardo Dr & Bernardo Bay Park/North Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	4	0	0	2	0	633	0	0	266	4
Future Volume (vph)	7	0	4	0	0	2	0	633	0	0	266	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		1	0		0	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.865					0.998	
Flt Protected	0.950											
Satd. Flow (prot)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Flt Permitted	0.950											
Satd. Flow (perm)	1770	0	1583	0	0	1611	0	1863	0	0	1859	0
Link Speed (mph)		15			30			30			30	
Link Distance (ft)		289			274			719			482	
Travel Time (s)		13.1			6.2			16.3			11.0	
Peak Hour Factor	0.69	0.69	0.69	0.50	0.50	0.50	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	10	0	6	0	0	4	0	754	0	0	271	4
Shared Lane Traffic (%)						10%						
Lane Group Flow (vph)	10	0	6	0	0	4	0	754	0	0	275	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 50.0%	ICU Level of Service A											
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	4	0	0	2	0	633	0	0	266	4
Future Vol, veh/h	7	0	4	0	0	2	0	633	0	0	266	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	1	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	50	50	50	84	84	84	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	6	0	0	4	0	754	0	0	271	4

Major/Minor	Minor2	Minor1		Major1		Major2	
Conflicting Flow All	1029	-	273	-	-	754	275
Stage 1	273	-	-	-	-	-	-
Stage 2	756	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	-	-	6.22	4.12
Critical Hdwy Stg 1	6.12	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	-	-	3.318	2.218
Pot Cap-1 Maneuver	212	0	766	0	0	409	1288
Stage 1	733	0	-	0	0	-	-
Stage 2	400	0	-	0	0	-	-
Platoon blocked, %							
Mov Cap-1 Maneuver	210	-	766	-	-	409	1288
Mov Cap-2 Maneuver	210	-	-	-	-	-	-
Stage 1	733	-	-	-	-	-	-
Stage 2	396	-	-	-	-	-	-























Approach	EB	WB	NB	SB
HCM Control Delay, s	18.2	13.9	0	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1288	-	-	210	766	409	856	-	-
HCM Lane V/C Ratio	-	-	-	0.048	0.008	0.01	-	-	-
HCM Control Delay (s)	0	-	-	23	9.7	13.9	0	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	0	-	-

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway













03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	4	38	14	4	36	59	558	16	20	199	51
Future Volume (vph)	39	4	38	14	4	36	59	558	16	20	199	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	150		150	150		110
Storage Lanes	0		1	0		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected		0.957			0.962		0.950			0.950		
Satd. Flow (prot)	0	1783	1583	0	1792	1583	1770	1863	1583	1770	1863	1583
Flt Permitted					0.938		0.950			0.950		
Satd. Flow (perm)	0	1863	1583	0	1747	1583	1770	1863	1583	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94			78			78
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		814			263			328			719	
Travel Time (s)		22.2			7.2			8.9			19.6	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Adj. Flow (vph)	49	5	48	18	5	45	70	664	19	20	203	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	48	0	23	45	70	664	19	20	203	52
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6

Lanes, Volumes, Timings

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	8.0	32.0	32.0	8.0	28.0	28.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	30.0	11.0	32.0	32.0	8.0	29.0	29.0
Total Split (%)	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	15.7%	45.7%	45.7%	11.4%	41.4%	41.4%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	7.0	27.0	27.0	4.0	24.0	24.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.7	3.7	2.0	3.7	3.7
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)	19.0	19.0	19.0	19.0	19.0	19.0		20.0	20.0		16.0	16.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	0
Act Effect Green (s)		6.2	6.2		6.5	6.5	6.0	29.7	29.7	4.1	25.2	25.2
Actuated g/C Ratio		0.16	0.16		0.16	0.16	0.15	0.75	0.75	0.10	0.63	0.63
v/c Ratio		0.19	0.15		0.08	0.13	0.26	0.48	0.02	0.11	0.17	0.05
Control Delay		18.3	2.9		17.6	2.4	20.0	6.9	0.0	21.4	8.3	1.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		18.3	2.9		17.6	2.4	20.0	6.9	0.0	21.4	8.3	1.8
LOS		B	A		B	A	C	A	A	C	A	A
Approach Delay		11.0			7.6			8.0			8.0	
Approach LOS		B			A			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 39.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 8.2

Intersection LOS: A

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway



HCM 2010 Signalized Intersection Summary

2: W Bernardo Dr & Rancho Bernardo Community Park Drwy/Main Driveway

03/28/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	4	38	14	4	36	59	558	16	20	199	51
Future Volume (veh/h)	39	4	38	14	4	36	59	558	16	20	199	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	49	5	48	18	5	45	70	664	19	20	203	52
Adj No. of Lanes	0	1	1	0	1	1	1	1	1	1	1	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.84	0.84	0.84	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	10	386	151	25	386	91	831	706	34	771	655
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.05	0.45	0.45	0.02	0.41	0.41
Sat Flow, veh/h	53	40	1583	31	104	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	54	0	48	23	0	45	70	664	19	20	203	52
Grp Sat Flow(s),veh/h/ln	94	0	1583	135	0	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	0.5	0.0	1.1	0.2	0.0	1.0	1.7	13.7	0.3	0.5	3.2	0.9
Cycle Q Clear(g_c), s	10.9	0.0	1.1	10.8	0.0	1.0	1.7	13.7	0.3	0.5	3.2	0.9
Prop In Lane	0.91		1.00	0.78		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	176	0	386	176	0	386	91	831	706	34	771	655
V/C Ratio(X)	0.31	0.00	0.12	0.13	0.00	0.12	0.77	0.80	0.03	0.58	0.26	0.08
Avail Cap(c_a), veh/h	644	0	921	660	0	921	278	1125	956	159	1000	850
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	13.2	14.1	0.0	13.1	20.9	10.7	6.9	21.7	8.6	7.9
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.3	0.0	0.1	5.0	3.4	0.0	5.7	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.5	0.2	0.0	0.4	1.0	7.6	0.1	0.3	1.7	0.4
LnGrp Delay(d),s/veh	20.9	0.0	13.2	14.4	0.0	13.3	26.0	14.1	7.0	27.5	8.8	8.0
LnGrp LOS	C		B	B		B	C	B	A	C	A	A
Approach Vol, veh/h		102			68			753			275	
Approach Delay, s/veh		17.3			13.7			15.0			10.0	
Approach LOS		B			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.9	25.1		15.2	6.3	23.6		15.2				
Change Period (Y+Rc), s	4.0	5.0		4.0	4.0	5.0		4.0				
Max Green Setting (Gmax), s	4.0	27.0		26.0	7.0	24.0		26.0				
Max Q Clear Time (g_c+I1), s	2.5	15.7		12.9	3.7	5.2		12.8				
Green Ext Time (p_c), s	0.0	4.5		0.2	0.0	1.6		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			14.0									
HCM 2010 LOS			B									



**Air Quality Analysis for the
Casa de las Campanas Phase III
Project
San Diego, California**

Prepared for
Ankrom Moisan Architects, Inc.
38 NW Davis, Suite 300
Portland, OR 97209
Contact: Mr. Joe Tucker

Prepared by
RECON Environmental, Inc.
1927 Fifth Avenue
San Diego, CA 92101
P 619.308.9333

RECON Number 9088
February 8, 2019

A handwritten signature in black ink that reads "Jessica Fleming".

Jessica Fleming, Environmental Analyst

TABLE OF CONTENTS

Acronyms.....	ii
Executive Summary.....	1
1.0 Introduction	3
2.0 Project Description.....	3
3.0 Regulatory Framework.....	7
3.1 Federal Regulations	7
3.2 State Regulations	10
3.3 San Diego Air Pollution Control District	12
4.0 Environmental Setting.....	12
4.1 Geographic Setting.....	12
4.2 Climate	13
4.3 Existing Air Quality	14
5.0 Thresholds of Significance	18
6.0 Air Quality Assessment	19
6.1 Construction Emissions.....	20
6.2 Operation Emissions	23
6.3 Impact Analysis.....	24
7.0 Conclusions.....	28
8.0 References Cited.....	30

FIGURES

1: Regional Location.....	4
2: Aerial Photograph of Project Vicinity.....	5
3: Site Plan.....	6

TABLES

1: Ambient Air Quality Standards	8
2: Summary of Air Quality Measurements Recorded at the Escondido Air Quality Monitoring Station.....	15
3: Air Quality Impact Screening Levels	19
4: Construction Phases and Equipment.....	21
5: Summary of Worst-case Construction Emissions (pounds per day)	22
6: Summary of Project Operational Emissions (pounds per day)	24

ATTACHMENT

1: CalEEMod Output – Project Emissions	
--	--

Acronyms

°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
City	City of San Diego
CO	carbon monoxide
CUP	Conditional Use Permit
DPM	diesel particulate matter
I-15	Interstate 15
LOS	Level of Service
NAAQS	National Ambient Air Quality Standards
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PM ₁₀	particulate matter with an aerodynamic diameter of 10 microns or less
PM _{2.5}	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppb	parts per billion
ppm	parts per million
RAQS	Regional Air Quality Strategy
ROG	reactive organic gas
SANDAG	San Diego Association of Governments
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SO ₂	sulfur dioxide
TACs	toxic air contaminants
TCM	Transportation Control Measures
U.S. EPA	United States Environmental Protection Agency
USC	United States Code
VOC	volatile organic compounds

Executive Summary

This report evaluates potential local and regional air quality impacts associated with the proposed Casa de las Campanas Phase III project (project) located at 18655 West Bernardo Drive, within the Rancho Bernardo Community Planning Area in the City of San Diego (City), immediately west of Interstate 15 (I-15). The project site is located within the existing Casa de las Campanas campus, which is an existing retirement community. The project would demolish an existing health care building and construct a five-story, 140,000-square-foot building that would consist of 24 independent living units, 66 assisted living units, and amenities. The proposed building would connect to the existing Casa Sur building.

The primary goal of the San Diego Air Pollution Control District's Regional Air Quality Strategy (RAQS) is to reduce ozone precursor emissions. The project site is designated as residential in the City's General Plan and the Rancho Bernardo Community Plan. The existing project has a Conditional Use Permit and the proposed Phase III project would be consistent with the CUP and amendments. The project is within an existing retirement community and would replace an existing 99-bed health care building with 90 independent and assisted living units. The project would not result in an increase in traffic over the existing use. Based on City of San Diego trip generation rates, the existing use generates 3 trips per bed for a total of 297 trips, which is similar to the 294 trips that would be generated by the project. While the project would provide additional units, it would not significantly alter the planned location, distribution, or growth of the human population in the area, as the project would serve seniors who have previously been living independently and require assisted living and health care support. The project would not result in a substantial increase in population and housing stock, as it is intended to serve residents already living in the region. The project would, therefore, not result in an increase in emissions that are not already accounted for in the RAQS. Thus, the project would not obstruct or conflict with implementation of the RAQS. Impacts would be less than significant and no mitigation would be required.

Additionally, as calculated in this analysis, project construction emissions would not exceed the applicable City emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project emissions would be well below these limits, project construction would not result in regional emissions that would exceed the National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) or contribute to existing violations. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction. Therefore, the project construction would result in a less than significant impact in regards to air quality standards. However, there are particularly sensitive receptors located on the project site. These sensitive receptors include seniors within the existing retirement community, particularly the seniors located immediately adjacent to the construction location. Although maximum construction emissions would be less than the applicable thresholds, due to the close proximity of sensitive receptors on-site, the following project design features are recommended and shall be included in the project's conditions of approval:

- The construction fleet shall use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize California Air Resources Board/U.S. Environmental Protection Agency Engine Certification Tier 3 or better, or other equivalent methods approved by the California Air Resources Board (CARB).
- The engine size of construction equipment shall be the minimum size suitable for the required job.
- Construction equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications.
- Per CARB's ACTM 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed 5 minutes unless more time is required per engine manufacturers' specifications or for safety reasons.

Long-term emissions of regional air pollutants occur from operational sources. Based on emissions estimates, project operational emissions would not exceed the applicable regional emissions thresholds. Therefore, as project emissions would be well below these limits, project operations would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations. Therefore, the project operation would result in a less than significant impact in regards to air quality standards and no mitigation would be required.

The project would not result in the exposure of sensitive receptors to substantial concentrations of diesel particulate matter during project operation. With the provision of MERV-13 or better filters in all proposed units, as included in the project design of the mechanical ventilation system, particulates entering the indoor air would be reduced, thus reducing cancer risk from diesel exhaust exposure. Additionally, the project is not anticipated to result in a carbon monoxide hot spot.

The project does not include heavy industrial or agricultural uses that are typically associated with objectionable odors. The project would involve the use of diesel-powered equipment during construction. Diesel exhaust may occasionally be noticeable at adjacent properties; however, construction activities would be temporary and the odors would dissipate quickly in an outdoor environment. Additionally, the measures outlined above would reduce construction exhaust emissions, which would also reduce construction-related odors. Therefore, this impact would be less than significant.

The project would not result in the generation of 100 pounds per day or more of particulate matter. Additionally, standard dust control measures would be implemented as a part of project construction. Impacts would be less than significant and no mitigation would be required.

The project would replace an existing health care building with a new five-story building within an existing retirement community. The new building would have a similar footprint to the existing building. The project would not increase contiguous building frontage along adjacent roadways and, therefore, is not anticipated to contribute to a substantial alteration of air movement that would affect air quality. Impacts would be less than significant and no mitigation would be required.

1.0 Introduction

The purpose of this report is to assess potential short-term and long-term local and regional air quality impacts resulting from development of the proposed Casa de las Campanas Phase III project (project).

Air pollution affects all southern Californians. Effects can include increased respiratory infections, increased discomfort, missed days from work and school, and increased mortality. Polluted air also damages agriculture and our natural environment.

The state of California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. The project site is located within the San Diego Air Basin (SDAB). The SDAB is currently classified as a federal non-attainment area for ozone, and a state non-attainment area for particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}), and ozone.

Air quality impacts can result from the construction and operation of the project. Construction impacts are short term and result from fugitive dust, equipment exhaust, and indirect effects associated with construction workers and deliveries. Operational impacts can occur on two levels: regional impacts resulting from growth-inducing development, or local hot-spot effects stemming from sensitive receivers being placed close to highly congested roadways. In the case of this project, operational impacts would be primarily due to emissions to the basin from mobile sources associated with vehicular travel along the roadways within the project area.

The analysis of impacts is based on federal and state Ambient Air Quality Standards and is assessed in accordance with the guidelines, policies, and standards established by the City of San Diego (City) and the San Diego Air Pollution Control District (SDAPCD). Project compatibility with the adopted air quality plan for the area is also assessed. Measures are recommended, as required, to reduce potentially significant impacts.

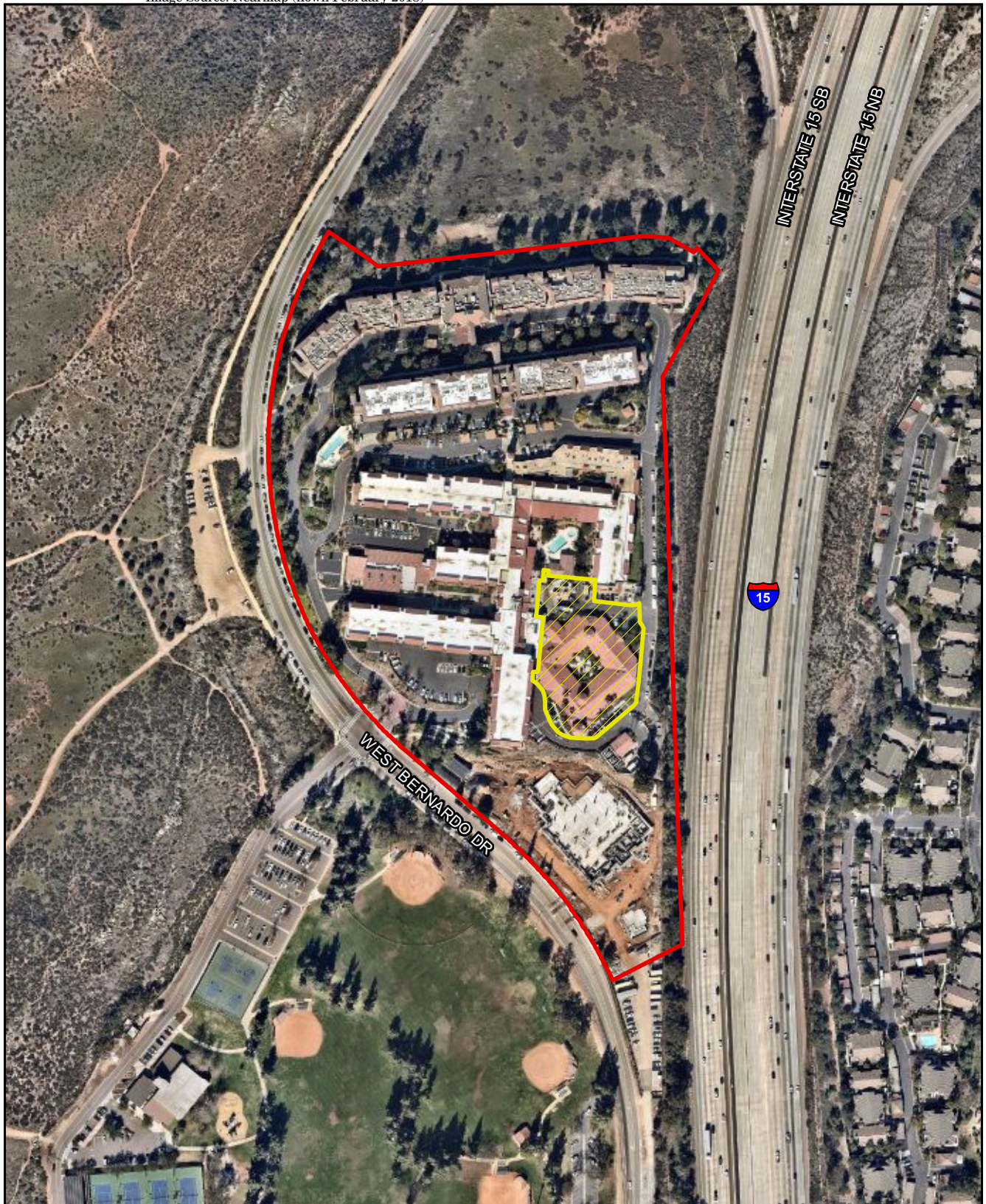
2.0 Project Description



The project site is located at 18655 West Bernardo Drive (Assessor's Parcel Number 272-740-0800) on the 22.29-acre Casa de las Campanas campus, within the Rancho Bernardo Community Plan area of the City, immediately west of Interstate 15 (I-15). Figure 1 shows the regional location of the project site. Figure 2 shows an aerial photograph of the project vicinity.

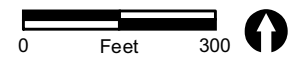
The project would demolish an existing 33,320-square-foot, 99-bed health care building and construct a five-story, 140,000-square-foot building that would consist of 24 independent living units, 66 assisted living units, and amenities. The proposed building would connect to the existing Casa Sur building. Figure 3 shows the proposed site plan.



FIGURE 1
Regional Location



-  Project Boundary
-  Project Area



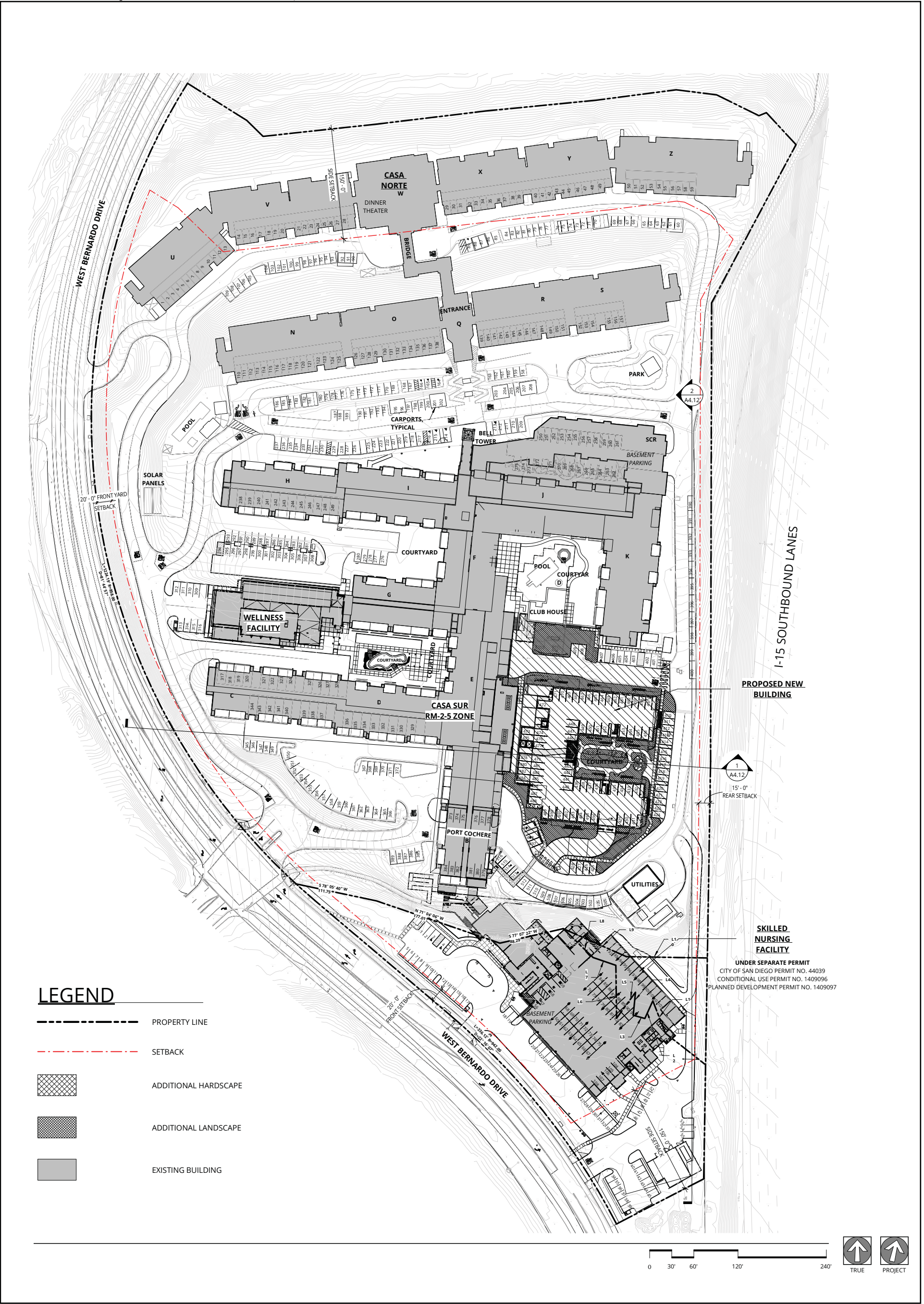


FIGURE 3

3.0 Regulatory Framework

3.1 Federal Regulations

Ambient Air Quality Standards (AAQS) represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect the public health and welfare. The federal Clean Air Act (CAA) was enacted in 1970 and amended in 1977 and 1990 [42 United States Code (USC) 7401] for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In 1971, in order to achieve the purposes of Section 109 of the CAA [42 USC 7409], the U.S. Environmental Protection Agency (U.S. EPA) developed primary and secondary National Ambient Air Quality Standards (NAAQS).

Six criteria pollutants of primary concern have been designated: ozone, carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), lead (Pb), and respirable particulate matter (PM₁₀ and PM_{2.5}). The primary NAAQS “. . . in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health . . .” and the secondary standards “. . . protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air” [42 USC 7409(b)(2)]. The primary NAAQS were established, with a margin of safety, considering long-term exposure for the most sensitive groups in the general population (i.e., children, senior citizens, and people with breathing difficulties). The NAAQS are presented in Table 1 (California Air Resources Board [CARB] 2016a).

An air basin is designated as either attainment or non-attainment for a particular pollutant. Once a non-attainment area has achieved the AAQS for a particular pollutant, it is re-designated as an attainment area for that pollutant. To be redesignated, the area must meet air quality standards for three consecutive years. After re-designation to attainment, the area is known as a maintenance area and must develop a 10-year plan for continuing to meet and maintain air quality standards, as well as satisfy other requirements of the federal CAA. The SDAB is a non-attainment area for the federal ozone standard.

Table 1 Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards ¹		National Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone ⁸	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm (137 µg/m ³)		0.070 ppm (137 µg/m ³)		
Respirable Particulate Matter (PM ₁₀) ⁹	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ³		—		
Fine Particulate Matter (PM _{2.5}) ⁹	24 Hour	No Separate State Standard		35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	12 µg/m ³	15 µg/m ³	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m ³)	Non-dispersive Infrared Photometry	35 ppm (40 mg/m ³)	—	Non-dispersive Infrared Photometry
	8 Hour	9.0 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		—	—	
Nitrogen Dioxide (NO ₂) ¹⁰	1 Hour	0.18 ppm (339 µg/m ³)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m ³)	—	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)		0.053 ppm (100 µg/m ³)	Same as Primary Standard	
Sulfur Dioxide (SO ₂) ¹¹	1 Hour	0.25 ppm (655 µg/m ³)	Ultraviolet Fluorescence	75 ppb (196 µg/m ³)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1,300 µg/m ³)	
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (for certain areas) ¹¹	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas) ¹¹	—	
Lead ^{12,13}	30 Day Average	1.5 µg/m ³	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m ³ (for certain areas) ¹²	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m ³		
Visibility Reducing Particles ¹⁴	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence			
Vinyl Chloride ¹²	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			
See footnotes on next page.						

See footnotes on next page.

Table 1
Ambient Air Quality Standards

ppm = parts per million; ppb = parts per billion; $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; – = not applicable.

- ¹ California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, particulate matter (PM_{10} , $\text{PM}_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
- ² National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10} , the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above $150 \mu\text{g}/\text{m}^3$ is equal to or less than one. For $\text{PM}_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
- ³ Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
- ⁴ Any equivalent measurement method which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.
- ⁵ National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
- ⁶ National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- ⁷ Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
- ⁸ On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
- ⁹ On December 14, 2012, the national annual $\text{PM}_{2.5}$ primary standard was lowered from $15 \mu\text{g}/\text{m}^3$ to $12.0 \mu\text{g}/\text{m}^3$. The existing national 24-hour $\text{PM}_{2.5}$ standards (primary and secondary) were retained at $35 \mu\text{g}/\text{m}^3$, as was the annual secondary standards of $15 \mu\text{g}/\text{m}^3$. The existing 24-hour PM_{10} standards (primary and secondary) of $150 \mu\text{g}/\text{m}^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
- ¹⁰ To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of ppb. California standards are in units of ppm. To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
- ¹¹ On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated non-attainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
- ¹² The Air Resources Board has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
- ¹³ The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard ($1.5 \mu\text{g}/\text{m}^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
- ¹⁴ In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and “extinction of 0.07 per kilometer” for the statewide and Lake Tahoe Air Basin standards, respectively.

SOURCE: CARB 2016.

3.2 State Regulations

3.2.1 Criteria Pollutants

The CARB has developed the California Ambient Air Quality Standards (CAAQS) and generally has set more stringent limits on the criteria pollutants than the NAAQS (see Table 1). In addition to the federal criteria pollutants, the CAAQS also specify standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride (see Table 1).

Similar to the federal CAA, the state classifies as either “attainment” or “non-attainment” areas for each pollutant based on the comparison of measured data with the CAAQS. The SDAB is a non-attainment area for the state ozone standards, the state PM₁₀ standard, and the state PM_{2.5} standard.

3.2.2 Toxic Air Contaminants

The public’s exposure to toxic air contaminants (TACs) is a significant public health issue in California. Diesel-exhaust particulate matter emissions have been established as TACs. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health (Assembly Bill [AB] 1807: Health and Safety Code Sections 39650–39674). The Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

The California Air Toxics Program establishes the process for the identification and control of TACs and includes provisions to make the public aware of significant toxic exposures and for reducing risk. Additionally, the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly Bill) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air.

The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

The Children’s Environmental Health Protection Act, California Senate Bill 25 (Chapter 731, Escutia, Statutes of 1999), focuses on children’s exposure to air pollutants. The act requires CARB to review its air quality standards from a children’s health perspective, evaluate the statewide air monitoring network, and develop any additional air toxic control measures needed to protect children’s health. Locally, toxic air pollutants are regulated through the SDAPCD’s Regulation XII. Of particular concern statewide are diesel-exhaust particulate matter emissions. Diesel-exhaust particulate matter was established as a TAC in 1998, and is estimated to represent a majority of the cancer risk from TACs statewide (based on the statewide average). Diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as

benzene and formaldehyde, have been previously identified as TACs by the CARB and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants program.

Following the identification of diesel particulate matter (DPM) as a TAC in 1998, CARB has worked on developing strategies and regulations aimed at reducing the risk from DPM. The overall strategy for achieving these reductions is found in the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB 2000). A stated goal of the plan is to reduce the statewide cancer risk arising from exposure to DPM by 85 percent by 2020.

In April 2005, CARB published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005). The handbook makes recommendations directed at protecting sensitive land uses from air pollutant emissions while balancing a myriad of other land use issues (e.g., housing, transportation needs, economics, etc.). It notes that the handbook is not regulatory or binding on local agencies and recognizes that application takes a qualitative approach. As reflected in the CARB Handbook, there is currently no adopted standard for the significance of health effects from mobile sources. Therefore, the CARB has provided guidelines for the siting of land uses near heavily traveled roadways. Of pertinence to this study, the CARB guidelines indicate that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles/day should be avoided when possible.

As an ongoing process, CARB will continue to establish new programs and regulations for the control of diesel particulate and other air-toxics emissions as appropriate. The continued development and implementation of these programs and policies will ensure that the public's exposure to DPM will continue to decline.

3.2.3 State Implementation Plan

The State Implementation Plan (SIP) is a collection of documents that set forth the state's strategies for achieving the NAAQS. In California, the SIP is a compilation of new and previously submitted plans, programs (such as air quality management plans, monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. The CARB is the lead agency for all purposes related to the SIP under state law. Local air districts and other agencies, such as the Department of Pesticide Regulation and the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval. The CARB then forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. All of the items included in the California SIP are listed in the Code of Federal Regulations (CFR) at 40 CFR 52.220.

The SDAPCD is responsible for preparing and implementing the portion of the SIP applicable to the SDAB. The SIP plans for San Diego County specifically include the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County (2012), and the 2004 Revision to the California State Implementation Plan for Carbon Monoxide – Updated Maintenance Plan for Ten Federal Planning Areas.

3.2.4 The California Environmental Quality Act

Section 15125(d) of the California Environmental Quality Act (CEQA) Guidelines requires discussion of any inconsistencies between the project and applicable general plans and regional plans, including the applicable air quality attainment or maintenance plan (or SIP).

3.3 San Diego Air Pollution Control District

The SDAPCD is the agency that regulates air quality in the SDAB. The SDAPCD prepared the RAQS in response to the requirements set forth in the California CAA AB 2595 (SDAPCD 1992) and the federal CAA. Motor vehicles are San Diego County's leading source of air pollution (SDAPCD 2013). In addition to these sources, other mobile sources include construction equipment, trains, and airplanes. Reducing mobile source emissions requires the technological improvement of existing mobile sources and the examination of future mobile sources, such as those associated with new or modification projects (e.g., retrofitting older vehicles with cleaner emission technologies). In addition to mobile sources, stationary sources also contribute to air pollution in the SDAB. Stationary sources include gasoline stations, power plants, dry cleaners, and other commercial and industrial uses. Stationary sources of air pollution are regulated by the local air pollution control or management district, in this case the SDAPCD.

The SDAPCD is responsible for preparing and implementing the RAQS. As part of the RAQS, the SDAPCD developed Transportation Control Measures (TCMs) for the air quality plan prepared by the San Diego Association of Governments (SANDAG) in accordance with AB 2595 and adopted by SANDAG on March 27, 1992, as Resolution Number 92-49 and Addendum. The RAQS and TCM set forth the steps needed to accomplish attainment of NAAQS and CAAQS. The required triennial updates of the RAQS and corresponding TCM were adopted in 1995, 1998, 2001, 2004, 2009, and 2016.

The SDAPCD has also established a set of rules and regulations initially adopted on January 1, 1969 and periodically reviewed and updated. These rules and regulations are available for review on the agency's website.

4.0 Environmental Setting

4.1 Geographic Setting

The project is located in the City of San Diego, about 12 miles east of the Pacific Ocean. The eastern portion of the SDAB is surrounded by mountains to the north, east, and south. These mountains tend to restrict airflow and concentrate pollutants in the valleys and low-lying areas below.

4.2 Climate

The project area, like the rest of San Diego County, has a Mediterranean climate characterized by warm, dry summers and mild winters. The mean annual temperature for the project area is 62 degrees Fahrenheit (°F). The average annual precipitation is 16 inches, falling primarily from November to April. Winter low temperatures in the project area average about 39°F, and summer high temperatures average about 86°F. The average relative humidity is 69 percent and is based on the yearly average humidity at Lindbergh Field (Western Regional Climate Center 2018).

The dominant meteorological feature affecting the region is the Pacific High Pressure Zone, which produces the prevailing westerly to northwesterly winds. These winds tend to blow pollutants away from the coast toward the inland areas. Consequently, air quality near the coast is generally better than that which occurs at the base of the coastal mountain range.

Fluctuations in the strength and pattern of winds from the Pacific High Pressure Zone interacting with the daily local cycle produce periodic temperature inversions that influence the dispersal or containment of air pollutants in the SDAB. Beneath the inversion layer pollutants become “trapped” as their ability to disperse diminishes. The mixing depth is the area under the inversion layer. Generally, the morning inversion layer is lower than the afternoon inversion layer. The greater the change between the morning and afternoon mixing depths, the greater the ability of the atmosphere to disperse pollutants.

Throughout the year, the height of the temperature inversion in the afternoon varies between approximately 1,500 and 2,500 feet above mean sea level. In winter, the morning inversion layer is about 800 feet above mean sea level. In summer, the morning inversion layer is about 1,100 feet above mean sea level. Therefore, air quality generally tends to be better in the winter than in the summer.

The prevailing westerly wind pattern is sometimes interrupted by regional “Santa Ana” conditions. A Santa Ana occurs when a strong high pressure develops over the Nevada-Utah area and overcomes the prevailing westerly coastal winds, sending strong, steady, hot, dry northeasterly winds over the mountains and out to sea.

Strong Santa Anas tend to blow pollutants out over the ocean, producing clear days. However, at the onset or during breakdown of these conditions, or if the Santa Ana is weak, local air quality may be adversely affected. In these cases, emissions from the South Coast Air Basin to the north are blown out over the ocean, and low pressure over Baja California draws this pollutant-laden air mass southward. As the high pressure weakens, prevailing northwesterly winds reassert themselves and send this cloud of contamination ashore in the SDAB. When this event does occur, the combination of transported and locally produced contaminants produce the worst air quality measurements recorded in the basin.

4.3 Existing Air Quality

Air quality at a particular location is a function of the kinds, amounts, and dispersal rates of pollutants being emitted into the air locally and throughout the basin. The major factors affecting pollutant dispersion are wind speed and direction, the vertical dispersion of pollutants (which is affected by inversions), and the local topography.

Air quality is commonly expressed as the number of days in which air pollution levels exceed state standards set by the CARB or federal standards set by the U.S. EPA. The SDAPCD maintains 10 air quality monitoring stations located throughout the greater San Diego metropolitan region. Air pollutant concentrations and meteorological information are continuously recorded at these stations. Measurements are then used by scientists to help forecast daily air pollution levels.

The Escondido monitoring station located at 600 East Valley Parkway, approximately 5 miles north of the project site, is the nearest station to the project site that measures a range of pollutants. The Escondido monitoring station measures ozone, NO₂, PM₁₀, and PM_{2.5}. Table 2 provides a summary of measurements collected at the Escondido monitoring station for the years 2011 through 2015. In 2015, the Escondido monitoring station was temporarily shut down to install a bike path. The grounds immediately adjacent to the station were being demolished to erect a new County facility. The new Escondido monitoring station will be part of this new County facility complex (about 20 meters southeast of the original location). The new Escondido monitoring station will begin operation again sometime this year.

Table 2 Summary of Air Quality Measurements Recorded at the Escondido Air Quality Monitoring Station					
Pollutant/Standard	2011	2012	2013	2014	2015
Ozone					
Days State 1-hour Standard Exceeded (0.09 ppm)	1	0	0	1	0
Days State 8-hour Standard Exceeded (0.07 ppm)	2	2	4	8	3
Days 2008 Federal 8-hour Standard Exceeded (0.075 ppm)	2	0	0	5	0
Days 2015 Federal 8-hour Standard Exceeded (0.070 ppm)	2	1	4	7	2
Max. 1-hr (ppm)	0.098	0.084	0.084	0.099	0.079
Max 8-hr (ppm)	0.089	0.074	0.074	0.079	0.071
Nitrogen Dioxide					
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppm)	0	0	0	0	0
Max 1-hr (ppm)	0.062	0.062	0.061	0.063	0.048
Annual Average (ppm)	--	0.013	0.013	0.011	--
PM₁₀*					
Measured Days State 24-hour Standard Exceeded (50 µg/m ³)	0	0	1	0	0
Calculated Days State 24-hour Standard Exceeded (50 µg/m ³)	0.0	0.0	6.0	0.0	--
Measured Days Federal 24-hour Standard Exceeded (150 µg/m ³)	0	0	0	0	0
Calculated Days Federal 24-hour Standard Exceeded (150 µg/m ³)	0.0	0.0	0.0	0.0	--
Max. Daily (µg/m ³)	40.0	33.0	82.0	44.0	31.0
State Annual Average (µg/m ³)	18.8	18.1	23.1	21.5	--
Federal Annual Average (µg/m ³)	18.8	18.0	23.2	21.6	17.5
PM_{2.5}*					
Measured Days Federal 24-hour Standard Exceeded (35 µg/m ³)	0	1	1	1	0
Calculated Days Federal 24-hour Standard Exceeded (35 µg/m ³)	0.0	3.1	1.1	1.0	--
Max. Daily (µg/m ³)	27.4	70.7	56.3	77.5	29.4
State Annual Average (µg/m ³)	10.4	--	10.5	9.3	--
Federal Annual Average (µg/m ³)	10.4	10.5	11.0	9.9	--
SOURCE: CARB 2018. ppm = parts per million µg/m ³ = micrograms per cubic meter -- = Not available. * Calculated days value. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.					

4.3.1 Ozone

Nitrogen oxides and hydrocarbons (reactive organic gases [ROG]) are known as the chief “precursors” of ozone. These compounds react in the presence of sunlight to produce ozone, which is the primary air pollution problem in the SDAB. Because sunlight plays such an important role in its formation, ozone pollution—or smog—is mainly a concern during the daytime in summer months. The SDAB is currently designated a federal and state non-attainment area for ozone. During the past 25 years, San Diego had experienced a decline in the number of days with unhealthy levels of ozone despite the region’s growth in population and vehicle miles traveled (SDAPCD 2013).

About half of smog-forming emissions come from automobiles. Population growth in San Diego has resulted in a large increase in the number of automobiles expelling ozone-forming pollutants while operating on area roadways. In addition, the occasional transport of smog-filled air from the South Coast Air Basin only adds to the SDAB’s ozone problem.

Stricter automobile emission controls, including more efficient automobile engines, have played a large role in why ozone levels have steadily decreased.

In order to address adverse health effects due to prolonged exposure, the U.S. EPA phased out the national 1-hour ozone standard and replaced it with the more protective 8-hour ozone standard. The SDAB is currently a non-attainment area for the previous (1997) national 8-hour standard, and is recommended as a non-attainment area for the revised (2008) national 8-hour standard of 0.075 parts per million (ppm).

Not all of the ozone within the SDAB is derived from local sources. Under certain meteorological conditions, such as during Santa Ana wind events, ozone and other pollutants are transported from the Los Angeles Basin and combine with ozone formed from local emission sources to produce elevated ozone levels in the SDAB.

Local agencies can control neither the source nor the transportation of pollutants from outside the air basin. The SDAPCD's policy, therefore, has been to control local sources effectively enough to reduce locally produced contamination to clean air standards. Through the use of air pollution control measures outlined in the RAQS, the SDAPCD has effectively reduced ozone levels in the SDAB.

Actions that have been taken in the SDAB to reduce ozone concentrations include:

- **TCMs if vehicle travel and emissions exceed attainment demonstration levels.** TCMs are strategies that will reduce transportation-related emissions by reducing vehicle use or improving traffic flow.
- **Enhanced motor vehicle inspection and maintenance program.** The smog check program is overseen by the Bureau of Automotive Repair. The program requires most vehicles to pass a smog test once every two years before registering in the state of California. The smog check program monitors the amount of pollutants automobiles produce. One focus of the program is identifying "gross polluters," or vehicles that exceed two times the allowable emissions for a particular model. Regular maintenance and tune-ups, changing the oil, and checking tire inflation can improve gas mileage and lower air pollutant emissions. It can also reduce traffic congestion due to preventable breakdowns, further lowering emissions.
- **Air Quality Improvement Program.** This program, established by AB 118, is a voluntary incentive program administered by the CARB to fund clean vehicle and equipment projects, research on biofuels production and the air quality impacts of alternative fuels, and workforce training.

4.3.2 Carbon Monoxide

The SDAB is classified as a state attainment area and as a federal maintenance area for CO. Until 2003, no violations of the state standard for CO had been recorded in the SDAB since 1991, and no violations of the national standard had been recorded in the SDAB since 1989. The violations that took place in 2003 were likely the result of massive wildfires that

occurred throughout the county. No violations of the state or federal CO standards have occurred since 2003.

Small-scale, localized concentrations of CO above the state and national standards have the potential to occur at intersections with stagnation points such as those that occur on major highways and heavily traveled and congested roadways. Localized high concentrations of CO are referred to as “CO hot spots” and are a concern at congested intersections, where automobile engines burn fuel less efficiently and their exhaust contains more CO.

4.3.3 Particulate Matter

Particulate matter is a complex mixture of microscopic solid or liquid particles including chemicals, soot, and dust. Anthropogenic sources of direct particulate emissions include crushing or grinding operations, dust stirred up by vehicle traffic, and combustion sources such as motor vehicles, power plants, wood burning, forest fires, agricultural burning and industrial processes. Additionally, indirect emissions may be formed when aerosols react with compounds found in the atmosphere.

Health studies have shown a significant association between exposure to particulate matter and premature death in people with heart or lung diseases. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat (U.S. EPA 2016).

As its properties vary based on the size of suspended particles, particulate matter is generally categorized as particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀) or particulate matter with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}).

4.3.3.1 PM₁₀

PM₁₀, occasionally referred to as “inhalable coarse particles” has an aerodynamic diameter of about one-seventh of the diameter of a human hair. High concentrations of PM₁₀ are often found near roadways, construction, mining, or agricultural operations.

4.3.3.2 PM_{2.5}

PM_{2.5}, occasionally referred to as “inhalable fine particles” has an aerodynamic diameter of about one-thirtieth of the diameter of a human hair. PM_{2.5} is the main cause of haze in many parts of the United States. Federal standards applicable to PM_{2.5} were first adopted in 1997.

4.3.4 Other Criteria Pollutants

The national and state standards for NO₂, oxides of sulfur (SO_x), and the previous standard for lead are being met in the SDAB, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future. As discussed above, new standards

for these pollutants have been adopted, and new designations for the SDAB will be determined in the future. The SDAB is also in attainment of the state standards for vinyl chloride, hydrogen sulfides, sulfates, and visibility-reducing particulates.

5.0 Thresholds of Significance

Thresholds used to evaluate potential impacts to air quality are based on applicable criteria in the CEQA Guidelines Appendix G and the City of San Diego Significance Determination Thresholds. The project would have a significant air quality impact if it would (City of San Diego 2016):

1. Obstruct or conflict with the implementation of the RAQS.
2. Result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Expose sensitive receptors to substantial pollutant concentration including air toxics such as diesel particulates.
4. Create objectionable odors affecting a substantial number of people.
5. Exceed 100 pounds per day of particulate matter (dust).
6. Result in a substantial alteration of air movement in the area.

The SDAPCD does not provide specific numeric thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD does specify Air Quality Impact Analysis trigger levels for new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts, rather, if these trigger levels are exceeded by a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. While, these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels are used to evaluate the increased emissions that would be discharged to the SDAB if the project were approved.

The SDAPCD trigger levels are also utilized by the City of San Diego in their Significance Determination Thresholds (City of San Diego 2016) as one of the considerations when determining the potential significance of air quality impacts for projects within the city. The air quality impact screening levels used in this analysis are shown in Table 3.

Table 3 Air Quality Impact Screening Levels			
Pollutant	Emission Rate		
	Pounds/Hour	Pounds/Day	Tons/Year
NO _x	25	250	40
SO _x	25	250	40
CO	100	550	100
PM ₁₀	--	100	15
Lead	--	3.2	0.6
VOC, ROG	--	137	15
PM _{2.5} ^a	--	67	10
SOURCE: SDAPCD, Rules 20.1, 20.2, 20.3; City of San Diego 2016.			
^a The City does not specify a threshold for PM _{2.5} . Threshold here is based on SDAPCD, Rules 20.1, 20.2, 20.3.			

6.0 Air Quality Assessment

Construction impacts are short term and result from fugitive dust, equipment exhaust, and indirect effects associated with construction workers and deliveries. Operational impacts can occur on two levels: regional or local. In the case of this project, operational impacts are primarily due to emissions from mobile sources associated with vehicular travel along the roadways within the project area.

Construction and operation air emissions were calculated using California Emissions Estimator Model (CalEEMod) 2016.3.2 (California Air Pollution Control Officers Association [CAPCOA] 2017). The CalEEMod program is a tool used to estimate air emissions resulting from land development projects based on California-specific emission factors. The model estimates mass emissions from two basic sources: construction sources and operational sources (i.e., area and mobile sources).

Inputs to CalEEMod include such items as the air basin containing the project, land uses, trip generation rates, trip lengths, vehicle fleet mix (percentage of autos, medium truck, etc.), trip destination (i.e., percent of trips from home to work, etc.), duration of construction phases, construction equipment usage, grading areas, season, and ambient temperature, as well as other parameters. The CalEEMod output files contained in Attachment 1 indicate the specific outputs for each model run. Emissions of oxides of nitrogen (NO_x), CO, SO_x, PM₁₀, PM_{2.5}, and ROG are calculated. Emission factors are not available for lead, and consequently, lead emissions are not calculated. The SDAB is currently in attainment of the federal and state lead standards. Furthermore, fuel used in construction equipment and most other vehicles is not leaded.

6.1 Construction Emissions

Construction-related activities are temporary, short-term sources of air emissions. Sources of construction-related air emissions include:

- Fugitive dust from grading activities;
- Construction equipment exhaust;
- Construction-related trips by workers, delivery trucks, and material-hauling trucks; and
- Construction-related power consumption.

Construction-related pollutants result from dust raised during demolition and grading, emissions from construction vehicles, and chemicals used during construction. Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces are all sources of fugitive dust. Construction operations are subject to the requirements established in Regulation 4, Rules 52, 54, and 55, of the SDAPCD's rules and regulations.

Heavy-duty construction equipment is usually diesel powered. In general, emissions from diesel-powered equipment contain more NO_x, SO_x, and particulate matter than gasoline-powered engines. However, diesel-powered engines generally produce less CO and less ROG than do gasoline-powered engines. Standard construction equipment includes tractors/loaders/backhoes, rubber-tired dozers, excavators, graders, cranes, forklifts, rollers, paving equipment, generator sets, welders, cement and mortar mixers, and air compressors.

Construction is anticipated to begin in October 2019 and last for approximately 18 months. Primary inputs are the numbers of each piece of equipment and the length of each construction stage. Specific construction phasing and equipment parameters for the project were provided by project contractor. Additionally, for the purposes of modeling emissions, a paving and an architectural coatings phase was included in the emissions calculations. The construction equipment estimates for these two phases are based on surveys, performed by the South Coast Air Quality Management District and the Sacramento Metropolitan Air Quality Management District, of typical construction projects which provide a basis for scaling equipment needs and schedule with a project's size. Air emission estimates in CalEEMod are based on the duration of construction phases; construction equipment type, quantity, and usage; grading area; season; and ambient temperature, among other parameters. Table 4 summarizes the anticipated construction phases, duration, and equipment.

Table 4 Construction Phases and Equipment		
Equipment	Quantity	Daily Operation Time (Hours)
Site Demolition (Duration – 3 weeks)		
Excavator	1	8
Loader	1	8
Concrete Saw	1	8
Grading/Shoring/Basement Foundation Walls/Basement Slab (Duration – 12 weeks)		
Compactor	2	6
Backhoe	1	8
Dozer	1	6
Grader	1	6
Vacuum Sweeper	1	2
Auger Machine	1	8
Forklift	1	5
Mobile Crane	1	7
Underground Utilities (Duration – 8 weeks)		
Backhoe	1	6
Compactor	2	6
Podium Structure (Duration – 5 weeks)		
Air Compressor	1	4
Concrete Vibrator	2	4
Generator	1	6
Concrete Mixer	4	4
Forklift	1	5
Concrete Pump	1	4
Saw	4	4
Metal Stud Structure/Roof Construction (Duration – 22 weeks)		
Air Compressor	1	4
Mobile Crane	1	7
Generator	2	7
Impact Wrench	2	4
Forklift	2	5
Saw	2	8
Welders	2	7
Shear Stud Guns	2	4
Exterior Skin (Duration – 24 weeks)		
Air Compressor	1	6
Mobile Crane	1	4
Generator	1	6
Forklift	2	5
Man-Lift	2	6
Saw	1	6
Screw Gun	6	6
Chop Saw	2	6
Architectural Coatings (Duration – 24 weeks, simultaneous with Exterior Skin Phase)		
Air Compressor	1	6
Paving (Duration – 1 week)		
Cement Mixer	4	6
Paver	1	7
Roller	1	7
Backhoe	1	7
Note: Each phase would also include vehicles associated with work commutes, dump trucks for hauling, and trucks for deliveries.		

Table 5 shows the total projected construction maximum daily emission levels for each criteria pollutant. The CalEEMod output files for construction emissions are contained in Attachment 1.

Table 5 Summary of Worst-case Construction Emissions (pounds per day)						
Construction	Emissions					
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Demolition	1	12	10	0	4	1
Grading/Shoring/Basement	3	27	13	0	6	4
Underground Utilities	0	3	3	0	0	0
Podium Structure	2	18	20	0	2	1
Metal Stud Structure/Roof	3	28	26	0	2	2
Exterior Skin	2	18	18	0	2	1
Architectural Coatings	17	2	2	0	0	0
Paving	1	7	8	0	1	0
Maximum Daily Emissions	17	28	26	0	6	4
<i>Significance Threshold</i>	<i>137</i>	<i>250</i>	<i>550</i>	<i>250</i>	<i>100</i>	<i>67</i>

Standard dust control measures would be implemented as a part of project construction in accordance with SDAPCD rules and regulations (Rules 50, 51, 52, 54, and 55) for controlling emissions from fugitive dust and fumes:

- Water the grading areas a minimum of twice daily to minimize fugitive dust.
- Provide sufficient erosion control to prevent washout of silty material onto public roads.
- Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling.
- Periodically sweep up dirt and debris spilled onto paved surfaces to reduce re-suspension of particulate matter caused by vehicle movement. Clean approach routes to construction sites of construction-related dirt.

Fugitive dust emissions were calculated using CalEEMod default values, and did not take into account the required dust control measures. Thus, the emissions shown in Table 4 are conservative. It should also be noted that all construction equipment is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation. This regulation, which applies to all off-road diesel vehicles 25 horsepower or greater, limits unnecessary idling to 5 minutes, requires all construction fleets to be labeled and reported to CARB, bans Tier 0 equipment and phases out Tier 1 and 2 equipment (thereby replacing fleets with cleaner equipment), and requires that fleets comply with Best Available Control Technology requirements.

As shown in Table 5, maximum daily construction emissions associated with the project are projected to be less than the applicable thresholds for all criteria pollutants. However, there are particularly sensitive receptors located on the project site. These sensitive receptors include seniors within the existing retirement community, particularly the seniors located

immediately adjacent to the construction location. Although maximum construction emissions would be less than the applicable thresholds, due to the close proximity of sensitive receptors on-site, the following project design features are recommended and shall be included in the project's conditions of approval:

- The construction fleet shall use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize California Air Resources Board/U.S. Environmental Protection Agency Engine Certification Tier 3 or better, or other equivalent methods approved by the CARB.
- The engine size of construction equipment shall be the minimum size suitable for the required job.
- Construction equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications.
- Per CARB's ACTM 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed 5 minutes unless more time is required per engine manufacturers' specifications or for safety reasons.

6.2 Operation Emissions

Mobile source emissions would originate from traffic generated by the project. Area source emissions would result from the use of natural gas, consumer products, as well as applying architectural coatings and landscaping activities.

Mobile source operational emissions are based on the trip rate, trip length for each land use type and size. According to the project traffic report, the project would generate 294 average daily trips (Chen Ryan 2018). Based on regional data compiled by CARB as part of the emission factor model, the average regional trip length for all trips in San Diego County is 5.8 miles (CARB 2014). This distance is multiplied by the total trip generation of the project to determine total project annual vehicle miles traveled. Default vehicle emission factors were used.

Area source emissions associated with the project include consumer products, natural gas used in space and water heating, architectural coatings, and landscaping equipment. Hearths (fireplaces) and woodstoves are also a source of area emissions; however, the project would not include hearths or woodstoves. Consumer products are chemically formulated products used by household and institutional consumers, including, but not limited to, detergents, cleaning compounds, polishes, floor finishes, disinfectants, sanitizers, and aerosol paints but not including other paint products, furniture coatings, or architectural coatings. Emissions due to consumer products are calculated using total building area and product emission factors. Emissions are generated from the combustion of natural gas used in space and water heating. Emissions are based on the Residential Appliance Saturation Survey which is a comprehensive energy use assessment that includes the end use for various climate zones in California.

For architectural coatings, emissions result from evaporation of solvents contained in surface coatings such as in paints and primers. Emissions are based on the building surface area, architectural coating emission factors, and a reapplication rate of 10 percent of area per year. Landscaping maintenance includes fuel combustion emission from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers as well as air compressors, generators, and pumps. Emission calculations take into account building area, equipment emission factors, and the number of operational days (summer days).

Table 6 provides a summary of the operational emissions generated by the project. CalEEMod output files for project operation are contained in Attachment 1. As shown, project-generated emissions are projected to be less than the City's significance thresholds for all criteria pollutants.

Table 6 Summary of Project Operational Emissions (pounds per day)						
Source	Emissions					
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Area Sources	4	0	7	0	0	0
Energy Sources	0	0	0	0	0	0
Mobile Sources	0	2	5	0	1	0
Total	4	2	12	0	1	0
<i>Significance Threshold</i>	<i>137</i>	<i>250</i>	<i>550</i>	<i>250</i>	<i>100</i>	<i>67</i>

6.3 Impact Analysis

1. Would the project obstruct or conflict with the implementation of the San Diego RAQS?

The RAQS is the applicable regional air quality plan that sets forth the SDAPCD's strategies for achieving the NAAQS and CAAQS. The SDAB is designated non-attainment for the federal and state ozone standard. Accordingly, the RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the standards for ozone. The two pollutants addressed in the RAQS are ROG and oxides of nitrogen (NO_x), which are precursors to the formation of ozone. Projected increases in motor vehicle usage, population, and growth create challenges in controlling emissions and by extension to maintaining and improving air quality. The RAQS, in conjunction with the TCM, were most recently adopted in 2016 as the air quality plan for the region.

The growth projections used by the SDAPCD to develop the RAQS emissions budgets are based on the population, vehicle trends, and land use plans developed in general plans and used by SANDAG in the development of the regional transportation plans and sustainable communities strategy. As such, projects that propose development that is consistent with the growth anticipated by SANDAG's growth projections and/or the general plan would not conflict with the RAQS. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the RAQS. In the event a project proposes development that is greater than

anticipated in the growth projections, further analysis would be warranted to determine if the project would exceed the growth projections used in the RAQS for the specific subregional area.

The project site is designated as residential in the City's General Plan and the Rancho Bernardo Community Plan. However, the existing project has a Conditional Use Permit (CUP) and the proposed Phase III project would be consistent with the approved CUP and amendments. The project is within an existing retirement community and would replace an existing 99-bed health care building with 90 independent and assisted living units. The project would not result in an increase in traffic over the existing use. Based on City of San Diego trip generation rates, the existing use generates 3 trips per bed for a total of 297 trips, which is similar to the 294 trips that would be generated by the project. While the project would provide additional units, it would not significantly alter the planned location, distribution, or growth of the human population in the area, as the project would serve seniors who have previously been living independently and require assisted living and health care support. The project would not result in a substantial increase in population and housing stock, as it would likely serve residents already living in the region. Additionally, as discussed in Sections 6.1 and 6.2, project emissions would not exceed the project-level significance thresholds. The project would, therefore, not result in an increase in emissions that are not already accounted for in the RAQS. Thus, the project would not obstruct or conflict with implementation of the RAQS.

2. Would the project result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation?

As shown in Table 5, project construction would not exceed the applicable regional emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project construction emissions would be well below these limits, project construction would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 6, project operation would not exceed the applicable regional emissions thresholds. Therefore, as project operation emissions would be well below these limits, project operation would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations. Therefore, the project would result in a less than significant impact in regards to air quality standards.

3. Would the project expose sensitive receptors to substantial pollutant concentration including air toxics such as diesel particulates?

Sensitive land uses include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. Sensitive receptors near the project site include seniors within the existing retirement community.

Diesel Particulate Matter – Construction

Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Construction of the project would result in the generation of diesel-exhaust DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities and on-road diesel equipment used to bring materials to and from the project site.

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction is anticipated to begin in October 2019 and last for approximately 18 months. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). Thus, if the duration of proposed construction activities near any specific sensitive receptor were 18 months, the exposure would be 5 percent of the total exposure period used for health risk calculation.

Therefore, DPM generated by project construction is not expected to create conditions where the probability is greater than 10 in 1 million of contracting cancer for the Maximally Exposed Individual or to generate ground-level concentrations of noncarcinogenic TACs that exceed a Hazard Index greater than 1 for the Maximally Exposed Individual. Additionally, with ongoing implementation of U.S. EPA and CARB requirements for cleaner fuels; off-road diesel engine retrofits; and new, low-emission diesel engine types, the DPM emissions of individual equipment would be substantially reduced over the years as the project construction continues. Therefore, project construction would not expose sensitive receptors to substantial pollutant concentration. However, as discussed in Section 6.1, due to the close proximity of sensitive receptors on-site, the following project design features are recommended and shall be included in the project's conditions of approval:

- The construction fleet shall use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize California Air Resources Board/U.S. Environmental Protection Agency Engine Certification Tier 3 or better, or other equivalent methods approved by the CARB.
- The engine size of construction equipment shall be the minimum size suitable for the required job.
- Construction equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications.

- Per CARB's ACTM 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed 5 minutes unless more time is required per engine manufacturers' specifications or for safety reasons.

Diesel Particulate Matter – Freeway

In April 2005, CARB published the Air Quality and Land Use Handbook: A Community Health Perspective (CARB 2005). The handbook includes recommendations directed at protecting sensitive land uses from air pollutant emissions while balancing a myriad of other land use issues (e.g., housing, transportation needs, economics, etc.). The handbook is not regulatory or binding on local agencies and application of the recommendations should use a qualitative approach. As reflected in the CARB Handbook, there is currently no adopted standard for the significance of health effects from mobile sources. Therefore, the CARB has provided guidelines for the siting of land uses near heavily traveled roadways. Of pertinence to this study, the CARB guidelines indicate that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles per day should be avoided when possible.

The project site is located within 500 feet of I-15, which carries more than 100,000 vehicles per day. The CAPCOA published a guidance document, Health Risk Assessments for Proposed Land Use Projects, that provides recommended measures that reduce concentrations of DPM (CAPCOA 2009). These include planting vegetation between the receptor and the freeway and installing newer electrostatic filters in adjacent receptor buildings. There is an existing line of trees and vegetation located between I-15 and the project site that reduces DPM concentrations. Additionally, the design for the project's ventilation system includes a pre-filtration system with MERV-8 filters and a final-filtration system with MERV-13 filters. Inclusion of these filters would be included in the project's conditions of approval. The MERV-13 filters would remove particulates entering the indoor air, thus reducing cancer risk from diesel exhaust exposure. Therefore, with the inclusion of these design elements, the potential increase in cancer risk and the non-cancer chronic risks would be less than significant.

Carbon Monoxide Hot Spots

Localized CO concentration is a direct function of motor vehicle activity at signalized intersections (e.g., idling time and traffic flow conditions), particularly during peak commute hours and meteorological conditions. The SDAB is a CO maintenance area under the federal CAA. This means that SDAB was previously a non-attainment area and is currently implementing a 10-year plan for continuing to meet and maintain air quality standards. As a result, ambient CO levels have declined significantly. CO hot spots have been found to occur only at signalized intersections that operate at or below level of service (LOS) E or worse. Based on the traffic impact analysis, the project would not result in a signalized intersection to operate at LOS E or F (Chen Ryan 2018), and, therefore, is not anticipated to result in a CO hot spot. Therefore, localized air quality impacts to sensitive receptors would be less than significant.

4. Would the project create objectionable odors affecting a substantial number of people?

The project does not include heavy industrial or agricultural uses that are typically associated with odor complaints. During construction, diesel equipment may generate some nuisance odors. Sensitive receptors near the project site include seniors within the existing retirement community; however, exposure to odors associated with project construction would be short term and temporary in nature. Additionally, the measures outlined above would reduce construction exhaust emissions, which would also reduce construction-related odors. Impacts would be less than significant.

5. Would the project exceed 100 pounds per day of particulate matter (dust)?

As shown in Tables 5 and 6, emissions of PM₁₀ during construction and operation of the project would be less than 100 pounds per day. Construction operations are subject to the requirements established in Regulation 4, Rules 52, 54, and 55, of the SDAPCD's rules and regulations. Standard dust control measures would be implemented as a part of project construction.

6. Would the project result in substantial alteration of air movement in the area?

Local topographic variation such as that caused by the height and shape of a row of buildings can influence air movement in a given location (Boston Redevelopment Authority 1986). Alterations in the built environment may increase the dispersion of air pollutants or cause stagnation that may result in a harmful concentration of air pollutants. Urban canyons are places where the street is flanked by buildings on both sides creating a canyon-like environment. Where urban canyons are oriented perpendicular to the prevailing wind patterns, the likelihood of restricted air movement and associated pollutant accumulation may increase.

The project would replace an existing health care building with a new 5-story building within an existing retirement community. The new building would have a similar footprint to the existing building. The project would not increase contiguous building frontage along adjacent roadways and, therefore, is not anticipated to contribute to a substantial alteration of air movement that would affect air quality.

7.0 Conclusions

The primary goal of the RAQS is to reduce ozone precursor emissions. The project site is designated as residential in the City's General Plan and the Rancho Bernardo Community Plan. The project would be consistent with the existing CUP and amendments. The project is within an existing retirement community and would replace an existing 99-bed health care building with 90 independent and assisted living units. The project would not result in an increase in traffic over the existing use. Based on City of San Diego trip generation rates, the existing use generates 3 trips per bed for a total of 297 trips which is similar to the 294 trips that would be generated by the project. While the project would provide additional units, it would not significantly alter the planned location, distribution, or growth of the human population in the area, as the project would serve seniors who have

previously been living independently and require assisted living and health care support. The project would not result in a substantial increase in population and housing stock, as it would likely serve residents already living in the region. The project would therefore not result in an increase in emissions that are not already accounted for in the RAQS. Thus, the project would not obstruct or conflict with implementation of the RAQS. Impacts would be less than significant and no mitigation would be required.

As shown in Table 5, project construction emissions would not exceed the applicable regional emissions thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project emissions would be well below these limits, project construction would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction. Therefore, the project construction would result in a less than significant impact in regards to air quality standards. However, there are particularly sensitive receptors located on the project site. These sensitive receptors include seniors within the existing retirement community, particularly the seniors located immediately adjacent to the construction location. Although maximum construction emissions would be less than the applicable thresholds, due to the close proximity of sensitive receptors on-site, the following project design features are recommended and shall be included in the project's conditions of approval:

- The construction fleet shall use any combination of diesel catalytic converters, diesel oxidation catalysts, diesel particulate filters and/or utilize California Air Resources Board/U.S. Environmental Protection Agency Engine Certification Tier 3 or better, or other equivalent methods approved by the CARB.
- The engine size of construction equipment shall be the minimum size suitable for the required job.
- Construction equipment shall be properly tuned and maintained in accordance with the manufacturer's specifications.
- Per CARB's ACTM 13 (California Code of Regulations Chapter 10 Section 2485), the applicant shall not allow idling time to exceed 5 minutes unless more time is required per engine manufacturers' specifications or for safety reasons.

Long-term emissions of regional air pollutants occur from operational sources. As shown in Table 6, project operational emissions would not exceed the applicable regional emissions thresholds. Therefore, as project emissions would be well below these limits, project operations would not result in regional emissions that would exceed the NAAQS or CAAQS or contribute to existing violations. Therefore, the project operation would result in a less than significant impact in regards to air quality standards and no mitigation would be required.

The project would not result in the exposure of sensitive receptors to substantial concentrations of DPM during project operation. With the provision of MERV-13 or better filters in all proposed units, as included in the project design, particulates entering the indoor air would be reduced, thus reducing cancer risk from diesel exhaust exposure.

Additionally, based on the traffic impact analysis, the project would not result in a signalized intersection to operate at LOS E or worse (Chen Ryan), and therefore is not anticipated to result in a CO hot spot.

The project does not include heavy industrial or agricultural uses that are typically associated with objectionable odors. The project would involve the use of diesel-powered construction equipment. Diesel exhaust may be noticeable temporarily at adjacent properties; however, construction activities would be temporary. Additionally, the measures outlined above would reduce construction exhaust emissions, which would also reduce construction-related odors. Therefore, odor impacts would be less than significant.

The project would not result in the generation of 100 pounds per day or more of particulate matter. Standard dust control measures would be implemented as a part of project construction in accordance with SDAPCD rules and regulations. Impacts would be less than significant and no mitigation would be required.

The project would replace an existing health care building with a new 5-story building within an existing retirement community. The new building would have a similar footprint to the existing building. The project would not increase contiguous building frontage along adjacent roadways and therefore is not anticipated to contribute to a substantial alteration of air movement that would affect air quality. Impacts would be less than significant and no mitigation would be required.

8.0 References Cited

Boston Redevelopment Authority

1986 Air Quality at Street-Level: Strategies for Urban Design. June 1986.

California Air Pollution Control Officers Association (CAPCOA)

2009 *Health Risk Assessments for Proposed Land Use Projects*. July 2009.

2017 California Emissions Estimator model (CalEEMod). User's Guide Version 2016.3.2. October, 2017.

California Air Resources Board (CARB)

2000 Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. California Air Resources Board. Stationary Source Division, Mobile Source Control Division. October.

2005 Air Quality and Land Use Handbook: A Community Health Perspective. California Air Resources Board. April.

2014 2014 Emission Factors Web Database model. Available at <https://www.arb.ca.gov/emfac/2014/>.

2016 Ambient Air Quality Standards. California Air Resources Board. May 4

2018 California Air Quality Data Statistics. Available at <http://www.arb.ca.gov/adam/welcome.html>. Top 4 Summary and Hourly Listing. Accessed on March 28, 2018.

Chen Ryan

2018 Casa de Campanas – Access Analysis Study. January 9.

Office of Environmental Health Hazard Assessment (OEHHA)

2015 Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual), February.

San Diego Air Pollution Control District (SDAPCD)

1992 1991/1992 Regional Air Quality Strategies. Air Pollution Control District. June.

2013 Air Quality in San Diego County. 2013 Annual Report.

San Diego, City of

2016 California Environmental Quality Act Significance Determination Thresholds. July.

U.S. Environmental Protection Agency (U.S. EPA)

2016 Criteria Air Pollutants, Particulate Matter. Available at <https://www3.epa.gov/airquality/particlepollution/index.html>. Last updated February 23.

Western Regional Climate Center

2018 Western U.S. Climate Historical Summaries. Available at <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2871> and <http://www.wrcc.dri.edu/cgi-bin/cliled.pl?ca23188>. Accessed on May 9, 2018.

ATTACHMENT 1

CalEEMod Output – Project Emissions

9088 CDLC Phase III - San Diego County APCD Air District, Winter

9088 CDLC Phase III
San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Congregate Care (Assisted Living)	66.00	Dwelling Unit	0.30	90,000.00	189
Retirement Community	24.00	Dwelling Unit	0.30	50,000.00	69

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	457.25	CH4 Intensity (lb/MWhr)	0.018	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

9088 CDLC Phase III - San Diego County APCD Air District, Winter

Project Characteristics - Energy intensity factors updated based on SDG&E renewable procurement
(457.25, 0.018, 0.004)

Land Use - 140,000 sf building
26,000 sf footprint (0.6 acre)

Construction Phase - Schedule obtained from BNBuilders, Inc.

Off-road Equipment -

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment -

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Trips and VMT -

Demolition - 37,000 sf building + 4,000 sf concrete

Grading - 9,300 cy export

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - Chen Ryan 2018

Assisted Living - 3 trips/unit

Retirement - 4 trips/unit

5.8 mile trip length

Energy Use -

Woodstoves - No woodstoves or fireplaces

Area Coating - SDAPCD Rule 67.0.1

Water And Wastewater - CalGreen 20% decrease in indoor water use
(3,440,132.55, 1,250,957.29)

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00

9088 CDLC Phase III - San Diego County APCD Air District, Winter

tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	100
tblConstructionPhase	NumDays	10.00	15.00
tblConstructionPhase	NumDays	2.00	60.00
tblConstructionPhase	NumDays	100.00	25.00
tblConstructionPhase	NumDays	100.00	110.00
tblConstructionPhase	NumDays	100.00	120.00
tblConstructionPhase	NumDays	5.00	120.00
tblFireplaces	NumberGas	36.30	0.00
tblFireplaces	NumberGas	13.20	0.00
tblFireplaces	NumberNoFireplace	6.60	66.00
tblFireplaces	NumberNoFireplace	2.40	24.00
tblFireplaces	NumberWood	23.10	0.00
tblFireplaces	NumberWood	8.40	0.00
tblGrading	MaterialExported	0.00	9,300.00
tblLandUse	LandUseSquareFeet	66,000.00	90,000.00
tblLandUse	LandUseSquareFeet	24,000.00	50,000.00
tblLandUse	LotAcreage	4.13	0.30
tblLandUse	LotAcreage	4.80	0.30
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

9088 CDLC Phase III - San Diego County APCD Air District, Winter

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	4.00	0.00
tblOffRoadEquipment	UsageHours	4.00	7.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	1.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.018
tblProjectCharacteristics	CO2IntensityFactor	720.49	457.25
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	HaulingTripNumber	1,163.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblVehicleTrips	HO_TL	7.50	5.80
tblVehicleTrips	HO_TL	7.50	5.80
tblVehicleTrips	HS_TL	7.30	5.80
tblVehicleTrips	HS_TL	7.30	5.80
tblVehicleTrips	HW_TL	10.80	5.80
tblVehicleTrips	HW_TL	10.80	5.80
tblVehicleTrips	WD_TR	2.74	3.00

9088 CDLC Phase III - San Diego County APCD Air District, Winter

tblVehicleTrips	WD_TR	2.40	4.00
tblWater	IndoorWaterUseRate	4,300,165.69	3,440,132.55
tblWater	IndoorWaterUseRate	1,563,696.61	1,250,957.29
tblWoodstoves	NumberCatalytic	3.30	0.00
tblWoodstoves	NumberCatalytic	1.20	0.00
tblWoodstoves	NumberNoncatalytic	3.30	0.00
tblWoodstoves	NumberNoncatalytic	1.20	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

9088 CDLC Phase III - San Diego County APCD Air District, Winter

2.1 Overall Construction (Maximum Daily Emission)**Unmitigated Construction**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.5028	27.2357	13.2015	0.0331	5.1250	1.2189	6.3439	2.5790	1.1226	3.7016	0.0000	3,258.999 0	3,258.999 0	0.9667	0.0000	3,283.167 4
2020	18.7710	27.7260	25.6340	0.0547	5.1250	1.3919	6.2451	2.5790	1.3580	3.6107	0.0000	5,210.842 2	5,210.842 2	0.9669	0.0000	5,229.728 1
2021	18.5565	17.5102	20.0007	0.0377	0.7085	0.8943	1.6027	0.1895	0.8583	1.0478	0.0000	3,664.974 8	3,664.974 8	0.5513	0.0000	3,678.756 1
Maximum	18.7710	27.7260	25.6340	0.0547	5.1250	1.3919	6.3439	2.5790	1.3580	3.7016	0.0000	5,210.842 2	5,210.842 2	0.9669	0.0000	5,229.728 1

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.5028	27.2357	13.2015	0.0331	5.1250	1.2189	6.3439	2.5790	1.1226	3.7016	0.0000	3,258.999 0	3,258.999 0	0.9667	0.0000	3,283.167 4
2020	18.7710	27.7260	25.6340	0.0547	5.1250	1.3919	6.2451	2.5790	1.3580	3.6107	0.0000	5,210.842 2	5,210.842 2	0.9669	0.0000	5,229.728 1
2021	18.5565	17.5102	20.0007	0.0377	0.7085	0.8943	1.6027	0.1895	0.8583	1.0478	0.0000	3,664.974 7	3,664.974 7	0.5513	0.0000	3,678.756 1
Maximum	18.7710	27.7260	25.6340	0.0547	5.1250	1.3919	6.3439	2.5790	1.3580	3.7016	0.0000	5,210.842 2	5,210.842 2	0.9669	0.0000	5,229.728 1

9088 CDLC Phase III - San Diego County APCD Air District, Winter

[illegible]

9088 CDLC Phase III - San Diego County APCD Air District, Winter

2.2 Overall Operational**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Energy	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
Mobile	0.4676	1.8700	4.8105	0.0140	1.1688	0.0146	1.1834	0.3124	0.0137	0.3261		1,417.8280	1,417.8280	0.0848		1,419.9489
Total	4.2515	2.1477	12.3334	0.0156	1.1688	0.0711	1.2399	0.3124	0.0702	0.3826	0.0000	1,676.0676	1,676.0676	0.1025	4.4900e-003	1,679.9674

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Energy	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
Mobile	0.4676	1.8700	4.8105	0.0140	1.1688	0.0146	1.1834	0.3124	0.0137	0.3261		1,417.8280	1,417.8280	0.0848		1,419.9489
Total	4.2515	2.1477	12.3334	0.0156	1.1688	0.0711	1.2399	0.3124	0.0702	0.3826	0.0000	1,676.0676	1,676.0676	0.1025	4.4900e-003	1,679.9674

9088 CDLC Phase III - San Diego County APCD Air District, Winter

	ROG	NOx	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail**Construction Phase**

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2019	10/21/2019	5	15	
2	Grading/Shoring/Basement	Grading	10/22/2019	1/13/2020	5	60	
3	UG Utilities	Trenching	1/14/2020	3/9/2020	5	40	
4	Podium Structure	Building Construction	3/10/2020	4/13/2020	5	25	
5	Metal Stud Structure/Roof	Building Construction	4/14/2020	9/14/2020	5	110	
6	Exterior Skin	Building Construction	9/15/2020	3/1/2021	5	120	
7	Architectural Coatings	Architectural Coating	9/15/2020	3/1/2021	5	120	
8	Paving	Paving	3/2/2021	3/8/2021	5	5	

Acres of Grading (Site Preparation Phase): 0**Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 283,500; Residential Outdoor: 94,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38

9088 CDLC Phase III - San Diego County APCD Air District, Winter

Demolition	Rubber Tired Dozers	0	0.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading/Shoring/Basement	Bore/Drill Rigs	1	8.00	221	0.50
Grading/Shoring/Basement	Concrete/Industrial Saws	0	0.00	81	0.73
Grading/Shoring/Basement	Cranes	1	7.00	231	0.29
Grading/Shoring/Basement	Forklifts	1	5.00	89	0.20
Grading/Shoring/Basement	Graders	1	6.00	187	0.41
Grading/Shoring/Basement	Plate Compactors	2	6.00	8	0.43
Grading/Shoring/Basement	Rubber Tired Dozers	1	6.00	247	0.40
Grading/Shoring/Basement	Sweepers/Scrubbers	1	2.00	64	0.46
Grading/Shoring/Basement	Tractors/Loaders/Backhoes	1	8.00	97	0.37
UG Utilities	Plate Compactors	2	6.00	8	0.43
UG Utilities	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Podium Structure	Air Compressors	1	4.00	78	0.48
Podium Structure	Cement and Mortar Mixers	4	4.00	9	0.56
Podium Structure	Concrete/Industrial Saws	6	4.00	81	0.73
Podium Structure	Cranes	0	0.00	231	0.29
Podium Structure	Forklifts	1	5.00	89	0.20
Podium Structure	Generator Sets	1	6.00	84	0.74
Podium Structure	Pumps	1	4.00	84	0.74
Podium Structure	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Metal Stud Structure/Roof	Air Compressors	1	4.00	78	0.48
Metal Stud Structure/Roof	Bore/Drill Rigs	2	4.00	221	0.50
Metal Stud Structure/Roof	Concrete/Industrial Saws	2	8.00	81	0.73
Metal Stud Structure/Roof	Cranes	1	7.00	231	0.29
Metal Stud Structure/Roof	Forklifts	2	5.00	89	0.20
Metal Stud Structure/Roof	Generator Sets	2	7.00	84	0.74

9088 CDLC Phase III - San Diego County APCD Air District, Winter

Metal Stud Structure/Roof	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Metal Stud Structure/Roof	Welders	2	7.00	46	0.45
Exterior Skin	Aerial Lifts	2	6.00	63	0.31
Exterior Skin	Air Compressors	1	6.00	78	0.48
Exterior Skin	Concrete/Industrial Saws	1	6.00	81	0.73
Exterior Skin	Cranes	1	4.00	231	0.29
Exterior Skin	Forklifts	2	5.00	89	0.20
Exterior Skin	Generator Sets	1	6.00	84	0.74
Exterior Skin	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coatings	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

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
Demolition	3	8.00	0.00	186.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading/Shoring/Base ment	9	23.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
UG Utilities	3	8.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Podium Structure	14	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Metal Stud Structure/Roof	12	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Exterior Skin	10	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.1 Mitigation Measures Construction**3.2 Demolition - 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	lb/day										lb/day					
Fugitive Dust					2.7241	0.0000	2.7241	0.4125	0.0000	0.4125			0.0000			0.0000
Off-Road	0.9555	8.6078	9.2681	0.0145		0.5148	0.5148		0.4920	0.4920		1,411.3331	1,411.3331	0.3007		1,418.8514
Total	0.9555	8.6078	9.2681	0.0145	2.7241	0.5148	3.2390	0.4125	0.4920	0.9045		1,411.3331	1,411.3331	0.3007		1,418.8514

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1107	3.7628	0.8616	9.6700e-003	0.2167	0.0144	0.2311	0.0594	0.0138	0.0731		1,055.1270	1,055.1270	0.0984		1,057.5872
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0355	0.0246	0.2339	6.6000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		65.3531	65.3531	2.1100e-003		65.4058
Total	0.1462	3.7874	1.0955	0.0103	0.2824	0.0149	0.2973	0.0768	0.0142	0.0910		1,120.4801	1,120.4801	0.1005		1,122.9930

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.2 Demolition - 2019**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7241	0.0000	2.7241	0.4125	0.0000	0.4125			0.0000			0.0000
Off-Road	0.9555	8.6078	9.2681	0.0145		0.5148	0.5148		0.4920	0.4920	0.0000	1,411.3331	1,411.3331	0.3007		1,418.8514
Total	0.9555	8.6078	9.2681	0.0145	2.7241	0.5148	3.2390	0.4125	0.4920	0.9045	0.0000	1,411.3331	1,411.3331	0.3007		1,418.8514

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1107	3.7628	0.8616	9.6700e-003	0.2167	0.0144	0.2311	0.0594	0.0138	0.0731		1,055.1270	1,055.1270	0.0984		1,057.5872
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0355	0.0246	0.2339	6.6000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		65.3531	65.3531	2.1100e-003		65.4058
Total	0.1462	3.7874	1.0955	0.0103	0.2824	0.0149	0.2973	0.0768	0.0142	0.0910		1,120.4801	1,120.4801	0.1005		1,122.9930

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.3 Grading/Shoring/Basement - 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	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.4007	27.1649	12.5290	0.0312		1.2175	1.2175		1.1213	1.1213		3,071.1089	3,071.1089	0.9607		3,095.1257
Total	2.4007	27.1649	12.5290	0.0312	4.9360	1.2175	6.1536	2.5289	1.1213	3.6502		3,071.1089	3,071.1089	0.9607		3,095.1257

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1021	0.0708	0.6725	1.8900e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		187.8902	187.8902	6.0600e-003		188.0417
Total	0.1021	0.0708	0.6725	1.8900e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		187.8902	187.8902	6.0600e-003		188.0417

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.3 Grading/Shoring/Basement - 2019**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.4007	27.1649	12.5290	0.0312		1.2175	1.2175		1.1213	1.1213	0.0000	3,071.1089	3,071.1089	0.9607		3,095.1257
Total	2.4007	27.1649	12.5290	0.0312	4.9360	1.2175	6.1536	2.5289	1.1213	3.6502	0.0000	3,071.1089	3,071.1089	0.9607		3,095.1257

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1021	0.0708	0.6725	1.8900e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		187.8902	187.8902	6.0600e-003		188.0417
Total	0.1021	0.0708	0.6725	1.8900e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		187.8902	187.8902	6.0600e-003		188.0417

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.3 Grading/Shoring/Basement - 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	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.2679	25.3580	12.2212	0.0312		1.1188	1.1188		1.0305	1.0305		3,007.844 7	3,007.844 7	0.9614		3,031.880 7
Total	2.2679	25.3580	12.2212	0.0312	4.9360	1.1188	6.0548	2.5289	1.0305	3.5594		3,007.844 7	3,007.844 7	0.9614		3,031.880 7

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0956	0.0639	0.6147	1.8300e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		181.9604	181.9604	5.4800e-003		182.0973
Total	0.0956	0.0639	0.6147	1.8300e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		181.9604	181.9604	5.4800e-003		182.0973

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.3 Grading/Shoring/Basement - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.2679	25.3580	12.2212	0.0312		1.1188	1.1188		1.0305	1.0305	0.0000	3,007.844 7	3,007.844 7	0.9614		3,031.880 7
Total	2.2679	25.3580	12.2212	0.0312	4.9360	1.1188	6.0548	2.5289	1.0305	3.5594	0.0000	3,007.844 7	3,007.844 7	0.9614		3,031.880 7

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0956	0.0639	0.6147	1.8300e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		181.9604	181.9604	5.4800e-003		182.0973
Total	0.0956	0.0639	0.6147	1.8300e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		181.9604	181.9604	5.4800e-003		182.0973

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.4 UG Utilities - 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	lb/day										lb/day					
Off-Road	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065		277.2955	277.2955	0.0783		279.2536
Total	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065		277.2955	277.2955	0.0783		279.2536

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.0333	0.0222	0.2138	6.4000e-004	0.0657	4.6000e-004	0.0662	0.0174	4.2000e-004	0.0179		63.2906	63.2906	1.9100e-003		63.3382
Total	0.0724	1.1489	0.5326	3.3100e-003	0.1334	6.0800e-003	0.1395	0.0369	5.8000e-003	0.0427		349.7528	349.7528	0.0250		350.3767

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.4 UG Utilities - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065	0.0000	277.2955	277.2955	0.0783		279.2536
Total	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065	0.0000	277.2955	277.2955	0.0783		279.2536

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.0333	0.0222	0.2138	6.4000e-004	0.0657	4.6000e-004	0.0662	0.0174	4.2000e-004	0.0179		63.2906	63.2906	1.9100e-003		63.3382
Total	0.0724	1.1489	0.5326	3.3100e-003	0.1334	6.0800e-003	0.1395	0.0369	5.8000e-003	0.0427		349.7528	349.7528	0.0250		350.3767

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.5 Podium Structure - 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	lb/day										lb/day					
Off-Road	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034		2,937.9711	2,937.9711	0.2125		2,943.2840
Total	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034		2,937.9711	2,937.9711	0.2125		2,943.2840

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.5 Podium Structure - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034	0.0000	2,937.9711	2,937.9711	0.2125		2,943.2840
Total	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034	0.0000	2,937.9711	2,937.9711	0.2125		2,943.2840

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.6 Metal Stud Structure/Roof - 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	lb/day										lb/day					
Off-Road	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492		4,410.144 2	4,410.144 2	0.7169		4,428.066 8
Total	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492		4,410.144 2	4,410.144 2	0.7169		4,428.066 8

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.6 Metal Stud Structure/Roof - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492	0.0000	4,410.144 2	4,410.144 2	0.7169		4,428.066 8
Total	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492	0.0000	4,410.144 2	4,410.144 2	0.7169		4,428.066 8

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.7 Exterior Skin - 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	lb/day										lb/day					
Off-Road	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848		2,503.1226	2,503.1226	0.4999		2,515.6203
Total	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848		2,503.1226	2,503.1226	0.4999		2,515.6203

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.7 Exterior Skin - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848	0.0000	2,503.1226	2,503.1226	0.4999		2,515.6203
Total	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848	0.0000	2,503.1226	2,503.1226	0.4999		2,515.6203

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0391	1.1267	0.3188	2.6700e-003	0.0677	5.6200e-003	0.0733	0.0195	5.3800e-003	0.0249		286.4622	286.4622	0.0231		287.0385
Worker	0.2701	0.1804	1.7371	5.1600e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		514.2358	514.2358	0.0155		514.6228
Total	0.3093	1.3071	2.0559	7.8300e-003	0.6017	9.3700e-003	0.6110	0.1611	8.8300e-003	0.1699		800.6980	800.6980	0.0385		801.6613

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.7 Exterior Skin - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580		2,503.3603	2,503.3603	0.4927		2,515.6777
Total	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580		2,503.3603	2,503.3603	0.4927		2,515.6777

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0319	1.0156	0.2890	2.6400e-003	0.0677	2.2300e-003	0.0699	0.0195	2.1300e-003	0.0216		283.8193	283.8193	0.0221		284.3721
Worker	0.2550	0.1640	1.6206	4.9900e-003	0.5340	3.6900e-003	0.5377	0.1416	3.4000e-003	0.1450		496.9559	496.9559	0.0143		497.3129
Total	0.2868	1.1796	1.9096	7.6300e-003	0.6017	5.9200e-003	0.6076	0.1611	5.5300e-003	0.1667		780.7752	780.7752	0.0364		781.6849

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.7 Exterior Skin - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580	0.0000	2,503.3603	2,503.3603	0.4927		2,515.6777
Total	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580	0.0000	2,503.3603	2,503.3603	0.4927		2,515.6777

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0319	1.0156	0.2890	2.6400e-003	0.0677	2.2300e-003	0.0699	0.0195	2.1300e-003	0.0216		283.8193	283.8193	0.0221		284.3721
Worker	0.2550	0.1640	1.6206	4.9900e-003	0.5340	3.6900e-003	0.5377	0.1416	3.4000e-003	0.1450		496.9559	496.9559	0.0143		497.3129
Total	0.2868	1.1796	1.9096	7.6300e-003	0.6017	5.9200e-003	0.6076	0.1611	5.5300e-003	0.1667		780.7752	780.7752	0.0364		781.6849

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.8 Architectural Coatings - 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	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	16.6675	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0540	0.0361	0.3474	1.0300e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		102.8472	102.8472	3.1000e-003		102.9246
Total	0.0540	0.0361	0.3474	1.0300e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		102.8472	102.8472	3.1000e-003		102.9246

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.8 Architectural Coatings - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	16.6675	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0540	0.0361	0.3474	1.0300e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		102.8472	102.8472	3.1000e-003		102.9246
Total	0.0540	0.0361	0.3474	1.0300e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		102.8472	102.8472	3.1000e-003		102.9246

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.8 Architectural Coatings - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	16.6442	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0510	0.0328	0.3241	1.0000e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		99.3912	99.3912	2.8600e-003		99.4626
Total	0.0510	0.0328	0.3241	1.0000e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		99.3912	99.3912	2.8600e-003		99.4626

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.8 Architectural Coatings - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	16.6442	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0510	0.0328	0.3241	1.0000e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		99.3912	99.3912	2.8600e-003		99.4626
Total	0.0510	0.0328	0.3241	1.0000e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		99.3912	99.3912	2.8600e-003		99.4626

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.9 Paving - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174

9088 CDLC Phase III - San Diego County APCD Air District, Winter

3.9 Paving - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174
Total	0.0706	0.0454	0.4488	1.3800e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		137.6186	137.6186	3.9500e-003		137.7174

4.0 Operational Detail - Mobile

9088 CDLC Phase III - San Diego County APCD Air District, Winter

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4676	1.8700	4.8105	0.0140	1.1688	0.0146	1.1834	0.3124	0.0137	0.3261		1,417.8280	1,417.8280	0.0848		1,419,9489
Unmitigated	0.4676	1.8700	4.8105	0.0140	1.1688	0.0146	1.1834	0.3124	0.0137	0.3261		1,417.8280	1,417.8280	0.0848		1,419,9489

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Congregate Care (Assisted Living)	198.00	145.20	161.04	347,167	347,167
Retirement Community	96.00	48.72	46.80	154,139	154,139
Total	294.00	193.92	207.84	501,306	501,306

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Congregate Care (Assisted Living)	5.80	5.80	5.80	41.60	18.80	39.60	86	11	3
Retirement Community	5.80	5.80	5.80	41.60	18.80	39.60	86	11	3

4.4 Fleet Mix

9088 CDLC Phase III - San Diego County APCD Air District, Winter

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Congregate Care (Assisted Living)	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Retirement Community	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
NaturalGas Unmitigated	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

9088 CDLC Phase III - San Diego County APCD Air District, Winter

5.2 Energy by Land Use - NaturalGas**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	1343.28	0.0145	0.1238	0.0527	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.0328	158.0328	3.0300e-003	2.9000e-003	158.9719
Retirement Community	738.114	7.9600e-003	0.0680	0.0290	4.3000e-004		5.5000e-003	5.5000e-003		5.5000e-003	5.5000e-003		86.8370	86.8370	1.6600e-003	1.5900e-003	87.3530
Total		0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	1.34328	0.0145	0.1238	0.0527	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.0328	158.0328	3.0300e-003	2.9000e-003	158.9719
Retirement Community	0.738114	7.9600e-003	0.0680	0.0290	4.3000e-004		5.5000e-003	5.5000e-003		5.5000e-003	5.5000e-003		86.8370	86.8370	1.6600e-003	1.5900e-003	87.3530
Total		0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

6.0 Area Detail**6.1 Mitigation Measures Area**

9088 CDLC Phase III - San Diego County APCD Air District, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Unmitigated	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5400					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.9960					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2255	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410		13.3697	13.3697	0.0130		13.6936
Total	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

9088 CDLC Phase III - San Diego County APCD Air District, Winter

6.2 Area by SubCategory**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5400					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.9960					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2255	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410		13.3697	13.3697	0.0130		13.6936
Total	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

7.0 Water Detail**7.1 Mitigation Measures Water****8.0 Waste Detail****8.1 Mitigation Measures Waste**

Institute Recycling and Composting Services

9.0 Operational Offroad

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

9088 CDLC Phase III - San Diego County APCD Air District, Winter

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

User Defined Equipment

Equipment Type	Number
----------------	--------

11.0 Vegetation

9088 CDLC Phase III - San Diego County APCD Air District, Summer

9088 CDLC Phase III
San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Congregate Care (Assisted Living)	66.00	Dwelling Unit	0.30	90,000.00	189
Retirement Community	24.00	Dwelling Unit	0.30	50,000.00	69

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	457.25	CH4 Intensity (lb/MWhr)	0.018	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

9088 CDLC Phase III - San Diego County APCD Air District, Summer

Project Characteristics - Energy intensity factors updated based on SDG&E renewable procurement
(457.25, 0.018, 0.004)

Land Use - 140,000 sf building
26,000 sf footprint (0.6 acre)

Construction Phase - Schedule obtained from BNBuilders, Inc.

Off-road Equipment -

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment -

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Off-road Equipment - Equipment list obtained from BNBuilders, Inc.

Trips and VMT -

Demolition - 37,000 sf building + 4,000 sf concrete

Grading - 9,300 cy export

Architectural Coating - SDAPCD Rule 67.0.1

Vehicle Trips - Chen Ryan 2018

Assisted Living - 3 trips/unit

Retirement - 4 trips/unit

5.8 mile trip length

Energy Use -

Woodstoves - No woodstoves or fireplaces

Area Coating - SDAPCD Rule 67.0.1

Water And Wastewater - CalGreen 20% decrease in indoor water use
(3,440,132.55, 1,250,957.29)

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00

9088 CDLC Phase III - San Diego County APCD Air District, Summer

tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValu e	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValu e	250	100
tblConstructionPhase	NumDays	10.00	15.00
tblConstructionPhase	NumDays	2.00	60.00
tblConstructionPhase	NumDays	100.00	25.00
tblConstructionPhase	NumDays	100.00	110.00
tblConstructionPhase	NumDays	100.00	120.00
tblConstructionPhase	NumDays	5.00	120.00
tblFireplaces	NumberGas	36.30	0.00
tblFireplaces	NumberGas	13.20	0.00
tblFireplaces	NumberNoFireplace	6.60	66.00
tblFireplaces	NumberNoFireplace	2.40	24.00
tblFireplaces	NumberWood	23.10	0.00
tblFireplaces	NumberWood	8.40	0.00
tblGrading	MaterialExported	0.00	9,300.00
tblLandUse	LandUseSquareFeet	66,000.00	90,000.00
tblLandUse	LandUseSquareFeet	24,000.00	50,000.00
tblLandUse	LotAcreage	4.13	0.30
tblLandUse	LotAcreage	4.80	0.30
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

9088 CDLC Phase III - San Diego County APCD Air District, Summer

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	4.00	0.00
tblOffRoadEquipment	UsageHours	4.00	7.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	6.00	5.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	1.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.018
tblProjectCharacteristics	CO2IntensityFactor	720.49	457.25
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblTripsAndVMT	HaulingTripNumber	1,163.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblVehicleTrips	HO_TL	7.50	5.80
tblVehicleTrips	HO_TL	7.50	5.80
tblVehicleTrips	HS_TL	7.30	5.80
tblVehicleTrips	HS_TL	7.30	5.80
tblVehicleTrips	HW_TL	10.80	5.80
tblVehicleTrips	HW_TL	10.80	5.80
tblVehicleTrips	WD_TR	2.74	3.00

9088 CDLC Phase III - San Diego County APCD Air District, Summer

tblVehicleTrips	WD_TR	2.40	4.00
tblWater	IndoorWaterUseRate	4,300,165.69	3,440,132.55
tblWater	IndoorWaterUseRate	1,563,696.61	1,250,957.29
tblWoodstoves	NumberCatalytic	3.30	0.00
tblWoodstoves	NumberCatalytic	1.20	0.00
tblWoodstoves	NumberNoncatalytic	3.30	0.00
tblWoodstoves	NumberNoncatalytic	1.20	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

9088 CDLC Phase III - San Diego County APCD Air District, Summer

2.1 Overall Construction (Maximum Daily Emission)**Unmitigated Construction**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.4910	27.2280	13.2406	0.0332	5.1250	1.2189	6.3439	2.5790	1.1226	3.7016	0.0000	3,271.254 8	3,271.254 8	0.9671	0.0000	3,295.431 4
2020	18.7313	27.7072	25.7078	0.0551	5.1250	1.3918	6.2451	2.5790	1.3579	3.6107	0.0000	5,251.969 9	5,251.969 9	0.9672	0.0000	5,270.843 6
2021	18.5187	17.4914	20.0953	0.0382	0.7085	0.8942	1.6026	0.1895	0.8583	1.0477	0.0000	3,711.4242 2	3,711.424 2	0.5510	0.0000	3,725.198 1
Maximum	18.7313	27.7072	25.7078	0.0551	5.1250	1.3918	6.3439	2.5790	1.3579	3.7016	0.0000	5,251.969 9	5,251.969 9	0.9672	0.0000	5,270.843 6

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.4910	27.2280	13.2406	0.0332	5.1250	1.2189	6.3439	2.5790	1.1226	3.7016	0.0000	3,271.254 8	3,271.254 8	0.9671	0.0000	3,295.431 4
2020	18.7313	27.7072	25.7078	0.0551	5.1250	1.3918	6.2451	2.5790	1.3579	3.6107	0.0000	5,251.969 8	5,251.969 8	0.9672	0.0000	5,270.843 6
2021	18.5187	17.4914	20.0953	0.0382	0.7085	0.8942	1.6026	0.1895	0.8583	1.0477	0.0000	3,711.4242 2	3,711.4242 2	0.5510	0.0000	3,725.198 1
Maximum	18.7313	27.7072	25.7078	0.0551	5.1250	1.3918	6.3439	2.5790	1.3579	3.7016	0.0000	5,251.969 8	5,251.969 8	0.9672	0.0000	5,270.843 6

9088 CDLC Phase III - San Diego County APCD Air District, Summer

[illegible]

9088 CDLC Phase III - San Diego County APCD Air District, Summer

2.2 Overall Operational**Unmitigated Operational**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Energy	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
Mobile	0.4812	1.8279	4.7586	0.0148	1.1688	0.0144	1.1832	0.3124	0.0135	0.3259		1,496.6215	1,496.6215	0.0835		1,498.7098
Total	4.2651	2.1056	12.2814	0.0164	1.1688	0.0709	1.2398	0.3124	0.0700	0.3825	0.0000	1,754.8610	1,754.8610	0.1012	4.4900e-003	1,758.7284

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Energy	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
Mobile	0.4812	1.8279	4.7586	0.0148	1.1688	0.0144	1.1832	0.3124	0.0135	0.3259		1,496.6215	1,496.6215	0.0835		1,498.7098
Total	4.2651	2.1056	12.2814	0.0164	1.1688	0.0709	1.2398	0.3124	0.0700	0.3825	0.0000	1,754.8610	1,754.8610	0.1012	4.4900e-003	1,758.7284

9088 CDLC Phase III - San Diego County APCD Air District, Summer

	ROG	NOx	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
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail**Construction Phase**

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2019	10/21/2019	5	15	
2	Grading/Shoring/Basement	Grading	10/22/2019	1/13/2020	5	60	
3	UG Utilities	Trenching	1/14/2020	3/9/2020	5	40	
4	Podium Structure	Building Construction	3/10/2020	4/13/2020	5	25	
5	Metal Stud Structure/Roof	Building Construction	4/14/2020	9/14/2020	5	110	
6	Exterior Skin	Building Construction	9/15/2020	3/1/2021	5	120	
7	Architectural Coatings	Architectural Coating	9/15/2020	3/1/2021	5	120	
8	Paving	Paving	3/2/2021	3/8/2021	5	5	

Acres of Grading (Site Preparation Phase): 0**Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 283,500; Residential Outdoor: 94,500; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38

9088 CDLC Phase III - San Diego County APCD Air District, Summer

Demolition	Rubber Tired Dozers	0	0.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading/Shoring/Basement	Bore/Drill Rigs	1	8.00	221	0.50
Grading/Shoring/Basement	Concrete/Industrial Saws	0	0.00	81	0.73
Grading/Shoring/Basement	Cranes	1	7.00	231	0.29
Grading/Shoring/Basement	Forklifts	1	5.00	89	0.20
Grading/Shoring/Basement	Graders	1	6.00	187	0.41
Grading/Shoring/Basement	Plate Compactors	2	6.00	8	0.43
Grading/Shoring/Basement	Rubber Tired Dozers	1	6.00	247	0.40
Grading/Shoring/Basement	Sweepers/Scrubbers	1	2.00	64	0.46
Grading/Shoring/Basement	Tractors/Loaders/Backhoes	1	8.00	97	0.37
UG Utilities	Plate Compactors	2	6.00	8	0.43
UG Utilities	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Podium Structure	Air Compressors	1	4.00	78	0.48
Podium Structure	Cement and Mortar Mixers	4	4.00	9	0.56
Podium Structure	Concrete/Industrial Saws	6	4.00	81	0.73
Podium Structure	Cranes	0	0.00	231	0.29
Podium Structure	Forklifts	1	5.00	89	0.20
Podium Structure	Generator Sets	1	6.00	84	0.74
Podium Structure	Pumps	1	4.00	84	0.74
Podium Structure	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Metal Stud Structure/Roof	Air Compressors	1	4.00	78	0.48
Metal Stud Structure/Roof	Bore/Drill Rigs	2	4.00	221	0.50
Metal Stud Structure/Roof	Concrete/Industrial Saws	2	8.00	81	0.73
Metal Stud Structure/Roof	Cranes	1	7.00	231	0.29
Metal Stud Structure/Roof	Forklifts	2	5.00	89	0.20
Metal Stud Structure/Roof	Generator Sets	2	7.00	84	0.74

9088 CDLC Phase III - San Diego County APCD Air District, Summer

Metal Stud Structure/Roof	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Metal Stud Structure/Roof	Welders	2	7.00	46	0.45
Exterior Skin	Aerial Lifts	2	6.00	63	0.31
Exterior Skin	Air Compressors	1	6.00	78	0.48
Exterior Skin	Concrete/Industrial Saws	1	6.00	81	0.73
Exterior Skin	Cranes	1	4.00	231	0.29
Exterior Skin	Forklifts	2	5.00	89	0.20
Exterior Skin	Generator Sets	1	6.00	84	0.74
Exterior Skin	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coatings	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

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
Demolition	3	8.00	0.00	186.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading/Shoring/Base ment	9	23.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
UG Utilities	3	8.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Podium Structure	14	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Metal Stud Structure/Roof	12	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Exterior Skin	10	65.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coatings	1	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.1 Mitigation Measures Construction**3.2 Demolition - 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	lb/day										lb/day					
Fugitive Dust					2.7241	0.0000	2.7241	0.4125	0.0000	0.4125			0.0000			0.0000
Off-Road	0.9555	8.6078	9.2681	0.0145		0.5148	0.5148		0.4920	0.4920		1,411.333 1	1,411.333 1	0.3007		1,418.851 4
Total	0.9555	8.6078	9.2681	0.0145	2.7241	0.5148	3.2390	0.4125	0.4920	0.9045		1,411.333 1	1,411.333 1	0.3007		1,418.851 4

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1076	3.7246	0.8040	9.8400e-003	0.2167	0.0141	0.2307	0.0594	0.0135	0.0728		1,073.186 2	1,073.186 2	0.0950		1,075.560 5
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0219	0.2475	7.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		69.6160	69.6160	2.2200e-003		69.6716
Total	0.1390	3.7465	1.0515	0.0105	0.2824	0.0145	0.2969	0.0768	0.0139	0.0907		1,142.802 1	1,142.802 1	0.0972		1,145.232 0

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.2 Demolition - 2019**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7241	0.0000	2.7241	0.4125	0.0000	0.4125			0.0000			0.0000
Off-Road	0.9555	8.6078	9.2681	0.0145		0.5148	0.5148		0.4920	0.4920	0.0000	1,411.3331	1,411.3331	0.3007		1,418.8514
Total	0.9555	8.6078	9.2681	0.0145	2.7241	0.5148	3.2390	0.4125	0.4920	0.9045	0.0000	1,411.3331	1,411.3331	0.3007		1,418.8514

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1076	3.7246	0.8040	9.8400e-003	0.2167	0.0141	0.2307	0.0594	0.0135	0.0728		1,073.1862	1,073.1862	0.0950		1,075.5605
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0219	0.2475	7.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		69.6160	69.6160	2.2200e-003		69.6716
Total	0.1390	3.7465	1.0515	0.0105	0.2824	0.0145	0.2969	0.0768	0.0139	0.0907		1,142.8021	1,142.8021	0.0972		1,145.2320

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.3 Grading/Shoring/Basement - 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	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.4007	27.1649	12.5290	0.0312		1.2175	1.2175		1.1213	1.1213		3,071.1089	3,071.1089	0.9607		3,095.1257
Total	2.4007	27.1649	12.5290	0.0312	4.9360	1.2175	6.1536	2.5289	1.1213	3.6502		3,071.1089	3,071.1089	0.9607		3,095.1257

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0903	0.0630	0.7117	2.0100e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		200.1459	200.1459	6.3900e-003		200.3057
Total	0.0903	0.0630	0.7117	2.0100e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		200.1459	200.1459	6.3900e-003		200.3057

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.3 Grading/Shoring/Basement - 2019**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.4007	27.1649	12.5290	0.0312		1.2175	1.2175		1.1213	1.1213	0.0000	3,071.1089	3,071.1089	0.9607		3,095.1257
Total	2.4007	27.1649	12.5290	0.0312	4.9360	1.2175	6.1536	2.5289	1.1213	3.6502	0.0000	3,071.1089	3,071.1089	0.9607		3,095.1257

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0903	0.0630	0.7117	2.0100e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		200.1459	200.1459	6.3900e-003		200.3057
Total	0.0903	0.0630	0.7117	2.0100e-003	0.1889	1.3500e-003	0.1903	0.0501	1.2400e-003	0.0514		200.1459	200.1459	6.3900e-003		200.3057

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.3 Grading/Shoring/Basement - 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	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.2679	25.3580	12.2212	0.0312		1.1188	1.1188		1.0305	1.0305		3,007.844 7	3,007.844 7	0.9614		3,031.880 7
Total	2.2679	25.3580	12.2212	0.0312	4.9360	1.1188	6.0548	2.5289	1.0305	3.5594		3,007.844 7	3,007.844 7	0.9614		3,031.880 7

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0844	0.0569	0.6520	1.9500e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		193.8318	193.8318	5.7900e-003		193.9765
Total	0.0844	0.0569	0.6520	1.9500e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		193.8318	193.8318	5.7900e-003		193.9765

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.3 Grading/Shoring/Basement - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9360	0.0000	4.9360	2.5289	0.0000	2.5289			0.0000			0.0000
Off-Road	2.2679	25.3580	12.2212	0.0312		1.1188	1.1188		1.0305	1.0305	0.0000	3,007.844 7	3,007.844 7	0.9614		3,031.880 7
Total	2.2679	25.3580	12.2212	0.0312	4.9360	1.1188	6.0548	2.5289	1.0305	3.5594	0.0000	3,007.844 7	3,007.844 7	0.9614		3,031.880 7

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0844	0.0569	0.6520	1.9500e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		193.8318	193.8318	5.7900e-003		193.9765
Total	0.0844	0.0569	0.6520	1.9500e-003	0.1889	1.3300e-003	0.1903	0.0501	1.2200e-003	0.0513		193.8318	193.8318	5.7900e-003		193.9765

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.4 UG Utilities - 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	lb/day										lb/day					
Off-Road	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065		277.2955	277.2955	0.0783		279.2536
Total	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065		277.2955	277.2955	0.0783		279.2536

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.0294	0.0198	0.2268	6.8000e-004	0.0657	4.6000e-004	0.0662	0.0174	4.2000e-004	0.0179		67.4198	67.4198	2.0100e-003		67.4701
Total	0.0667	1.1474	0.5140	3.4200e-003	0.1334	5.9800e-003	0.1394	0.0369	5.7000e-003	0.0426		361.4598	361.4598	0.0237		362.0525

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.4 UG Utilities - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065	0.0000	277.2955	277.2955	0.0783		279.2536
Total	0.2173	1.9558	2.0255	3.0600e-003		0.1145	0.1145		0.1065	0.1065	0.0000	277.2955	277.2955	0.0783		279.2536

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.0294	0.0198	0.2268	6.8000e-004	0.0657	4.6000e-004	0.0662	0.0174	4.2000e-004	0.0179		67.4198	67.4198	2.0100e-003		67.4701
Total	0.0667	1.1474	0.5140	3.4200e-003	0.1334	5.9800e-003	0.1394	0.0369	5.7000e-003	0.0426		361.4598	361.4598	0.0237		362.0525

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.5 Podium Structure - 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	lb/day										lb/day					
Off-Road	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034		2,937.9711	2,937.9711	0.2125		2,943.2840
Total	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034		2,937.9711	2,937.9711	0.2125		2,943.2840

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.5 Podium Structure - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034	0.0000	2,937.9711	2,937.9711	0.2125		2,943.2840
Total	2.1344	16.9392	18.2956	0.0314		1.0082	1.0082		1.0034	1.0034	0.0000	2,937.9711	2,937.9711	0.2125		2,943.2840

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.6 Metal Stud Structure/Roof - 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	lb/day										lb/day					
Off-Road	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492		4,410.144 2	4,410.144 2	0.7169		4,428.066 8
Total	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492		4,410.144 2	4,410.144 2	0.7169		4,428.066 8

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.6 Metal Stud Structure/Roof - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492	0.0000	4,410.144 2	4,410.144 2	0.7169		4,428.066 8
Total	3.1491	26.4189	23.5781	0.0468		1.3825	1.3825		1.3492	1.3492	0.0000	4,410.144 2	4,410.144 2	0.7169		4,428.066 8

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.7 Exterior Skin - 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	lb/day										lb/day					
Off-Road	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848		2,503.1226	2,503.1226	0.4999		2,515.6203
Total	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848		2,503.1226	2,503.1226	0.4999		2,515.6203

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.7 Exterior Skin - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848	0.0000	2,503.1226	2,503.1226	0.4999		2,515.6203
Total	1.7402	16.2601	16.1093	0.0261		0.9264	0.9264		0.8848	0.8848	0.0000	2,503.1226	2,503.1226	0.4999		2,515.6203

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0374	1.1276	0.2873	2.7400e-003	0.0677	5.5200e-003	0.0732	0.0195	5.2800e-003	0.0248		294.0401	294.0401	0.0217		294.5824
Worker	0.2385	0.1607	1.8425	5.5000e-003	0.5340	3.7500e-003	0.5377	0.1416	3.4500e-003	0.1451		547.7856	547.7856	0.0164		548.1945
Total	0.2759	1.2883	2.1297	8.2400e-003	0.6017	9.2700e-003	0.6109	0.1611	8.7300e-003	0.1698		841.8257	841.8257	0.0381		842.7769

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.7 Exterior Skin - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580		2,503.3603	2,503.3603	0.4927		2,515.6777
Total	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580		2,503.3603	2,503.3603	0.4927		2,515.6777

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0302	1.0183	0.2595	2.7100e-003	0.0677	2.1400e-003	0.0698	0.0195	2.0500e-003	0.0215		291.3520	291.3520	0.0208		291.8724
Worker	0.2248	0.1461	1.7241	5.3100e-003	0.5340	3.6900e-003	0.5377	0.1416	3.4000e-003	0.1450		529.3866	529.3866	0.0151		529.7643
Total	0.2551	1.1644	1.9836	8.0200e-003	0.6017	5.8300e-003	0.6075	0.1611	5.4500e-003	0.1666		820.7385	820.7385	0.0359		821.6367

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.7 Exterior Skin - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580	0.0000	2,503.3603	2,503.3603	0.4927		2,515.6777
Total	1.5745	14.7710	15.9494	0.0261		0.7935	0.7935		0.7580	0.7580	0.0000	2,503.3603	2,503.3603	0.4927		2,515.6777

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0302	1.0183	0.2595	2.7100e-003	0.0677	2.1400e-003	0.0698	0.0195	2.0500e-003	0.0215		291.3520	291.3520	0.0208		291.8724
Worker	0.2248	0.1461	1.7241	5.3100e-003	0.5340	3.6900e-003	0.5377	0.1416	3.4000e-003	0.1450		529.3866	529.3866	0.0151		529.7643
Total	0.2551	1.1644	1.9836	8.0200e-003	0.6017	5.8300e-003	0.6075	0.1611	5.4500e-003	0.1666		820.7385	820.7385	0.0359		821.6367

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.8 Architectural Coatings - 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	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	16.6675	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0477	0.0321	0.3685	1.1000e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		109.5571	109.5571	3.2700e-003		109.6389
Total	0.0477	0.0321	0.3685	1.1000e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		109.5571	109.5571	3.2700e-003		109.6389

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.8 Architectural Coatings - 2020**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	16.6675	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0477	0.0321	0.3685	1.1000e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		109.5571	109.5571	3.2700e-003		109.6389
Total	0.0477	0.0321	0.3685	1.1000e-003	0.1068	7.5000e-004	0.1075	0.0283	6.9000e-004	0.0290		109.5571	109.5571	3.2700e-003		109.6389

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.8 Architectural Coatings - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	16.6442	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0450	0.0292	0.3448	1.0600e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		105.8773	105.8773	3.0200e-003		105.9529
Total	0.0450	0.0292	0.3448	1.0600e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		105.8773	105.8773	3.0200e-003		105.9529

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.8 Architectural Coatings - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	16.4253					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	16.6442	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0450	0.0292	0.3448	1.0600e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		105.8773	105.8773	3.0200e-003		105.9529
Total	0.0450	0.0292	0.3448	1.0600e-003	0.1068	7.4000e-004	0.1075	0.0283	6.8000e-004	0.0290		105.8773	105.8773	3.0200e-003		105.9529

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.9 Paving - 2021**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286		1,035.3425	1,035.3425	0.3016		1,042.8818

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040

9088 CDLC Phase III - San Diego County APCD Air District, Summer

3.9 Paving - 2021**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.7214	6.7178	7.0899	0.0113		0.3534	0.3534		0.3286	0.3286	0.0000	1,035.3425	1,035.3425	0.3016		1,042.8818

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040
Total	0.0623	0.0405	0.4774	1.4700e-003	0.1479	1.0200e-003	0.1489	0.0392	9.4000e-004	0.0402		146.5994	146.5994	4.1800e-003		146.7040

4.0 Operational Detail - Mobile

9088 CDLC Phase III - San Diego County APCD Air District, Summer

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4812	1.8279	4.7586	0.0148	1.1688	0.0144	1.1832	0.3124	0.0135	0.3259		1,496.6215	1,496.6215	0.0835		1,498.7098
Unmitigated	0.4812	1.8279	4.7586	0.0148	1.1688	0.0144	1.1832	0.3124	0.0135	0.3259		1,496.6215	1,496.6215	0.0835		1,498.7098

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Congregate Care (Assisted Living)	198.00	145.20	161.04	347,167	347,167
Retirement Community	96.00	48.72	46.80	154,139	154,139
Total	294.00	193.92	207.84	501,306	501,306

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Congregate Care (Assisted Living)	5.80	5.80	5.80	41.60	18.80	39.60	86	11	3
Retirement Community	5.80	5.80	5.80	41.60	18.80	39.60	86	11	3

4.4 Fleet Mix

9088 CDLC Phase III - San Diego County APCD Air District, Summer

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Congregate Care (Assisted Living)	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Retirement Community	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250
NaturalGas Unmitigated	0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

9088 CDLC Phase III - San Diego County APCD Air District, Summer

5.2 Energy by Land Use - NaturalGas**Unmitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	1343.28	0.0145	0.1238	0.0527	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.0328	158.0328	3.0300e-003	2.9000e-003	158.9719
Retirement Community	738.114	7.9600e-003	0.0680	0.0290	4.3000e-004		5.5000e-003	5.5000e-003		5.5000e-003	5.5000e-003		86.8370	86.8370	1.6600e-003	1.5900e-003	87.3530
Total		0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	1.34328	0.0145	0.1238	0.0527	7.9000e-004		0.0100	0.0100		0.0100	0.0100		158.0328	158.0328	3.0300e-003	2.9000e-003	158.9719
Retirement Community	0.738114	7.9600e-003	0.0680	0.0290	4.3000e-004		5.5000e-003	5.5000e-003		5.5000e-003	5.5000e-003		86.8370	86.8370	1.6600e-003	1.5900e-003	87.3530
Total		0.0225	0.1918	0.0816	1.2200e-003		0.0155	0.0155		0.0155	0.0155		244.8698	244.8698	4.6900e-003	4.4900e-003	246.3250

6.0 Area Detail**6.1 Mitigation Measures Area**

9088 CDLC Phase III - San Diego County APCD Air District, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936
Unmitigated	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5400					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.9960					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2255	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410		13.3697	13.3697	0.0130		13.6936
Total	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

9088 CDLC Phase III - San Diego County APCD Air District, Summer

6.2 Area by SubCategory**Mitigated**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5400					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.9960					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2255	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410		13.3697	13.3697	0.0130		13.6936
Total	3.7615	0.0859	7.4413	3.9000e-004		0.0410	0.0410		0.0410	0.0410	0.0000	13.3697	13.3697	0.0130	0.0000	13.6936

7.0 Water Detail**7.1 Mitigation Measures Water****8.0 Waste Detail****8.1 Mitigation Measures Waste**

Institute Recycling and Composting Services

9.0 Operational Offroad

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

9088 CDLC Phase III - San Diego County APCD Air District, Summer

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

User Defined Equipment

Equipment Type	Number
----------------	--------

11.0 Vegetation

CASA DE LAS CAMPANAS
PHASE III

ENVIRONMENTAL NOISE IMPACT REPORT

Submitted to:

Joe Tucker, Principal
Ankrom Moisan Architects
6720 SW Macadam Ave. Suite 100
Portland, OR 97219

Prepared by:

A³ Acoustics, LLP
241 S. Lander St. Suite 200
Seattle, WA 98134

19 March 2019



TABLE OF CONTENTS

1.	Executive Summary	1
2.	Fundamentals of Sound	3
3.	Noise Descriptors	3
3.1	Decibels	3
3.2	A-Weighting.....	3
3.3	Equivalent Sound Level (L _{EQ}).....	4
3.4	Community Noise Equivalent Level (CNEL)	4
4.	Vibration Descriptors	5
4.1	Peak Particle Velocity (PPV).....	5
4.2	Vibration Velocity Level (L _V).....	5
5.	Regulatory Framework.....	6
5.1	Applicable State Noise Standards.....	6
5.2	City of San Diego Noise Element – Land Use Compatibility Standards	7
5.3	City of San Diego Municipal Code §59.5.0401-08	8
5.4	California Green Building Code (CALGreen)	9
5.5	City of San Diego – Ground-Borne Vibration	9
5.6	Project Requirements.....	10
6.	Thresholds of Significance	11
7.	Analysis Methodology	12
7.1	Traffic Noise	12
7.2	Construction Noise.....	12
7.3	Mechanical Equipment Noise.....	14
7.4	Traffic Generation	14
8.	Existing Conditions.....	15
8.1	Measurements	16
8.2	Noise Model – Existing Noise Environment	17
8.3	Site Compatibility	18
9.	Site Generated Noise and Impacts	19
9.1	Construction Activities.....	19
9.2	Site-Generated Noise.....	21
10.	Future Noise Environment at the Project Site	23
11.	Summary of Impacts	30
12.	Mitigation Measures	31
13.	Noise Levels with Mitigation	33

1. EXECUTIVE SUMMARY

This report serves to investigate the existing noise environment and assess the potential noise impact associated with the construction and operation of an expansion at the existing Casa de las Campanas campus at 18655 W. Bernardo Drive in San Diego, CA. The proposed five-story expansion includes parking, residential, common, memory care, and assisted living areas totaling approximately 140,000 square feet. Project compatibility with the existing noise environment and potential impacts from the construction and operation of the project are analyzed to determine compliance with the regulatory framework.

The planned Phase III expansion site is centered at approximately 33°03'02.9"N 117°04'26.2"W on the existing Casa de las Campanas campus. It is bound by the existing campus to the North, South and West and Interstate 15 to the East. Casa de las Campanas is located within an RM-2-5 residential zone; the nearest and only noise-sensitive receivers are located within an RM-1-1 residential zone to the East of Interstate 15.

Major existing noise sources at the project site include Interstate 15 and W Bernardo Drive. These are the only significant traffic noise sources and the site is not located within Community Noise Equivalent Level (CNEL) contours of any airports or located near any rail lines. Traffic noise at the site is expected to consistently reach a CNEL of 75-80. Accordingly, the eastern building envelope will need to have a STC_c of 45 (OITC 35) to comply with the City of San Diego's Noise Compatibility Guideline of 45 CNEL for interior residential areas.

The project would generate noise from construction activities, site traffic, parking lot activities, truck deliveries and on-site mechanical equipment. Noise emission from the operation of the project is analyzed to the existing Casa de las Campanas buildings and the RM-1-1 land use zone to the East in accordance with noise standards in the City Noise Abatement and Control Ordinance (Noise Ordinance).



Figure 1-1: Casa de las Campanas Campus Plan – Phase III Expansion Project Site Shown in Orange

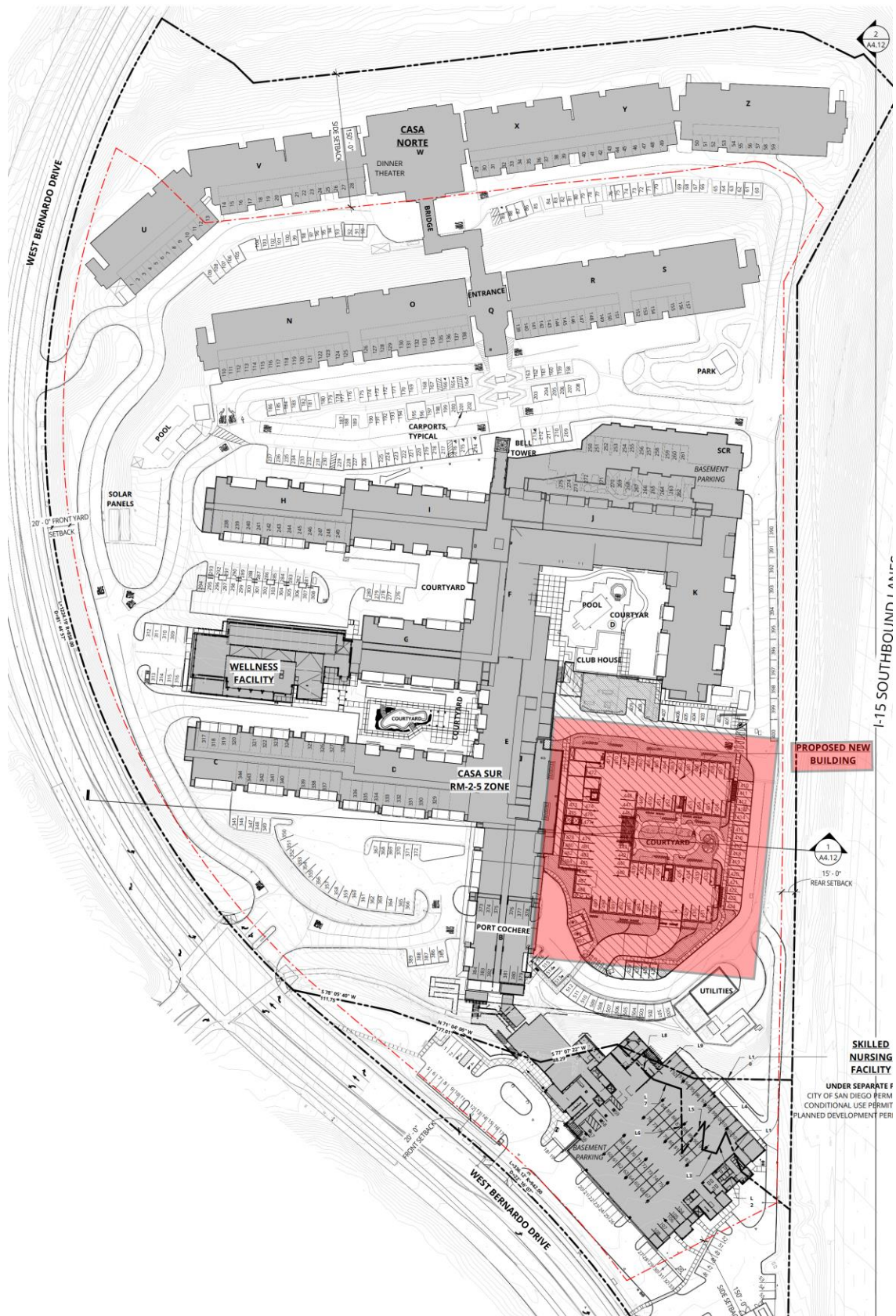


Figure 1-2 : Casa de las Campanas Site Plan with Proposed Phase III Highlighted in Red

2. FUNDAMENTALS OF SOUND

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a medium to the human ear. These pressure waves, perceived as sound, can be described by their *frequency* and *amplitude*. As sound propagates through a medium, it modulates between periods of compression (positive pressure) and rarefaction (negative pressure). The number of times per second that a wave modulates between the compression and rarefaction periods is the frequency and is expressed in Hertz (Hz) or cycles per second (cps). Amplitude describes the maximum pressure differential of the sound wave and is perceived as “loudness.”

The medium of main concern for environmental noise is air; noise is defined undesired sound. Units and descriptors that quantify noise are detailed in the following section.

3. NOISE DESCRIPTORS

The following sections briefly describe the noise descriptors that will be used throughout this study:

3.1 Decibels

The amplitude of a sound is described in terms of sound pressure level (SPL) which refers to the root-mean-square (rms) pressure of a sound wave at a given point in space and is measured in Pascals (Pa). However, expressing sound pressure levels in terms of Pa would be very cumbersome since it would require a very wide range of numbers (approximately 20 μPa to 200 Pa (20,000,000 μPa)). Accordingly, when working with sound pressure levels, a logarithmic scale, decibels (dB) are used. Decibels, when used in the context of sound pressure, describe the ratio of a given sound pressure to the reference (20 μPa – the human threshold of hearing for sound in air). A sound pressure level, in decibels, is calculated as follows:

$$SPL = 20 \log_{10} \left(\frac{X}{20 \mu Pa} \right)$$

where X is the actual sound pressure and 20 μPa is the reference pressure.

Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. Decibel values are added with the following formula:

$$dB = 10 \log_{10} (10^{\frac{a}{10}} + 10^{\frac{b}{10}})$$

For example, substituting the decibel values 73 and 76 for a and b yields a result of 78.

3.2 A-Weighting

Sound pressure alone is not a reliable indicator of loudness. Perception of loudness depends on the characteristics of the receiver. For example, in humans and many other mammals, the frequency or pitch of a sound influences perceived loudness. In general, the healthy human ear is most sensitive to sounds between 1 kHz and 5 kHz and perceives higher (≥ 7 -8kHz) and lower frequency (≤ 500 Hz) sounds of the same amplitude as being less loud. In order to better relate noise to the characteristics of this equal loudness perception across frequencies a frequency-dependent weighting scale (A Weighting) is used. To indicate that a sound pressure measurement is A-Weighted, an A is added to the dB unit (dBA).

3.3 Equivalent Sound Level (L_{EQ})

Many noise sources produce levels that fluctuate over time; examples include mechanical equipment that cycles on and off, or construction work which can vary sporadically. The equivalent sound level (L_{EQ}) describes the average acoustical energy content of noise for an identified period of time. The L_{EQ} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy over the duration of the exposure.

3.4 Community Noise Equivalent Level (CNEL)

It is recognized that a given level of noise may be more or less tolerable depending on the duration of the exposure experienced by an individual, as well as the time of day during which the noise occurs. The community noise equivalent level (CNEL) is a measure of the cumulative 24-hour noise exposure that considers not only the variation of the A-weighted noise level but also the duration and the time of day of the disturbance. The CNEL is derived from the twenty-four A-weighted 1-hour L_{EQ} periods that occur in a day, with a 5 dB penalty applied to the 19:00 to 21:00 hourly L_{EQ} periods and a 10 dB penalty applied to the 22:00 to 6:00 hourly L_{EQ} periods to account for increased noise sensitivity during these hours. The formula to calculate CNEL is as follows:

$$CNEL = 10 \log_{10} \left\{ \left(\sum_{7:00}^{18:00} 10^{\frac{x}{10}} \right) + \left(\sum_{19:00}^{21:00} 10^{\frac{x+5}{10}} \right) + \left(\sum_{22:00}^{6:00} 10^{\frac{x+10}{10}} \right) \right\}$$

where x equals the hourly L_{EQ} of the given hour 0:00 through 23:00.

Many state and local agencies have adopted CNEL as the measure of community noise, including the State Department of Aeronautics and the California Commission on Housing and Community Development.

4. VIBRATION DESCRIPTORS

4.1 Peak Particle Velocity (PPV)

Vibration consists of rapidly fluctuating motions with an average motion of zero. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak amplitude of the vibration velocity. The accepted unit for measuring PPV in the USA is inches per second (in/sec); therefore, this is the unit that is used throughout this report. PPV is only applicable to this Project in the assessment of potential building damage due to ground-borne vibration from construction activities. (PPV is related to the stresses that are experienced by buildings subjected to ground-borne vibration.)

4.2 Vibration Velocity Level (L_v)

Although PPV is appropriate for evaluating the potential for building damage, it is not suitable for evaluating human response to ground-borne vibration. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to an "average" vibration amplitude. However, the actual average level is not a useful measure of vibration because the net average of a vibration signal is zero. Instead, vibration velocity level (L_v) is used for evaluating human response. L_v describes the root mean square (rms) velocity amplitude of the vibration. This rms value may be thought of as a "smoothed" or "magnitude-averaged" amplitude. The rms of a vibration signal is typically calculated over a 1 second period. The maximum L_v describes the maximum rms velocity amplitude that occurs during a vibration measurement.

L_v can be measured in inches per second (in/sec). However, expressing these levels in terms of in/sec would be very cumbersome since it would require a very wide range of numbers. For this reason, L_v is stated in terms of decibels. Although it is not a universally accepted notation, the abbreviation "VdB" is used throughout this report to denote vibration velocity level decibels in order to reduce the potential for confusion with sound level decibels. The VdB is a logarithmic unit that describes the ratio of the actual rms velocity amplitude to a reference velocity amplitude. The accepted reference velocity amplitude is 1×10^{-6} in/sec.

5. REGULATORY FRAMEWORK

5.1 Applicable State Noise Standards

5.1.1 Residential

The California Environmental Quality Act (CEQA) Guidelines establishes guidelines for the evaluation of significant impacts of environmental noise attributable to a proposed project. The guidelines ask whether the project would result in:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance or applicable standards of other agencies.
2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
6. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The CEQA Guidelines and the City's Noise Element provide no definition of what constitutes a substantial noise increase. Typically, in high noise environments, if the CNEL due to the project would increase by 3 dBA at noise sensitive receptors, the impact is considered significant.

5.2 City of San Diego Noise Element – Land Use Compatibility Standards

The City of San Diego General Plan Noise Element defines compatibility standards for different categories of land use. These standards are intended to be used in planning efforts to prevent future incompatibilities. Off-site noise sources including traffic noise are covered by the land use compatibilities shown in Table 5-1. For residential multi-family use, the land use applicable to the project, noise levels up to 60 CNEL are considered compatible and noise levels up to 70 CNEL are considered compatible with the condition that the building envelope attenuates exterior noise to 45 CNEL.

Table 5-1: City of San Diego Noise Element – 2015 Land Use Noise Compatibility Standards

Land Use Category			Exterior Noise Exposure (CNEL)			
			60	65	70	75
<i>Parks and Recreational</i>						
Parks, Active and Passive Recreation						
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities						
<i>Agricultural</i>						
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables						
<i>Residential</i>						
Single Dwelling Units; Mobile Homes				45		
Multiple Dwelling Units <i>*For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.</i>				45	45*	
<i>Institutional</i>						
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12 Educational Facilities; Libraries; Museums; Places of Worship; Child Care Facilities				45		
Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities				45	45	
Cemeteries						
<i>Retail Sales</i>						
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories					50	50
<i>Commercial Services</i>						
Building Services; Business Support; Eating & Drinking; Financial Institutions; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support					50	50
Visitor Accommodations				45	45	45
<i>Offices</i>						
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters					50	50
<i>Vehicle and Vehicular Equipment Sales and Services Use</i>						
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking						
<i>Wholesale, Distribution, Storage Use Category</i>						
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution						
<i>Industrial</i>						
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries						
Research & Development					50	
	Compatible	Indoor Uses	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.			
		Outdoor Uses	Activities associated with the land use may be carried out.			
	Conditionally Compatible	Indoor Uses	Building structure must attenuate exterior noise to the indoor noise level indicated by the number for occupied areas. Refer to Section I.			
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable. Refer to Section I.			
	Incompatible	Indoor Uses	New construction should not be undertaken.			
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.			

5.3 City of San Diego Municipal Code §59.5.0401-08

5.3.1 Criteria Applicable to Site Generated Noise

Site generated noise is regulated by the City of San Diego Municipal Code (SDMC) §59.5.0401, which states:

- A. It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit
- B. The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts.

SDMC §59.5.0401 noise limits, by 1-hour LA_{EQ} , are detailed in Table 5-2.

Table 5-2: SDMC §59.5.0401 Noise Level Limits by Land Use

Land Use	Time of Day	$LA_{EQ(1)}$
Single Family Residential	7:00 - 19:00	50
	19:00 - 22:00	45
	22:00 - 7:00	40
Multi-Family Residential	7:00 - 19:00	55
	19:00 - 22:00	50
	22:00 - 7:00	45
All other Residential	7:00 - 19:00	60
	19:00 - 22:00	55
	22:00 - 7:00	50
Commercial	7:00 - 19:00	65
	19:00 - 22:00	60
	22:00 - 7:00	60
Industrial or Agricultural	Any time	75

5.3.2 Criteria Applicable to Construction Noise

Construction noise is regulated by SDMC § 59.5.0404, which states:

- A. It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with the exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator.
- B. Except as provided in subsection C hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.
- C. The provisions of subsection B of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

5.4 California Green Building Code (CALGreen)

§5.507.4.2 of the 2013 California Green Building Code stipulates that for buildings exposed to a noise level of 65 dB or more when measured as a 1-hour Equivalent Sound Level (L_{EQ}), the building façade, including walls, windows, and roofs, shall provide enough sound insulation so that the interior sound level from exterior sources does not exceed 50 dBA during any hour of operation. This applies to non-residential spaces such as retail space, leasing, and amenities.

5.5 City of San Diego – Ground-Borne Vibration

The City of San Diego does not establish criteria for maximum vibration thresholds. However, the Federal Transit Administration (FTA) provides standards and guidelines for perceptibility and annoyance for ground-borne vibration as well as construction vibration impact criteria for building damage. In most circumstances, common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures. For roadways, the ground-borne vibration from traffic is barely perceptible.

The FTA has published a technical manual titled, “Transit Noise and Vibration Impacts Assessment,” that provides ground-borne vibration impact criteria with respect to building damage and human response during construction activities. As discussed above, building vibration damage is measured in peak particle velocity described in the unit of inches per second. Table 5-3 provides the Federal Transit Administration vibration criteria applicable to construction activities.

Table 5-3: Federal Transit Administration Construction Vibration Impact Criteria for Building Damage

Building Category	Peak Particle Velocity (ips)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Impacts for the human response to vibration levels are given in VdB by the FTA in the Transit Noise and Vibration Impact Assessment manual as shown in Table 5-4 below. The FTA Land Use Category 1 impact criteria is intended for vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. These Category 1 impact criteria vibration levels are well below those associated with human annoyance but are equal to the threshold of perceptibility. The FTA vibration criteria for Category 2, residential impact, indicate impacts occur at a 72 VdB vibration level for frequent events occurring more than 70 times per day, at 75 VdB for occasional events occurring between 30 and 70 times per day, and at 80 VdB for infrequent events occurring less than 30 times per day.

Table 5-4 : FTA Ground-Borne Vibration Impact Criteria for General Assessment

Land Use Category	GBV Impact Levels (VdB re 1 μ in/sec)		
	Frequent Events ¹	Occasional Events ²	Infrequent Events ³
Category 1: Buildings where vibration would interfere with interior operations	65⁴	65	65
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime use	75	78	83

Notes:

1. “Frequent Events” is defined as more than 70 vibration events of the same source per day.
2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.
3. “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

5.6 Project Requirements

The project requirements are summarized in Table 5-5 below.

Table 5-5 : Summary of Project Requirements

Activity	Standard
Exterior Noise at Multi-Family Residences	60 CNEL Conditionally Compatible up to 75 CNEL when affected by traffic noise.
Interior Noise at Multi-Family and Residences	45 CNEL
Interior Noise at Non-Residential Spaces (CALGreen)	50 dBA during any hour of operation
Construction Noise	Limited to the hours of 7:00 to 19:00. Maximum of 75 dBA at Residential Property line during construction hours
Operational Noise	At multi-family residential property, one-hour average sound level: 55 dBA from 7:00 to 19:00 50 dBA from 19:00 to 22:00 45 dBA from 22:00 to 7:00 At single-family residential property, one-hour average sound level: 50 dBA from 7:00 to 19:00 45 dBA from 19:00 to 22:00 40 dBA from 22:00 to 7:00
Vibration	At residences where people normally sleep: 72 VdB - greater than 70 events per day 75 VdB - between 30-70 events per day 80 VdB - less than 30 events per day

6. THRESHOLDS OF SIGNIFICANCE

Based on the regulatory framework discussed in Section 5, a significant impact will be assessed if the Project will result in:

- A. Exposure of persons to or generation of noise levels in excess of standards established in the San Diego General Plan and the San Diego Municipal Code, or applicable standards of other agencies. This impact will occur if:
 - 1. The CNEL exceeds 65 dBA at outdoor use areas such as balconies, patios and outdoor recreation areas at the proposed building; or
 - 2. The CNEL exceeds 45 dBA within the interior of the proposed building; or
 - 3. Project construction generates a 12-hour average noise level in excess of 75 dBA at off-site sensitive receptors or at sensitive receptors associated with the existing Casa de las Campanas facilities; or
 - 4. Project construction generates a CNEL in excess of 45 dBA within residential rooms or 50 dBA within office areas associated with the existing Casa de las Campanas facilities; or
 - 5. The operation of the Project's outdoor mechanical equipment generates a CNEL in excess of 65 dBA at outdoor uses associated with the existing Casa de las Campanas facilities; or
 - 6. The operation of the Project's outdoor mechanical equipment generates a CNEL in excess of 45 dBA within residential rooms or 50 dBA within office areas associated with the existing Casa de las Campanas facilities; or
 - 7. The operation of the Project generates noise levels that exceed the standards identified in the San Diego Municipal Code.
- B. Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels. This impact will occur if:
 - 1. Any Project construction activity causes the vibration velocity level (Lv) to exceed 72 VdB at any residential building or 75 VdB at any institutional building; or,
 - 2. The PPV at any building due to Project construction exceeds 0.20 in/sec.
- C. A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project. This impact will occur if operation of the Project increases the noise level at a sensitive off-site property by more than 3 dB.
- D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project. This impact will occur if Project construction increases the noise level at a sensitive off-site property by more than 10 dB.
- E. Exposure of persons residing or working on the Project site to excessive noise levels as a result of activities at an airport. Since there are no airports in the vicinity of the Project, this threshold will not be considered further in this study.

7. ANALYSIS METHODOLOGY

Site topography, layout, and scale are modeled for all of the following analyses using site plan drawings (A1.00p, 11-01-17 Architectural DD progress set) aerial imagery (Landsat/Copernicus, 2016) and elevation data (2 ft contour lines, SanGIS, 2015).

7.1 Traffic Noise

Interstate 15 and W Bernardo Drive are the primary automobile traffic noise sources at the Casa de las Campanas site. Noise emissions from these roadways are modeled using Datakustik's CadnaA v2018 in accordance with the RLS-90 traffic noise standard. The noise model uses traffic volume data obtained from Caltrans. Hourly AADT by vehicle classification is not available, so vehicle classification mix was conservatively estimated based on road type. Software calculations predict the noise emission level from road sources, taking into account the site measurements and the input parameters, and project the received levels on a three-dimensional receiver grid at the project site. Input parameters used in the model are shown in Table 7-1.

Table 7-1: Input Parameters for Traffic Noise Model

Road	AADT	Type	Speed Limit	Gradient	% Heavy Vehicles (7:00-22:00)	% Heavy Vehicles (22:00-7:00)
I-15	212000	Motorway	65 mph	2%	25	45
W Bernardo Dr	6850	Local	35 mph	1%	10	3

7.2 Construction Noise

Noise levels from the proposed construction operations are calculated in accordance with ISO 9613 *Attenuation of sound during propagation outdoors* to the closest points of the nearest sensitive receivers. To simplify the noise emissions analysis, it is assumed that construction activity will be located around the center of the site.

Each phase of construction has specific equipment and operation requirements, resulting in varying noise characteristics per phase. Overall noise levels for each phase of the proposed construction operations are calculated as the summation of all equipment to be used, with an applied time correction. The time correction is based on the percentage of time each piece of equipment is expected to be used at a maximum load and the total estimated duration of use. Total sound energy of all sources is modeled assuming simultaneous use of all equipment. Information on the equipment and duration of use, shown in Table 7-2, is based on the Phase III construction schedule obtained from the contractor, BNBuilders, Inc.

Table 7-2: CDLC Phase III Construction Schedule – Estimated Noise Levels

Construction Phase, Duration, & Equipment	LA _{max} @ 50'	Usage Factor ¹	Daily Operation Time (Hours)	Time Correction ² (dBA SPL)	LA _{EQ(12)} @ 50' with Time Correction
Site Demolition (Duration: 3 Weeks)					
1 excavator	81	0.4	8	-6	75
1 loader	79	0.4	8	-6	73
3 dump trucks	81	0.4	8	-6	75
1 concrete saw	90	0.2	8	-9	81
2 pickup trucks	78	0.4	1	-15	63
Combined					83
Grading/Shoring/Basement Foundation Walls/Basement Slab (Duration: 12 Weeks)					
2 compactors	86	0.2	6	-10	76
1 backhoe	78	0.4	8	-6	72
1 dump truck	77	0.4	8	-6	71
1 dozer	82	0.4	6	-7	75
2 pickup trucks	78	0.4	1	-15	63
1 grader	85	0.4	6	-7	78
1 vacuum sweeper	82	0.1	2	-18	64
1 auger machine	85	0.5	8	-5	80
1 forklift	75	0.4	5	-8	67
1 mobile crane	81	0.2	7	-9	72
Combined					84
UG Utilities (Duration: 8 Weeks)					
1 backhoe	81	0.4	6	-7	74
2 compactors	86	0.2	6	-10	76
3 pickup trucks	80	0.4	8	-6	74
Combined					80
Podium Structure (Duration: 5 Weeks)					
1 air compressor	78	0.4	4	-9	69
2 concrete vibrators	83	0.2	4	-12	71
1 generator	81	0.5	6	-6	75
4 concrete mixers	85	0.4	4	-9	76
1 forklift	75	0.4	5	-8	67
1 concrete pump	81	0.2	4	-12	70
4 saws	90	0.2	4	-12	78
1 flatbed truck	74	0.4	4	-9	60
4 pickup trucks	81	0.4	1	-15	66
Combined					82
Metal Stud Structure/Roof Construction (Duration: 22 Weeks)					
1 air compressor	78	0.4	4	-9	69
1 mobile crane	81	0.2	7	-9	70
2 generators	84	0.5	7	-5	78
2 impact wrenches	88	0.5	4	-8	80
2 forklifts	78	0.4	5	-8	70
2 saws	87	0.2	8	-9	78
2 trucks	77	0.4	3	-10	67
4 pickup trucks	81	0.4	1	-15	66
2 welders	80	0.4	7	-6	74
2 shear stud guns	88	0.5	4	-8	80
Combined					86
Exterior Skin (Duration: 24 Weeks)					
1 air compressor	78	0.4	6	-7	71
1 mobile crane	81	0.2	4	-12	68
1 generator	81	0.5	6	-6	75
2 forklifts	78	0.4	5	-8	70
2 JLG man-lifts	78	0.2	6	-10	68
1 saw	84	0.2	6	-10	74
2 trucks	77	0.4	2	-12	66
6 pickup trucks	83	0.4	1	-15	68
6 screw guns	93	0.5	6	-6	87
2 chop saws	93	0.2	6	-10	83
Combined					89

¹ Percentage of time equipment is operating at maximum level

² Correction for usage factor and total duration of use (in hours) averaged over a 12-hour period: $(q \cdot (10 \cdot \log(t/12)))$ where q is the usage factor for the equipment and t is the estimated duration of use in hours.

7.3 Mechanical Equipment Noise

Noise levels from mechanical equipment are modeled using CadnaA v2018 in accordance with ISO 9613 *Attenuation of sound during propagation outdoors*. The predictive noise model assumes all mechanical equipment operating continuously under a maximum load. Mechanical equipment contributing to exterior noise emission are detailed in Table 7-3.

Table 7-3: New Mechanical Equipment Contributing to CDLC Phase III Exterior Noise Emission

Type	Location	LwA	dBA SPL (5'-0")
Exhaust Fan 1	Roof	75	63
Exhaust Fan 2	Roof	72	60
Exhaust Fan 3	Roof	72	60
Exhaust Fan 4	Roof	66	54
Exhaust Fan 5	Roof	77	65
Packaged Air Handling Unit 1	Roof	91	79
Packaged Air Handling Unit 2	Roof	91	79
Packaged Air Handling Unit 3	Roof	93	81
Packaged Air Handling Unit 4	Roof	81	69
Fluid Cooler 1	Central Utility Plant	97	85
Cooler Condenser 1	Central Utility Plant	80	68
Cooler Condenser 2	Central Utility Plant	78	66
Water Chiller 1	Central Utility Plant	91	79

7.4 Traffic Generation

Trips generated to and from the project site on W Bernardo Drive are obtained by the project traffic consultant, Chen Ryan Associates. Additional trips are added to the existing traffic noise model in CadnaA.

8. EXISTING CONDITIONS

To calibrate the noise model, continuous 24-hour measurements were taken at two locations at the project site, shown in 8-1, with Larson Davis 820 Type 1 sound level meters. Both sound level meters were configured with an A weighting network and slow response and were calibrated before and after measurements to ensure accuracy of the data. Weather conditions during the measurement period were partly cloudy with temperatures ranging from 50 to 65 degrees Fahrenheit.



Figure 8-1: Existing Traffic Noise Measurement Locations

8.1 Measurements

The results of the continuous 24-hour measurement periods are shown in Figures 8-2 and 8-3 as Hourly LA_{EQ} and CNEL.

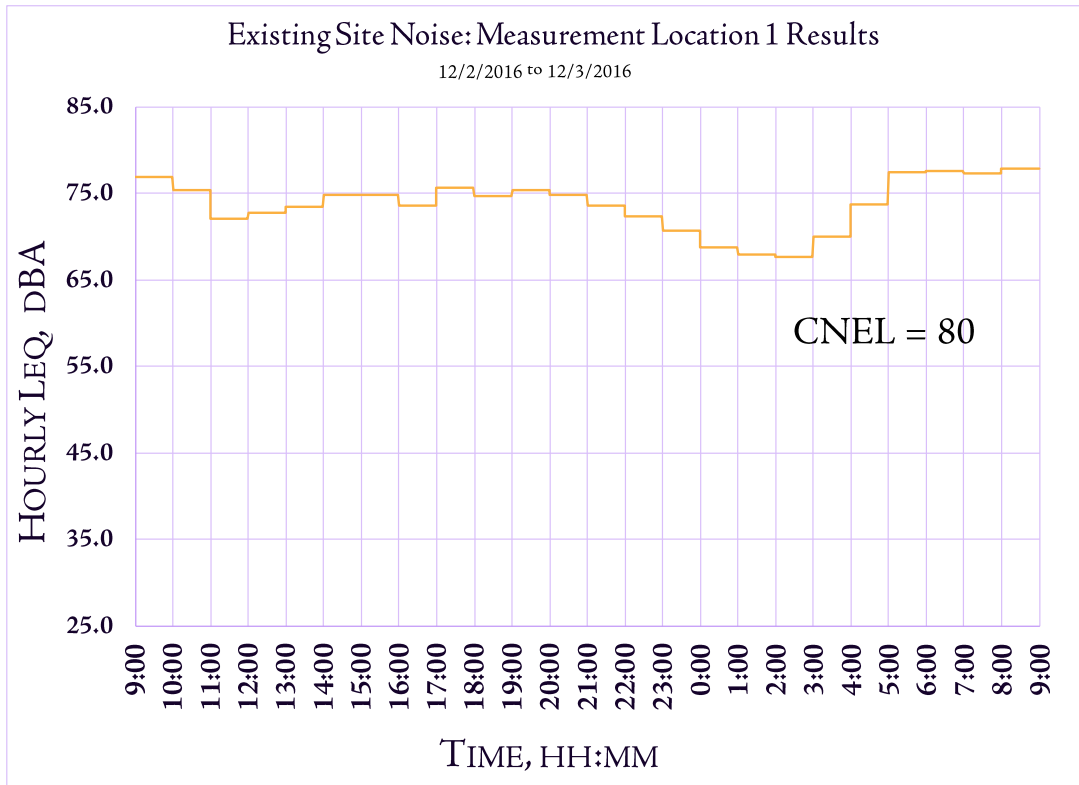


Figure 8-2: Existing Site Traffic Noise – Measurement Location 1 Results

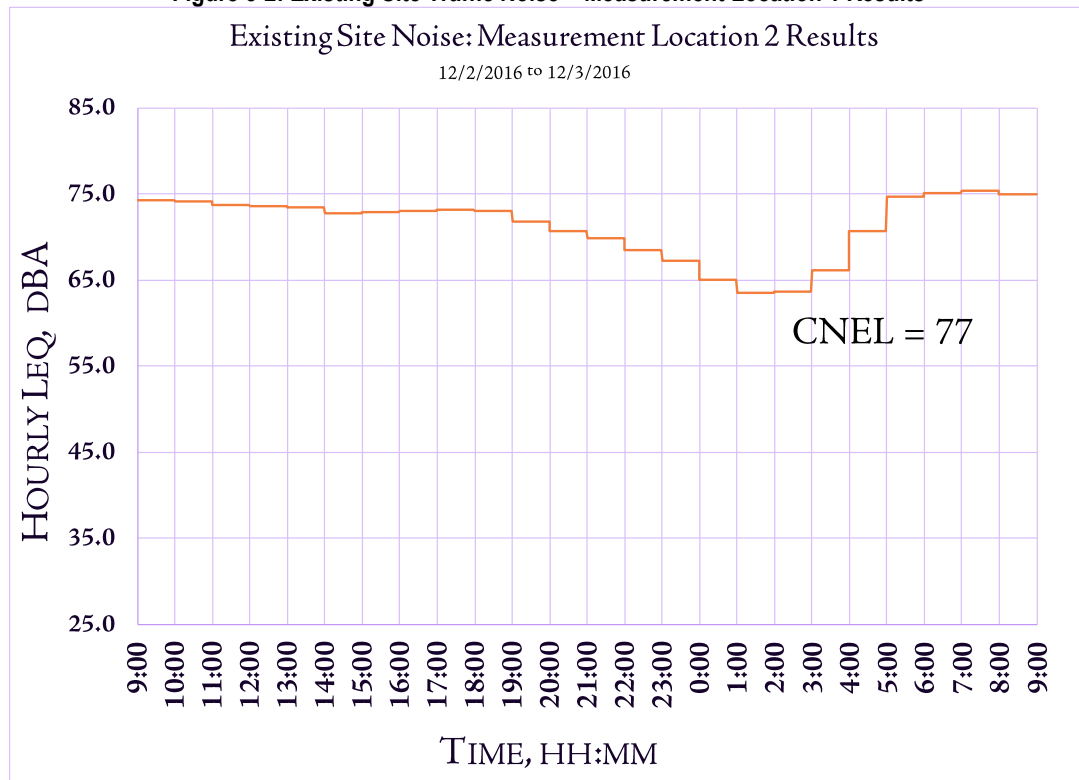


Figure 8-3: Existing Site Traffic Noise – Measurement Location 2 Results

8.2 Noise Model – Existing Noise Environment

Using the input parameters specified in Table 7-1 in accordance with the RLS-90 standard, the following 5 dB CNEL contours in Figure 8-4 are generated on a ground-floor receiver grid at the project site. In addition, noise levels are calculated to all building facades in a vertical grid. Numbers displayed in octagonal symbols represent the maximum CNEL received on that vertical receiver line.

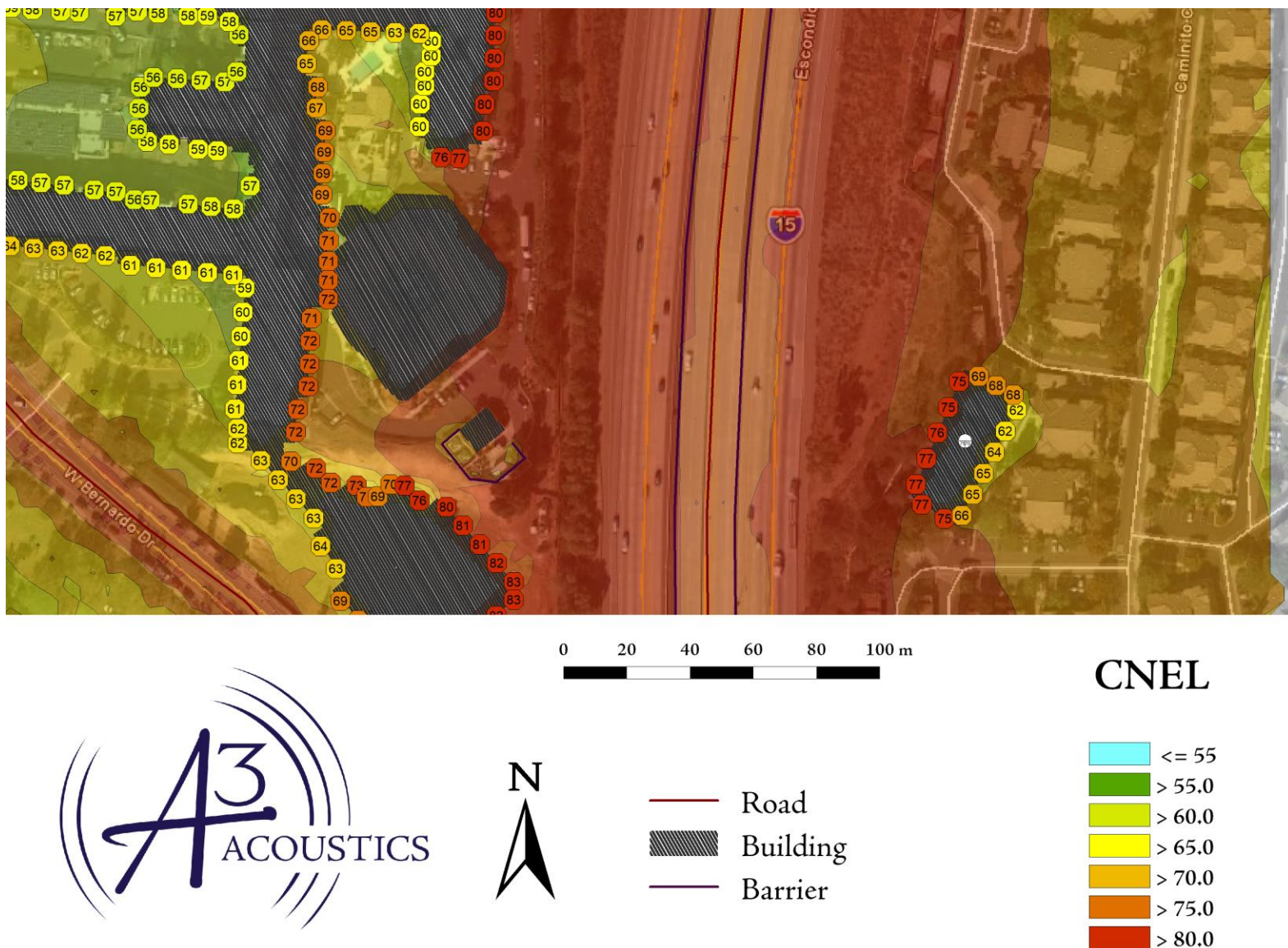


Figure 8-4: Existing Site Traffic Noise

8.3 Site Compatibility

As shown in Figure 8-4, the Casa de las Campanas project site is defined as incompatible by the City of San Diego compatibility guidelines for mixed-use residential. However, with the noise mitigations detailed in Section 12, the conditionally compatible interior noise criteria of 45 CNEL and exterior criteria of 65 CNEL will be satisfied.

9. SITE GENERATED NOISE AND IMPACTS

9.1 Construction Activities

9.1.1 Construction Noise

Following the methodology described in Section 7.2, construction noise levels are calculated to the nearest receiving locations at adjacent sensitive receivers.

Table 9-1: CDLC Construction Noise: Estimated Received Noise Levels at Nearest Sensitive Receivers

Noise-Sensitive Location	Construction Phase	Estimated LA _{EQ} (12Hr) @ 50 ft	Attenuation due to Distance (dBA SPL)	LA _{EQ} (12Hr) @ Location
RM-1-1 zone to the East	Site Demolition	83	-21 (600')	62
	Grading	84		63
	UG Utilities	80		59
	Podium Structure	82		61
	Metal Stud Structure	86		65
	Exterior Skin	89		68
Nearest Existing Casa de las Campanas facility to the West	Site Demolition	83	-10 (160')	73
	Grading	84		74
	UG Utilities	80		70
	Podium Structure	82		72
	Metal Stud Structure	86		76
	Exterior Skin	89		79
Nearest Existing Casa de las Campanas facility to the North	Site Demolition	83	-11 (170')	72
	Grading	84		73
	UG Utilities	80		69
	Podium Structure	82		71
	Metal Stud Structure	86		75
	Exterior Skin	89		78
Nearest Existing Casa de las Campanas facility to the South	Site Demolition	83	-12 (200')	72
	Grading	84		73
	UG Utilities	80		69
	Podium Structure	82		71
	Metal Stud Structure	86		74
	Exterior Skin	89		78

As shown in Table 5-1, the estimated 12-hour average noise levels received at the RM-1-1 residential zone to the East will range from 61 to 68 dBA. This meets the SDMC limit of 75 dBA for construction noise levels received at residential properties.

Table 5-1 also illustrates that construction noise is estimated to meet SDMC limits to the existing Casa de las Campanas facility during all phases except the final two (Metal Stud Structure, Exterior Skin). However, the actual noise levels received at the existing Casa de las Campanas facility locations are dependent on the equipment location and could have the potential to also exceed the SDMC limit of 75 dBA. Accordingly, a temporary noise barrier should be installed during all phases of construction on the north, east and south boundaries of the site.

9.1.2 Ground-Borne Vibration from Construction

There are no regulatory requirements for vibration from construction equipment. However, ground-borne vibration from construction activities might be noticeable depending on the equipment and location. The primary vibratory source during the construction of the project will be large bulldozers and other similar heavy equipment items. Based on published data from Caltrans, typical bulldozer activities generate a peak particle velocity (PPV) of 0.089 in/sec and a vibration level (Lv) of 87 VdB at a distance of 25 feet. Using these values, an analysis was conducted to estimate the ground-borne vibration levels that will be experienced at the nearest off-site and on-site buildings during construction of the Project.

Table 9-2 – Average Ground-Borne Vibration From Construction – Distances Calculated from Site Center

Noise-Sensitive Location	Distance	PPV (in/sec)	VdB
RM-1-1 zone to the East	600	0.0027	57
CdIC facility to the West	160	0.0116	69
CdIC facility to the North	170	0.0108	69
CdIC facility to the South	200	0.0090	67

As shown in the table, the predicted vibration levels at the sensitive receptors are well below the thresholds established in Section 6; therefore, the impact is less than significant at these locations. However, if a heavy piece of construction equipment operates within about 115 feet of an existing Casa de las Campanas building, it may generate a vibration level (Lv) in excess of 72 VdB. Likewise, if the equipment operates within about 15 feet of an existing building, it may generate a peak particle velocity in excess of the 0.20 in/sec threshold. Since it is unknown where the equipment will operate, the impact is considered to be potentially significant. However, this will be reduced to below a level of significance with implementation of a Vibration Monitoring Plan as detailed in Section 12 "Mitigation Measures."

Note: While this analysis provides a worst-case scenario for vibration generation by heavy equipment, actual ground-borne vibration levels at the site throughout the construction period are heavily dependent on equipment location and activity type. To determine whether ground-borne vibration levels stay below significant impact thresholds, long-term continuous vibration monitoring will be conducted during demolition and construction. A vibration monitoring plan will be submitted for review and approval prior to issuance of construction permits.

9.2 Site-Generated Noise

9.2.1 Mechanical Equipment

Noise emissions from equipment outlined in Section 7.3 are shown in Figure 9-1 as ground-floor CNEL contours. Numbers displayed in octagonal symbols on building facades represent the maximum CNEL received on that vertical receiver line.

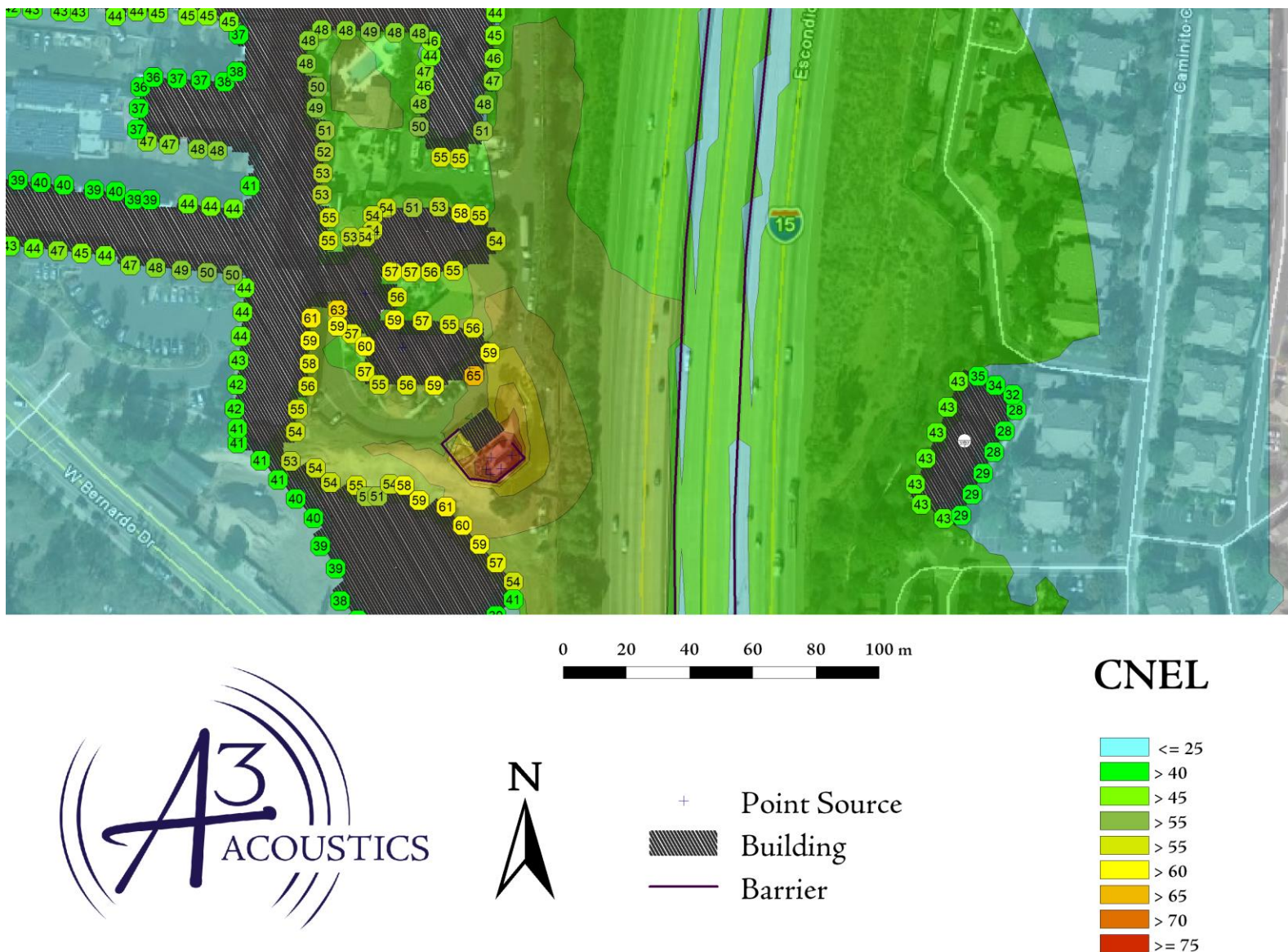


Figure 9-1: Noise from Proposed New Mechanical Equipment – Casa de las Campanas Phase III

As shown in Figure 9-1, noise from the exterior mechanical systems at Casa de las Campanas Phase III exceed the SDMC exterior noise limits for residential areas. However, noise from Interstate 15 is significantly higher in all receiver zones, therefore the impact is negligible.

9.2.2 Emergency Generator Operation

A Kohler Model 600REOZVB emergency generator will be installed in the central utility plant, approximately 60 feet from the nearest Casa de las Campanas building and 450 feet from the RM-1-1 zone to the East. Generators are not required to meet noise code during emergency use but are expected to during monthly testing. According to the manufacturer, this unit has an operational sound pressure level during testing (0% Load) of 74 dBA at 23 feet. Taking into account this data and the screening effect of the central utility plant barrier, the worst-case scenario received noise levels are 55 dBA at the top floor of the Phase II Casa de las Campanas facility and 36 dBA to the nearest RM-1-1 property line. This meets SDMC limits.

9.2.3 Traffic Generation

According to the traffic consultant, a total of 294 daily trips will be generated by the project, which equates to a 4.3% increase in daily traffic on W Bernardo Dr. Overall, this is expected to impact the CNEL emission of the road by less than 1 decibel. Therefore, the impact is negligible.

9.2.4 Truck Deliveries

Deliveries of supplies to the Project will occur on twice weekly for large trucks and daily for small trucks to a loading area located at the northwest corner of the project site. Distances from the loading area to the noise-sensitive locations are detailed in Table 9-3.

Table 9-3 – Distances – Truck Deliveries to Noise Sensitive Locations

Noise-Sensitive Receptor	Distance
RM-1-1 zone to the East	600
CdIC facility to the West (loading dock)	20
CdIC facility to the North	120
CdIC facility to the South	350

Because of the attenuation by distance and the high noise levels generated by traffic on the freeway, noise levels generated by truck deliveries at the Project site will not cause an increase in the ambient noise environment at the noise sensitive receptors. Therefore, the impact is considered less than significant.

9.2.5 Trash Pickups

Another on-site activity that will occur is trash pickups. Monthly trash pickups will occur at a container for campus remodel work located at the northwest corner of the site, and twice weekly pickups will occur at the southeast corner of the campus. The trash pickup and compacting vehicles use hydraulic equipment having typical noise levels of 80 to 85 dBA at 50 feet during operations. A typical trash pickup takes approximately three minutes, with the higher noise levels occurring during about one-half of the operation. With two trash bins at the enclosure, the pickup will take approximately six minutes. Estimated hourly noise levels for trash pickups are detailed in the Table 9-4 to each of the noise-sensitive locations.

Table 9-4 – Trash Pickup Noise Impact

Noise-Sensitive Receptor	Distance	Trash Pickup Location	1-Hr Leq
RM-1-1 zone to the East	600	Remodel Container	46 to 51 dBA
	400	Main Campus Container	49 to 54 dBA
CdIC facility to the West	100	Remodel Container	59 to 65 dBA*
	450	Main Campus Container	48 to 53 dBA*
CdIC facility to the North	80	Remodel Container	61 to 67 dBA
	700	Main Campus Container	46 to 50 dBA*
CdIC facility to the South	360	Remodel Container	50 to 55 dBA
	130	Main Campus Container	60 to 65 dBA

*Note: This receptor location does not have direct exposure to the trash pickup location. Actual noise levels will be 10-20 dB below those noted in the table due to screening from the building(s).

As shown in the table, three of the trash pickups (shown in red) are anticipated to exceed the City's daytime noise ordinance standard of 60 dBA. However, the impact is considered less than significant based on the following criteria:

1. Modeled trash pickup noise is below the ambient noise level at all of the receptor locations and the building exteriors were designed/constructed in a manner to mitigate these higher ambient noise levels.
2. These events only occur semi-weekly and monthly and last for approximately 2-3 minutes at a given time.

10. FUTURE NOISE ENVIRONMENT AT THE PROJECT SITE

The dominant source of noise affecting the Project site will be traffic on the I-15 freeway and W. Bernardo Drive. To estimate the unmitigated future traffic noise exposures that will be experienced at the Project site, the calibrated CadnaA model discussed in Section 9 of this report was revised to take into account the increased traffic volumes on the roadways and altered topography due to the presence of the building. Also included in the revised noise model was the on-site mechanical equipment discussed in Section 7.3 of this report. The results of the analysis are presented as a noise contour map in Figure 10-1 for receptors at a height of 5 feet above the proposed grade.

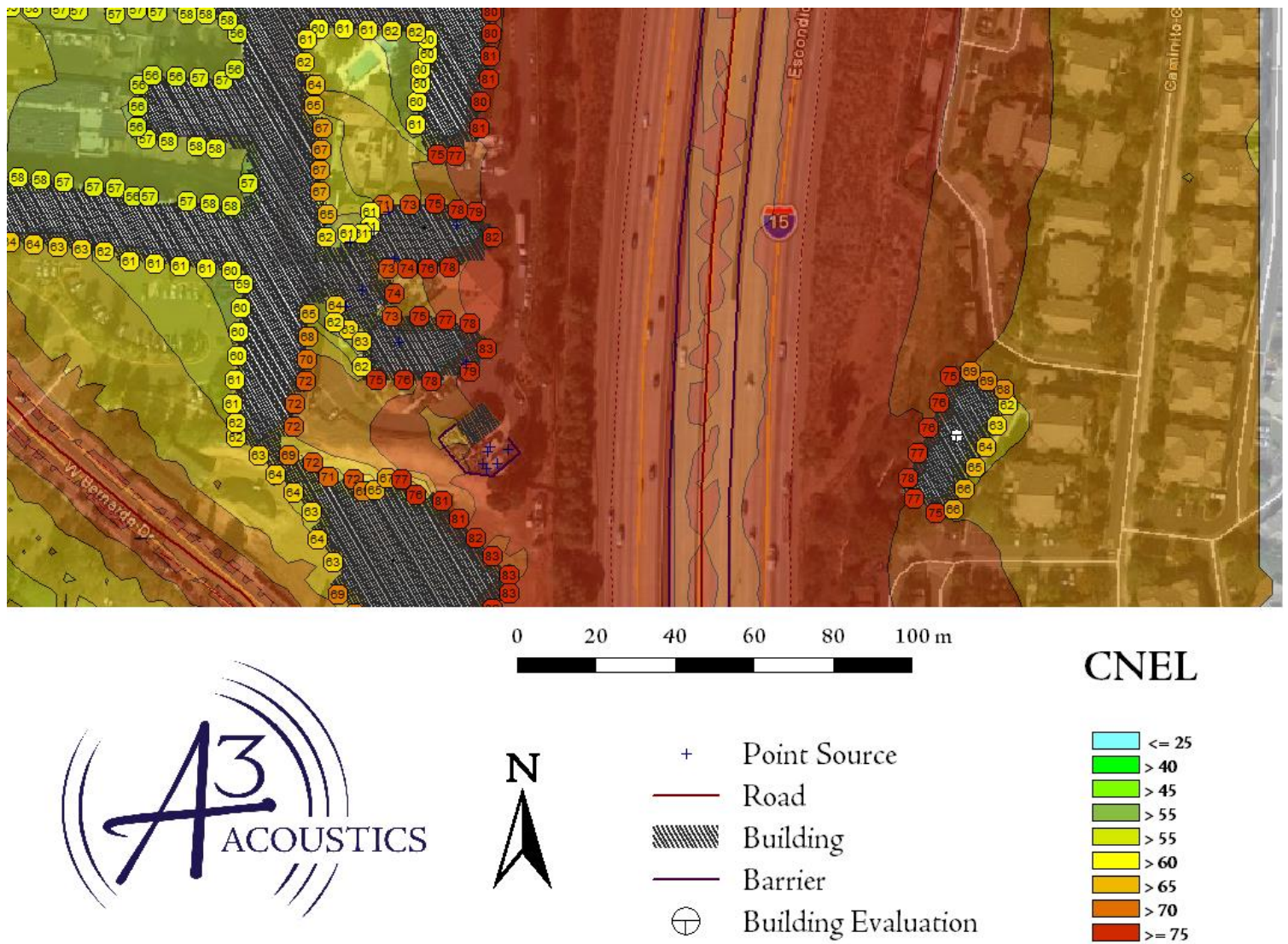


Figure 10-1: Future Noise Environment – 2032

Based on the noise model, exterior noise levels exceeding 65 CNEL at outdoor use areas are shown in Figures 10-2 through 10-6 as red, green or orange dashed lines; noise mitigation will be required in these areas.

Also shown in Figures 10-2 through 10-6 are the expected interior noise levels with standard building construction, which assumes 20 dB of attenuation with all windows and doors closed. Impact in residential units exceeding the City's interior noise standard of 45 dB is considered significant and are shown in red, yellow and orange; noise mitigation will be required in these areas. Out of the 37 total outdoor use areas, 33 will require noise mitigation, while 86 of the 90 residences will require mitigation.

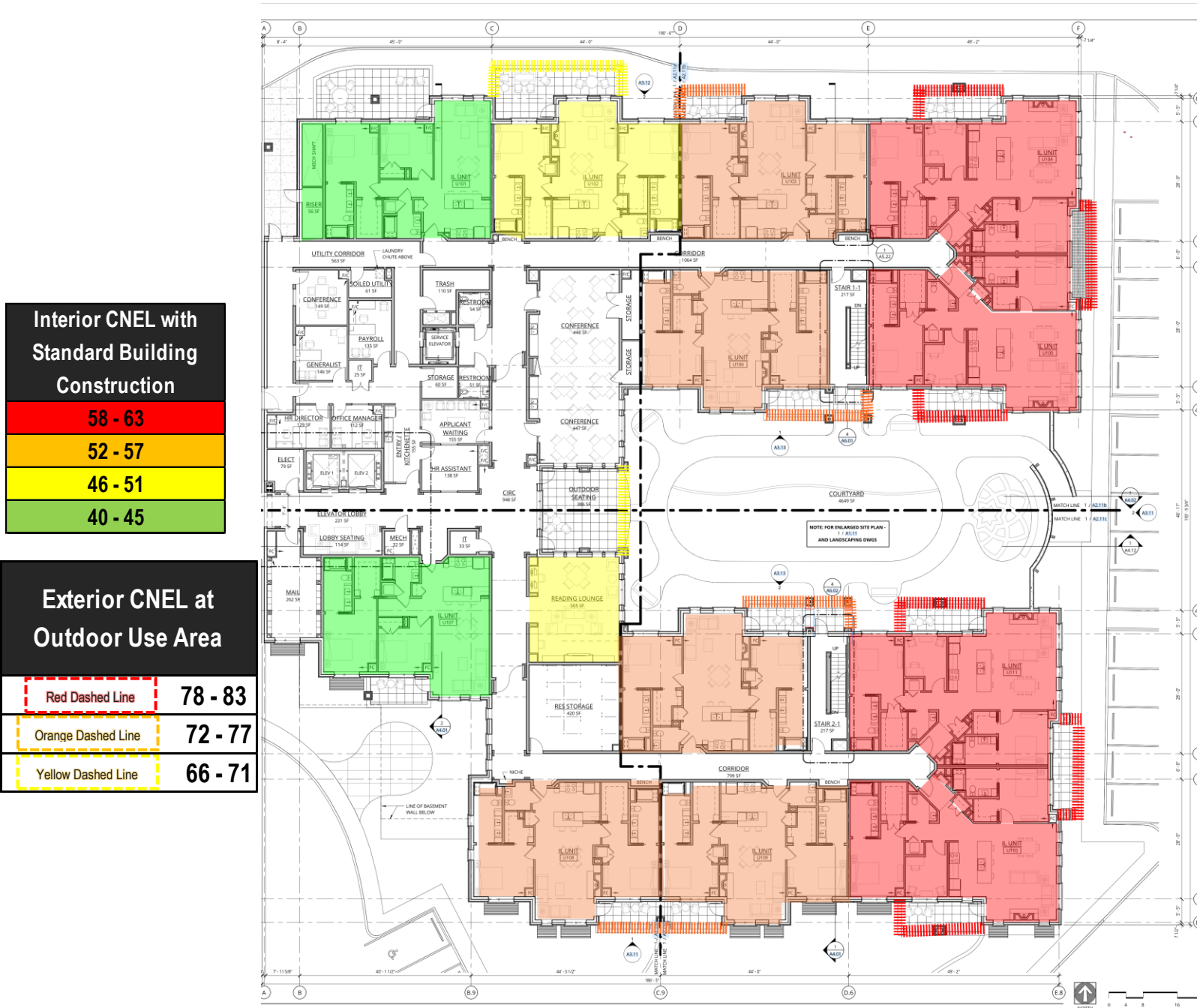


Figure 10-2 – Future Noise Environment – Exterior and Interior Noise Levels – 1st Floor

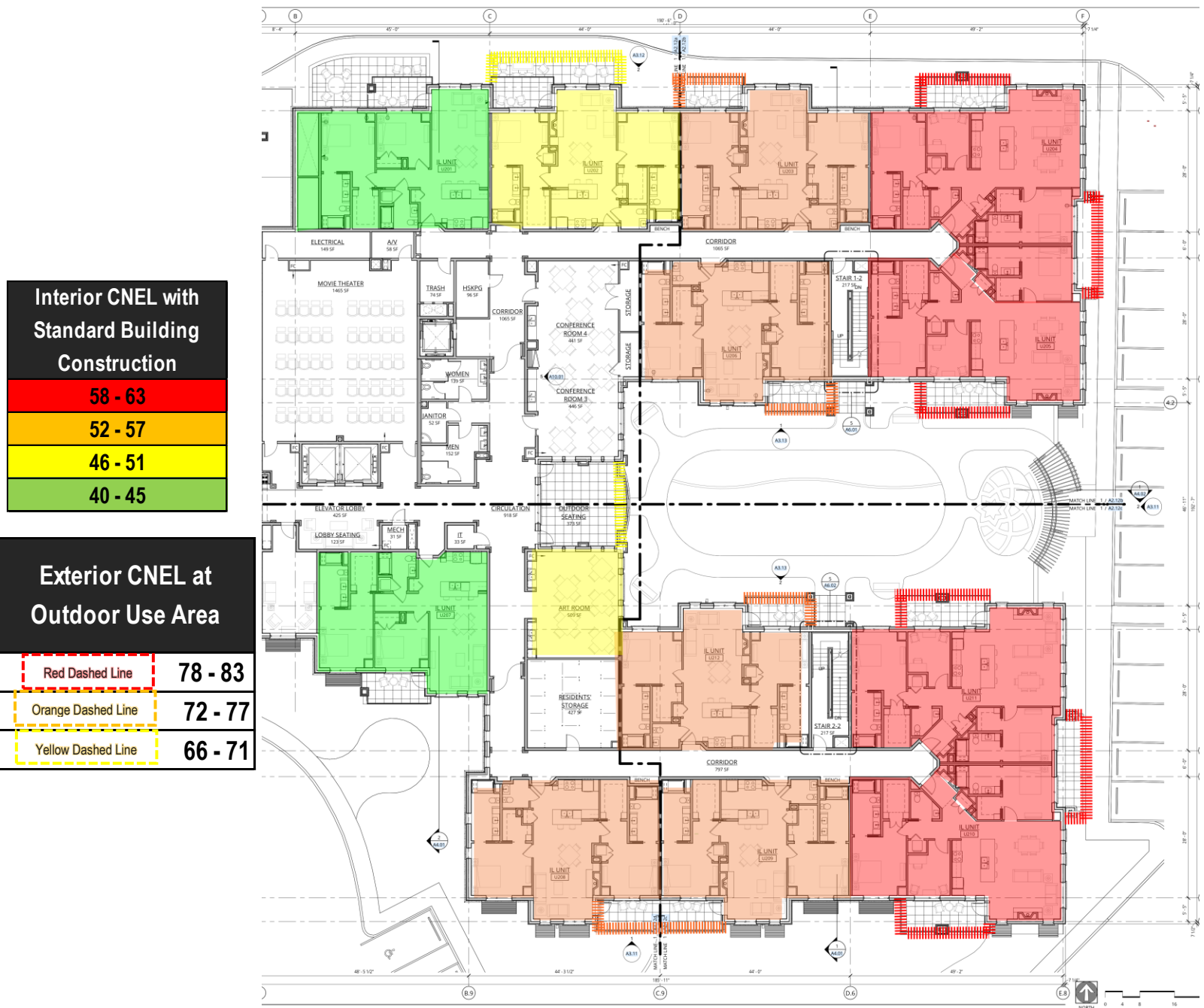


Figure 10-3 – Future Noise Environment – Exterior and Interior Noise Levels – 2nd Floor



Figure 10-4 – Future Noise Environment – Exterior and Interior Noise Levels – 3rd Floor



Figure 10-5 – Future Noise Environment – Exterior and Interior Noise Levels – 4th Floor



Figure 10-6 – Future Noise Environment – Exterior and Interior Noise Levels – 5th Floor

11. SUMMARY OF IMPACTS

Using the criteria established in this study, the following may be concluded regarding the impact of the proposed Project:

The Project will result in the exposure of persons to noise levels in excess of standards established in the San Diego General Plan and the San Diego Municipal Code, and applicable standards of other agencies. This significant impact will occur at:

Outdoor balconies and common areas where exterior CNEL will exceed 65 dBA and interior locations within the proposed building where the CNEL will exceed 45 dBA.

Project construction may result in the exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels. This potentially significant impact may occur at the nearest existing Casa de las Campanas buildings.

The Project will not produce a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project. Therefore, the impact is less than significant.

Project construction may produce noise levels in excess of 75 dBA (12-hour L_{EQ}) at the existing nursing facility buildings. Therefore, the impact is significant.

12. MITIGATION MEASURES

Based on the measurement results and predictive noise modeling, the following recommendations are made to meet criteria the "compatible" criteria for interior nursing facility spaces (45 CNEL) and outdoor amenity spaces (65 CNEL). All locations for window and barrier recommendations are included in Appendices II and III.

1. Noise barriers shall be constructed around the perimeters of all outdoor areas exceeding 65 CNL.
 - a) The continuous noise barrier enclosing the courtyard should be constructed out of a minimum 4 lb/psf material and have a minimum height of 12'-0". The barrier should extend around the entire perimeter of the courtyard and terminate at the exterior walls of the building.
 - b) Balconies and common decks exceeding an exterior CNEL of 77 shall be enclosed with a glass wall of a minimum 5/16" thick and 8'-0" high with no gaps.
 - c) Balconies and common decks exceeding an exterior CNEL of 72 should be enclosed with a glass wall of a minimum 5/16" thick and 6'-0" high with no gaps at the base and corners
2. All exterior doors and windows shall be well fitted and sealed.
 - a) Windows shall have a fixed sash or an efficiently weather stripped, operable sash. The sash shall be rigid and weather-stripped with material that is compressed airtight when the window is closed.
 - i. Recommendations for STC rated glazing assemblies, up to STC 45 for the worst-case scenario exterior noise locations, are detailed in the marked-up drawings in Appendix II
 - b) Glass shall be sealed in an airtight manner with a non-hardening sealant or a soft elastomeric gasket or gasket tape.
 - c) The perimeter of window and door frames shall be sealed airtight to the exterior wall construction with a sealant conforming to one of the following Federal specifications: TT-S- 00227, TT-S-00230 or TT-S-00153.
 - d) Fresh air should be supplied by a ducted system that maintains the acoustical performance of the exterior building envelope
3. Exterior wall assemblies shall be comprised of the following minimum construction:
 - 7/8" stucco or 1-1/4" simulated stone
 - 1-1/2" cold-formed framing – vert z-girt at 16" OC
 - 3-1/2" mineral fiber insulation
 - (2) layers 5/8" moisture-resistant sheathing
 - Cold-formed metal framing
 - (2) layers 5/8" gypsum wallboard
 - a) Acoustic construction details are essential to the performance of any wall assembly. At the concrete slab, it is recommended that the layer of gypsum board on the unit side be sealed on top and bottom with resilient caulk, as well as around the junction boxes.
 - b) Window rough-in seams should be no greater than 'A', and all seams should be caulked with resilient caulking.
 - c) Seal, caulk, gasket or weather-strip all joints and seams to eliminate air leakage through these assemblies. This would include around windows and doorframes, at penetrations through walls, and all other openings in the building envelope.
4. The interior noise standard is to be met in all spaces with the windows and doors closed. Ventilation is required in all spaces per the Uniform Building Code and Uniform Mechanical Code standards in order to provide a habitable environment. Wall-mounted air conditioners shall not be used.
5. All supply and return ducts to the exterior shall have the first five feet from the exterior of 20-gauge steel duct that is internally lined with one-inch thick internal acoustic lining. For compliance with health and safety

requirements, kitchen exhaust ducts should not be lined. Each duct shall include a 90 degree elbow within the first five feet from the exterior such that there is no direct line of sight through the duct. Where a 90 degree elbow cannot be used, two 45 degree elbows may be used so that there is no direct line of sight through the duct. Duct openings should not be oriented towards the freeway.

6. Attic vents, if any, should not be oriented towards the freeway.
7. Range exhaust ducts connecting the interior space to the exterior shall contain a weighted backdraft damper.
8. Skylights should not be used at the project site.
9. At any penetrations of exterior walls by pipes, ducts or conduits, the space between the wall and pipes, ducts or conduits shall be caulked or filled to form an airtight seal.
10. Any other exterior vents or penetrations should not be used.
11. To mitigate construction noise to within SDMC limits at the existing Casa de las Campanas facility, a temporary noise barrier should be installed from the existing structures. See Figure 12-1 below for recommended extents.
 - a) The barrier should consist of a minimum 1 lb/sf mass loaded vinyl
 - b) In areas shown in red in Figure 12-1, the barrier should be suspended from the roof levels of the existing building and extend to the ground level. Drape the barrier material onto the ground to prevent sound transfer beneath the gap. Overlap the material where seams occur to prevent gaps between the barrier material.
 - c) In areas shown in blue in Figure 12-1, the barrier should be mounted on the ground level and have a vertical extent of 20'. The barrier should be continuous and have no gaps at the bottom or at any seams.

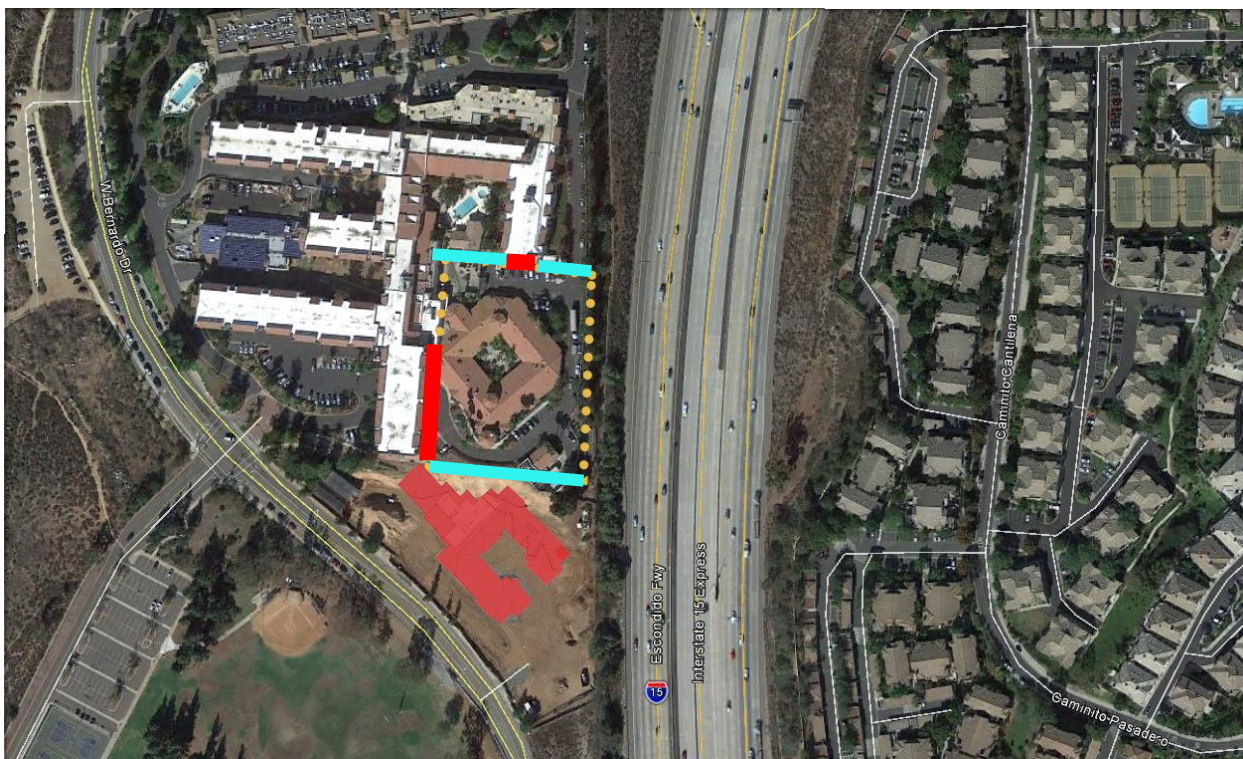


Figure 12-1: Temporary Construction Noise Barrier – Recommended Extents

12. To the extent feasible, heavy construction equipment (bulldozers, excavators, etc.) shall not operate within 115 feet of the existing residential buildings at Casa de las Campanas facilities in order to minimize annoyance. Where this is not feasible, activities should take place during daytime work hours to minimize adverse impact on the residents in the existing facility. Additionally, residents should be relocated if impacted significantly. To avoid potential building damage due to vibration, the following measures shall be implemented when use of such equipment will take place within 15 feet of the existing buildings:

- a) Qualified structural and geotechnical engineers shall review the peak vibration velocities estimated in this report and determine if there are any risks to the building, including possible risks from dynamic soil settlement induced by the vibration. If the structural or geotechnical engineers identify any potential risks, they shall take all necessary steps to protect the building including, but not limited to, photographing and/or videotaping the building in order to provide a record of the existing conditions before construction.
- b) If considered appropriate by a qualified structural engineer or geotechnical engineer, long-term continuous vibration monitoring will be provided. A vibration monitoring plan will be submitted upon request.

13. NOISE LEVELS WITH MITIGATION

Existing noise levels at the Casa de las Campanas campus are within a range that will require noise mitigation to meet the interior design criteria of CNEL 45 and outdoor amenity space criteria of CNEL 65. With the noise mitigations outlined in Section 12, the exterior CNEL will be reduced to 65 dBA or less at all exterior living areas and 45 dBA or less within interior building spaces, complying with the City's noise standards. Therefore, the impact with mitigation will be less than significant.

Construction noise and vibration are expected to be in a range that will require noise mitigation and cause potential annoyance at the existing Casa de las Campanas facility. With the outlined mitigations, the impact will be less than significant. Impact from construction noise and vibration to the nearest residential zone and potential for structural damage to nearby buildings is not significant.

Please contact us with any questions.

Sincerely,
A³ Acoustics, LLP



MOHAMED AIT ALLAOUA
MANAGING PARTNER &
SENIOR ACOUSTICAL CONSULTANT



JOHN DAVENPORT
STAFF CONSULTANT

A³ ACOUSTICS, LLP
241 SOUTH LANDER ST, SUITE 200
SEATTLE, WA 98134
206.792.7796 – O
WWW.A3ACOUSTICS.COM

APPENDIX – WINDOW RECOMMENDATION MARKUP

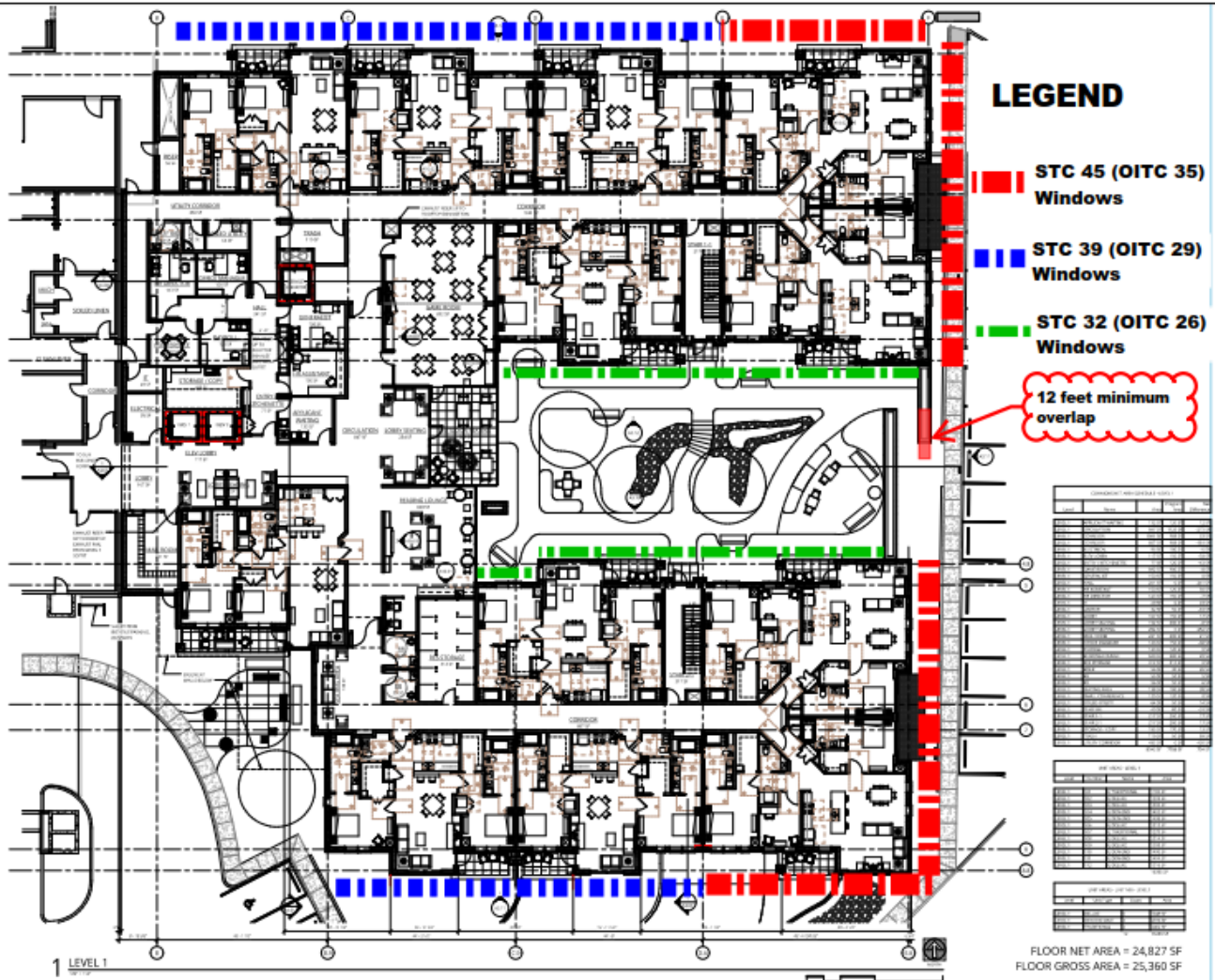


Figure A1 – Window Recommendations – Level 1



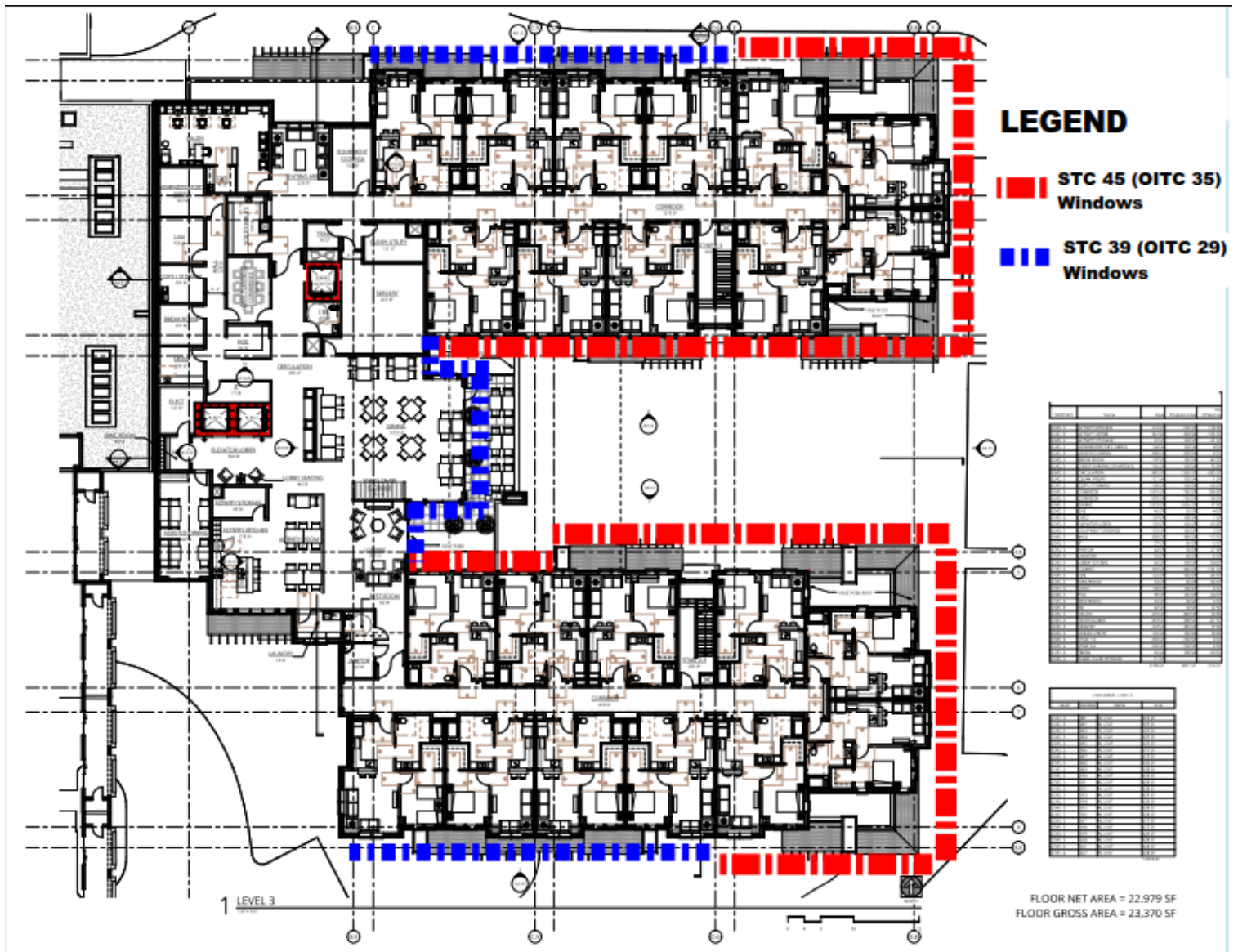


Figure A3 – Window Recommendations – Level 3



Figure A4 – Window Recommendations – Level 4



CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

PROJECT DESCRIPTION

Casa de las Campanas Phase 3 (The Project) consists of construction of a new five (5) story assisted living facility with (1) story of underground parking. The building will have common / amenity space and 90 Independent / Assisted living units. Prior to construction, the existing skilled nursing facility located on the site will be demolished.

SECTION 1: OVERVIEW

- 1.1 This plan will dictate the constructions methods and considerations regarding demolished materials as well as waste generated from procurement of new products and materials. This plan will be adhered to during the course of demolition and new construction.
- 1.2 This plan is based on the requirements of the LEED Materials and Resources Credit specific to Construction Waste Management. This project's goal is to divert a minimum of **75% of construction and demolition debris from landfill disposal as outlined in the LEED Rating System.**

SECTION 2: PURPOSE

- 2.1 Purpose of the construction waste management plan is to categorize construction waste, as material for salvage, as materials for recycling to a usable product, or to be disposed of in a licensed rubble landfill, in order to reduce tipping fees and material waste, in general, while helping to protect the environment.

SECTION 3: DEFINITIONS

- 3.1 Diverted materials include any products or materials that are either the result of demolition or are purchased for new construction that will be discarded. Materials will be categorized as trash for disposal, materials for resale, materials for donation, prevented waste, or as recycled.

SECTION 4: RECYCLABLE MATERIALS

- 4.1 The following is a list of the construction and demolition waste materials that BNB intends to divert where applicable:
 - a. Mixed Paper (from packaging and office trailers)
 - b. Aluminum Cans (from eating areas and office trailers)
 - c. Metals (Metal Studs, Sheet Metal Products, Steel, etc.)
 - d. Wood (Lumber, Plywood, OSB, Particle Board, etc.)
 - e. Concrete (Washout from Cafeteria slab pour back, Trench Demo)
 - f. Cardboard (from packaging)
 - g. Gypsum Board (Drywall)
 - h. Plastics
 - i. Asphaltic Concrete
 - j. Carpet
 - k. Cement Fiber Products
 - l. Concrete Masonry Units
 - m. Glass
 - n. Insulation
 - o. Paint
 - p. Rigid Foam Insulation
- 4.2 The following is a list of Return Materials that BNB intends to divert and return to manufacturer.
 - a. All Wood Pallets & Dunnage
 - b. Carpet and Carpet Padding
 - c. Acoustic Ceiling Tile

SECTION 5: COLLECTION OF WASTE

- 5.1 Throughout the duration of the project BNB and each subcontractor will be responsible for the appropriate disposal of their waste. Construction Demolition and Waste will be collected and managed in one of the following ways at the job site:
- Hauled directly off site upon its creation by its creator;
 - Disposed of in on site, regularly serviced, collection boxes;
 - Donated or sold to organizations;
 - Other methods of diverting or preventing waste.
- 5.2 Guidelines will be determined by the specific hauling company for this jobsite as described below.
- 5.3 In order to better facilitate the collection of construction waste at the jobsite during construction, BNB has acquired the services of a **Waste Removal Vendor**. The waste removal vendor is familiar with the methods for diverting waste and will provide the project with commingled (combined) and/ or source separated (segregated) collection debris boxes. General dry waste ranging from plastics to cardboard, absent garbage and organics, will be collected in a commingled box. Source separated boxes may be provided for clean dimensional wood, concrete, dry wall and metals. As needed, the waste removal vendor will exchange empty collection boxes for full boxes.
- Waste to be disposed of identified containers on site and then removed by the Waste Removal Vendor:**
 - Mixed Paper (from packaging and office trailers)
 - Aluminum Cans (from eating areas and office trailers)
 - Metals (Metal Studs, Sheet Metal Products, etc.)
 - Wood (Lumber, Plywood, OSB, Particle Board, etc.)
 - Cardboard (from packaging)
 - Gypsum Board (Drywall)
 - Plastics
 - Asphaltic Concrete
 - Carpet
 - Cement Fiber Products
 - Concrete Masonry Units
 - Glass
 - Insulation
 - Paint
 - Rigid Foam Insulation
 - Waste to be salvaged for donation or resale:**
 - Pallets
 - Copper (by source subcontractor)
 - Casework
 - Sheet Metal
 - Other methods of waste diversion: TBD**
- 5.4 The debris boxes will be located in a clearly designated area on the job site. All workers on site will be responsible for putting waste in the correct collection box. Disposal of waste will be monitored by BNB to avoid contamination, and to ensure that the proper materials are taken to the appropriate waste management facility. BNB will reinforce the collection procedures through documentation and during regular “tool box” safety meetings.
- 5.5 No other materials can be mixed with the recycled roll-off debris boxes. All loads must contain clean recyclable material and may not exceed eight (8) tons in one debris box.

SECTION 7: TRACKING AND MONITORING

- 7.1 All waste created during the project will be consistently monitored and tracked. BNBs project specific database will be used to facilitate the documentation process. Trades removing their own waste will be responsible for tracking the waste via documentation. This documentation shall categorically track **the quantities of waste material, the methods of diversion, the percentage diverted, and the recycling facilities utilized**. BNB will maintain a database throughout the duration of the project wherein the quantities of all construction waste will be tracked by **weight (tons)**.
- 7.2 When the **subcontractor** is responsible for hauling waste off site, the subcontractor will be responsible for documenting the **quantities of waste material weight (tons), the method of diversion, the percentage diverted, and the facility utilized for diversion**.
- 7.3 For waste collected on site, the **waste diversion vendor** will submit tracking forms to BNB for all waste collected in the on-site commingled and source separated collection boxes. BNB will transfer this information into the project specific database where project monthly reports will be generated. These reports will quantitatively track the total tonnage or yardage of waste produced and recycled during the course of the project.

END OF WASTE MANAGEMENT PLAN