GEOTECHNICAL INVESTIGATION
7TH AND ROBINSON
SAN DIEGO, CALIFORNIA

Prepared for:

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California

Project No. 11347.001

June 27, 2016

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

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.

Geotechnical 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 civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you 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 the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- 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. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* 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 environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of 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. Confer with you GBC-Member geotechnical engineer for more information.

GBC GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

June 27, 2016

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92677

Attention: Mr. Jim Ivory

Subject: Geotechnical Investigation
7th and Robinson
San Diego, California

In accordance with your request and authorization, Leighton and Associates, Inc. (Leighton) has conducted a geotechnical investigation for the proposed residential and mixed use development located at 635 Robinson Avenue in the Hillcrest neighborhood of San Diego, California. We understand that this development may include a 4-level above ground parking garage as well as a 6-level residential/retail mixed-use building with three levels underground parking. Based on the results of our study, it is our professional opinion that the site is suitable for development of such a project. The accompanying geotechnical report presents a summary of our current investigation and provides geotechnical conclusions and recommendations.

3934 Murphy Canyon Road, Suite B205 ▪ San Diego, CA 92123-4425
858.292.8030 ▪ Fax 858.292.0771 ▪ www.leightongroup.com

If you have any questions regarding our report, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

PROFESSIONAL GEOLOGIST
ROBERT C. STROH
NO. 2099
CERTIFIED
ENGINEERING
GEOLOGIST
EXP. 10/31/17
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
DAVID B. NEVIUS
2789
Expires 6/30/17
GEOTECHNICAL
STATE OF CALIFORNIA

Robert C. Stroh, CEG 2099
Associate Engineering Geologist
Extension: 4090, rstroh@leightongroup.com

David B. Nevius, GE 2789
Associate Engineer
Extension:8484, dnevius@leightongroup.com

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1.0 INTRODUCTION

1. 1 Site Location and Description

The proposed project site is located at 635 Robinson Avenue, southwest of Robinson Avenue and 7th Avenue in the Hillcrest neighborhood of San Diego, California (see Figure 1, *Site Location Map*). The block is bounded by Robinson Avenue to the north, 7th Avenue to the east, multi-family residential properties to the south, and commercial/retail properties to the west. The site is currently occupied by two parking lots which service the AT&T facility to the north (see Figure 2, *Geotechnical Map*).

Site topography is nearly level with a ground surface elevation of approximately 286 feet.

Site Latitude and Longitude
32.7465º N
117.1588º W

1. 2 Proposed Development

The proposed project will include a mixed-use residential, retail, and commercial building with basement parking, along with an additional parking structure to serve the adjacent AT&T facility. Based on our review of the conceptual plans by Carrier Johnston + Culture (Appendix D), the proposed mixed-use development consists of six levels of residential and retail space with three levels of basement parking. The separate AT&T parking garage, located south of the mixed-use development, will provide 4 levels of parking.

1.3 Purpose and Scope

This report presents the results of our geotechnical investigation for the 7th and Robinson project site. The intent of this report is to characterize engineering properties of onsite soils, identify geologic and seismic hazards that may impact the proposed improvements, and to provide preliminary geotechnical recommendations for the currently proposed project.

We recommend that all individuals utilizing this report read the preceding information sheet prepared by GBC (the Geotechnical Business Council of the Geoprofessional Business Association) and Section 8.0, Limitations, located at the end of this report.

2.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

2.1 Site Investigation

The subsurface exploration consisted of excavating five (5) small diameter (8-inch) hollow-stem auger borings (B-1 through B-5) drilled to depths ranging from approximately 31 feet to 91 feet below the existing ground surface (bgs). Logs of exploratory borings are provided in Appendix B, and boring locations are provided on Figure 2. A deep percolation test was conducted in Boring B-3. An additional shallow percolation test (P-1) was performed on the east of the site (Figure 2). Results of the percolation tests are also included in Appendix B.

The borings were performed within the limits of the current project site to characterize the onsite soils, including those likely to be encountered at and below the proposed foundation elevations for this project. Prior to drilling, we marked proposed boring locations and notified Underground Service Alert (USA) to identify buried utilities. A private utility locator service was also used to identify utilities in the parking lots.

The borings were logged by a staff geologist during drilling in accordance with the Unified Soil Classification System (ASTM D2488). Relatively undisturbed samples were collected using a California Ring sampler, disturbed Standard Penetration Test (SPT) samples, and bulk soil samples were obtained from these borings at selected depth intervals. The soil samples were transported to our in-house geotechnical laboratory for evaluation and appropriate testing. After logging and sampling, the boreholes were backfilled with bentonite grout in accordance with DEH standards. The boring logs are presented in Appendix B. Figure 2 depicts the location of the excavated borings.

2.2 Laboratory Testing

Laboratory testing performed on representative soil samples obtained during the recent subsurface exploration included tests of moisture and density, sieve analysis, shear strength, expansion index, and geochemical analysis for corrosion. A discussion of the laboratory tests performed and a summary of the laboratory test results are presented in Appendix C. In-situ moisture and density test results are provided on the boring logs in Appendix B.

3.0 SUMMARY OF GEOTECHNICAL CONDITIONS

3.1 Geologic Setting

The project area is situated in the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California, and varies in width from approximately 30 to 100 miles (Norris and Webb, 1990). The province is characterized by mountainous terrain on the east composed mostly of Mesozoic igneous and metamorphic rocks, and relatively low-lying coastal terraces to the west underlain by late Cretaceous-age, Tertiary-age, and Quaternary-age sedimentary units. Most of the coastal region of the County of San Diego, including the site, occur within this coastal region and are underlain by sedimentary units. Specifically, the subject site is located within the coastal plain section of the Peninsular Range Geomorphic Province of California, which generally consists of subdued landforms underlain by sedimentary bedrock. A regional geology map is provided as Figure 3

3.2 Site-Specific Geology

Based on the subsurface exploration and review of pertinent geologic literature and maps, the geologic units underlying the site consist of Undocumented Fill, underlain in turn by Quaternary-aged Very Old Paralic Deposits and Tertiary-aged San Diego Formation. The approximate areal distribution of these units is depicted on the Geotechnical Map (Figure 2). The approximate vertical distribution of lithologic units underlying the site is shown on the geologic Cross-Section A-A' (Figure 4). A brief description of the geologic units encountered on the site is presented below.

3.2.1 Undocumented Fill (Afu)

A generally thin (1 to 5-foot thick) layer of undocumented artificial fill soils, apparently placed during the site's initial construction were observed across the site. An as-graded report was not available for our review, and it is assumed that no engineering observations of these fill soils were provided at the time of grading. The character of these fill soils varied across the site, but generally included reddish brown to dark reddish brown, moist, loose to medium dense, silty sand, gravelly sand, and clayey sand as well as localized clay. Based upon our field investigation, we anticipate that the more plastic, clayey soils may be located below the proposed parking garage site. These soils are also expected to have greater potential for expansion.

3.2.2 Very Old Paralic Deposits (Map Symbol – Qvop)

Previously the site was mapped as being underlain by the Lindavista Formation (Kennedy, 1975). More recent mapping by Kennedy and Tan, 2008 has renamed the previously mapped geologic formation as Very Old Paralic Deposits - Subunit 9 (Figure 3). As encountered during our field investigation, this unit consists of reddish brown to orange-brown, dense to very dense, silty and clayey sands with trace gravels and sandy clays. Cemented interbeds, gravel layers, and hard concretionary layers were also encountered in this unit. Although not encountered during drilling operations, discrete cobbles or cobble layers are commonly encountered in this unit. These soils are suitable for use as structural fill provided they are free of rock fragments larger than 6 inches in maximum dimension. This unit, as encountered, varied in thickness from 3 feet (at Boring B-3), to approximately 12 feet (at Boring B-4).

3.2.3 San Diego Formation (Map Symbol –Tsd)

Tertiary-aged San Diego Formation underlies the entire site at depth and was observed extending to the total depth explored (91 feet below ground surface). As encountered, the San Diego Formation generally consisted of dense to very dense, brown to grayish brown and pale to light gray, moist, sandstone with silt and some interbedded gravel layers. Well cemented gravel conglomerate and concretions were also encountered during drilling.

Based on our experience with similar sites in the area, excavations within this unit will encounter zones of poorly graded cohesionless sands that may cave or slough during unsupported site excavation and the performance of drilling excavation.

3.3 Surface and Groundwater

Groundwater was observed in the exploratory hollow-stem boring B-3 at a depth of approximately 83 feet bgs (approximate elevation 205 feet). The groundwater table may fluctuate with seasonal variations and irrigation, and local perched groundwater conditions may exist.

Based on our review of the conceptual plans and our experience with similar projects, groundwater is not expected to be a constraint to site development. We do not anticipate that temporary dewatering will be necessary to complete the excavation of the proposed basement.

3.4 Engineering Characteristics of On-site Soils

Based on the results of our laboratory testing of representative on-site soils (Appendix C), and our professional experience on similar sites with similar soils conditions, the engineering characteristics of the on-site soils are discussed below.

3.4.1 Expansion Potential

The expansion potential of the on-site soil is anticipated to be very low to medium. Based upon our field exploration and sampling, we anticipate that the fill soils may have the greatest potential for expansion, with the underlying formational soils having very low to low potential for expansion. However, localized more expansive soils may be encountered during construction operations. Geotechnical observations and/or laboratory testing upon completion of site grading are recommended to determine the actual expansion potential of finish grade soils on the site at the location of improvements.

3.4.2 Soil Corrosivity

A preliminary screening of the on-site soils was performed to evaluate their potential corrosive effect on concrete and ferrous metals. In summary, laboratory testing on one representative soil sample obtained during our subsurface exploration evaluated pH, minimum electrical resistivity, and chloride and soluble sulfate content. The sample tested had measured pH value of 7.57, and a measured minimum electrical resistivity of 824 ohm-cm. Test results also indicated that the sample had a chloride content of 66.7 parts per million (ppm), and soluble a sulfate content of 180 ppm.

3.4.3 <u>Excavation Characteristics</u>

The site is underlain by undocumented fill, Paralic Deposits with silty to clayey sandstone and gravel conglomerate, and the San Diego Formation consisting of generally friable and poorly graded sandstone with siltstone and interbedded gravel conglomerate. Isolated cobbles and cobble layers should also be anticipated.

With regards to the proposed project, it is anticipated these on-site soils can be excavated with conventional heavy-duty construction equipment. Note that zones of poorly graded and friable sand and sandstone may cave or slough during unsupported excavations and drilling. It should be noted that localized gravel layers (and potentially cobble layers) exist that may impede drilling for deep foundations and shoring. Oversize cobble material, if encountered, should be placed in non-structural areas or hauled off-site.

3.4.4 <u>Percolation and Infiltration Characteristics</u>

Based on our field percolation testing, the in-situ percolation rates and calculated infiltration rates at tested locations and depths are summarized in Table 1 below. The percolation test locations (B-3 and P-1) are shown on Figure 2. Field data and calculated percolation rate for each percolation test location is presented in Appendix B. It should be noted that the deep percolation test on Boring B-3 was tested over a depth interval of 50 to 75 feet.

We have used the following equation based upon the Porchet Method to convert measured percolation rates to infiltration rates:

$$I_t = \frac{\Delta H * 60 * r}{\Delta t(r+2H_{AVG})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = radius of test hole
H_{AVG} = average head over the time interval, inches

Table 1
Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)
B-3	75	San Diego Formation (Tsd)	0.14	428	4.61
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7

It should be emphasized that the percolation test results are only representative of the tested location and depth where they are performed. Varying subsurface conditions may exist outside of the test location, which could alter the measured percolation rate or calculated infiltration rate indicated above. In addition, it is important to note that percolation rates are not equal to infiltration rates. As a result, we have made a distinction between percolation rates where water movement is considered laterally and vertically versus infiltration rates where only the vertical direction is considered. We have used the Porchet Method to convert measured percolation rates to calculated infiltration rates in accordance with County of Riverside Standards (2011) and as recommended in the City of San Diego Storm Water Standards BMP Design Manual (2016).

It is possible that the long term rate of infiltration of permeable soil strata may be much lower than the values obtained by testing. Specifically, infiltration may be influenced by: variable vertical character and limited lateral extent of more permeable soil strata; reduction of infiltration over time due to silting of the soil pore spaces; and other unknown factors. Accordingly, the possibility of future surface ponding of water as well as shallow groundwater impacts on subterranean structures such as basements, underground utilities, etc. should be anticipated as possible future conditions in all design aspects of the site. Additional recommendations are provided in Section 7.7.

Considering the variance in materials encountered in our borings at the subject site, a factor of safety should applied to the above measured percolation rates and calculated infiltration rates to be used for BMP design. It should be noted that the above rates represent stabilized values and that these rates may degrade over time due to complete saturation of underlying soils, and fines build-up and plugging if pre-treatment and maintenance of the storm water device is not performed. As such, the selected percolation or infiltration rates should be reduced by a factor of safety determined by the design engineer to establish a conservative design rate for the service life of the proposed system.

4.0 FAULTING

4.1 Regional Tectonic Setting

During the late Pliocene, several new faults developed in Southern California, creating a new tectonic regime superposed on the flat-lying section of Tertiary and late Cretaceous rocks in the San Diego region. One of these fault systems is the Rose Canyon Fault Zone, which is considered the most significant fault within the San Diego Metropolitan area.

The principal known onshore faults in southernmost California are the San Andreas, San Jacinto, Elsinore, Imperial, and Rose Canyon faults, which collectively transfer the majority of this deformation (Figure 5, *Regional Fault Map*). The balance of the plate margin slip is taken by the offshore zone of faults which include the Coronado Bank, Descanso, San Diego Trough, and San Clemente faults, which lie off of the San Diego and northern Baja California coastline. Most of the offshore faults coalesce south of the international border, where they come onshore as the Agua Blanca fault which transects the Baja, California peninsula (Jennings, 2010).

4.2 Rose Canyon Fault Zone in San Diego

The Rose Canyon Fault was first recognized by Fairbanks (1893). He described the feature as an area of uplifting or folding from La Jolla Bay to the Soledad Hills. Since that time, numerous others have mapped the Rose Canyon Fault and have attributed the formation of several physiographic features such as, Mount Soledad, Mission Bay, and San Diego Bay to the activity along the fault. The Rose Canyon Fault Zone (RCFZ) consists of predominantly right-lateral strike-slip faults that extend southwest to southeast through the San Diego metropolitan area (Figure 6, *Rose Canyon Fault Map*). Movement along the fault zone is generally complex and consists of various combinations of oblique, normal and strike-slip motion. The fault zone extends offshore at La Jolla and continues north-northwest subparallel to the coastline. To the south in the San Diego downtown area the fault zone appears to splay out into a group of generally right-normal oblique faults extending into San Diego Bay (Treiman, 1993).

5.0 SEISMICITY

5.1 Seismicity

The site is considered to lie within a seismically active region, as can all of Southern California (Jennings, 2010). Specifically, the Rose Canyon fault zone located approximately 1.2 miles west of the site is the 'active' fault considered having the most significant effect at the site from a design standpoint (USGS, 2008).

5.1.1 Site Class

Utilizing 2013 California Building Code (CBC procedures), we have characterized the site soil profile to be Site Class D based on our experience with similar sites in the project area and the results of our subsurface evaluation.

5.1.2 Building Code Mapped Spectral Acceleration Parameters

The effect of seismic shaking may be mitigated by adhering to the California Building Code and state-of-the-art seismic design practices of the Structural Engineers Association of California. Provided below in Table 2 are the risk-targeted spectral acceleration parameters for the project determined in accordance with the 2013 California Building Code (CBSC, 2013a) and the USGS U.S. Seismic Design Maps Web Application (2014).

Table 2
CBC Mapped Spectral Acceleration Parameters

Site Class	D
Site Coefficients	F_a = 1.025 F_v = 1.543
Mapped MCE_R Spectral Accelerations	S_S = 1.187g S_1 = 0.457g
Site Modified MCE_R Spectral Accelerations	S_{MS} = 1.217g S_{M1} = 0.705g
Design Spectral Accelerations	S_{DS} = 0.811g S_{D1} = 0.470g

Utilizing ASCE Standard 7-10, in accordance with Section 11.8.3, the following additional parameters for the peak horizontal ground acceleration are associated with the Geometric Mean Maximum Considered Earthquake (MCE_G). The mapped MCE_G peak ground acceleration (PGA) is 0.527g for the site. For a Site Class D, the F_{PGA} is 1.000 and the mapped peak ground acceleration adjusted for Site Class effects (PGA_M) is 0.527g for the site.

5.1.3 Shallow Ground Rupture

As previously discussed, the site is not underlain by known active or potentially active faults. Therefore, the potential for ground rupture due to faulting at the site is considered low. Ground lurching is defined as movement of low density materials on a bluff, steep slope, or embankment due to earthquake shaking. Since the site is relatively flat and removed from any over-steepened slopes, lurching or cracking of the ground surface as a result of nearby or distant seismic events is unlikely.

5.1.4 Liquefaction and Dynamic Settlement

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, saturated, granular soils are susceptible to liquefaction and dynamic settlement. Liquefaction is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to behave as a viscous liquid. This effect may be manifested by excessive settlements and sand boils at the ground surface.

Based on our evaluation, the on-site soils are not considered liquefiable due to their dense condition and absence of a shallow groundwater condition. Considering planned grading and foundation design measures, dynamic settlement potential is also considered negligible.

5.1.5 Tsunamis, Seiches, and Flood Hazard

Based upon the California Emergency Management Agency Tsunami Inundation Map (CalEMA, 2009), the site is not located within a tsunami inundation area. In addition, based on the distance between the site and large, open bodies of water, and the elevation of the site with respect to sea level, the possibility of seiches and/or tsunamis is considered to be nil.

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2012); the site is not located within a floodplain. Based on our review of topographic maps, the site is not located downstream of a dam or within a dam inundation area. Based on this review and our site reconnaissance, the potential for flooding of the site is considered nil.

6.0 CONCLUSIONS

Based on the results of our geotechnical investigation of the site, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the project plans and specifications.

The following items are geotechnical factors that may affect the development and/or support our opinion:

- Based on the results of our subsurface explorations and our experience with similar projects in the site area, the depth to groundwater is anticipated to be approximately 83 feet or more below the existing ground surface (approximate elevation of 205 feet msl).
- The underlying Old Paralic Deposits and San Diego Formation are not subject to liquefaction or lateral spreading based on their geologic age, dense to very dense character and the lack of a shallow groundwater table. In addition, other geologic hazards such as landsliding are not present at the site.
- Excavations at the site will require temporary shoring to facilitate construction and to reduce the potential vertical and horizontal ground movements (i.e., damage) beneath the existing public streets and adjacent improvements.
- The undocumented fill soils onsite are potentially compressible. These soils are not considered suitable for structural loads or support of engineered fill soils or site improvements in their present condition. We anticipate that these materials will be removed during performance of the proposed basement excavation for the mixed-use residential improvements. In addition, these soils should be removed and replaced as engineered fill under shallow foundations supporting the AT&T parking structure and other ancillary improvements.
- Based on the results of our subsurface exploration, we anticipate that the onsite materials should be generally rippable with conventional heavy-duty earthwork equipment. However, it should be noted that localized gravel and cobble layers exist that may impede drilling for deep foundations and shoring.
- Based on our experience with similar sites and the results of our subsurface investigation of the site, excavations within the underlying soil materials may

encounter zones of poorly graded cohesionless and friable sands that will likely cave or slough during site excavation and drilling. Care in these cases should be exercised which may include the excavation of shorter open-face segments or casing of drilled excavations.

- Based on laboratory testing and visual classification, materials derived from the on-site soil materials are anticipated to have very low to medium expansion potential, although locally more expansive materials may be encountered.

- Although Leighton does not practice corrosion engineering, laboratory test results indicate the soils present on the site have a negligible potential for sulfate attack on normal concrete. However, the onsite soils are considered to be corrosive to buried uncoated ferrous metals. A corrosion consultant may be consulted to provide additional information.

- The existing onsite soils are suitable for reuse as engineered fill provided they are relatively free of organic material, debris, and rock fragments larger than 6 inches in maximum dimension.

- Based upon limited percolation testing, the existing geologic conditions may be suitable for Low Impact Development or BMP measures provided the recommendations in this report are followed.

7.0 RECOMMENDATIONS

7.1 Earthwork

We anticipate that earthwork at the site will consist of site preparation, installation of shoring, excavation, and placement of backfill. We recommend that earthwork on the site be performed in accordance with the following recommendations and the General Earthwork and Grading Specifications for Rough Grading included in Appendix E. In case of conflict, the following recommendations supersede those presented in Appendix E.

7.1.1 Site Preparation

Prior to grading, all areas to receive structural fill or engineered structures should be cleared of surface and subsurface obstructions, including any existing debris and undocumented or loose fill soils, and stripped of vegetation. Removed vegetation and debris should be properly disposed off-site. All areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 6 inches, brought to above-optimum moisture conditions, and recompacted to at least 90 percent relative compaction (based on ASTM Test Method D1557).

7.1.2 Excavations and Oversize Material

Excavations of the onsite materials may generally be accomplished with conventional heavy-duty earthwork equipment in good working condition. Although not anticipated, local heavy ripping or breaking may be required if strongly cemented formational material is encountered. Oversized material, if any, should be handled in accordance with Appendix E.

Surficial soils along with friable underlying sands present on site may cave during trenching and excavation operations. In accordance with OSHA requirements, excavations deeper than 5 feet should be shored or be laid back in accordance with Section 7.2 if workers are to enter such excavations. Shoring recommendations are presented in Section 7.4.6.

7.1.3 Removal and Recompaction

Undocumented fill soils not removed by the planned grading should be excavated, moisture-conditioned, and then compacted prior to placing any additional fill or improvements (such as flatwork, etc.). In areas surrounding the planned excavation that receive fill or other surface improvements, these soils should be removed down to competent paralic deposits and recompacted to proposed grades. The thickness of these soils may vary across the site and may be locally deeper in certain areas.

7.1.4 Engineered Fill Placement and Compaction

The onsite soils are generally suitable for use as compacted fill provided they are free of organic material, debris, and rock fragments larger than 6 inches in maximum dimension. The onsite soils typically possesses a moisture content below optimum and may require moisture conditioning prior to use as compacted fill. All fill soils should be brought to above-optimum moisture conditions and compacted in uniform lifts to at least 90 percent relative compaction based on laboratory standard ASTM Test Method D 1557 and 95 percent relative compaction for wall backfill soils if used for structural purposes, such as to support a footing, supporting subgrade soils, and supporting slab-on-grade concrete subjected to vehicle loading. The optimum lift thickness required to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in lifts not exceeding 8 inches in thickness.

Placement and compaction of fill should be performed in general accordance with the current City of San Diego grading ordinances, sound construction practice, and the General Earthwork and Grading Specifications for Rough Grading presented in Appendix E.

7.1.5 Expansive Soils and Selective Grading

It is not anticipated that highly expansive soils will be encountered during site grading. We anticipate that the cuts for the mixed-use residential structure will be excavated into material that has a very low to low potential for expansion. Soils with low to medium expansion potential may be encountered within the fill soils underlying the AT&T parking garage site.

Expansion testing should be performed on the finish grade soils to verify their expansion potential. If highly expansive soils are present within 5 feet of finish grade, special foundation and slab considerations may be required. Alternatively, it is expected that very low to low expansion material will be excavated as part of the mixed-use below grade parking structure, and could be used as engineered fill supporting shallow foundations elsewhere on the site.

7.1.6 Utility Trench Excavation and Backfill

All excavation work should comply with the current requirements of OSHA. Trenches (either open or backfilled) which parallel structures, pavements, or flatwork should be planned so that they do not extend below a plane having a downward slope of one vertical and one horizontal from a line nine inches above the bottom edge of footings, pavements, or flatwork. Also, no parallel trenches should be closer than 1.5 feet from the closest edge of footings, pavements, or flatwork. Should it be necessary to locate parallel trenches which do not meet the criteria recommended above for footings at conventional depth, we recommend that the footing depths be increased until the criteria are met. A check should be made by the civil designer to verify that all trenches comply with the setback recommendations of this paragraph. If there are special cases where these requirements are not practical, the civil designer should communicate with the project geotechnical engineer and architect on a case-by-case basis.

Pipe bedding should consist of sand with a sand equivalent (SE) of not less than 30. Bedding should be extended the full width of the trench for the entire pipe zone, which is the zone from the bottom of the trench, to one foot above the top of the pipe. The sand should be brought up evenly on each side of the pipe to avoid unbalanced loads. Onsite materials will probably not meet bedding requirements. Except for predominantly clayey soils, the onsite soils may be used as trench backfill above the pipe zone provided they are free of organic matter and have a maximum particle size of three inches. Compaction by jetting or flooding is not recommended.

7.2 Temporary Excavations

Sloping excavations may be utilized when adequate space allows. Based on the results of our evaluation, we provide the following recommendations for sloped excavations in undocumented fill soils or dense formational materials without seepage conditions.

Table 3
Maximum Slope Ratios

Excavation Depth (feet)	Maximum Slope Ratio Undocumented Fill Soils	Maximum Slope Ratio In Dense Formation
0 to 5	1:1 (Horizontal to Vertical)	Vertical
5 to 20	1.5:1 (Horizontal to Vertical)	1:1 (Horizontal to Vertical)

The above values are based on the assumption that no surcharge loading or equipment is present within 10 feet of the top of slope. Care should be taken during design of excavations adjacent to the existing structures so that foundation support is preserved. A “competent person” should observe the slope on a daily basis for signs of instability.

7.3 Surface Drainage and Erosion

Surface drainage should be controlled at all times and carefully taken into consideration during precise grading, landscaping, and construction of site improvements. The proposed development should have appropriate drainage systems to collect roof runoff. Positive surface drainage should be provided to direct surface water away from the structures toward the street or suitable drainage facilities. Planters should be designed with provisions for drainage to the storm drain. Ponding of water adjacent to structures or pavements should be avoided.

The impact of heavy irrigation or inadequate runoff gradient can create perched water conditions, resulting in seepage or shallow ground water conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to change in moisture content of foundation soils, which may cause distress to structures and improvements, moisture content of the soils surrounding the improvements should be kept as relatively constant as possible.

All area drain inlets should be maintained and kept clear of debris in order to function properly. In addition, landscaping should not cause any obstruction to site drainage.

7.4 Preliminary Foundation and Slab Considerations

Conventional foundations (spread and continuous footings) and/or structural mat foundations are considered suitable for support of the proposed structures provided the footings are embedded into competent dense formational materials as recommended herein.

These recommendations are preliminary and should be reviewed and revised, as necessary, once the actual size and configuration of the project has been confirmed. Foundations and slabs should be designed in accordance with structural considerations and the following recommendations. These recommendations assume that the soils encountered within 5 feet of finish grade have a very low to medium potential for expansion. If highly expansive soils are encountered selective grading is recommended. If selective grading cannot be accomplished, additional foundation and slab design may be necessary.

7.4.1 Foundation Design

Preliminary foundation recommendations have been developed for the Mixed-Use Residential Structure, the AT&T Parking Garage, and ancillary structures.

Mixed-Use Residential Structure

The following recommendations assume that the planned structure will be founded over a basement parking structure. Accordingly, surficial soils are expected to be removed, rather than replaced as compacted fills. Should at grade structures be included in the design, we should be contacted to provide additional recommendations. For footings located 20 or more feet below existing site grades, bearing on competent formational material, the allowable bearing capacities of Table 4 below may be utilized.

Table 4
Allowable Bearing Values for Conventional Foundations

Depth Below Finish Grade (feet)	Isolated Spread Footing (minimum width of 2 feet)	Continuous Wall Footing (minimum width of 2 feet)
2*	5,000	4,000
3*	7,000	5,000

* For depths of 20 feet or more below existing site grades

Parking Garage Foundations

Regarding shallow conventional foundations for the proposed AT&T parking garage at existing site elevations, we recommend an allowable bearing capacity of 2,500 psf for foundations in engineered fill. This capacity assumes a minimum foundation depth of 24 inches and minimum width of 24 and 18 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 3,500 psf.

For shallow foundations bearing on formation, including Paralic Deposits (expected at a depth of 4 to 5 feet below existing grade), we recommend an allowable bearing capacity of 3,500 psf for foundations in competent formation. This capacity assumes a minimum foundation depth of 24 inches and minimum width of 24 and 18 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 4,500 psf.

Ancillary Structures

Regarding shallow conventional foundations for associated ancillary structures at existing site elevations, we recommend an allowable bearing capacity of 2,000 psf for foundations in engineered fill or formation. This capacity assumes a minimum foundation depth of 18 inches and minimum width of 18 and 12 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 3,000 psf.

The above capacities for all of the above foundations are for dead plus live loads and may be increased by one-third for short-term wind or seismic loads. The recommended allowable-bearing capacities are based on a maximum total settlement of 1 to 1.5 inches and a differential settlement of ¾-inch in fill soils, and a maximum total settlement of 1 inch and a differential settlement of 1/2-inch in formation.

7.4.2 Mat Foundation Design

A structural mat foundation may be used for support of the mixed-use residential structure. Thickness and reinforcement of the mat foundation should be in accordance with the design of the project structural engineer. If any of the soils exposed at foundation grades are disturbed during the excavation process, they should be excavated to suitable competent formational materials.

We recommend that the structure may be founded on a mat foundation supported on competent formational material using a static long term allowable bearing capacity not to exceed 9,000 pounds per square foot, considering basement footing depths will likely vary between 20 and 30 feet for the project. The bearing capacity may be increased when considering loads of a short duration such as wind or seismic forces.

Mat foundations typically experience some deflection due to loads placed on the mat and the reaction of the soils underlying the mat. A design coefficient of subgrade reaction K_1, 150 to 200 pounds per cubic inch (pci) may be used for evaluating such deflections at the site. These values are based on the soil conditions encountered in exploratory excavations and are considered as applied to a unit square foot area. The value should be adjusted for the design mat size. The coefficient of subgrade reaction K_b for a mat of a specific width may be evaluated using the following equation:

$$K_b = K_1 [(b+1)/2b]^2$$

where b is the least width of the foundation

To account for edge conditions, the lower value should be considered at the center of the mat increasing to the higher value at the edges. Following preliminary foundation design by the structural engineer, the contact pressure distribution and estimated settlement should be reviewed by Leighton.

7.4.3 Slab Design

Slabs-on-grade should be reinforced with reinforcing bars placed at mid-height in the slab. Slabs should have crack joints at spacings designed by the structural engineer. Columns should be structurally isolated from slabs. Slabs should be a minimum of 5 inches thick and reinforced with No. 3 rebars at 18 inches on center or No. 4 rebars at 24 inches on center (each way). If additional loading is anticipated (i.e., basement floor slab with traffic loading), a slab thickness of at least 6 inches with reinforcement should be used. A moisture barrier should be placed at mid-height in a 4 inch thick sand layer if reduction of moisture vapor up through the concrete slab is desired (such as below equipment, living/office areas, etc.), otherwise the sand layer may be deleted.

7.4.4 Lateral and Hydrostatic Pressures

Lateral loads may be resisted by assuming a passive pressure of 350 psf per foot of depth and coefficient of friction of 0.35 between concrete and soil. Below the water table, the passive pressure should be reduced to 150 psf. The lateral resistance may be taken as the sum of the passive and frictional resistance, provided the passive resistance does not exceed two-thirds of the total resistance.

For design purposes, the following lateral earth pressure values for level or sloping backfill are recommended for walls backfilled with onsite soils of very low to low expansion potential or undisturbed in-place materials.

Table 5
Static Equivalent Fluid Weight,
pounds per cubic foot (pcf)

Conditions	Level	2:1 Slope
Active	35	55
At-Rest	55	75

Unrestrained (yielding) cantilever walls should be designed for an active equivalent pressure value provided above. In the design of walls restrained from movement at the top (non-yielding) such as basement walls, the at-rest pressures should be used. To account for potential redistribution of forces during a seismic event, retaining walls providing lateral support where exterior grades on opposites sides differ by more than 6 feet fall under the requirements of 2013 CBC Section 1803.5.12 and/or ASCE 7-10 Section 15.6.1 and should also be analyzed for seismic loading. For that analysis, an additional uniform lateral seismic force of 9H should be considered for the design of the retaining walls with level backfill, where H is the height of the wall. This value should be increased by 150% for restrained walls. For this equation, H equals the overall retained height in feet. If conditions other than those covered herein are anticipated, the equivalent fluid pressure values should be provided on an individual case basis by the geotechnical engineer.

For portions of the wall not placed against shoring, the above values assume granular backfill and free-draining conditions to prevent buildup of hydrostatic pressure in the backfill. Backfill should meet the requirements for engineered fill materials described in Section 7.1.4 of this report, and should have an expansion index of 30 or less. Wall backfill should be compacted by mechanical methods to at least 90 percent relative compaction in accordance with ASTM D 1557 per Section 7.1.4. All walls should be properly waterproofed.

Special cases such as combinations of sloping and shoring or other surcharge loads (not specified above) 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. Based on groundwater measurements made during our field investigation, it is not anticipated that braced excavations will be constructed below the groundwater table; therefore, the above pressures do not include hydrostatic pressures.

However, to mitigate the potential for hydrostatic build-up behind the basement walls, drainage board should be extended from 2 feet below the ground surface to relief valves or by piping to a sump at the lowest wall elevations. Waterproofing of the basement walls should be as designed by the structural engineer and/or architect. It should be noted that a NPDES permit may be required for groundwater discharged through basement wall drains/relief valves which is then discharged to a storm water conveyance system. As an alternative to discharging potential ground water to a storm water conveyance system, ground water may be discharged to infiltration wells if located more than 10 feet above groundwater. If infiltration wells are proposed, our office should review the proposed infiltration well design and provide supplemental recommendations for infiltration rates.

As an alternative to mitigating for hydrostatic build-up behind the basement walls by the use of basement wall drainage devices, basement walls may be water proofed and designed to resist hydrostatic conditions. In that case, an additional pressure equal to 62.4 pcf multiplied by the depth below the design elevation should be applied in a direction normal to the surface being considered. In this case, a NPDES permit is not required.

Since design of retaining systems is sensitive to surcharge pressures behind the excavation, we recommend that this office be consulted if unusual load conditions are anticipated.

7.4.5 Shoring of Excavations

Based on our present understanding of the project, excavations on the order of 20 to 30 feet deep are anticipated below the proposed residential mixed-use improvements. Accordingly, and because of the limited space, temporary shoring of vertical excavations may be required. We recommend that vertical excavations be retained either by a cantilever shoring system deriving passive support from cast-in-place soldier piles (i.e. lagging-shoring system) or a restrained tie-back and pile system. Based on our experience with similar projects, if lateral movement of the shoring system on the order of more than 1 inch cannot be tolerated, we recommend the utilization of a restrained tie-back and pile system. Shoring of excavations of this size is typically performed by specialty contractors with knowledge of the metropolitan San Diego area soil conditions. Lateral earth pressures for design of shoring are presented below:

Cantilever Shoring System
Active pressure = 35 (pcf), triangular distribution
Passive Pressure = 250 (pcf) in fill, 350 (pcf) competent formation

Tie-Back Shoring System
Restrained Active Pressure = Rectangular distribution of 23H psf, where H is wall height (or wall and slope height above) in feet.
Passive Pressure = 250 (pcf) in fill, 350 (pcf) competent formation

General
All shoring systems should consider adjacent surcharging loads. The design wall height should consider loss of passive support associated with footing excavations.

For design of tie-backs, we recommend a concrete-soil bond stress of 600 psf of the concrete-soil interface area for straight shaft anchors. This value should be considered only behind the 30 degree line (measured from the vertical) up from the base of the excavation. This portion should also be used for calculating resisting forces. Tie-back anchors should be individually proof-tested to 130 percent of design capacity. Further details and design criteria for tie-backs can be provided as appropriate. Since design of retaining systems is sensitive to surcharge pressures behind the excavation, we recommend that this office be consulted if unusual load conditions are anticipated. Care should be exercised when excavating into the on-site soils since caving or sloughing of these materials is possible. We recommend that the void space behind lagging be filled with sand/cement slurry. Field testing of tie-backs and observation of soldier pile excavations should be performed during construction.

Settlement monitoring of adjacent sidewalks and adjacent structures should be considered to evaluate the performance of the shoring. Shoring of the excavation is the responsibility of the contractor. Extreme caution should be used to minimize damage to existing pavement, utilities, and/or structures caused by settlement or reduction of lateral support.

7.4.6 Design Groundwater Elevation

Based on the results of our subsurface exploration and our experience with similar projects in the site area, we anticipate groundwater to be at a depth of 83 or more feet bgs or at an elevation of 205 feet msl. We do not anticipate that the static groundwater will be encountered during the construction of the proposed project; however groundwater levels may fluctuate during periods of precipitation.

7.4.7 Monitoring of Shoring

Settlement monitoring of adjacent sidewalks and structures should be performed to evaluate the performance of the shoring. Shoring of the excavation is the responsibility of the contractor. Extreme caution should be used to minimize damage to existing pavement, utilities, and/or structures caused by settlement or reduction of lateral support. Sequencing of underpinning, shoring installation, excavation and dewatering will be critical to control of deflections and settlement. Once the shoring contractor is selected, a detailed excavation phasing plan should be submitted and reviewed by the shoring designer and geotechnical engineer.

The shoring should be surveyed for vertical and horizontal deflection by the Civil Engineer at the top, mid-point, and bottom of each wall face (4 faces) at 50-foot intervals along the wall length. Vertical settlements should be surveyed along an alignment behind the wall at each of the mid-wall monitoring points to a distance behind the wall equal to 1/2 times the wall height. The survey points should be established prior to the start of construction and continued on a weekly basis as the construction proceeds and while the excavation remains open. After completion of the excavation, the survey interval may be extended based on evaluation by the geotechnical consultant.

7.5 Dewatering

We do not anticipate that groundwater will be encountered during construction and the proposed subterranean levels, and foundation excavations will not extend below the groundwater table. Therefore, dewatering during construction is not anticipated, excluding the construction of solider piles for the shoring system.

7.6 Concrete Flatwork

Concrete sidewalks and other flatwork (including construction joints) should be designed by the project civil engineer and should have a minimum thickness of 4 inches. Should mitigation of potential cracking be desired, 8x8 WWM or No. 3 bars at 24 inches on center may be utilized. For all concrete flatwork, the upper 12 inches of subgrade soils should be moisture conditioned to at least 4 to 6 percent above optimum moisture content depending on the soil type and compacted to at least 90 percent relative compaction based on ASTM Test Method D1557 prior to the concrete placement. Moisture testing should be confirmed 24 hours prior to concrete placement. In areas of high expansive soil, we recommend the inclusion of dowels between curbs and/or exterior flatwork near exterior and interior walkways.

7.7 Infiltration Best Management Practices

Foundation and subsurface improvements (e.g., basements) of residential structures located adjacent to proposed infiltration systems should be evaluated to ensure that they may not be adversely impacted from infiltration of surface water.
Where setbacks cannot be attained a 30-mil impermeable liner should be placed along the sides and bottom of the infiltration basins. We recommend setbacks for stormwater infiltration devices as summarized in the table below:

Table 6 Stormwater Infiltration System Setbacks (measured from bottom of infiltration device)	
Setback from	Distance
Any foundation	No closer than a 1:1 plane drawn away from 9" above the bottom of foundation
Face of any slope	H/2, 5 feet minimum (H is height of slope)

Also, surface drainage should be controlled at all times and carefully taken into consideration during precise grading, landscaping, and construction of site improvements. Positive drainage (e.g., roof gutters, downspouts, area drains, etc.) should be provided to direct surface water away from structures and improvements and towards the street or suitable drainage devices. Ponding of water adjacent to structures or pavements should be avoided. Roof gutters, downspouts, and area drains should be aligned so as to transport surface water to a minimum distance of 5 feet away from structures. The performance of structural foundations is dependent upon maintaining adequate surface drainage away from structures.

Water should be transported off the site in approved drainage devices or unobstructed swales. We recommend a minimum flow gradient for unpaved drainage within 5 feet of structures of 2 percent sloping away. All area drain inlets should be maintained and kept clear of debris in order to function properly. In addition, landscaping should not cause any obstruction to site drainage. Rerouting of drainage patterns and/or installation of area drains should be performed, if necessary, by a qualified civil engineer or a landscape architect.

7.8 Construction Observation and Plan Reviews

The recommendations provided in this report are based on preliminary design information and subsurface conditions disclosed by widely spaced borings. The interpolated subsurface conditions should be checked in the field during construction. Construction observation of all onsite excavations and field density testing of all compacted fill should be performed by a representative of this office so that construction is in accordance with the recommendations of this report. We recommend that where possible, excavation exposures be geologically mapped by the geotechnical consultant during grading for the presence of potentially adverse geologic conditions. In addition, during the installation of perimeter shoring systems, we also recommend that a geologist be on-site to log sidewalls for potential faults, since the City will require an “as-built” letter regarding existing fault hazards prior to the approval of building permit inspection services.

Final project drawings should be checked by Leighton and Associates, Inc. before excavation to see that the recommendations provided in this report are incorporated in the project plans.

8.0 LIMITATIONS

The conclusions and recommendations presented in this report are based in part upon data that were obtained from a limited number of observations, site visits, excavations, samples, and tests. Such information is by necessity incomplete. The nature of many sites is such that differing geotechnical or geological conditions can occur within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions, and recommendations presented in this report can be relied upon only if Leighton has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site.

Figures

Project: 11347.001	Eng/Geol: DNB/RCS
Scale: 1 " = 2,000 '	Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: (mmurphy)

SITE LOCATION MAP

7th and Robinson
San Diego, California

Figure 1

Leighton

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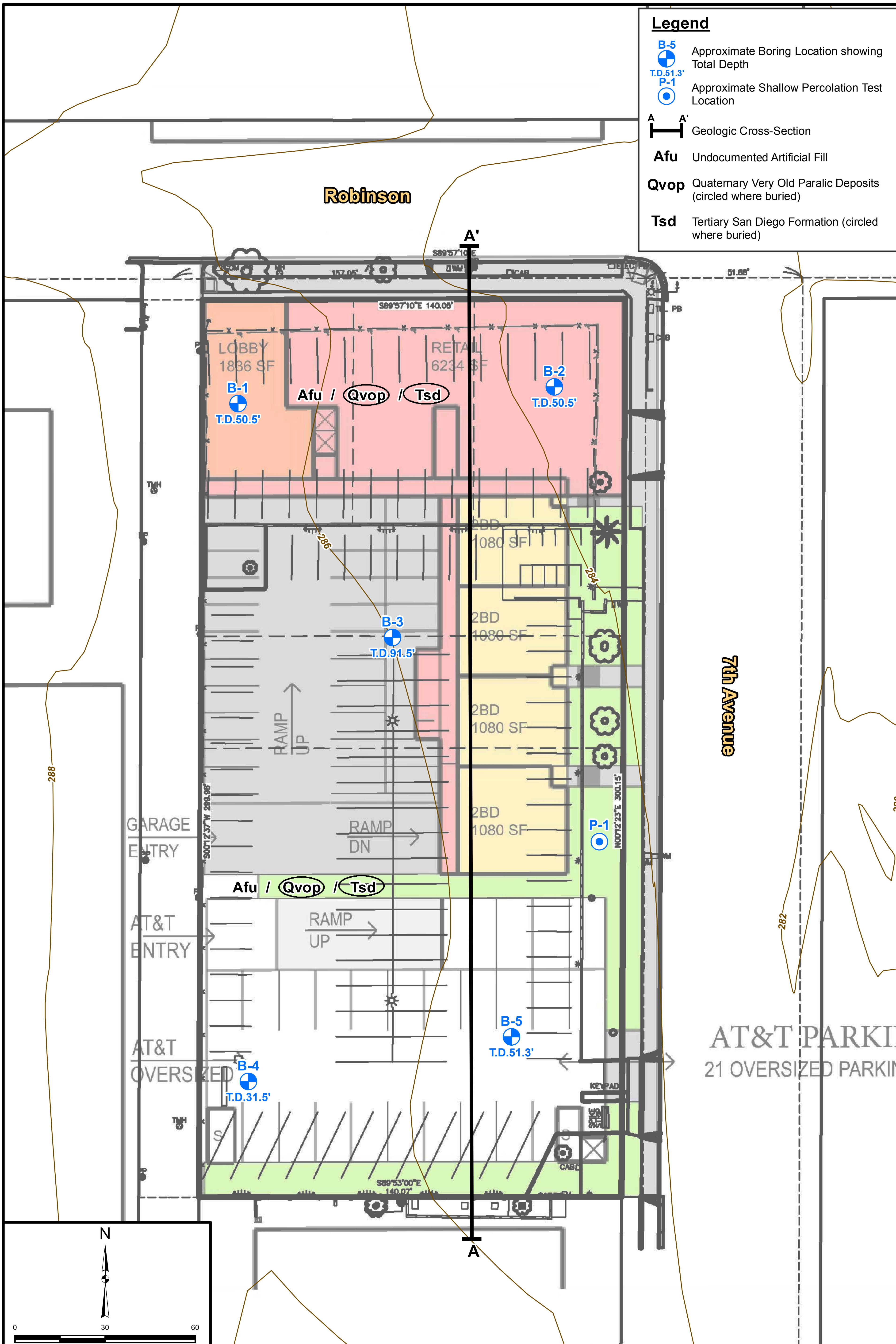

Project: 11347.001

Eng/Geol: DBN/RCS

Scale: 1 " = 30 '

Date: June 2016

Base Map: Lvl-1, 7th & Robinson by Carrier Johnson+Culture3, 6/5/2016.

Author: (mmurphy)

GEOTECHNICAL MAP

7th and Robinson
San Diego, California

Figure 2

Leighton

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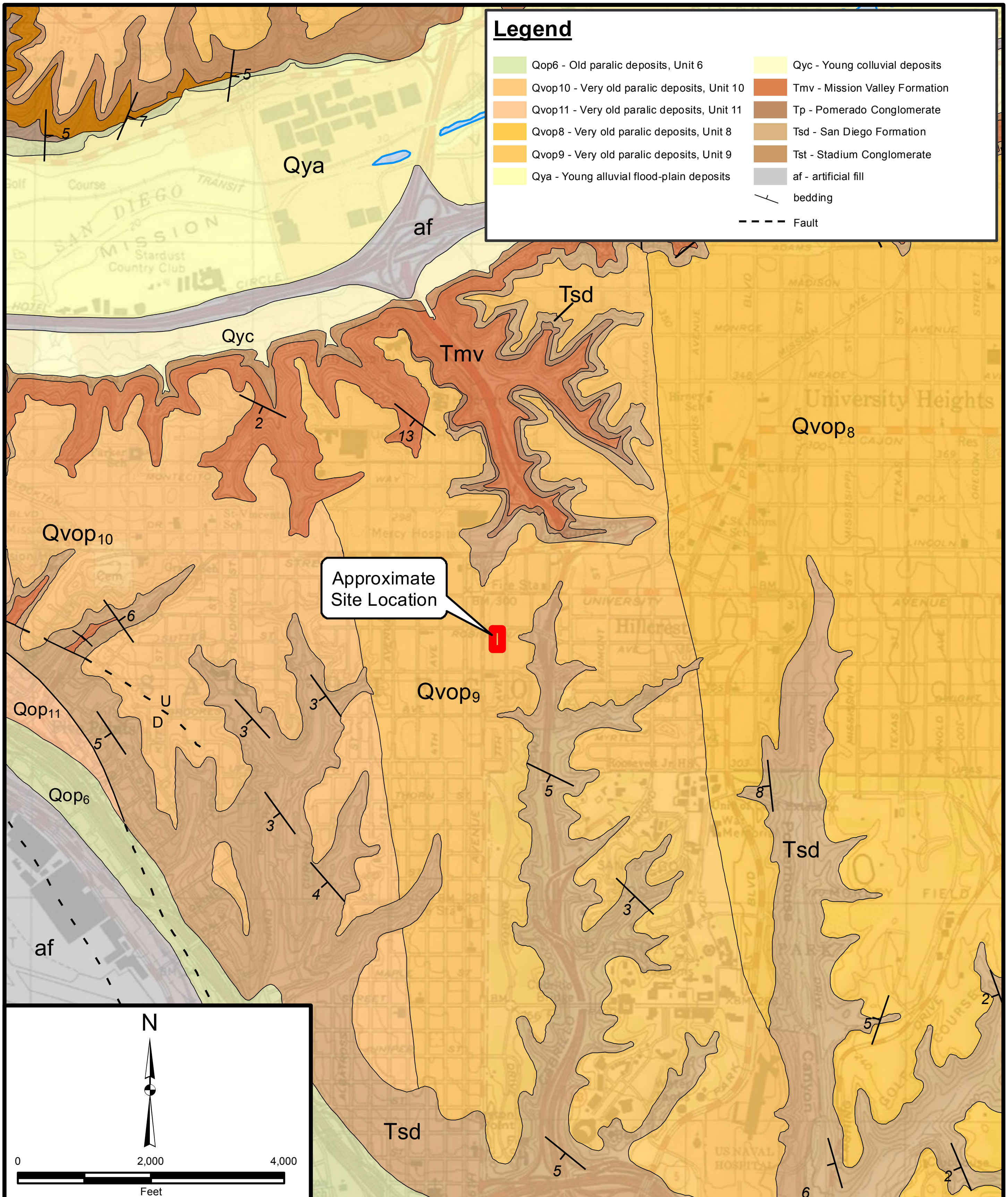

Project: 11347.001	Eng/Geol: DBN/RCS
Scale: 1 " = 2,000 '	Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: (mmurphy)

REGIONAL GEOLOGY MAP

7th and Robinson
San Diego, California

Figure 3

Leighton

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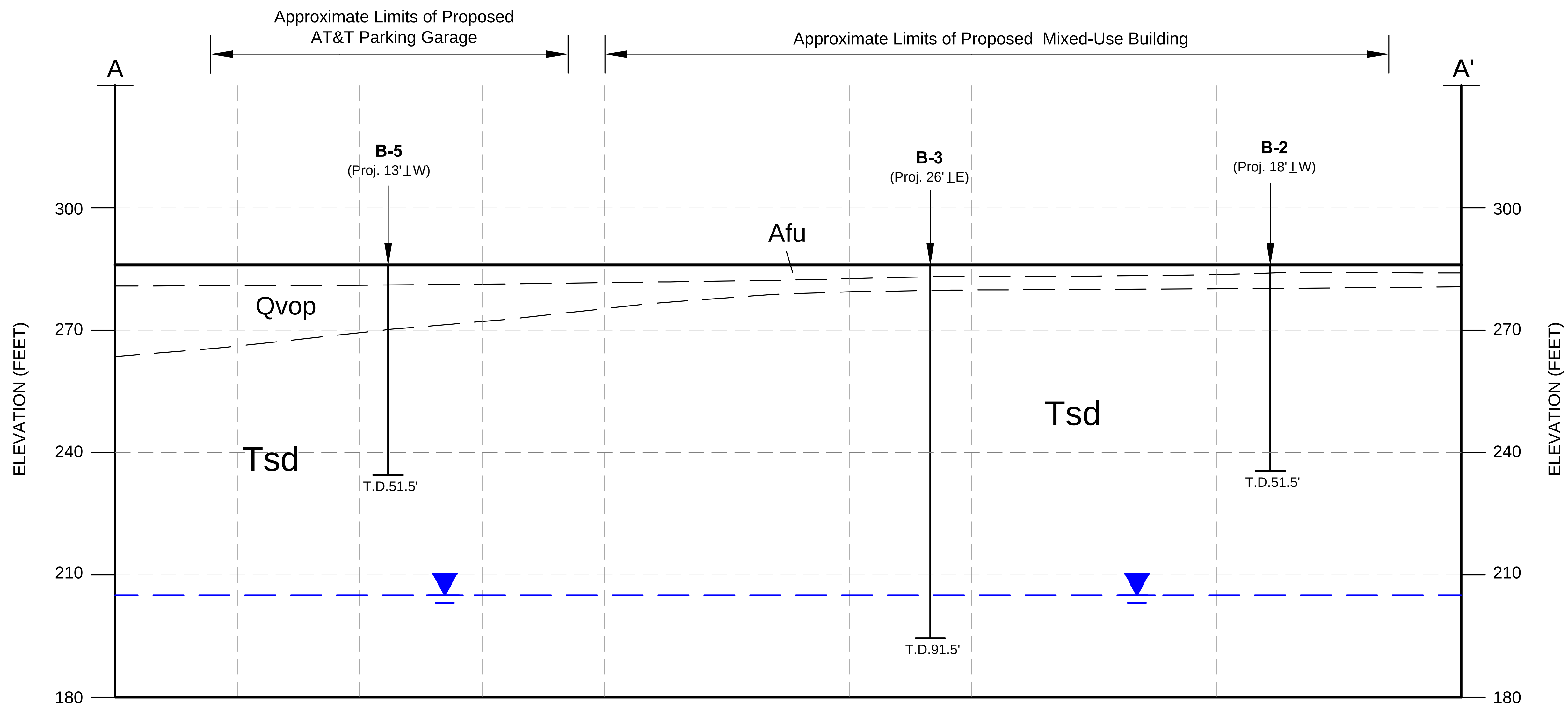

LEGEND

B-5 T.D.51.5'	APPROXIMATE BORING LOCATION SHOWING TOTAL DEPTH	Afu	UNDOCUMENTED ARTIFICIAL FILL
	APPROXIMATE GEOLOGIC CONTACT	Qvop	QUATERNARY VERY OLD PARALIC DEPOSITS
	GROUNDWATER TABLE	Tsd	TERTIARY SAN DIEGO FORMATION

Project: 11347.001	Eng/Geol: DBN/RCS
Scale: 1"=30'	Date: June 2016
Reference: Author: MAM	

GEOLOGIC CROSS-SECTION A-A'

7th and Robinson
San Diego, California

Figure 4

Leighton

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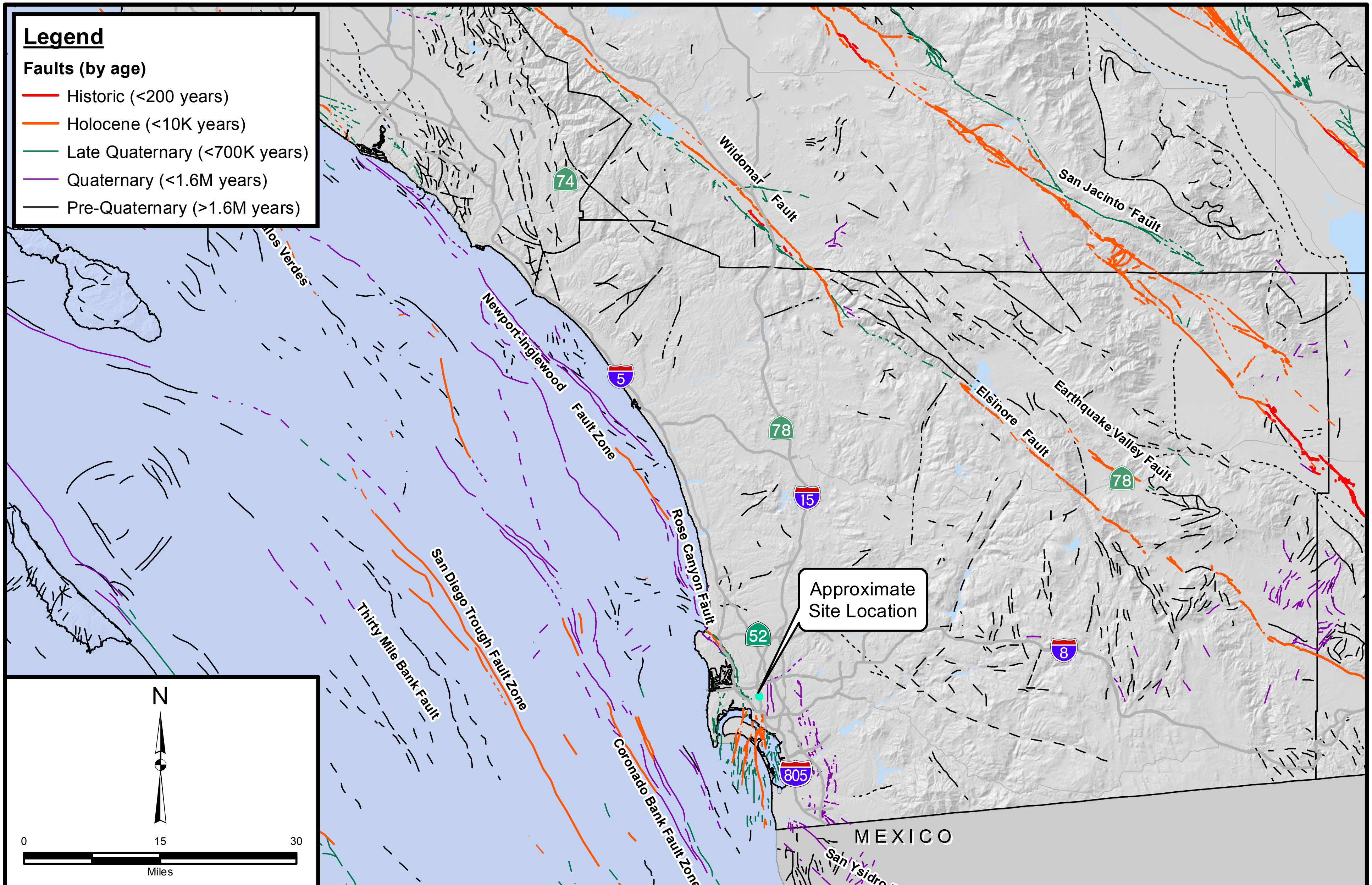

Project: 11347.001 | Eng/Geol:DBN/RCS

Scale: 1 " = 15 miles | Date: June 2016

Faults: Bryant, Bryant CGS 2010
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

REGIONAL FAULT MAP

7th and Robinson
San Diego, California

Figure 5

Leighton

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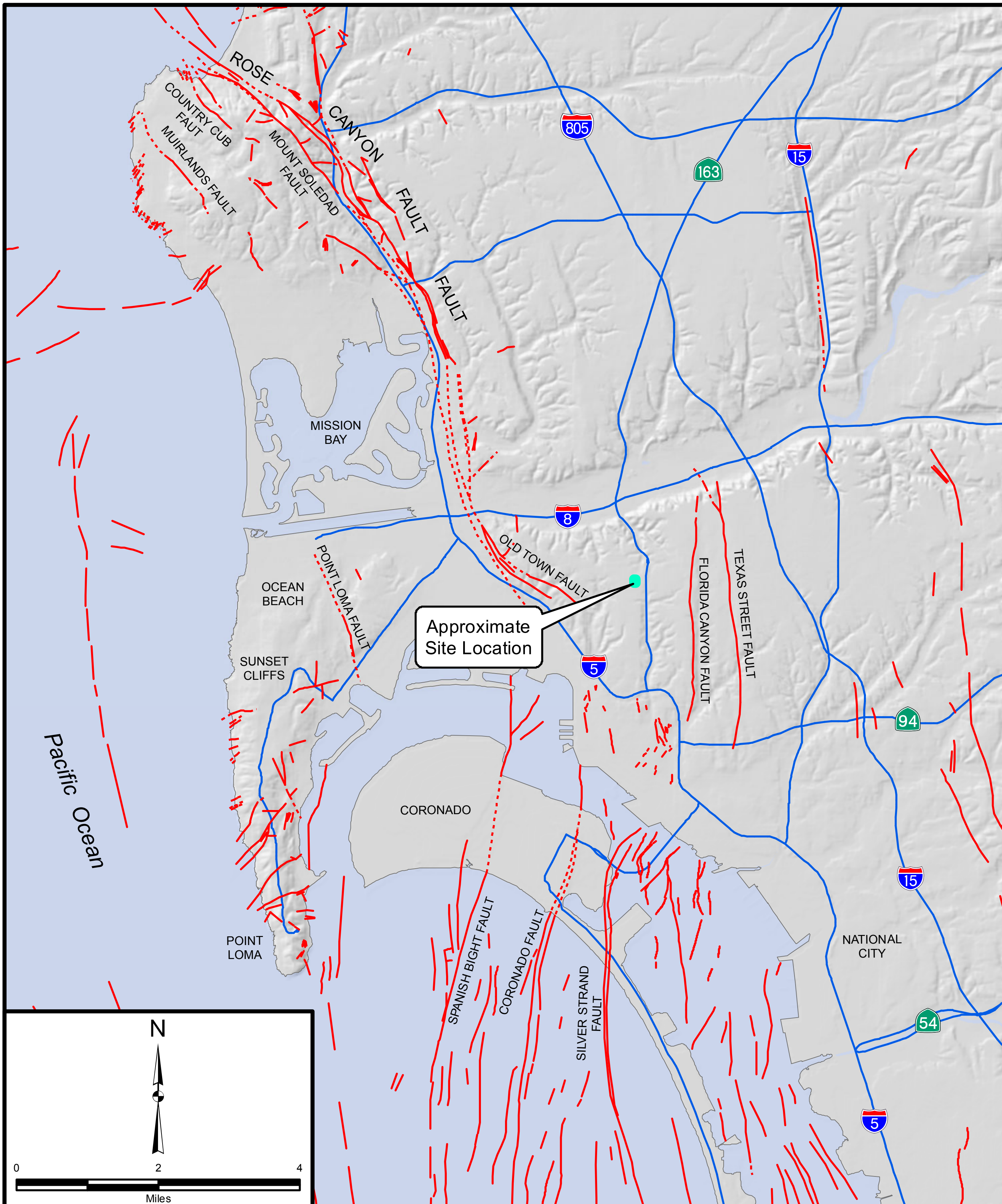

Project: 11297.001	Eng/Geol: DBN/RCS
Scale: 1 " = 2 miles	Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

ROSE CANYON FAULT MAP

7th and Robinson
San Diego, California

Figure 6

Leighton

Map Saved as P:\Drafting\11347\001\Maps\11347-001_F06_RCFM_2016-06-13.mxd on 6/13/2016 10:57:46 AM

Appendix A
References

APPENDIX A

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APPENDIX A

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APPENDIX A

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Appendix B
Boring Logs and Percolation Test Results

GEOTECHNICAL BORING LOG KEY

Project No.		**Date Drilled**	
Project	KEY TO BORING LOG GRAPHICS	**Logged By**	
Drilling Co.		**Hole Diameter**	
Drilling Method		**Ground Elevation**	
Location		**Sampled By**	

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0								Asphaltic concrete	
									Portland cement concrete	
								CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay	
								CH	Inorganic clay; high plasticity, fat clays	
								OL	Organic clay; medium to plasticity, organic silts	
	5							ML	Inorganic silt; clayey silt with low plasticity	
								MH	Inorganic silt; diatomaceous fine sandy or silty soils; elastic silt	
								ML-CL	Clayey silt to silty clay	
								GW	Well-graded gravel; gravel-sand mixture, little or no fines	
								GP	Poorly graded gravel; gravel-sand mixture, little or no fines	
	10							GM	Silty gravel; gravel-sand-silt mixtures	
								GC	Clayey gravel; gravel-sand-clay mixtures	
								SW	Well-graded sand; gravelly sand, little or no fines	
								SP	Poorly graded sand; gravelly sand, little or no fines	
								SM	Silty sand; poorly graded sand-silt mixtures	
	15							SC	Clayey sand; sand-clay mixtures	
									Bedrock	
									Ground water encountered at time of drilling	
				B-1					Bulk Sample	
	20			C-1					Core Sample	
				G-1					Grab Sample	
				R-1					Modified California Sampler (3" O.D., 2.5 I.D.)	
				SH-1					Shelby Tube Sampler (3" O.D.)	
				S-1					Standard Penetration Test SPT (Sampler (2" O.D., 1.4" I.D.)	
	25			PUSH					Sampler Penetrates without Hammer Blow	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- TR THERMAL RESISTIVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-1

Project No. 11347.001 **Start Date Drilled** 6-9-16 **End Date Drilled** 6-9-16
Project Greystar **Hole Diameter** 8"
Drilling Co. Baja Exploration **Ground Elevation** 289'
Drilling Method CME-75 - 140lb - Autohammer - 30" Drop **Logged By** CDL
Location See Figure 2 **Sampled By** CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0								ASPHALT CONCRETE, approximately 3" over AGGREGATE BASE, approximately 4" over	
								SM	ARTIFICIAL FILL (Afu) @ 1': Silty SAND, medium dense, reddish brown, moist, fine to medium SAND	
								CL		
285										
	5			S-1	11 18 22			CL	VERY OLD PARALIC DEPOSITS (Qvop) @ 4': CLAY, dark reddish brown, moist, plastic	
									TERTIARY SAN DIEGO FORMATION @ 6': Poorly-graded SANDSTONE with SILT, dense, grayish brown, moist, fine SAND, well-cemented, sampler over packed	
280										
	10			R-1	18 26 37	122	10	SM	@ 10': Silty SANDSTONE, dense, brown, very moist to wet, fine to medium SAND, some larger well-rounded GRAVEL, over packed, damaged rings stress quality samples with driller damaged rings	
275										
	15			S-2	8 7 11			SP-SM	@ 15': Poorly-graded SANDSTONE with SILT, medium dense, pale to light gray, moist, fine SAND, friable	
270										
	20			R-2	10 18 30	94	11	SP	@ 20': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND, friable	DS
265										
	25			S-3	18 21 29			SP-SM	@ 25': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	
260										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-1

Project No.	11347.001	**Start Date Drilled**	6-9-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	Soil Description	Type of Tests
	30			R-3	17 50/5"			SP-SM	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	DS
255										
	35			S-4	13 24 31				@ 35': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	
250										
	40			R-4	22 50/5"	88	17		@ 40': Poorly-graded SANDSTONE with SILT, very dense, trace very thin gray and orange-brown bedding	
245									@ 44': Concretion	
	45									
240										
	50			S-5	16 23 33				@ 50': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, tracely mottled with orange-brown nodules, sharply becomes light orange-brown with 1" oxidized bed, very dense, moist fine SAND	
									Total Deepth = 51.5 Feet **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete on 6/9/16**	
235										
	55									
230										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-2

Project No.	11347.001	**Start Date Drilled**	6-9-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	286'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							GP	ASPHALT CONCRETE 2.5" thick over AGGREGATE BASE 4" thick over	
285								SP	ARTIFICIAL FILL @ .4": Gravelly SAND, orange-brown, moist, fine to coarse SAND and well-rounded gravel	
									VERY OLD PARALIC DEPOSITS (Qvop) @ 2': Gravelly SANDSTONE, very dense, orange-brown, moist, fine to coarse SAND, fine well-rounded gravel	
	5			R-1	14 50/3"	108	9	SP		
280								SP	TERTIARY SAN DIEGO FORMATION (Tsd) @ 6': Poorly-graded SANDSTONE, pale light gray, moist, very dense, fine SAND	
	10			S-1	8 11 17			SP-SM	@ 10': Interbedded poorly-graded SANDSTONE and SANDSTONE with SILT, light orange-brown, moist, very dense, thinly bedded, trace very thin beds of pale gray, laminated interbeds	
275										
	15			R-2	16 18 29	93	7	SP	@ 15': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND, shoe exhibits laminated brownish gray, silty SAND	
270										
	20			S-2	13 17 30			SP-SM	@ 20': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND	
265										
	25			R-3	21 3 50/4"	103	5		@ 25': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
260										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-2

Project No.	11347.001	**Start Date Drilled**	6-9-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	286'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
255	30			S-3	12 27 39			SP-SM	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, moist, fine SAND, vertical open fractures, concoidal orientation from sampling	
250	35			R-4	23 50/3"	92	9		@ 35': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
245	40			S-4	12 14 26				@ 40': Poorly-graded SANDSTONE with SILT, dense, olive-brown, moist, fine SAND	
240	45								@ 47': Concretion	
235	50			R-5	50/5"	92	10		@ 50': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
230	55								**Total Depth = 50.5 Feet** **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete on 6/9/16**	
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								ASPHALT CONCRETE, approximately 3" over AGGREGATE BASE, approximately 5" over	
				B-1 1'-5'				GP SM	ARTIFICIAL FILL (Afu) @ .5": Clayey SAND, brown, moist, fine SAND, some fine to medium GRAVEL, sandy CLAY, stiff, dark reddish brown, moist, fine SAND	
285								CL		
								SP	TERTIARY SAN DIEGO FORMATION (Tsd)	
	5			R-1	34 50/3"	108	9		@ 5': Poorly-graded SANDSTONE, very dense, pale olive-brown, damp, very fine SAND, cemented	
280										
	10			S-1	50/4"			GP	@ 9.5': CONGLOMERATE, well-cemented bed @ 10': No recovery, dense drilling to 15', gravels in spoil cuttings	
275										
	15			R-2	50/6"	93	7	SP	@ 15': Poorly-graded SANDSTONE, very dense, pale olive, moist, very fine SAND, dense drilling to 20'	
270										
	20			S-2	12 15 16				@ 20': Poorly-graded SANDSTONE, dense, pale olive, moist, very fine SAND, dense drilling to 20'	
265										
	25			R-3	19 50/6"	103	5		@ 25': Poorly-graded SANDSTONE, very dense, pale white mottled with orange-brown, damp, fine SAND, trace medium angular SILTSTONE, rip-up clasts	
260										
	30									

SAMPLE TYPES:
B BULK SAMPLE
C CORE SAMPLE
G GRAB SAMPLE
R RING SAMPLE
S SPLIT SPOON SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:
-200 % FINES PASSING
AL ATTERBERG LIMITS
CN CONSOLIDATION
CO COLLAPSE
CR CORROSION
CU UNDRAINED TRIAXIAL
DS DIRECT SHEAR
EI EXPANSION INDEX
H HYDROMETER
MD MAXIMUM DENSITY
PP POCKET PENETROMETER
RV R VALUE
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
SG SPECIFIC GRAVITY
UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16
End Date Drilled	6-8-16		
Project	Greystar	**Hole Diameter**	8"
Drilling Co.	Baja Exploration	**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop	**Logged By**	CDL
Location	See Figure 2	**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S-3	16 24 37			SP	@ 30': Poorly-graded SANDSTONE, very dense, pale olive-brown, mottled with orange-brown, moist, fine SAND, very friable	
255										
	35			R-4	24 50/4"	92	9		@ 35': Poorly-graded SANDSTONE, very dense, pale olive-brown, mottled with orange-brown, moist, fine SAND, very friable	
250										
	40			S-4	21 21 36			SP-SM	@ 40': Poorly-graded SAND with SILT, very dense, light gray, moist, fine SAND, friable	
245										
	45									
240										
	50			R-5	50/6"	92	10	SP	@ 50': Poorly-graded SANDSTONE, very dense, pale yellow-brown to light brown, damp, fine SAND, friable	
235										
	55									
230										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	60			S-5	29 36 50/6"			SP	@ 60': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND, friable	
225										
	65									
220										
	70			R-6	29 50/5"				@ 70': Poorly-graded SANDSTONE, very dense, light brown, very moist, fine SAND, very thin bed of gray silty SANDSTONE, gravel in shoe, well-rounded (broken)	
215										
	75							GP	@ 74'-80': Well-cemented, GRAVEL CONGLOMERATE, large gravel, hole collapsed during cleanout	
210										
	80			S-6	50/6"			SP-SM	@ 80': Poorly-graded SANDSTONE with SILT, very dense, grayish brown, very moist to wet, fine SAND, fine well-rounded GRAVEL, lodged in shoe, recovered sluff	
205 ▽									@ 84': Cemented bed 1' thick	
	85									
200										
	90									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	90			R-7	17 28 34			SP-SM	@ 90': Poorly-graded SANDSTONE with SILT, dense, gray mottled with olive greenish brown, wet, fine SAND	
195									**Total Depth = 91.5 Feet** **Groundwater encountered at 83 feet at time of drilling** **<u>NOTES FOR PERCOLATOIN TEST</u>** **0-50': 2" I.D. Solid Pipe** **50-75': 2" I.D. Slotted Pipe** **75'-91.5': Bentonite Seal** **After Percolation, backfilled with bentonite grout with concrete on 6/8/16**	
	95									
190										
	100									
185										
	105									
180										
	110									
175										
	115									
170										
	120									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-4

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							GP	ASPHALT CONCRETE, approximately 4" over AGGREGATE BASE approximately 6" over	
				B-1 1'-5'				SC	<u>ARTIFICIAL FILL (Afu)</u> @ 1': Clayey SAND, loose to medium dense, dark reddish brown, some fine SAND	EI, CR
285	5			R-1	16 50/3"			SM	<u>VERY OLD PARALIC DEPOSITS (Qvop)</u> @ 5': Silty SANDSTONE, very dense, mottled reddish brown, moist, fine to medium SAND, disturbed sample, damaged all rings	
280	10			S-1	10 10 19			SC	@ 10': Clayey SANDSTONE, medium dense, reddish brown, very moist, fine to medium SAND, micaceous, approximately 25% CLAY	SA, H
								GP		
275	15			R-2	50/4"				@ 25': No recovery	
								SP	<u>TERTIARY SAN DIEGO FORMATION (Tsd)</u>	
270	20			S-2	29 12 19				@ 20': Poorly-graded SANDSTONE, medium dense, light to pale gray, moist, fine SAND, grades with depth to silty SANDSTONE, mechanically broken gravel in waste barrel	
265	25			R-3	50/5"				@ 25': Poorly-graded SANDSTONE, very dense, pale gray, moist, fine SAND	
260	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-4

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	30			S-3	14 27 38			SP	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale gray, moist, fine SAND	
									Total Depth = 31.5 Feet **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete**	
255	35									
250	40									
245	45									
240	50									
235	55									
230	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-5

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	287'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							GP	ASPHALT CONCRETE, approximately 2.5" over AGGREGATE BASE, approximately 3" over	
285				B-1 1'-4'				SC	ARTIFICIAL FILL (Afu) @ .5': Clayey SAND, loose to medium dense, dark reddish brown	
	5			S-1	8 8 8			SM	VERY OLD PARALIC DEPOSITS (Qvop) @ 5': Silty SANDSTONE, medium dense, light brown, moist, fine SAND, mottled with clayey sand pockets	SA
280										
	10			R-1	19 18 50/5"			GP	@ 10': Gravelly SANDSTONE, very dense, orange-brown, moist, fine to medium SAND, moderately friable, driller notes well-cemented, low sample recovery, gravels from 11' to 15', large well-rounded GRAVEL in shoe	
275										
	15			S-2	10 17 20			SP-SM	TERTIARY SAN DIEGO FORMATION @ 15': Poorly-graded SANDSTONE with SILT, medium dense, pale gray, slightly mottled with orange-brown stringers, moist, fine SAND, 40/1" on first blows, Qln/Tsd contact	
270										
	20			R-2	16 20 42				@ 20': Poorly-graded SANDSTONE, very dense, light to pale gray, moist, fine SAND	
265										
	25			S-3	18 18 26				@ 25': Poorly-graded SANDSTONE with SILT, dense, light to pale gray, moist, fine SAND	
260										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

* * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * *

GEOTECHNICAL BORING LOG B-5

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	287'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Graphic Log: N S

Elevation Feet	Depth Feet	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30		R-3	50/5"			SP	@ 30': Poorly-graded SANDSTONE, very dense, light to pale gray, moist, fine SAND	
255									
	35		S-4	20 29 44			SP-SM	@ 35': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, trace mottling of orange-brown, moist, fine SAND	
250									
	40		R-4	40 50/2"				@ 40': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, trace mottling of orange-brown, moist, fine SAND	
245									
	45							@ 45': Encountered concretion to 50'	
240									
	50		S-5	24 37 50/4"				@ 50': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, undulatory, lamination, sampler over packed	
235								**Total Depth = 51.3 Feet** **No groundwater encountered at time of drilling** **Backfilled with bentonite grout on 8/9/16**	
	55								
230									
	60								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
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- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

FIELD PERCOLATION TEST DATA SHEET

Project Name:	Grey Star	Project No.:	11347.001
Proj. Address:	635 Robinson Avenue, San Diego, CA		

SOIL TYPE / TEST LOCATION / BOREHOLE

Soil Type: Poorly Graded SANDSTONE

Location: B-3

Hole Dia: 8"

Depth 50'-75'

Tested by: CDL Pre-Saturation Date: 6-8-16 Test Date: 6-9-16

Notes: Measurements in Inches (in)

Time of Day	Interval / Notes	Initial Depth to Water (in)	Final Depth of Water (in)	Δ in Water Level (in.)	Percolation Rate (min/inch)
0924	30 minutes	772.80	853.92	81.12	0.37
0958	30 minutes	672.00	842.52	170.52	0.18
1032	30 minutes	636.00	838.44	202.44	0.15
1107	30 minutes	651.60	834.60	183.00	0.16
1143	30 minutes	600.00	826.32	226.32	0.13
1218	30 minutes	600.00	824.88	224.88	0.13
1308	30 minutes	600.00	820.92	220.92	0.14

Notes: 0.14 min/inch or 428 inch/hour

Last 30 minute testing reading used to detmine percolation rate

Leighton

FIELD PERCOLATION TEST DATA SHEET

Project Name:	Grey Star	Project No.:	11347.001
Proj. Address:	635 Robinson Avenue, San Diego, CA		

SOIL TYPE / TEST LOCATION / BOREHOLE

Soil Type: Poorly Graded SANDSTONE

Location: P-1

Hole Dia: 6"

Depth 13"-19"

Tested by: CDL Pre-Saturation Date: 6-8-16 Test Date: 6-9-16

Notes: Measurements in Inches (in)

Time of Day	Interval / Notes	Initial Depth to Water (in)	Final Depth of Water (in)	Δ in Water Level (in.)	Percolation Rate (min/inch)
0948	30 minutes	12.250	17.250	5.00	6.00
1019	30 minutes	13.250	17.375	4.13	7.27
1050	30 minutes	13.625	17.125	3.50	8.57
1121	30 minutes	13.625	17.125	3.50	8.57
1152	34 minutes	13.500	17.125	3.63	9.38
1227	43 minutes	12.875	17.625	4.75	9.05
1311	30 minutes	13.500	16.375	2.88	10.43
1342	30 minutes	13.250	16.500	3.25	9.23
1427	30 minutes	13.375	16.500	3.125	9.60

Notes: 9.6 min/inch or 6.25 inch/hour

Last 30 minute testing reading used to detmine percolation rate

Appendix C
Laboratory Testing Procedures and Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

Moisture and Density Determination Tests: Moisture content and dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The results of these tests are presented in the boring logs.

Direct Shear Test: Direct shear tests were performed on two selected relatively undisturbed samples which were soaked for a minimum of 24 hours under a surcharge equal to the applied normal force during testing. After transfer of the samples to the shear box and reloading of the samples, the pore pressures set up in the samples (due to the transfer) were allowed to dissipate for a period of approximately 1 hour prior to application of shearing force. The samples were tested under various normal loads utilizing a motor-driven, strain-controlled, direct-shear testing apparatus at a strain rate of 0.05 inches per minute. The test results are presented on the attached figures.

Classification or Grain Size Tests: Typical materials were subjected to mechanical grain-size analysis by sieving from U.S. Standard brass screens (ASTM Test Methods C136 or D422). Hydrometer analyses were performed where applicable quantities of fines were encountered. The data was evaluated in determining the classification of the materials. The grain-size distribution curves are presented in the test data and the Unified Soil Classification (USCS) is presented in both the test data and the boring logs.

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with Caltrans Test Method CT643 for Steel or CT532 for concrete and standard geochemical methods. The results are presented in the table below:

Sample Location	Sample Description	pH	Minimum Resistivity (ohms-cm)
B-4 @ 1-5’	Reddish Brown Clayey Sand	7.57	824

APPENDIX C (continued)

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method CT422. The results are presented below:

Sample Location	Sample Description	Chloride Content, ppm
B-4 @ 1-5’	Reddish Brown Clayey Sand	66.7

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (Caltrans Test Method CT417). The test results are presented in the table below:

Sample Location	Sample Description	Sulfate Content, ppm
B-4 @ 1-5’	Reddish Brown Clayey Sand	180

Expansion Index Tests (ASTM Test Method 4829):

The expansion potential of selected materials was evaluated by the Expansion Index Test, U.B.C. Standard No. 18-2. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch thick by 4-inch diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of this test are presented in the table below:

Sample Location	Sample Description	Expansion Index	Expansion Potential
B-4 @ 1-5’	Reddish Brown Clayey Sand	47	Low

SOIL RESISTIVITY TEST
DOT CA TEST 643

Project Name: GREYSTAR / 7TH & ROBINSON | Tested By : BCC | Date: 6/19/15
Project No. : 11347.001 | Data Input By: BCC | Date: 6/20/15
Boring No.: B-4 | Checked By: BCC | Date: 6/20/15
Sample No. : B-1 | Depth (ft.) : 1.0-5.0
Visual Soil Identification: SC

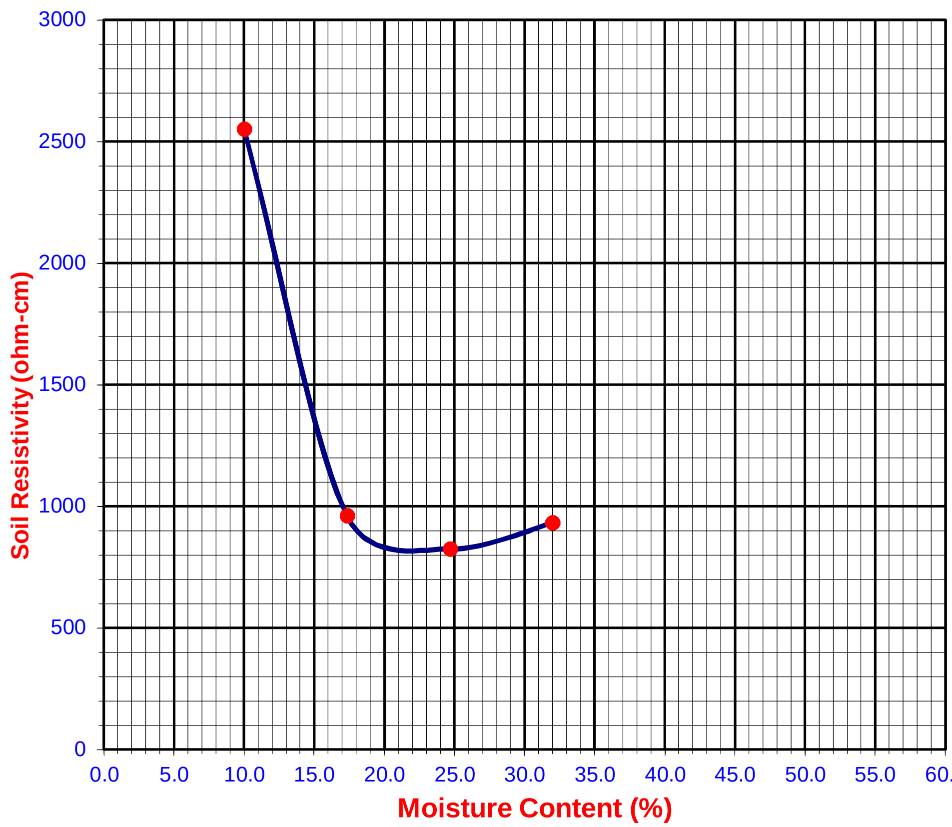
** NOTE: ASTM G-187 REQUIRES SOIL SPECIMENS TO PASS THROUGH NO.8 SIEVE PRIOR TO TESTING. THEREFORE, THIS TEST METHOD MAY NOT BE REPRESENTATIVE FOR COARSER MATERIALS.

Initial Moisture Content (%)

Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	90.90
Wt. of Container (g)	0.00
Moisture Content (%)	10.01

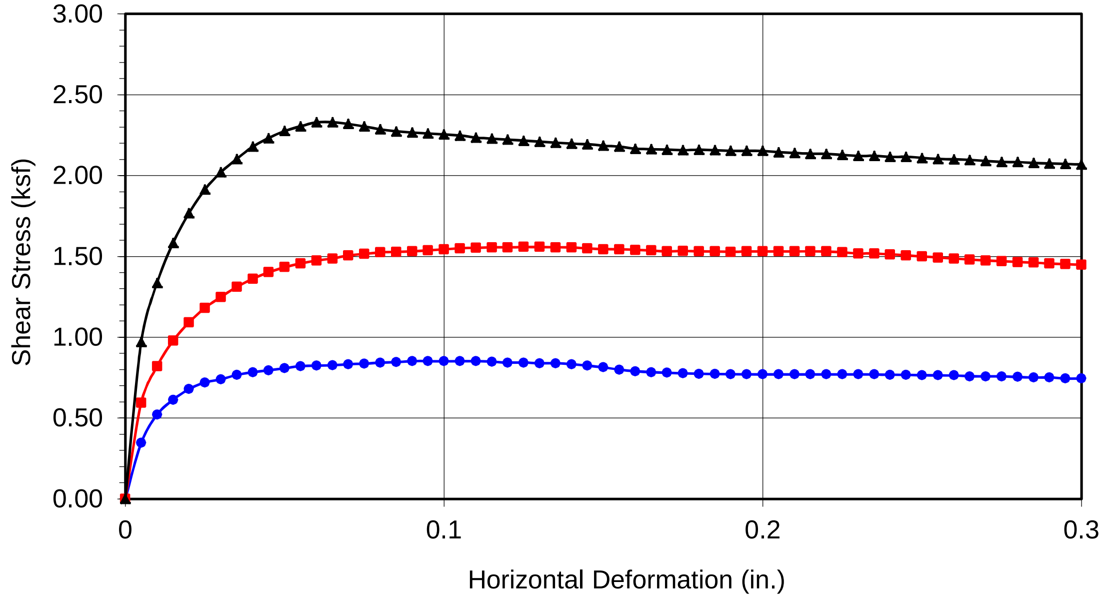
Initial Soil Weight (g)(Wt)	150.0
Box Constant:	0.981

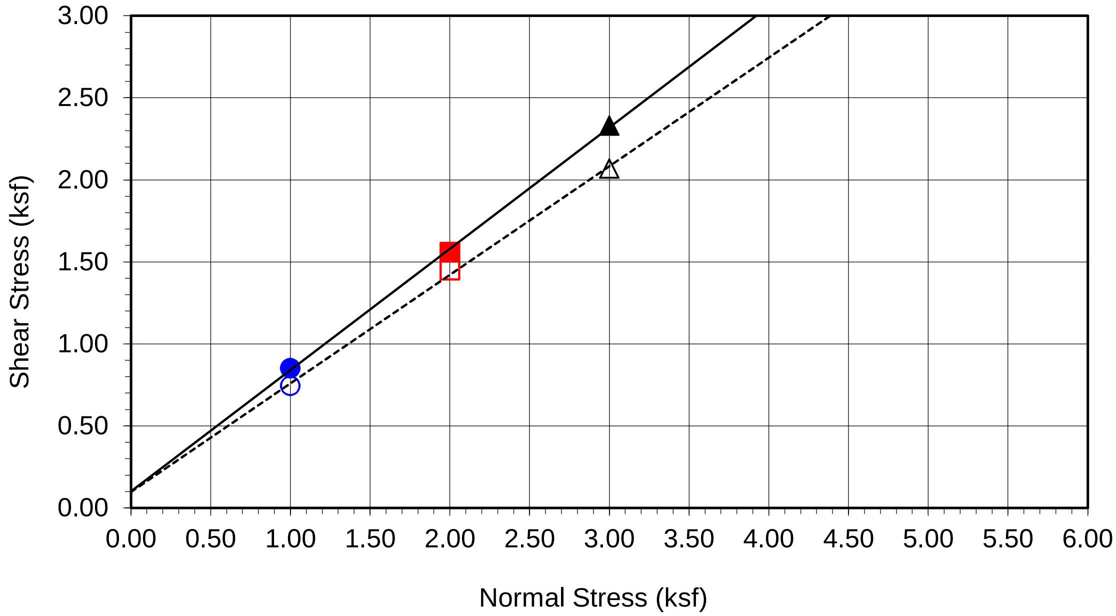
Remolded Specimen	Moisture Adjustments				
Water Added (ml)	0	10	20	30	
Adj. Moisture Content	10.01	17.35	24.68	32.01	
Resistance Rdg. (ohm)	2600	980	840	950	
Soil Resistivity (ohm-cm)	2551	961	824	932	



Minimum Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content	Soil pH
AASHTO T-288, DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	AASHTO T-288, DOT CA Test 643
824	24.68	180	66.7	7.57

Rev. 12-04





Boring No.	**B-1**
Sample No.	**R-2**
Depth (ft)	**21-21.5**
Sample Type:	Ring
Soil Identification: Pale olive silt (ML)	

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	102	36
Ultimate	97	34

Normal Stress (kip/ft²)	1.000	2.000	3.000
Peak Shear Stress (kip/ft²)	● 0.852	■ 1.559	▲ 2.330
Shear Stress @ End of Test (ksf)	○ 0.745	□ 1.449	△ 2.069
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.34	11.34	11.34
Dry Density (pcf)	90.3	91.4	92.6
Saturation (%)	35.3	36.2	37.3
Soil Height Before Shearing (in.)	0.9933	0.9915	0.9852
Final Moisture Content (%)	27.8	27.8	26.7

Leighton

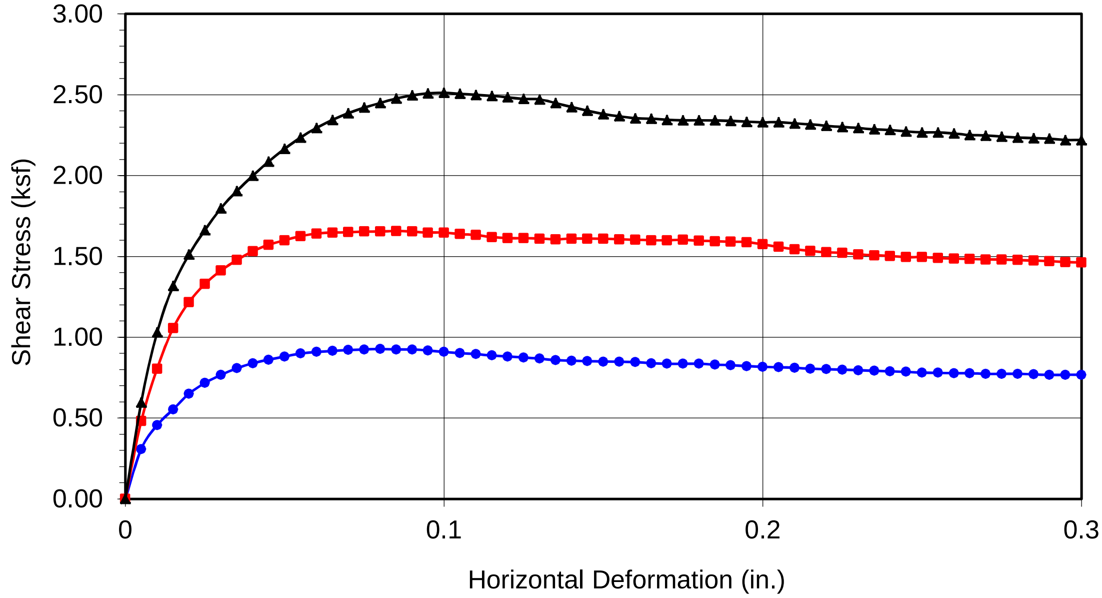
DIRECT SHEAR TEST RESULTS

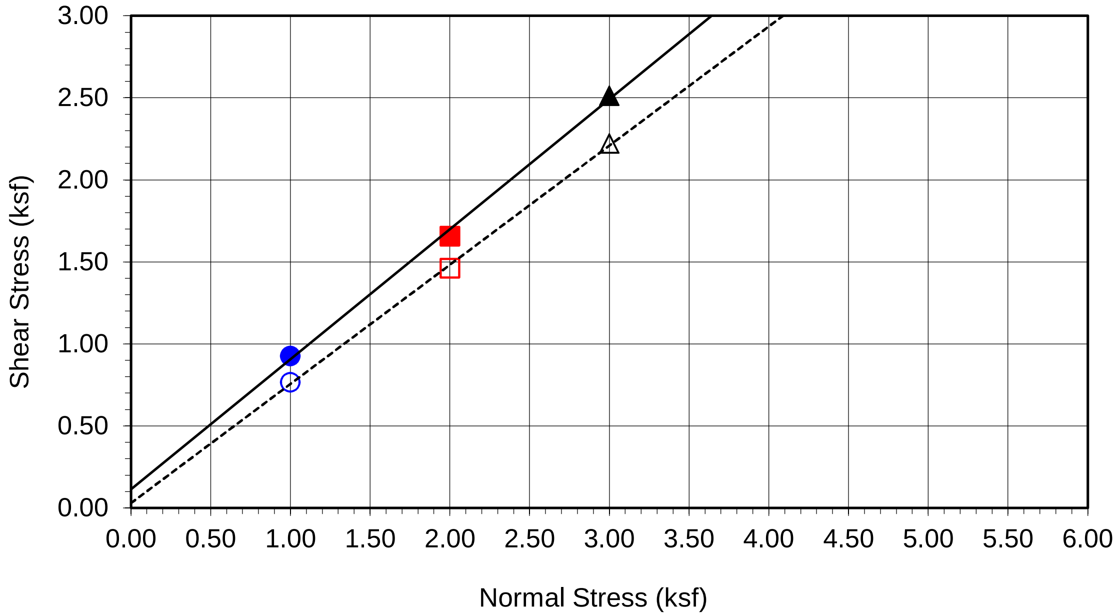
Consolidated Drained - ASTM D 3080

Project No.: 11347.001

Greystar/7th & Robinson

06-16





Boring No.	**B-1**
Sample No.	**R-3**
Depth (ft)	**31-31.5**
Sample Type:	Ring

Soil Identification:
Light olive gray silt (ML)

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	114	38
Ultimate	30	36

Normal Stress (kip/ft²)	1.000	2.000	3.000
Peak Shear Stress (kip/ft²)	● 0.927	■ 1.657	▲ 2.512
Shear Stress @ End of Test (ksf)	○ 0.767	□ 1.462	△ 2.220
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	13.52	13.52	13.52
Dry Density (pcf)	86.9	88.3	89.5
Saturation (%)	38.8	40.2	41.4
Soil Height Before Shearing (in.)	0.9939	0.9876	0.9848
Final Moisture Content (%)	31.5	30.6	29.4

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DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 11347.001

Greystar/7th & Robinson

06-16

EXPANSION INDEX of SOILS
ASTM D 4829

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Project Name:	GREYSTAR / 7TH & ROBINSON	Tested By:	BCC	Date:	22-Jun-2016
Project No. :	10347.001	Checked By:	BCC		23-Jun-2016
Boring No:	B-4	Depth (ft.)	1.0-5.0		
Sample No. :	B-1	Location:	**		
Sample Description:	SC: REDDISH-BROWN CLAYEY SAND				

Dry Wt. of Soil + Cont. (g)	2250.0
Wt. of Container No. (g)	0.0
Dry Wt. of Soil (g)	2250.0
Weight Soil Retained on #4 Sieve	16.5
Percent Passing # 4	99.3

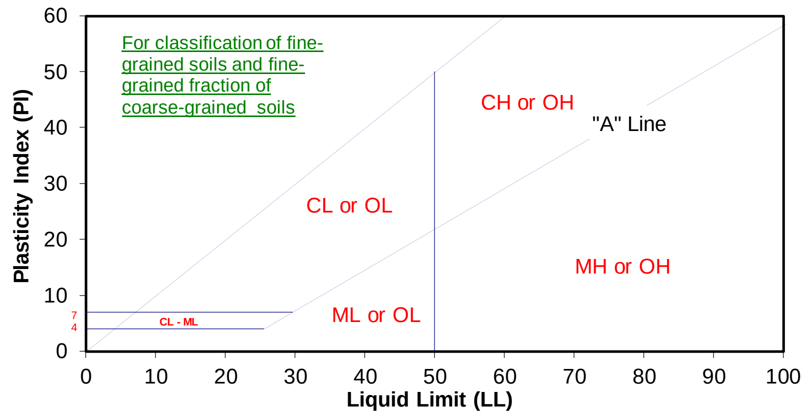
MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0468
Wt. Comp. Soil + Mold (g)	615.3	644.6
Wt. of Mold (g)	203.8	203.8
Specific Gravity (Assumed)	2.70	2.70
Container No.	e-3	e-3
Wet Wt. of Soil + Cont. (g)	300.0	644.6
Dry Wt. of Soil + Cont. (g)	275.7	378.2
Wt. of Container (g)	0.0	203.8
Moisture Content (%)	8.8	16.5
Wet Density (pcf)	124.1	132.8
Dry Density (pcf)	114.1	113.9
Void Ratio	0.478	0.547
Total Porosity	0.323	0.354
Pore Volume $(cm)^3$	66.9	76.6
Degree of Saturation (%) [S meas]	**49.7**	**81.7**

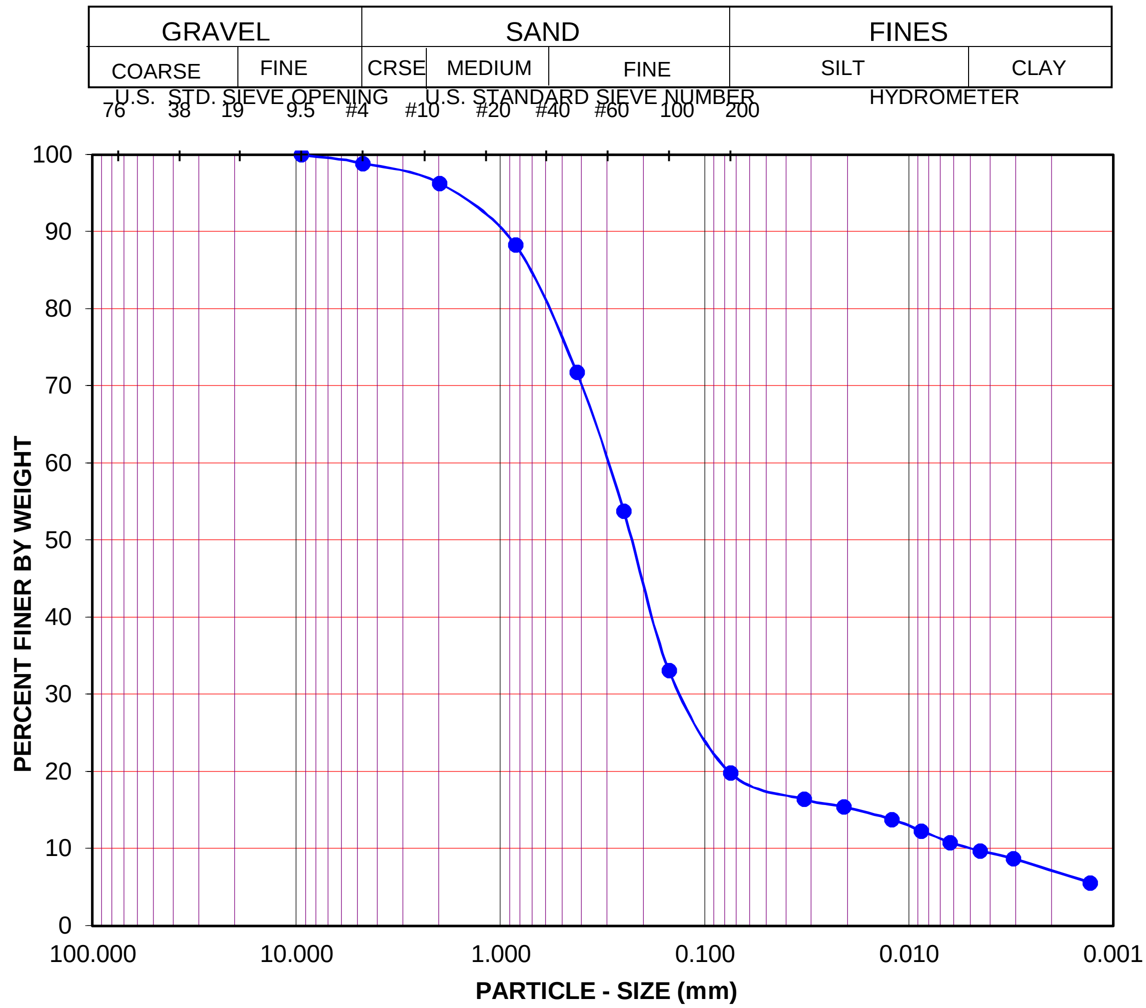
SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
6/22/16	19:12	1.0	0	1.0000
6/22/16	19:22	1.0	10	1.0000
	Add Distilled Water to the Specimen			
6/23/16	16:19	1.0	1257	1.0468
6/23/16	17:19	1.0	1317	1.0468

Expansion Index (EI meas) =	((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	46.8
Expansion Index (Report) =	Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**47**

Rev. 05-09





Location	Sample No.	Depth (ft)	Soil Type	GR:SA:FI (%)	LL,PL,PI
B-4	S-1	10.0-11.5	SC	1:79:20	N/A

Sample Description:
SC: REDDISH-BROWN CLAYEY SAND

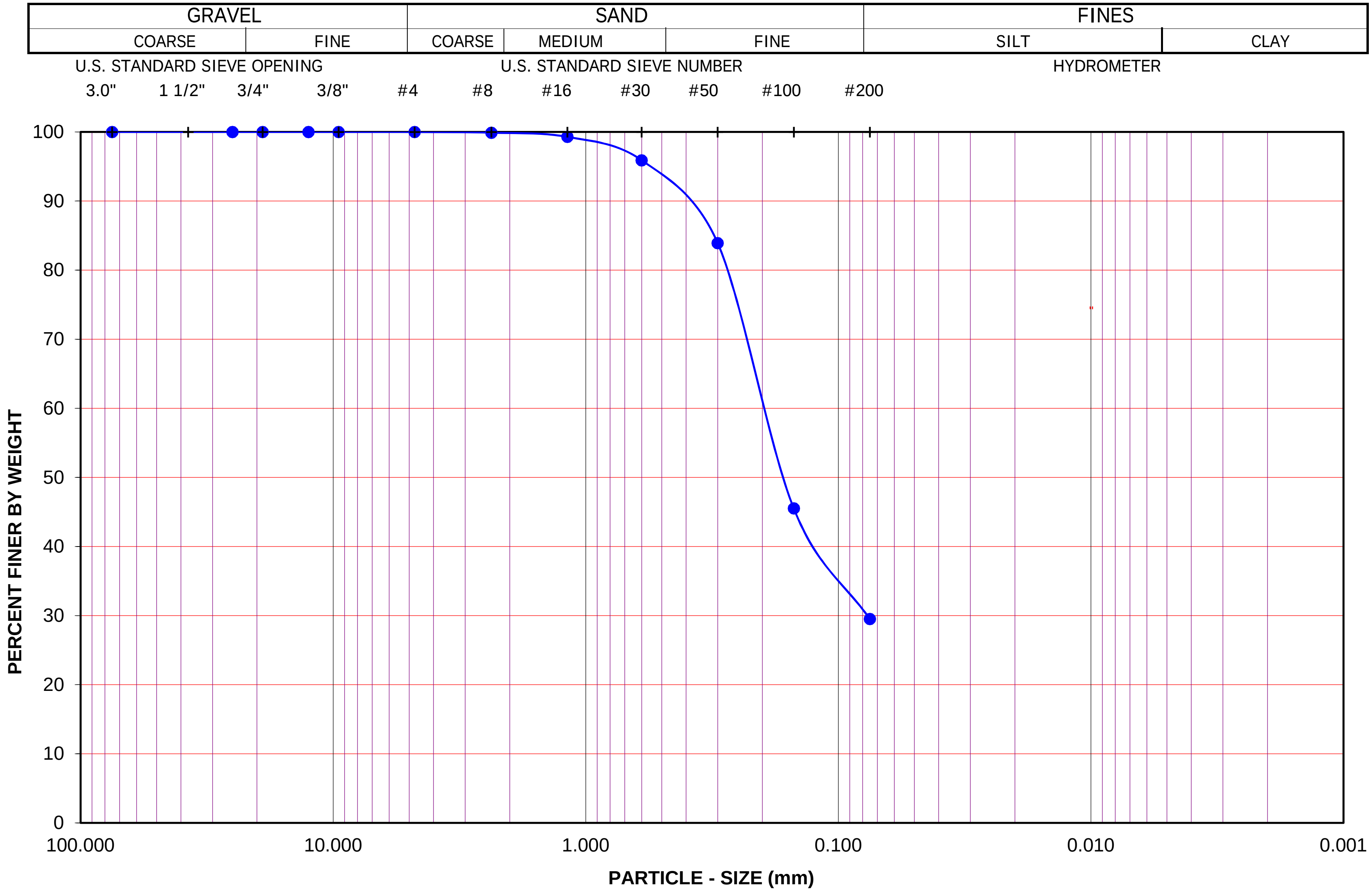
Leighton

Project No.: 11347.001

GRAYSTAR / 7TH &

ATTERBERG LIMITS, PARTICLE - SIZE CURVE
ASTM D 4318, D 422

Rev. 12-04



Project Name: GRAYSTAR / 7TH & ROBINSON

Project No.: 11347.001

Exploration No.: B-5 Sample No.: S-1

Depth (feet): 5.0-6.5 Soil Type : SM

Soil Identification: SM: BROWN SILTY SAND

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

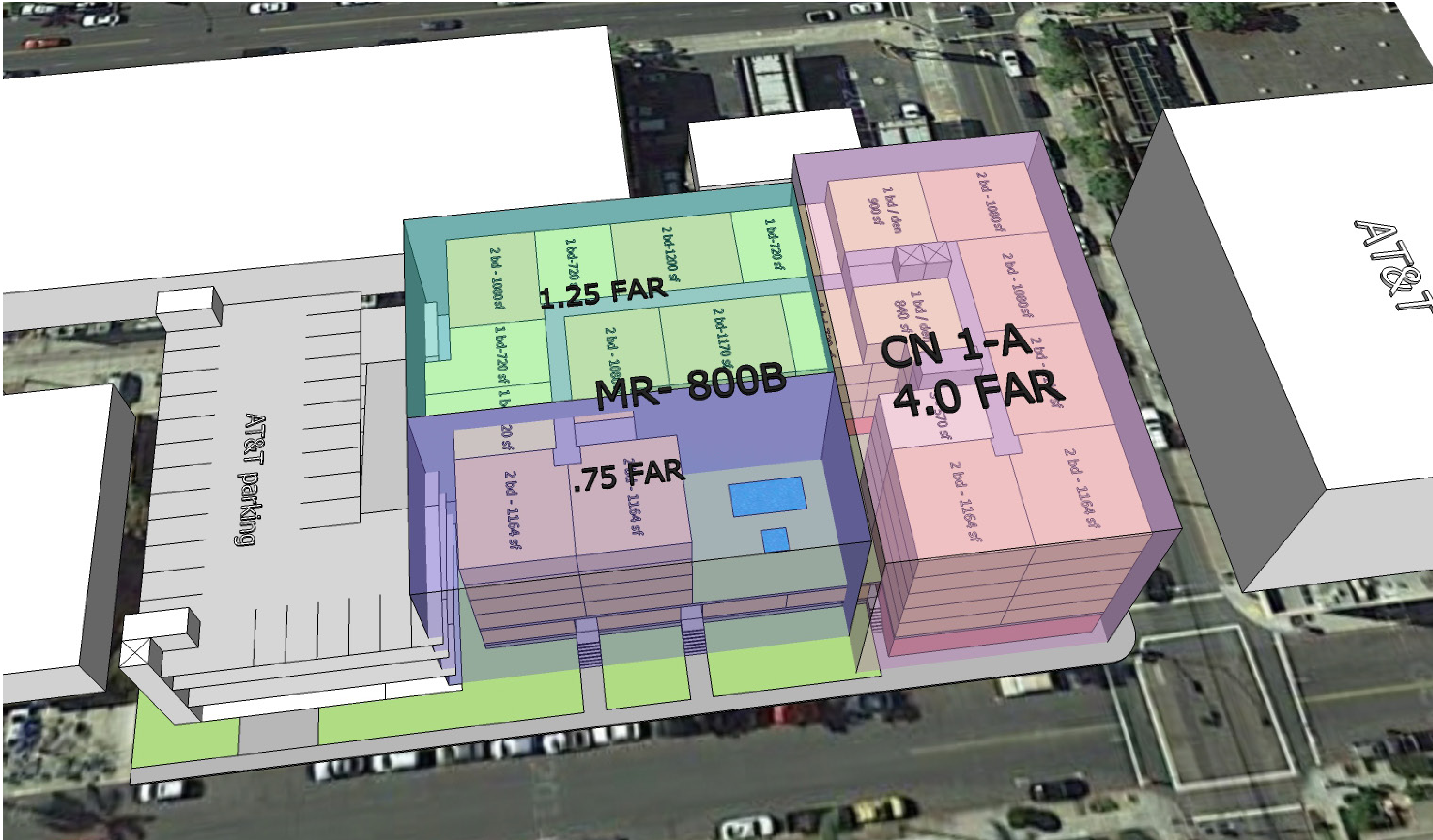
GR:SA:FI : (%) 0 : 70 : 30

Jun-16

Sieve B-5,S1

Appendix D
Conceptual Plans


Robinson
7th Ave.
7TH &
ROBINSON
YIELD STUDY



ZONING

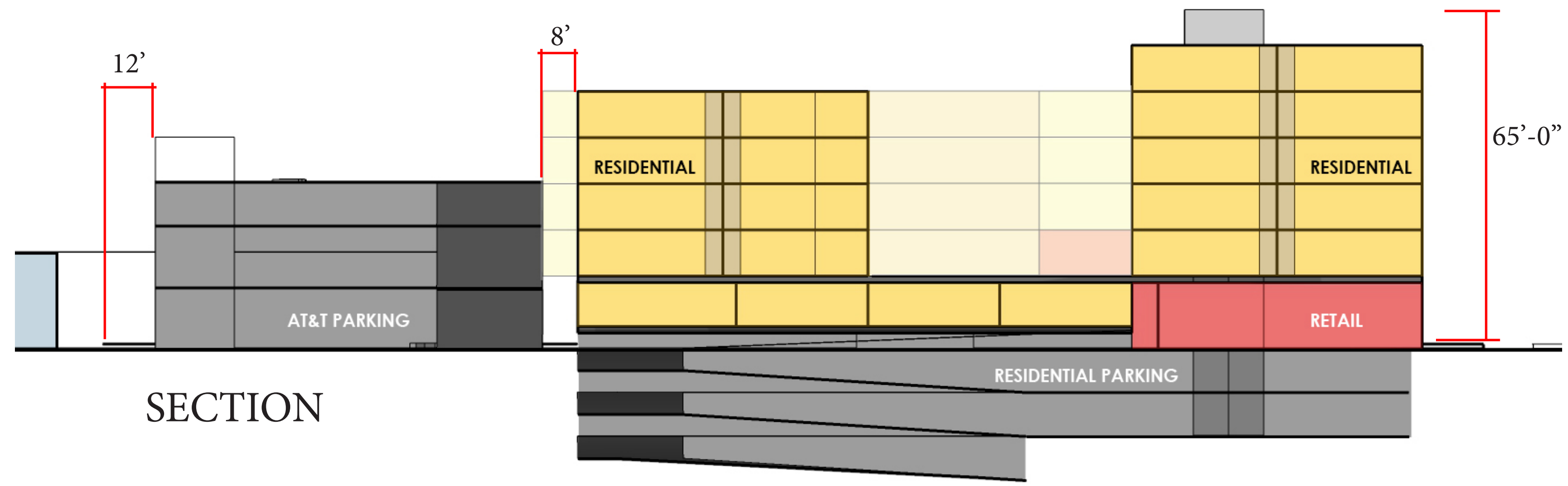
7TH & ROBINSON

N.T.S.

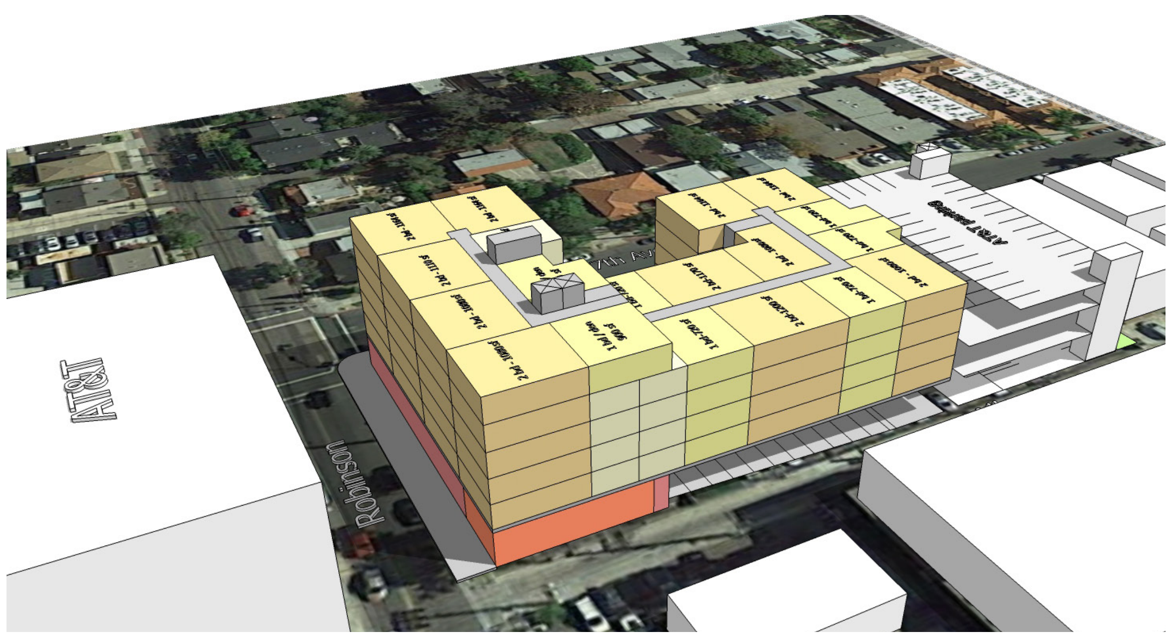
Yield Study Option #3 04.05.16

carrierjohnson + CULTURƎ

VIEW- WEST



SECTION



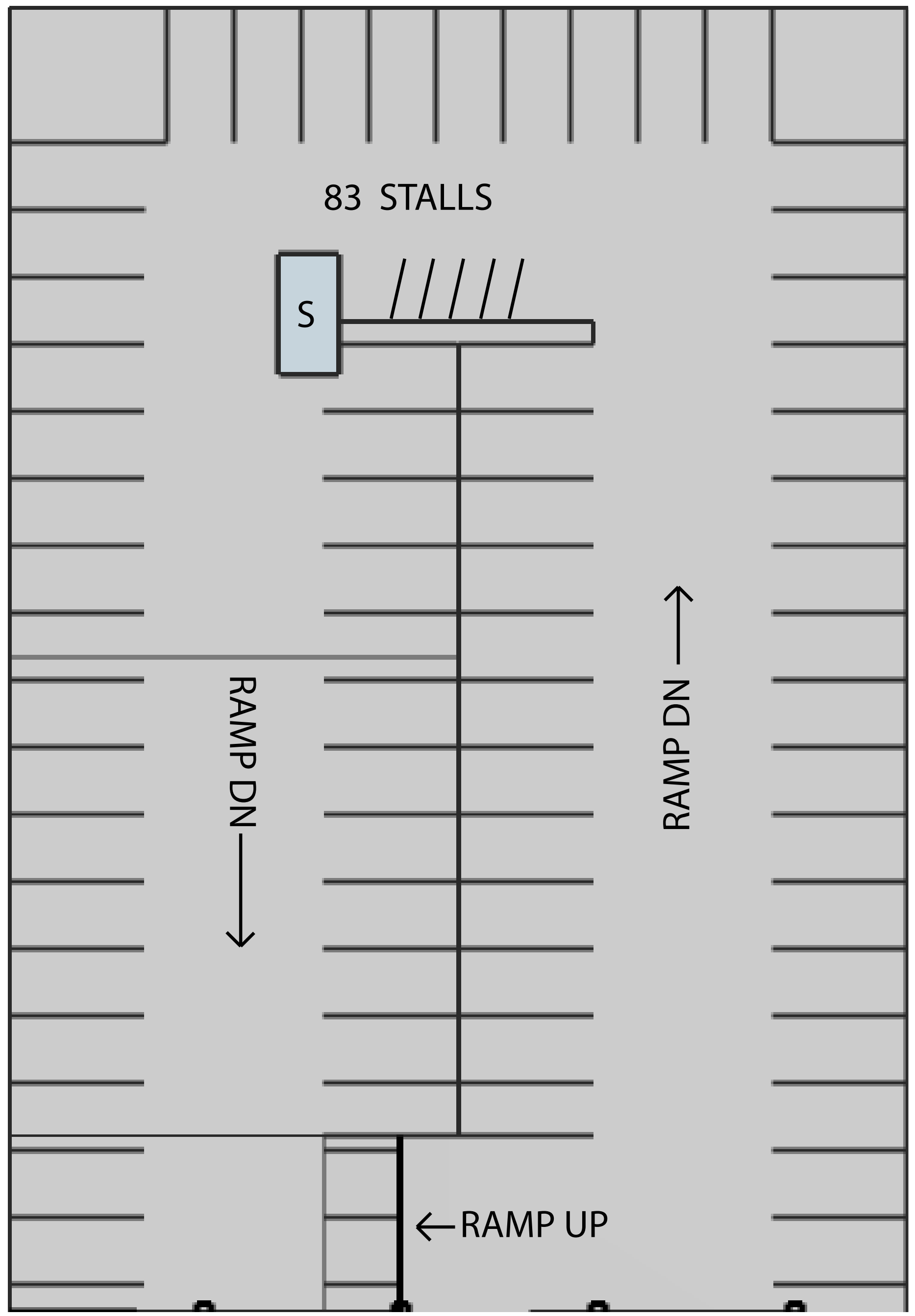
VIEW- EAST

N.T.S.

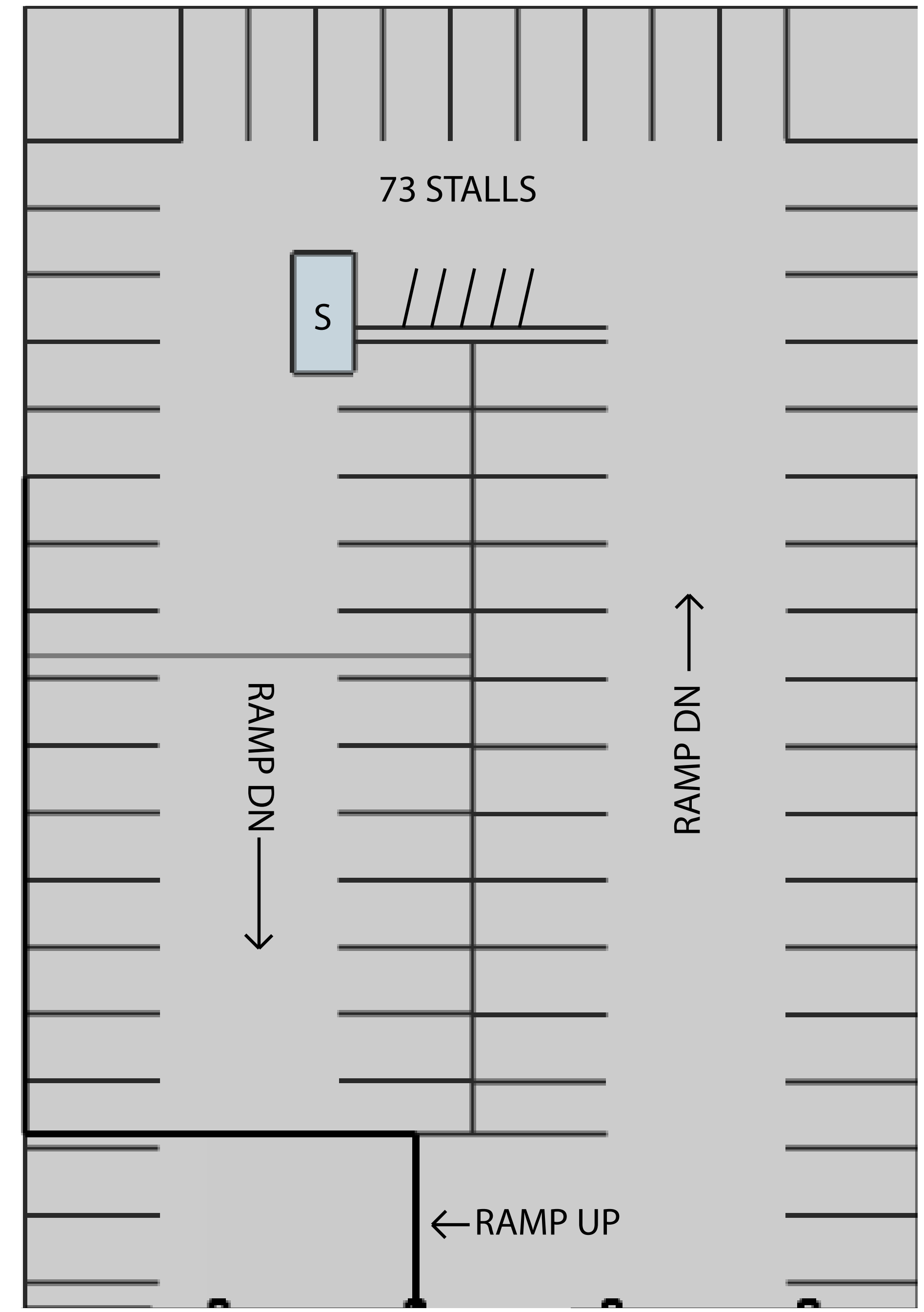
7TH & ROBINSON

Yield Study Option #3 04.05.16

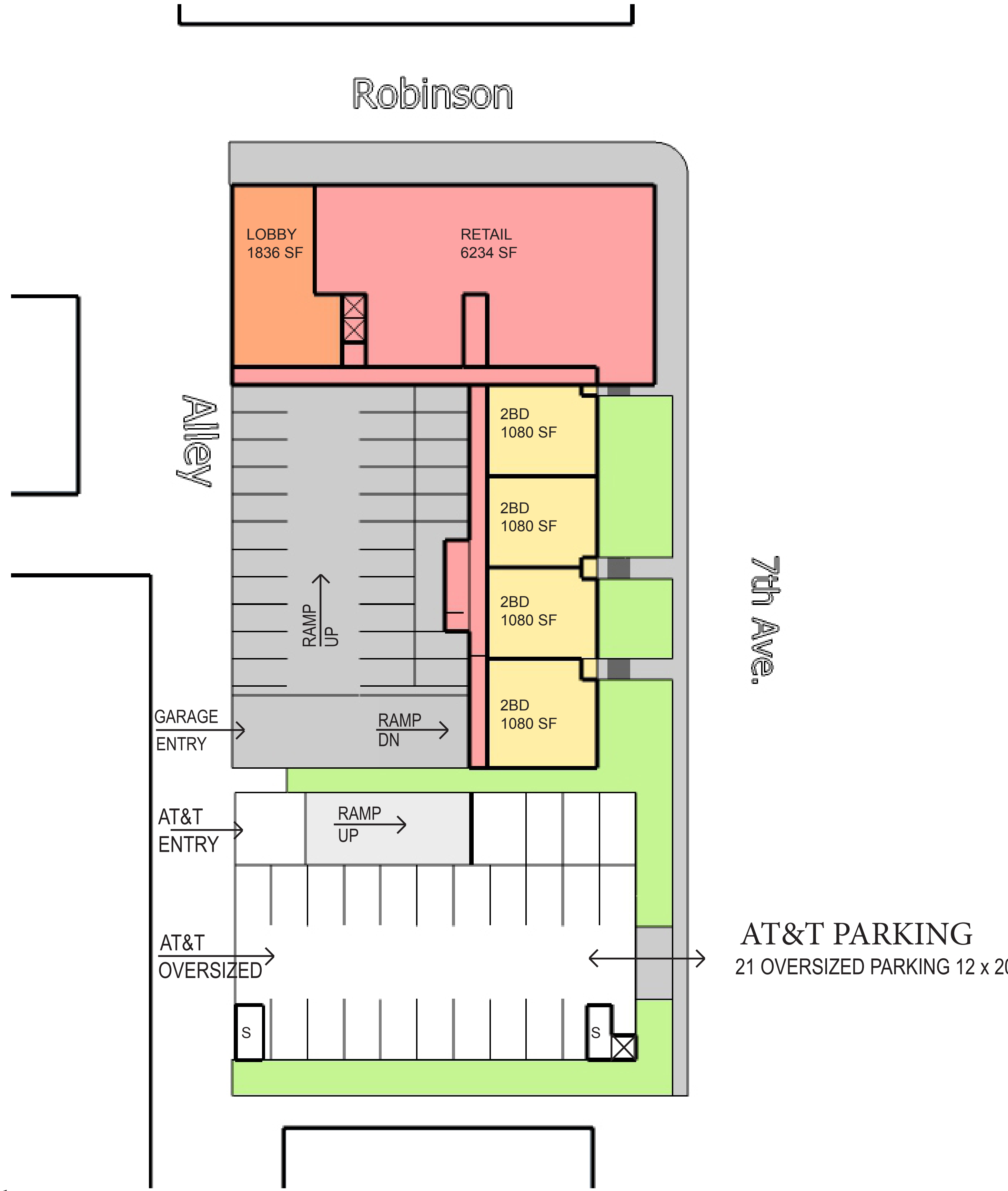
carrierjohnson + CULTURE


83 STALLS
S
RAMP DN
RAMP DN
RAMP UP

LVL- B2


73 STALLS
S
RAMP DN
RAMP DN
RAMP UP

LVL- B1



LVL- 1

7TH & ROBINSON

N.T.S.

Yield Study Option #3 04.05.16

carrierjohnson + CULTURƎ

AT&T PARKING

9 OVERSIZED PARKING 12 x 20

10 STANDARD PARKING 9 x 18

LVL- 2


Robinson
2BD 1080 SF
2BD 1080 SF
2BD 1110 SF
2BD 1164 SF
S 570 SF
1BD 720 SF
S
S 570 SF
2BD 1164 SF
S 570 SF
T
1BD 720 SF
1BD 720 SF
2BD 1170 SF
2BD 1200 SF
2BD 1080 SF
S
2BD 1164 SF
1BD 720 SF
2BD 1080 SF
1BD 720 SF
1BD 720 SF
2BD 1164 SF
RAMP UP
RAMP DN
S
S
7th Ave.
Alley
AT&T PARKING
22 STANDARD PARKING
LVL-3


Robinson
2BD 1080 SF
2BD 1080 SF
2BD 1110 SF
2BD 1164 SF
S 570 SF
1BD 720 SF
S
S 570 SF
2BD 1164 SF
S 570 SF
T
1BD 720 SF
1BD 720 SF
2BD 1170 SF
2BD 1200 SF
2BD 1080 SF
S
2BD 1164 SF
1BD 720 SF
2BD 1080 SF
1BD 720 SF
1BD 720 SF
2BD 1164 SF
RAMP DN
S
S
7th Ave.
Alley
AT&T PARKING
28 STANDARD PARKING
LVL-4

LVL-5

LVL-6

7TH & ROBINSON

N.T.S.

Yield Study Option #3 04.05.16

carrierjohnson + CULTURE

Appendix E
General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 <u>Processing</u>

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 <u>Overexcavation</u>

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 <u>Benching</u>

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical

Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

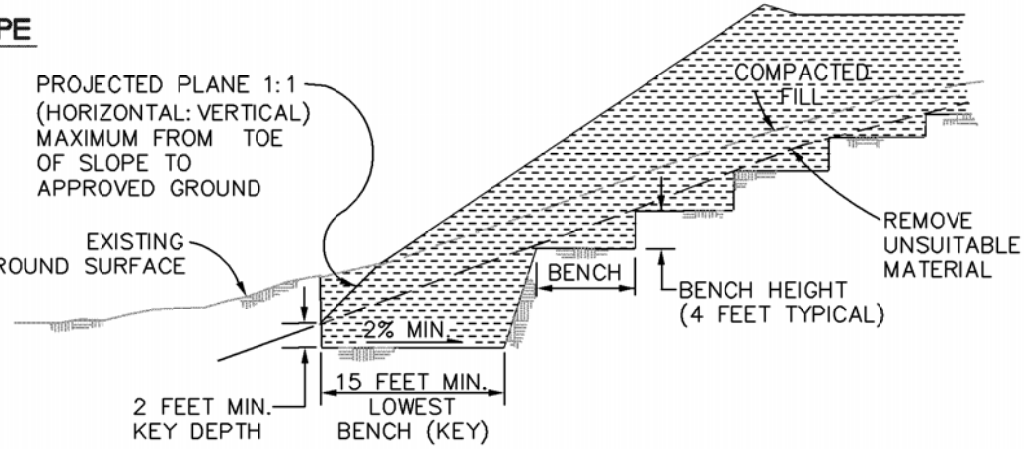
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

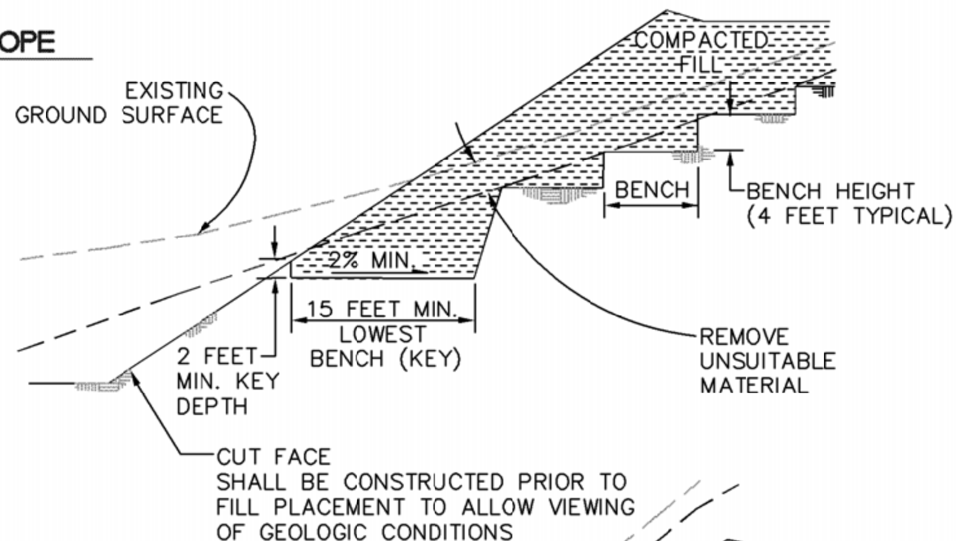
7.4 Observation and Testing

The densification of the bedding around the conduits shall be observed by the Geotechnical Consultant.

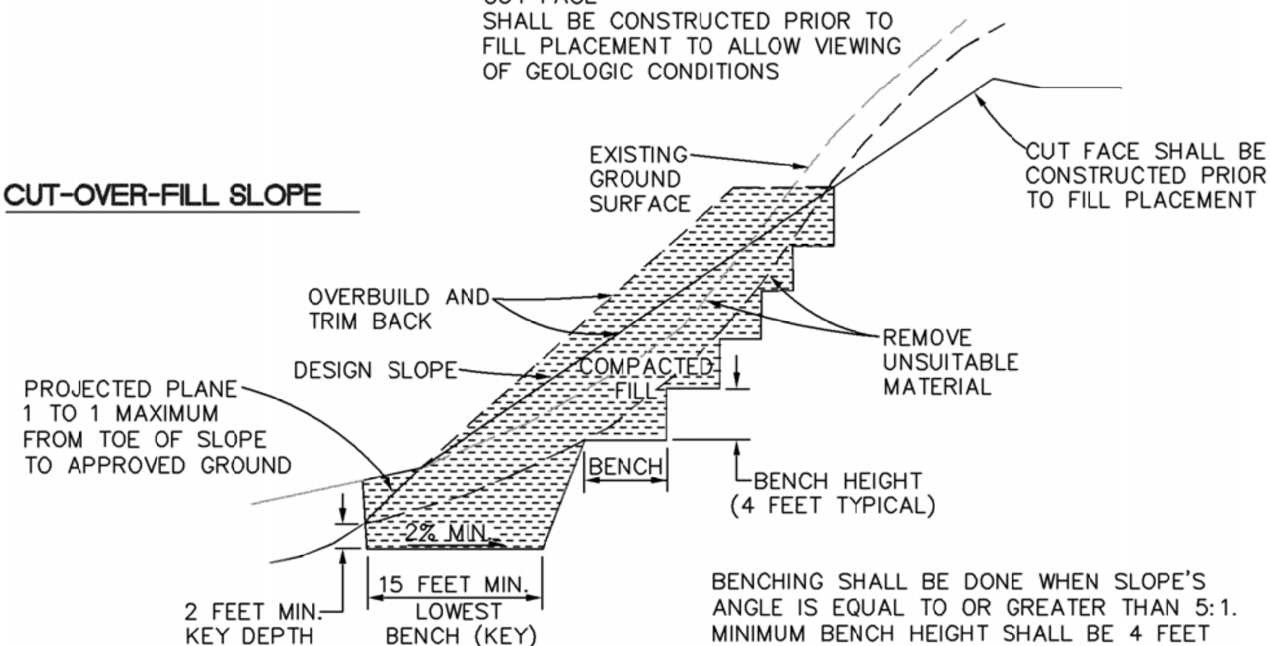
FILL SLOPE



FILL-OVER-CUT SLOPE



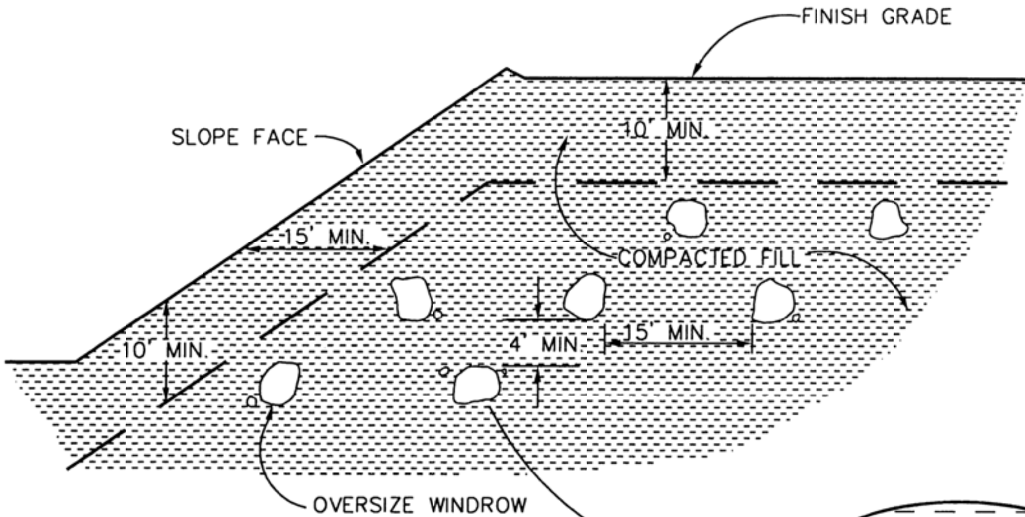
CUT-OVER-FILL SLOPE

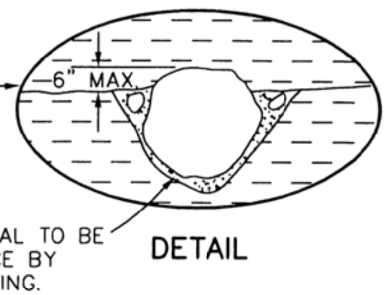


BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING

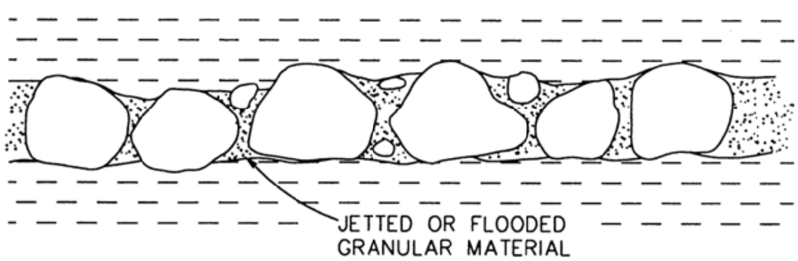
GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL A





DETAIL

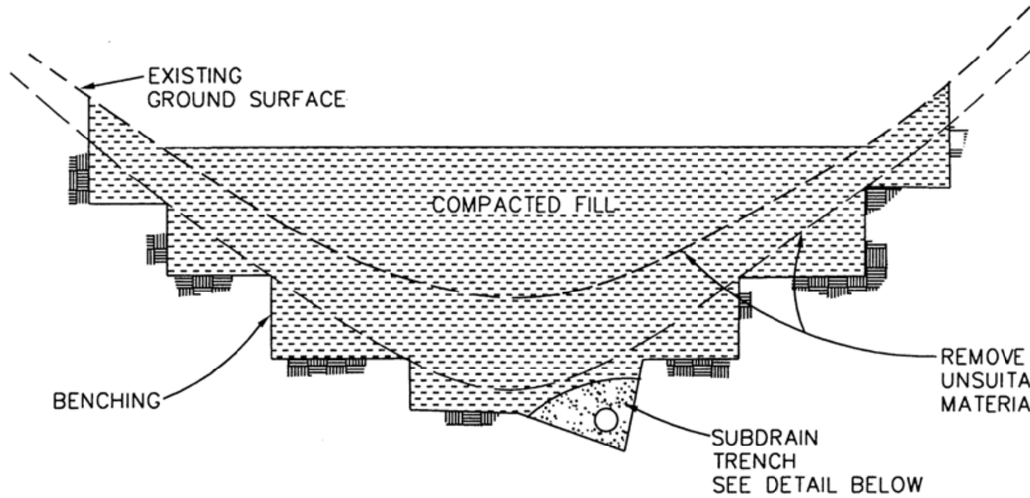
* OVERSIZE ROCK IS LARGER THAN 8 INCHES IN LARGEST DIMENSION.
* EXCAVATE A TRENCH IN THE COMPACTED FILL DEEP ENOUGH TO BURY ALL THE ROCK.
* BACKFILL WITH GRANULAR SOIL JETTED OR FLOODED IN PLACE TO FILL ALL THE VOIDS.
* DO NOT BURY ROCK WITHIN 10 FEET OF FINISH GRADE.
* WINDROW OF BURIED ROCK SHALL BE PARALLEL TO THE FINISHED SLOPE.

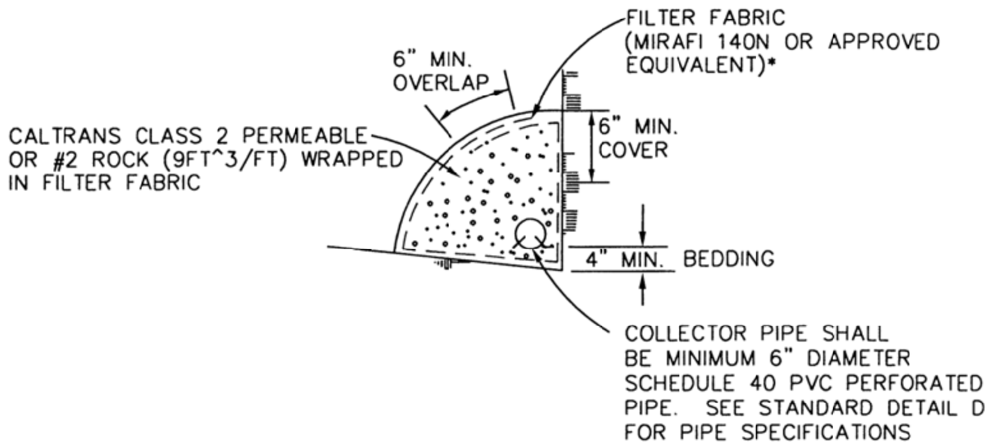


TYPICAL PROFILE ALONG WINDROW

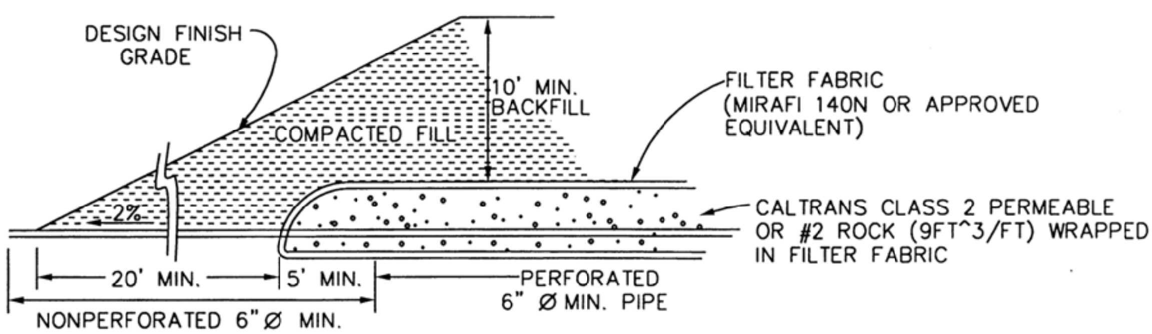
OVERSIZE ROCK DISPOSAL

GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL B





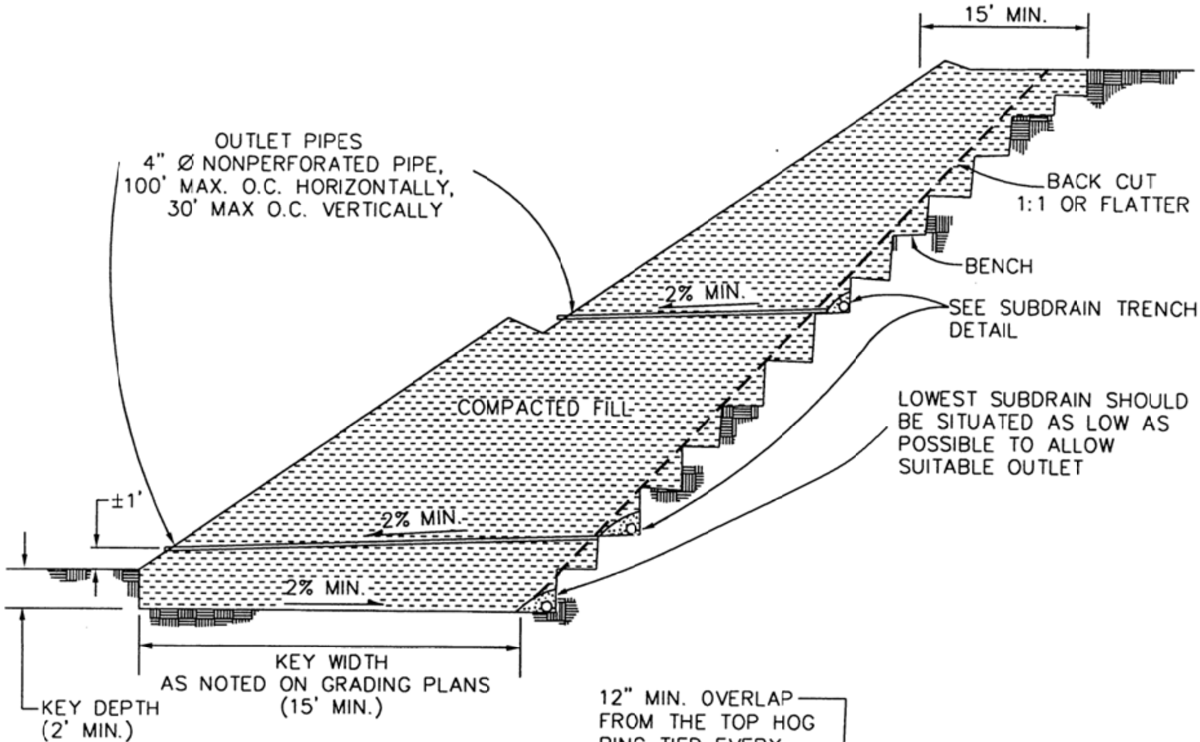
SUBDRAIN DETAIL

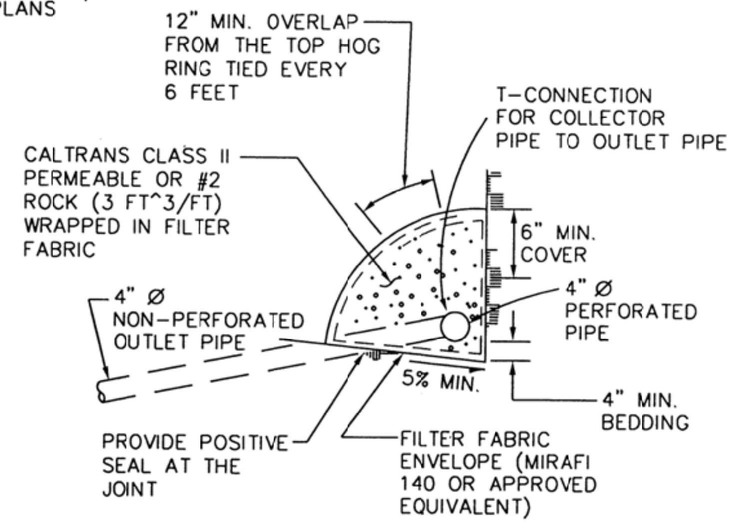


DETAIL OF CANYON SUBDRAIN OUTLET

CANYON SUBDRAINS

GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL C





SUBDRAIN TRENCH DETAIL

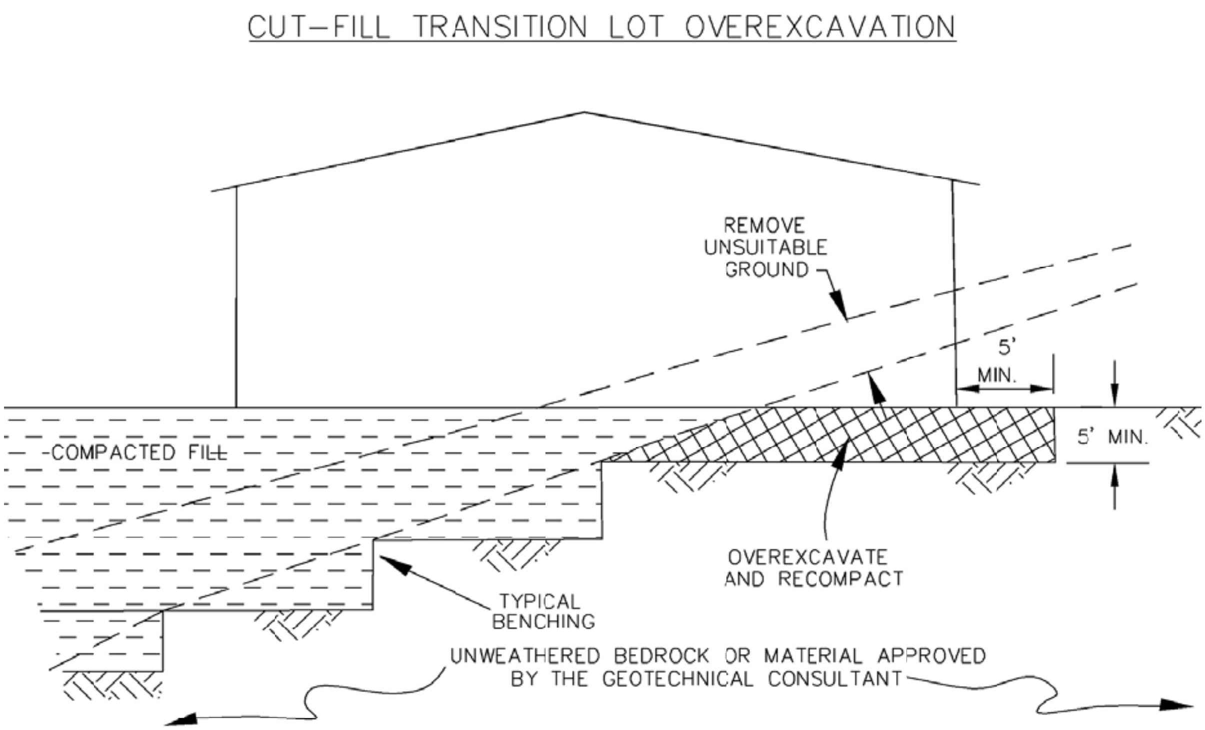
SUBDRAIN INSTALLATION – subdrain collector pipe shall be installed with perforation down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drill holes are used. All subdrain pipes shall have a gradient of at least 2% towards the outlet.

SUBDRAIN PIPE – Subdrain pipe shall be ASTM D2751, SDR 23.5 or ASTM D1527, Schedule 40, or ASTM D3034, SDR 23.5, Schedule 40 Polyvinyl Chloride Plastic (PVC) pipe.

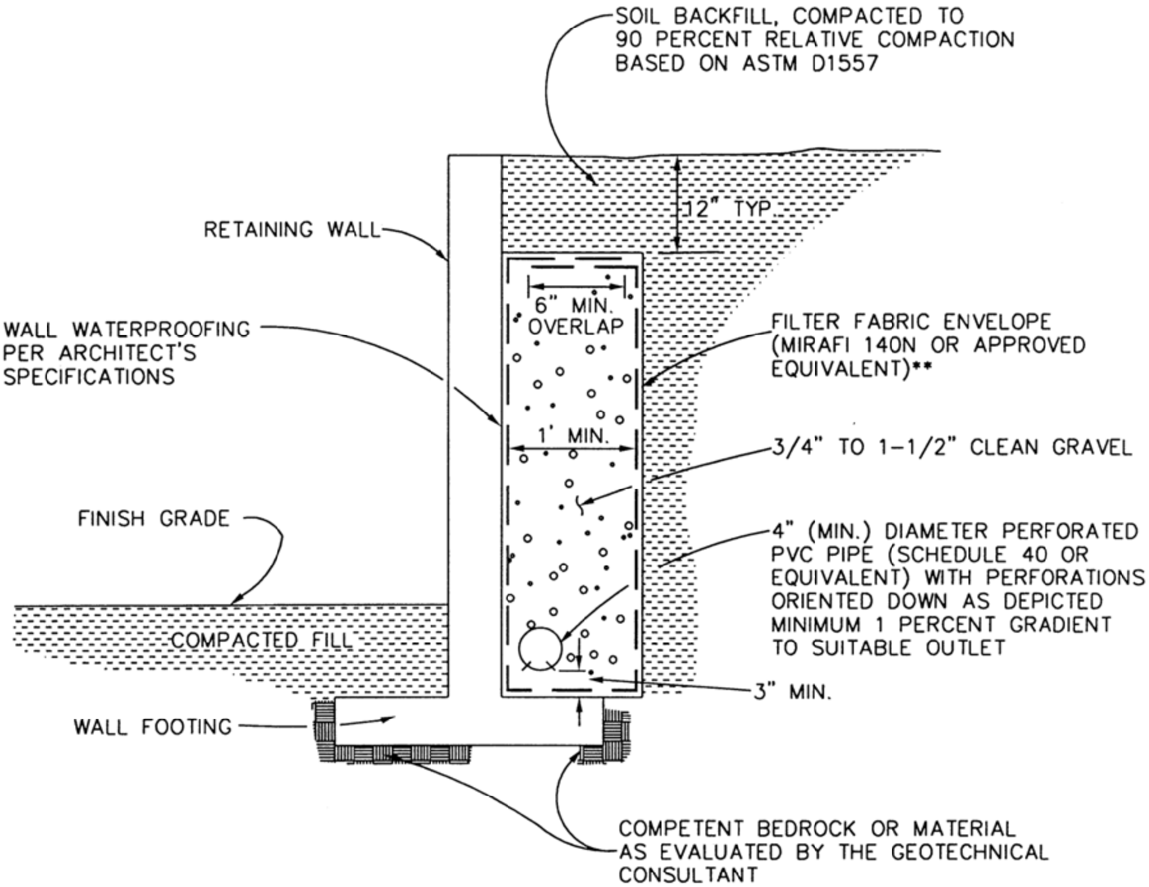
All outlet pipe shall be placed in a trench no wider than twice the subdrain pipe.

BUTTRESS OR REPLACEMENT FILL SUBDRAINS

GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL D

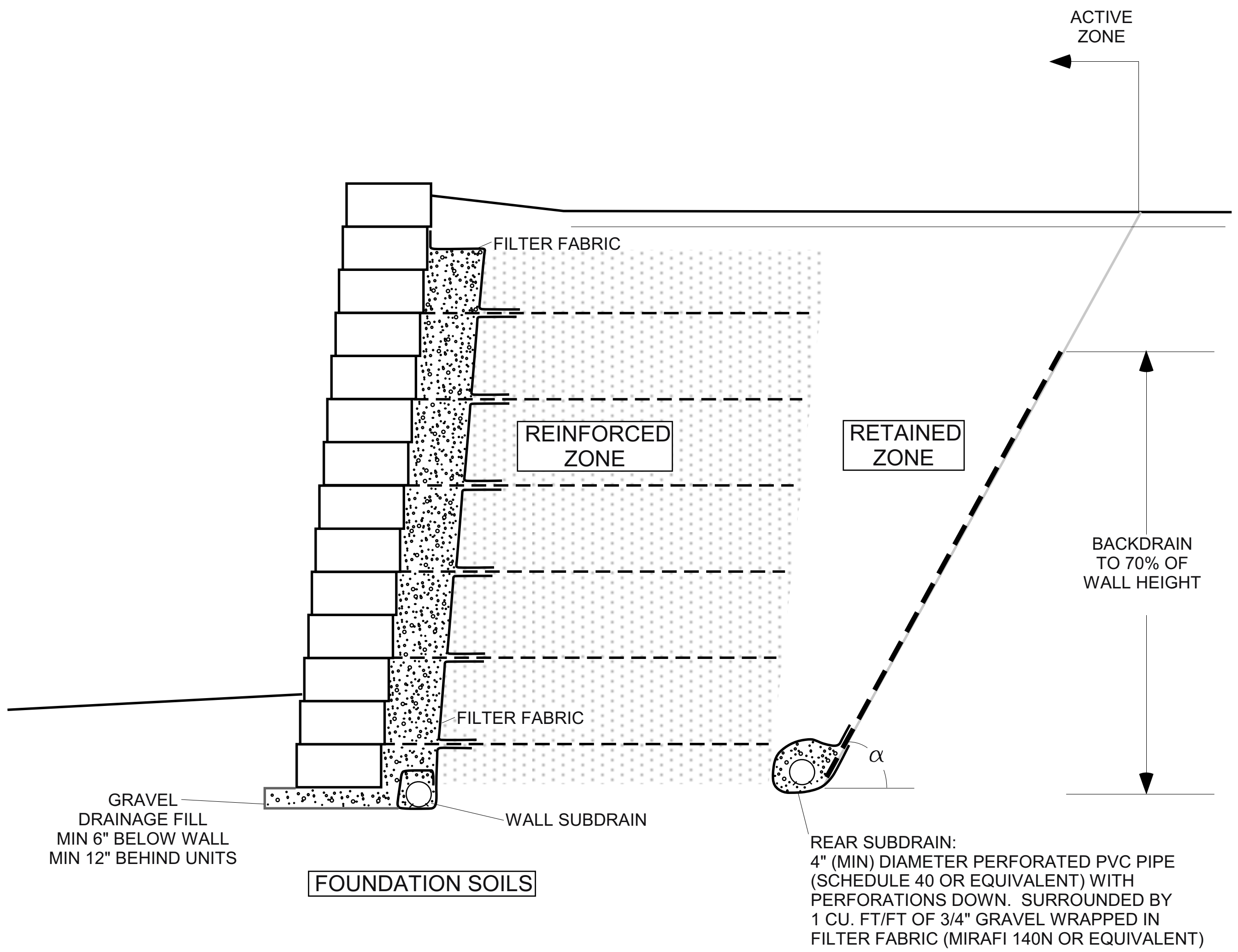


TRANSITION LOT FILLS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL E



NOTE: UPON REVIEW BY THE GEOTECHNICAL CONSULTANT, COMPOSITE DRAINAGE PRODUCTS SUCH AS MIRADRAIN OR J-DRAIN MAY BE USED AS AN ALTERNATIVE TO GRAVEL OR CLASS 2 PERMEABLE MATERIAL. INSTALLATION SHOULD BE PERFORMED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

RETAINING WALL DRAINAGE	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL F



NOTES:

1) MATERIAL GRADATION AND PLASTICITY

REINFORCED ZONE:

SIEVE SIZE	% PASSING
1 INCH	100
NO. 4	20-100
NO. 40	0-60
NO. 200	0-35

FOR WALL HEIGHT < 10 FEET, PLASTICITY INDEX < 20
FOR WALL HEIGHT 10 TO 20 FEET, PLASTICITY INDEX < 10
FOR TIERED WALLS, USE COMBINED WALL HEIGHTS
WALL DESIGNER TO REQUEST SITE-SPECIFIC CRITERIA FOR WALL HEIGHT > 20 FEET

GRAVEL DRAINAGE FILL:

SIEVE SIZE	% PASSING
1 INCH	100
3/4 INCH	75-100
NO. 4	0-60
NO. 40	0-50
NO. 200	0-5

2) CONTRACTOR TO USE SOILS WITHIN THE RETAINED AND REINFORCED ZONES THAT MEET THE STRENGTH REQUIREMENTS OF WALL DESIGN.

3) GEOGRID REINFORCEMENT TO BE DESIGNED BY WALL DESIGNER CONSIDERING INTERNAL, EXTERNAL, AND COMPOUND STABILITY.

3) GEOGRID TO BE PRETENSIONED DURING INSTALLATION.

4) IMPROVEMENTS WITHIN THE ACTIVE ZONE ARE SUSCEPTIBLE TO POST-CONSTRUCTION SETTLEMENT. ANGLE $\alpha = 45 + \phi/2$, WHERE ϕ IS THE FRICTION ANGLE OF THE MATERIAL IN THE RETAINED ZONE.

5) BACKDRAIN SHOULD CONSIST OF J-DRAIN 302 (OR EQUIVALENT) OR 6-INCH THICK DRAINAGE FILL WRAPPED IN FILTER FABRIC. PERCENT COVERAGE OF BACKDRAIN TO BE PER GEOTECHNICAL REVIEW.

SEGMENTAL RETAINING WALLS

GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL G

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

February 13, 2017

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92614

Attention: Mr. Jim Ivory

Subject: Response to City Cycle Issues, 7th and Robinson, City of San Diego Cycle 1 LDR – Geology, Multi-Discipline Review, dated December 13, 2016.

Reference: Leighton and Associates, Geotechnical Investigation, 7th and Robinson, San Diego, California, Project Number 11347.001, dated June 27, 2016.

San Dieguito Engineering, Inc., Grading Plan, Hillcrest III, San Diego, California, Sheet C-2, dated February 14, 2017.

In accordance with your request, we have addressed City Cycle Issue Comments which include providing this letter as an update to our report for the proposed 7th Avenue and Robinson Street project located in San Diego, California. Specifically, we have prepared a response to the City of San Diego Cycle 1 LDR - Geology Cycle Issues for the proposed project, completed December 13, 2016. For clarity, the City of San Diego cycle issues are italicized and numbered in accordance with the order presented on City's issues sheet. It should also be noted that issues addressed below are specific to the geotechnical aspects of the project and other issues for other disciplines are not addressed in this letter.

<u>Issue No. 2</u>

The project consultants could note that a NPDES permit may be required by the Regional Water Quality Control Board for groundwater discharged through basement *wall drains and pumped to a stormwater conveyance system. The Geology Section will defer to LDR-Engineering for discharge permit requirements.*

Response

This condition has been noted in Section 7.4.4 of our above-referenced 2016 report.

Issue No. 4

Apply the appropriate factor of safety to the calculated infiltration rates.

Response

We recommend applying a factor of safety of 2 to calculated infiltration rates as provided in Table 1 below. Additional recommendations with regard to infiltration measures are included in our referenced 2016 geotechnical investigation. It should be emphasized that the infiltration test results are only representative of the tested location and depth where they are performed. At the time infiltration testing was performed specific locations of stormwater infiltration BMPs were not known.

Table 1

Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)	Infiltration Rate, with F.S.=2 (inches/hr)
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7	0.85

Issue No. 5

Provide the information required in the Storm Water Standards, Work Sheet C.4-1 or Form I-8 (https://www.sandiego.gov/sites/default/files/storm-water-standards-manual-2016-1.pdf).

<u>Response</u>

We have included Worksheet C.4-1 of Appendix C as Appendix A of this letter.

If you have any questions regarding this letter, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

PROFESSIONAL GEOLOGIST ROBERT C. STROH NO. 2099 CERTIFIED ENGINEERING GEOLOGIST EXP. 10/31/17 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER DAVID B. NEVIUS 2789 Expires 6/30/17 GEOTECHNICAL STATE OF CALIFORNIA

David B. Nevius, GE 2789
Associate Engineer

Robert C. Stroh, CEG 2099
Associate Geologist

Attachment: City of San Diego Worksheet C.4-1

Distribution: (1) Addressee

City of San Diego Worksheet C.4-1

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

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria 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: Results of our shallow percolation test indicate a percolation rate greater than 0.5 inches/hour with an applied factor of safety 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	
Provide basis: Infiltration can be allowed provided that infiltration measures are designed in accordance with the setback requirements provided in our June 29, 2016 Geotechnical Investigation. 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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. In addition, a groundwater separation of at least 10 feet needs to be provided for the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration 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	X Full	

*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.

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: Results of our shallow percolation test indicate a percolation rate greater than 0.5 inches/hour with an applied factor of safety of 2. 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: Infiltration can be allowed provided that infiltration measures are designed in accordance with the setback requirements provided in our June 27, 2016 Geotechnical Investigation. 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			

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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. 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.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. 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.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. 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.		

*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

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

May 23, 2017

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92677

Attention: Mr. Jim Ivory

Subject: Geotechnical Update Letter, Proposed Mixed-Use Development, 7th and Robinson, San Diego, California

Reference: Leighton and Associates, Inc., Geotechnical Investigation, 7th and Robinson, San Diego, California, dated June 27, 2016.

San Dieguito Engineering, Inc., Civil Plans, Hillcrest III, San Diego, California, Sheet C-1 through C-4, dated May 19, 2017.

In accordance with your request, we have prepared this Geotechnical Update letter for the 7th and Robinson project in San Diego, California. The purpose of this letter is to provide updated recommendations for proposed drywells and to provide the City of San Diego's Appendix C, Worksheet C.4-1, which is based on our current understanding of the City's requirements and our professional judgement.

In support of the proposed project, Leighton and Associates, Inc. (Leighton) previously prepared the referenced geotechnical investigation including subsurface exploration and a deep percolation test for a proposed drywell system. In preparation of this letter, we have reviewed the referenced report (Leighton) and civil drawings (San Dieguito Engineering, Inc).

Based upon our review of the civil drawings, we understand that the proposed development will include a multi-story mixed-used residential development with three levels of subterranean parking and a separate parking garage, also with three subterranean levels. We understand that site stormwater will be collected and routed into two drywells (one drywell each in the basement of the multi-use building and parking structure) with infiltration occurring over a depth interval of 50 to 75 feet below ground surface.

Unfactored infiltration rates were previously provided in our 2016 report. We recommend applying a factor of safety of 2 to calculated infiltration rates as provided in Table 1 below. Additional recommendations with regard to infiltration measures are included in our referenced 2016 geotechnical investigation. It should be emphasized that the infiltration test results are only representative of the tested location and depth where they are performed. At the time infiltration testing was performed specific locations of stormwater infiltration BMPs were not known. Based upon the results of our percolation testing at the depths indicated, the site classifies as a “full infiltration” site.

Table 1
Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)	Infiltration Rate, with F.S.=2 (inches/hr)
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7	0.85
B-3	75	San Diego Formation (Tsd)	0.14	428	4.61	2.30

We have included Worksheet C.4-1 as Appendix A of this letter.

If you have any questions regarding this letter, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

PROFESSIONAL GEOLOGIST ROBERT C. STROH NO. 2099 CERTIFIED ENGINEERING GEOLOGIST EXP. 10/31/17 STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER DAVID B. NEVIUS 2789 Expires 6/30/17 GEOTECHNICAL STATE OF CALIFORNIA

David B. Nevius, GE 2789
Associate Engineer

Robert C. Stroh, CEG 2099
Associate Geologist

Attachment: City of San Diego Worksheet C.4-1

Distribution: (1) Addressee

Leighton

Appendix A

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

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Provide basis: Results of our percolation testing indicates an infiltration rate greater than 0.5 inches/hour with an applied factor of safety of 2. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.				
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Provide basis: Infiltration can be allowed provided that infiltration measures are designed in accordance with the requirements provided in our June 27, 2016 Geotechnical Investigation. 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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. In addition, a groundwater separation of at least 10 feet needs to be provided for the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
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Worksheet C.4-1 Page 3 of 4			
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Provide basis: Infiltration can be allowed provided that infiltration measures are designed in accordance with the requirements provided in our June 27, 2016 Geotechnical Investigation. 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			

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
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*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

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.

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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: Hillcrest 111 NDP

Property Address: 635 Robinson Avenue

Applicant Name/Co.: Jim Ivory, Greystar GP II, LLC

Contact Phone: (949) 735-9870 Contact Email: jivory@greystar.com

Was a consultant retained to complete this checklist? ■ Yes ☐ No If Yes, complete the following

Consultant Name: Jeannette Temple Contact Phone: (619) 523-1930

Company Name: Atlantis Group Contact Email: jtemple@atlantissd.com

Project Information

1. What is the size of the project (acres)? 0.96
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of single-family units):
   - ■ Residential (indicate # of multi-family units): 111
   - ■ Commercial (total square footage): 4800
   - ☐ 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:

Residential mixed-use project with 111 dwelling units, including 9 very low income affordable housing units.

[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] OR, 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?; OR, 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.

The project is consistent with the relevant goals and policies of the City's General Plan and the Uptown Community Plan. The project proposes the development of 111 residential dwelling units including 9 very low income affordable units, 4,800 square feet of commercial retail space within a 7-story mixed use building with 3 levels of underground parking and a detached parking structure at 635 Robinson Ave. The Community Plan designates the site as Residential High Density (44-73 Du/Ac) and Mixed-Use Commercial with Very-High Intensity (up to 109 Du/Ac). The 0.96 acre site is in the MR-800B and CN-1A zones of the Mid-City Communities Planned District, which allows up to 82 units. To achieve the desired density, the project will utilize the City's Affordable Housing Density Bonus program to develop the 29 bonus density units and obtain two incentives from the maximum structure height and stepback requirements. In exchange, the project will set aside 9 units for very low income households and is therefore consistent with the goals and objectives on the Housing Element of the General Plan for the creation and promotion of affordable housing.
The project is consistent with the goals and recommendations for residential development within the Uptown Community Plan. The proposed structure incorporates the objectives of the Urban Design Element by containing a mixture of land uses, building articulation, varied exterior building materials, and pedestrian interest at the street level. The development would enhance the level and quality of pedestrian activity in the community and also meets the objective in the Transportation Element of the community plan for development of off-street parking facilities by providing three levels of underground parking.

[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			
1. *Cool/Green Roofs*. • 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)?; OR • 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?; OR • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component. This project would 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 the California Green Building Standards Code.	☑	☐	☐

[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. Low-flow fixtures/appliances will be consistent with each of the following for the residential building: a. Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60psi; b. Standard dishwashers: 4,25 gallons per cycle; c. Compact dishwashers: 3.5 gallons per cycle; and d. Clothes washers: water factor of 6 gallons per cubic feet of drum capacity For the nonresidential portion of the building: a. 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; and b. Appliances and fixtures for commercial applications that meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards Code	☑	☐	☐

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. Seven of the required 79 parking spaces required will be provided with a listed cabinet, box, or enclosure connected to a conduit linking parking spaces with an electrical service, in a manner approved by the building and safety official. Of the total listed cabinets, boxes or enclosures provided, at least half will have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents.	☑	☐	☐

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. Bike storage for the residential building will be provided on the Ground Floor and Subterranean Level 2 of the garage, for a total of 59 spaces. Four short term and two long term bicycle parking stalls for the commercial use will be provided where two short term and one long term bicycle parking stalls are required.	☑	☐	☐

[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).

(Exempt)-The project will not have over 10 tenant occupants (employees). There will be an on-site manager that lives in an apartment with shower facilities.

☐ ☐ ☑

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.

The proposed Project includes an employment use in a TPA with 10 required parking spaces and therefore will provide two designated parking spaces for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles.

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). (Exempt)-There will be less than 50 onsite employees.	☐	☐	☑

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 Pan (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

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.

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.

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.

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 *California Code of Regulations.*	
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 • 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)

THE CITY OF SAN DIEGO

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

No FAA Notification Self-Certification Agreement

FORM DS-503
MAY 2013

This agreement is made by and between the City of San Diego, a Municipal Corporation [City] and the owner or owner's duly authorized representative of real property [Property Owner], located at

635 Robinson Ave San Diego Ca
(PROPERTY ADDRESS)

and more particularly described as

Lots 25 thru 36, Block 4 of Crittenden Map 303 PTS 522075
(LEGAL DESCRIPTION) (PROJECT APPROVAL NO.S.)

in the City of San Diego, County of San Diego, State of California [Property].

Per Section 77.15 of Title 14 of the Code of Federal Regulations CFR) Part 77, no person is required to notify the Federal Aviation Administration (FAA) for any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

77.19 2(b) Conical Surface clear

The City will not require notification to the FAA if a professional, licensed by the state of California to prepare construction documents provides certification on their plans along with their signature and registration stamp that the structure(s) or modification to existing structure(s) shown on the plans do not require Federal Aviation Administration notification because per Section 77.15 (a) of Title 14 of the Code of Federal Regulations CFR Part 77, notification is not required.

In consideration of the grant of permission by the City of San Diego to allow the self certification of the determination of no requirement to notify FAA under section 77.15 of Title 14 of the Code of Federal Regulations CFR Part 77, the applicant covenants and agrees with the City of San Diego as follows:

1. Should it be subsequently determined by the City, Airport Land Use Commission, State, or the Federal Aviation Administration, or any other government agency that the proposed project is required to notify the Federal Aviation Administration under CFR Part 77, the City assumes no responsibility or liability for any changes required to the submitted construction drawings and documents and to the structures installed on the project site as a result of and to achieve consistency with the FAA's determination of No Hazard to Air Navigation.

2. The applicant certifies that said owner(s) acknowledges and accepts that the construction drawings and documents that are part of the ministerial approval application as well as the construction in the field may have to be revised as necessary to comply with the FAA Determination of Hazard to Air Navigation. The applicant also acknowledges that if a Determination of Presumed Hazard is made by the FAA, that the City will stop all construction until a Determination of No Hazard to Air Navigation is made by the FAA for the project or a permit from the California Department of Transportation is obtained in accordance with Public Utilities Code Section 21659. The applicant acknowledges that this may cost the applicant more money in permitting and construction costs, as well as delays in project construction.

3. Furthermore, the applicant certifies that said owner(s) acknowledges and accepts all responsibility for changes required to the submitted construction drawings and documents and to the structures installed on the project site as a result of and to achieve consistency with the FAA's determination. The applicant acknowledges and accepts that the City assumes no responsibility for said changes and the impacts that result to the development as a result. The applicant shall defend, indemnify, and hold harmless the City, its agents, officers, and employees from any and all claims, actions, proceedings, damages, judgments, or costs, including attorney's fees, against the City or its agents,

officers, or employees, including, but not limited to, any to any action to attack, set aside, void, challenge, or annul this development approval or decision.

The City will promptly notify applicant of any claim, action, or proceeding and, if the City should fail to cooperate fully in the defense, the applicant shall not thereafter be responsible to defend, indemnify, and hold harmless the City or its agents, officers, and employees. The City may elect to conduct its own defense, participate in its own defense, or obtain independent legal counsel in defense of any claim related to this indemnification. In the event of such election, applicant shall pay all of the costs related thereto, including without limitation reasonable attorney's fees and costs. In the event of a disagreement between the City and applicant regarding litigation issues, the City shall have the authority to control the litigation and make litigation related decisions, including, but not limited to, settlement or other disposition of the matter. However, the applicant shall not be required to pay or perform any settlement unless such settlement is approved by applicant.

4. Lastly, the applicant certifies that said owner acknowledges and accepts that additional plan review and inspection fees may be required if additional staff reviews of the revised drawings and documents or additional inspections are necessary to reflect the final design of the development to be consistent with a FAA Determination of Hazard to Air Navigation

(SIGNATURE)

Michael D. Wolfe, PE 44271 Engineer of Work

(PRINT NAME & TITLE)

San Dieguito Engineering Inc.

(COMPANY ORGANIZATION NAME)

5·16·17

(DATE)

SAN DIEGUITO ENGINEERING, INC
Engineering | Surveying | Planning

San Dieguito Engineering, Inc.
462 Stevens Avenue, Suite 305
Solana Beach, CA 92075
858-345-1149

CITY OF SAN DIEGO
PRIORITY DEVELOPMENT PROJECT – STORM WATER QUALITY MANAGEMENT PLAN
(PDP-SWQMP)

635 ROBINSON AVENUE

635 ROBINSON AVENUE
SAN DIEGO, CALIFORNIA 92103
A.P.N. 312-290-05-00

PTS 522075

PREPARED FOR:
Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92614

PREPARED BY:
San Dieguito Engineering, Inc.
462 Stevens Avenue, Suite 305
Solana Beach, California 92075

REVISION 3: July 17, 2017
REVISION 2: May 11, 2017
REVISION 1: February 13, 2017
ORIGINAL DATE: *November 3, 2016*

I hereby declare that I am the engineer of work for this project, 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 current standards.

7.26.17

Michael D. Wolfe
R.C.E. No. 44271

Date

The City of San Diego

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

635 Robinson Avenue
PTS 522075
DWG _____

ENGINEER OF WORK:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. WOLFE
44271
Exp. 9-30-17
CIVIL
STATE OF CALIFORNIA

Michael D. Wolfe, PE 44271
Provide Wet Signature and Stamp Above Line

PREPARED FOR:

Greystar
17885 Von Karman Ave, Ste 450
Irvine, California 92614
Insert Telephone Number

PREPARED BY:

San Dieguito Engineering, Inc.
462 Stevens Avenue, Suite 305
Solana Beach, California 92075
(858) 345-1149

DATE:
July 17, 2017

Approved by: City of San Diego Date

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TABLE OF CONTENTS

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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

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CERTIFICATION PAGE

Project Name: 635 Robinson Avenue
Permit Application Number: PTS 522075

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 44271 9.30.17
Engineer of Work's Signature, PE Number & Expiration Date

Michael D. Wolfe
Print Name

San Dieguito Engineering, Inc.
Company

July 17, 2017
Date

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. WOLFE
44271
Exp. 9.30.17
CIVIL
STATE OF CALIFORNIA
Engineer's Stamp

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Project Name: 635 Robinson Avenue PTS522075

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	11/3/16	☐ Preliminary Design/Planning/CEQA ☒ Final Design	Initial Submittal
2	2/13/17	☐ Preliminary Design/Planning/CEQA ☒ Final Design	Revisions per Cycle Issues
3	5/11/17	☐ Preliminary Design/Planning/CEQA ☒ Final Design	Revision Per Cycle Issues, Conversion to Full Infiltration
4	7/17/17	☐ Preliminary Design/Planning/CEQA ☒ Final Design	Revisions per City's Request to add pretreatment to Maxwell Units

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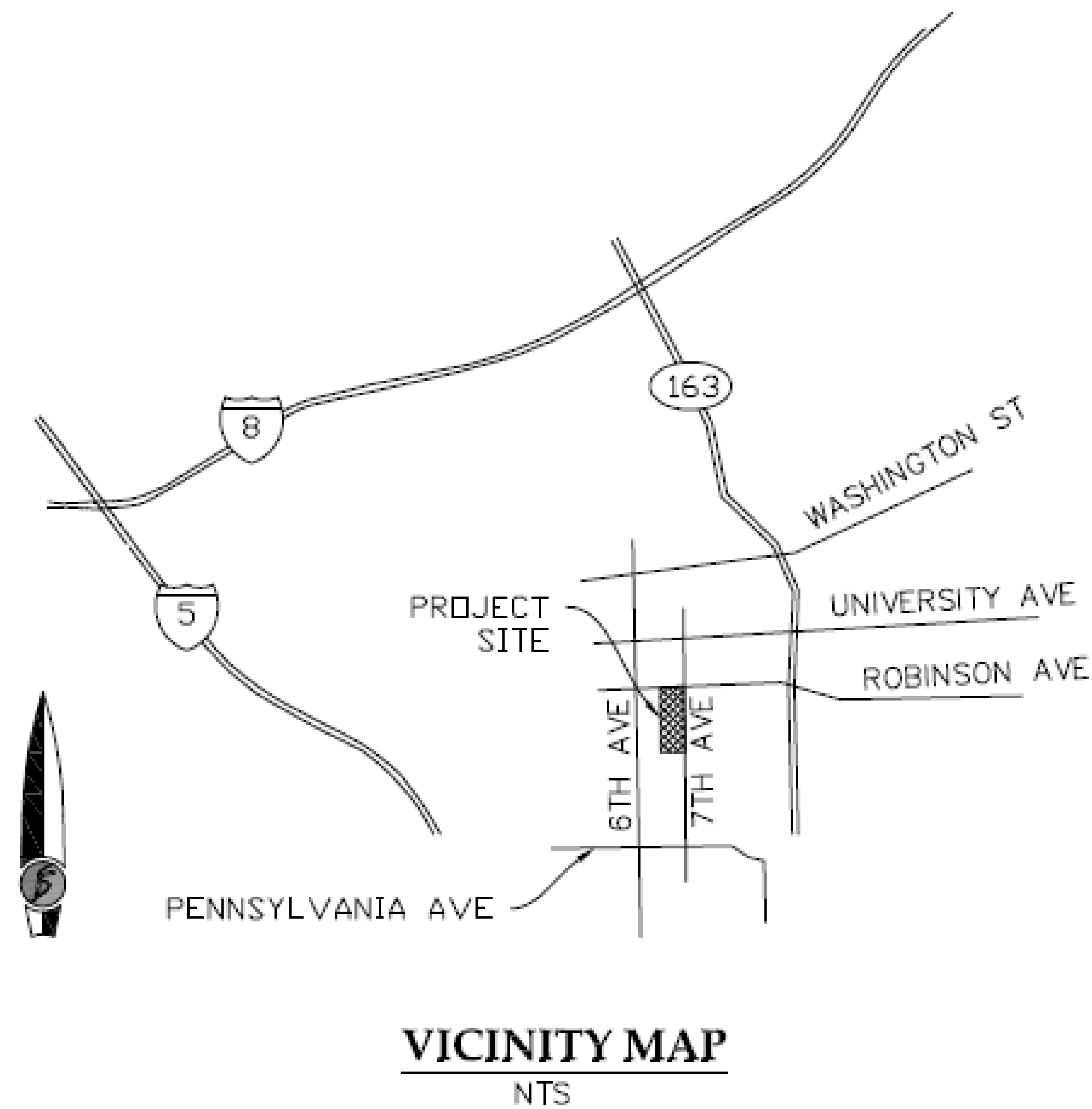
Project Name: 635 Robinson Avenue PTS522075

PROJECT VICINITY MAP

Project Name: 635 Robinson Avenue
Permit Application Number: PTS 522075



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City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM DS-560

OCTOBER 2016

Project Address: 635 Robinson Avenue, San Diego, California 92103	Project Number *(for City Use Only)*:

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1] , which is administered 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.)

❑ Yes; SWPPP required, skip questions 2-4 ❑ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity resulting in ground disturbance and contact with storm water runoff?

❑ Yes; WPCP required, skip 3-4 ❑ No; next question

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)

❑ Yes; WPCP required, skip 4 ❑ No; next question

4. Does the project only include the following Permit types listed below?

- Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
- Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or 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, pot holing, curb and gutter replacement, and retaining wall encroachments.

❑ Yes; no document required

Check one of the boxes below, and continue to PART B:

❑ If you checked "Yes" for question 1,
a SWPPP is REQUIRED. Continue to PART B

❑ If you checked "No" for question 1, and checked "Yes" for question 2 or 3,
a WPCP is REQUIRED. If the project proposes 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.**

❑ If you checked "No" for all questions 1-3, and checked "Yes" for question 4
PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.shtml

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.

Complete PART B and continued to Section 2

1. ❑ **ASBS**

a. Projects located in the ASBS watershed.

2. ❑ **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.

3. ❑ **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.

4. ❑ **Low Priority**

a. Projects requiring a Water Pollution Control Plan but not subject to ASBS, high, or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

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.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

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?	❑ Yes ❑ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	❑ Yes ❑ 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).	❑ Yes ❑ No

Clear Page 2

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. **Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:**
   - **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?**

   ❑ Yes; PDP exempt requirements apply ❑ 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?

   ❑ Yes; PDP exempt requirements apply ❑ No; project not exempt.

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).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".

If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Development Project".

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.	❑ Yes ❑ 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.	❑ Yes ❑ 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.	❑ Yes ❑ 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.	❑ Yes ❑ No
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).**	❑ Yes ❑ 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).	❑ Yes ❑ No

Clear Page 3

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). ☐ Yes ☒ No

8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create 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 (ADT) of 100 or more vehicles per day. ☐ Yes ☒ 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. ☐ Yes ☒ 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 of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1.	The project is **NOT SUBJECT TO PERMANENT STORM WATER REQUIREMENTS.**	☐
2.	The project is a **STANDARD DEVELOPMENT PROJECT**. Site design and source control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance.	☐
3.	The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance.	☐
4.	The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the <u>Storm Water Standards Manual</u> for guidance on determining if project requires a hydromodification plan management	☒

Michael D. Wolfe — Engineer of Work

Name of Owner or Agent *(Please Print)* — Title

[signature] — 7.26.17

Signature — Date

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: 635 Robinson Avenue			
Permit Application Number: PTS 522075			Date: 7/17/17
Determination of Requirements			
The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements. 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.			
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.	◉ Yes	Go to Step 2.	
	○ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.	
Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building):			
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) in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	○ Standard Project	Stop. Standard Project requirements apply.	
	◉ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.	
	○ PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.	
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:			

Form I-1 Page 2		
Step	**Answer**	**Progression**
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.	○ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	◉ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (<u>not required if prior lawful approval does not apply</u>):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	◉ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply: The project site discharges to the public storm drain conveyance system that then discharges to hardened CalTrans storm drains along 163 that ultimately discharge to the San Diego Bay. In addition, this system is hardened all the way to the discharge point at the San Diego Bay. A copy of the WMAA Exempted Areas and additional information is provided for reference in Attachment 2.		
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.	○ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	◉ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply:		

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	635 Robinson Avenue
Project Address	635 Robinson Avenue, San Diego, CA 92103
Assessor's Parcel Number(s) (APN(s))	452-103-61-00
Permit Application Number	PTS 522075
Project Watershed	Select One: ○ San Dieguito River ○ Penasquitos ○ Mission Bay ○ San Diego River ◉ San Diego Bay ○ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	908.21 Pueblo San Diego
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	0.96 Acres ([SQFT] Square Feet)
Area to be disturbed by the project (Project Footprint)	0.965 Acres (42,035 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	0.827 Acres (36,025 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.138 Acres (6,010 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.	Site was already urbanized and paved, -5 %

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): ☒ Existing development ☐ Previously graded but not built out ☐ Agricultural or other non-impervious use ☐ Vacant, undeveloped/natural Description / Additional Information: Site is developed and urbanized with paved parking and minor ornamental landscaping
Existing Land Cover Includes (select all that apply): ☒ Vegetative Cover ☐ Non-Vegetated Pervious Areas ☒ Impervious Areas Description / Additional Information: Site is developed and urbanized with paved parking and minor ornamental landscaping
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B ☐ NRCS Type C ☒ NRCS Type D
Approximate Depth to Groundwater (GW): ○ GW Depth < 5 feet ○ 5 feet < GW Depth < 10 feet ○ 10 feet < GW Depth < 20 feet ◉ GW Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐ Watercourses ☐ Seeps ☐ Springs ☐ Wetlands ☒ None Description / Additional Information: Site is developed and urbanized with paved parking and minor ornamental landscaping

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:

1. The existing conveyance is urbanized flow over impervious areas to the public storm drain system.

2. No off-site runoff is conveyed through the site.

3. Project site discharges to the curb and gutter lines. These curb and gutters then drain into the public storm drains system and through a hardened system to the bay.

4. Discharge points are identified on the DMA exhibit (please see Attachment 1a) and in the hydrology report (please see Attachment 5.)

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The proposed site convers the paved parking lots in a mixed-use building, underground parking, and residential units.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): Buildings, parking areas, sidewalks, courtyards
List/describe proposed pervious features of the project (e.g., landscape areas): Planter Boxes, landscaping, street trees (off-site in public right-of-way)
Does the project include grading and changes to site topography? ◉ Yes ○ No Description / Additional Information: The project will be excavating an underground parking garage

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 site proposes to channel roof runoff to down drains that will be fitted with treatment control devices. Then, runoff with enter landscaping. Once water is discharged from the landscaping it will then be conveyed to street trees per SD-A and Maxwell IV Infitlration Devices. Overflow will be conveyed to the curb and gutter of existing streets.

Please refer to the hydrology report provided for reference in Attachment 5.

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:

The project proposes to create multi-use structures that include a parking garage, retail, commercial, and residential components.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
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) The project site discharges to the curb and gutters and then into the public storm drain. The public storm drain is a hardened system to its discharge point in the bay.
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. San Diego Bay: IND, NAV, REC1, REC2, COMM, BIOL, EST, WILD, RARE, MAR, MIGR, SPWN, SHELL
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations.
Provide distance from project outfall location to impaired or sensitive receiving waters. Outfall is at the receiving waters
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 There is no conflict here.

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
SD Bay, Downtown Anchorage	Miscellaneous	Benthic Community Effects
SD Bay, Downtown Anchorage	Toxicity	Sediment Toxicity

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	○	●	○
Nutrients	○	●	○
Heavy Metals	○	●	○
Organic Compounds	○	●	○
Trash & Debris	○	●	○
Oxygen Demanding Substances	●	○	○
Oil & Grease	○	●	○
Bacteria & Viruses	○	●	○
Pesticides	○	●	○

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):

Please see the exhibit provided for reference in Attachment 1

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:

Please see the exhibit provided for reference in Attachment 1

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. N/A - Site is exempt from HMP.
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: N/A - Site is exempt from HMP
Discussion / Additional Information: (optional) N/A - Site is exempt from HMP.

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 site is a vertical development in a completely urbanized area. The site will be limited in the amount of permeable areas due to its vertical construction (6 floors over 2 underground parking levels to maximize the impervious areas being proposed.
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. N/A

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Project Name: 635 Robinson Avenue PTS522075

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. • "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	◉ Yes	○ No	○ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	◉ Yes	○ No	○ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	○ Yes	○ No	◉ N/A
Discussion / justification if SC-3 not implemented: No areas meeting this requirement are proposed by the project site.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	○ Yes	○ No	◉ N/A
Discussion / justification if SC-4 not implemented: No areas meeting this requirement are proposed by the project site.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-5 not implemented:			

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	◉ Yes	○ No	○ N/A
Interior floor drains and elevator shaft sump pumps	◉ Yes	○ No	○ N/A
Interior parking garages	◉ Yes	○ No	○ N/A
Need for future indoor & structural pest control	◉ Yes	○ No	○ N/A
Landscape/Outdoor Pesticide Use	◉ Yes	○ No	○ N/A
Pools, spas, ponds, decorative fountains, and other water features	◉ Yes	○ No	○ N/A
Food service	○ Yes	○ No	◉ N/A
Refuse areas	◉ Yes	○ No	○ N/A
Industrial processes	○ Yes	○ No	◉ N/A
Outdoor storage of equipment or materials	○ Yes	○ No	◉ N/A
Vehicle/Equipment Repair and Maintenance	○ Yes	○ No	◉ N/A
Fuel Dispensing Areas	○ Yes	○ No	◉ N/A
Loading Docks	○ Yes	○ No	◉ N/A
Fire Sprinkler Test Water	◉ Yes	○ No	○ N/A
Miscellaneous Drain or Wash Water	○ Yes	○ No	◉ N/A
Plazas, sidewalks, and parking lots	◉ Yes	○ No	○ N/A
SC-6A: Large Trash Generating Facilities	○ Yes	○ No	◉ N/A
SC-6B: Animal Facilities	○ Yes	○ No	◉ N/A
SC-6C: Plant Nurseries and Garden Centers	○ Yes	○ No	◉ N/A
SC-6D: Automotive-related Uses	○ Yes	○ No	◉ N/A
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.			

Project Name: 635 Robinson Avenue PTS522075

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. • "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 Draiange Pathways and Hydrologic Features	○ Yes	○ No	◉ N/A
Discussion / justification if SD-1 not implemented: Site is fully developed and urbanized. No natural areas to preserve			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	○ Yes	○ No	◉ N/A
1-2 Are street trees implemented? If yes, are they shown on the site map?	◉ Yes	○ No	○ N/A
1-3 Implemented street trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	◉ Yes	○ No	○ N/A
1-4 Is street tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	◉ Yes	○ No	○ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	○ Yes	○ No	◉ N/A
Discussion / justification if SD-2 not implemented: Site is fully developed and urbanized. No natural areas to preserve			

Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	○ Yes	◉ No	○ N/A
Discussion / justification if SD-3 not implemented: Site is already fully developed and urbanized. Proposed site will incorporate some landscaping, but other than the selected areas the site will remain impervious.			
SD-4 Minimize Soil Compaction	○ Yes	◉ No	○ N/A
Discussion / justification if SD-4 not implemented: Site proposes underground parking that will be two stories deep. This will compact and replace all soils on site that are not being removed.			
SD-5 Impervious Area Dispersion	○ Yes	◉ No	○ N/A
Discussion / justification if SD-5 not implemented: Minimal landscaping areas are being proposed. All areas will be over the underground parking areas and will need to be lined per the geotechnical engineer.			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	◉ Yes	○ 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.)	◉ Yes	○ No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	○ Yes	◉ No	

Project Name: 635 Robinson Avenue PTS522075

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	○ Yes	○ No	◉ N/A
Discussion / justification if SD-6 not implemented: Site is proposing to build over an underground parking garage. Permeable surfaces will not be feasible per the geotechnical sengineer. Also, since the top stories will be the residential use of the mixed-use design, green roofs will not be feasible.			
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?	○ Yes	○ No	◉ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	○ Yes	○ No	◉ 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?	○ Yes	○ No	◉ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	◉ Yes	○ No	○ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	○ Yes	○ No	◉ N/A
Discussion / justification if SD-8 not implemented: Not enough landscaping to warrant harvest and re-use			
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?	○ Yes	○ No	◉ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:
Please see the DMA exhibit provided as Attachment 1a.

Project Name: 635 Robinson Avenue PTS522075

Summary of PDP Structural BMPs	Form I-6
PDP Structural BMPs	
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). 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). 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).	
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. Step 1: Self-Mitigating Areas were determined and annotated where drainage flowed directly off-site. Step 1A: Self-Mitigating Areas need no further design. De minimus or self-treating and self-retaining areas were annotated on the project site. Step 1B: DMAs, DMA Subareas, and BMPs were annotated and DCV was calculated with the required spreadsheets provided for reference in Attachment 1. Step 2: Harvest and use has been deemed infeasible by Worksheet B.3-1 Step 3: Infiltration is feasible per the soils report (See Attachment 6 for the soil report). Infiltrators are being used at DMA1-BMP1 and DMA2-BMP2. Step 4: BMPs are designed to meet the DCV. Site is exempt from HMP. Step 5: Not applicable (Continue on page 2 as necessary.)	

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) N/A

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. DMA1-BMP1	
Construction Plan Sheet No. Grading Plan Details	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ○ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ◉ Other (describe in discussion section below)	
Purpose: ◉ Pollutant control only ○ Hydromodification control only ○ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	San Dieguito Engineering, Inc.
Who will be the final owner of this BMP?	Property Owner
Who will maintain this BMP into perpetuity?	Property Owner
What is the funding mechanism for maintenance?	Executed City Agreement

Form I-6 Page 4 of X (Copy as many as needed)
Structural BMP ID No. DMA1-BMP1
Construction Plan Sheet No. Grading Plan Details
Discussion (as needed): This is a Maxwell IV Infiltration device. DMA1-BMP1 is composed of DMA1 areas R1, R2, and LS1

Project Name: 635 Robinson Avenue PTS522075

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. DMA2-BMP2	
Construction Plan Sheet No. Grading Plan Details	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ○ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ◉ Other (describe in discussion section below)	
Purpose: ◉ Pollutant control only ○ Hydromodification control only ○ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	San Dieguito Engineering, Inc.
Who will be the final owner of this BMP?	Property Owner
Who will maintain this BMP into perpetuity?	Property Owner
What is the funding mechanism for maintenance?	Executed City Agreement

Form I-6 Page 4 of X (Copy as many as needed)
Structural BMP ID No. DMA2-BMP2
Construction Plan Sheet No. Grading Plan Details
Discussion (as needed): This is a Maxwell IV Infiltration device. DMA2-BMP2 is composed of DMA2 areas R3, PV1, and LS2 thruough LS5.

THE CITY OF SAN DIEGO	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:	Project No.:
Project Applicant:	Phone:
Project Address:	
Project Engineer:	Phone:

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.

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.

CERTIFICATION:
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.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ________________________________

Date of Signature: _ __

Printed Name: _ _

Title: _ _

Phone No. _ _

Engineer's Stamp

DS-563 (12-15)

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ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

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Project Name: 635 Robinson Avenue PTS522075

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒ 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	◉ Included on DMA Exhibit in Attachment 1a ○ 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.	◉ Included ○ 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.	◉ Included ○ 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	☒ Included

Project Name: 635 Robinson Avenue PTS522075

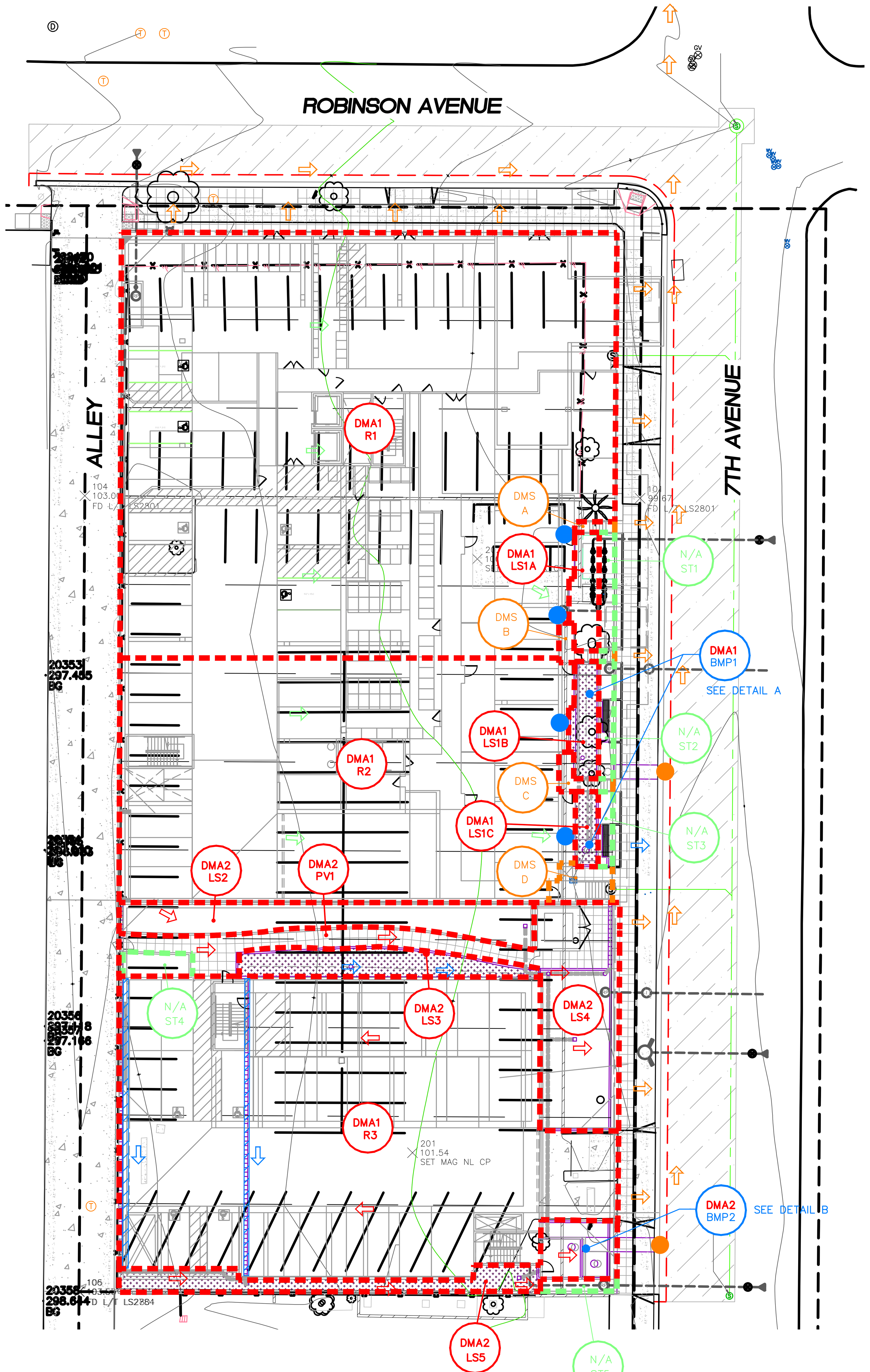
Use this checklist to ensure the required information has been included on the DMA Exhibit:

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)

STREET TREE TABLE (PER SD–A)*			
ON–SITE	OFF–SITE	TOTAL	AVE. CANOPY
0	10	10	25 FEET

*SEE LANDSCAPE PLANS FOR EXACT LOCATIONS



LEGEND

DMA/DMA SUB–AREA BOUNDARY
BMP BOUNDARY (BIORETENTION)
DEMINIMUS DMA BOUNDARY
SELF MITIGATING AREA BOUNDARY
DMA # ## — DMA ID, DMA SUB–AREA ID
DMA # ## — DMA ID, BMP ID — DCV VAULT AND MAXWELL IV DEEP INFILTRATION DEVICE
N/A ## — SELF–TREATING DMA ID
N/A ## — DEMINIMUM DMA ID
DRAINAGE FLOW DIRECTION
DRAINAGE FLOW DIRECTION (PIPED)
DRAINAGE FLOW DIRECTION (OFF–SITE)
DRAINAGE FLOW DIRECTION (ROOF)
ROOF DOWNSPOUT TO LANDSCAPING W/ INLINE PRE–TREATMENT FILTERS
TRENCH DRAIN WITH FLOGARD CATCH BASIN INSERT FILTER (O.A.E.)
OVERFLOW THROUGH CURB OUTLET PER SDRSD D–25
XX — POINT OF COMPLIANCE

DETAILS

MAXWELL UNIT, INLINE FILTER INSERTS, AND ASSOCIATED DETAILS ARE PROVIDED ON EXHIBITS LABELED AS ATT 1A/B – DETAILS 1 AND ATT 1A/B – DETAILS 2.

WORKSHEET B-2.1 - DESIGN CAPTURE VOLUME (FULL SITE)				
1	85^{th} Percentile 24-hr Storm Depth from Figure B.1-1	d=	***0.51***	INCHES
2	Area Tributary to BMP(s)	A=	***0.943***	ACRES
3	Area Weighted Runoff Factor	C=	***0.810***	UNITLESS
4	Stree Tree Volume Reductions	TCV=	***0***	CU-FT
5	Rain Barrel Volume Reductions	RCV=	***0***	CU-FT
6	Calculate DCV = (3630 x C x d X A) – TCV - RCV	DCV=	***1,415***	CU-FT

WORKSHEET B.4-1: SIMPLE SIZING METHOD				
1	DCV (Worksheet B-2.1)	DCV=	***1,415***	CU-FT
2	Estimated Design Infiltration Rate (Worksheet D.5-1)	K_{design}=	***9.6***	IN/HR
3	Available BMP Surface Area	A_{BMP}=	***58***	SQ-FT
4	Average Effective Depth (DCV / A_{BMP})	D_{avg}=	***24.4***	FEET
5	Drawdown Time, T (D_{avg} * 12 / K_{design})	T=	***30.5***	HOURS
6	Other Notes: This worksheet designed per manufacturer's specifications. A_{BMP} is for 2 devices.			

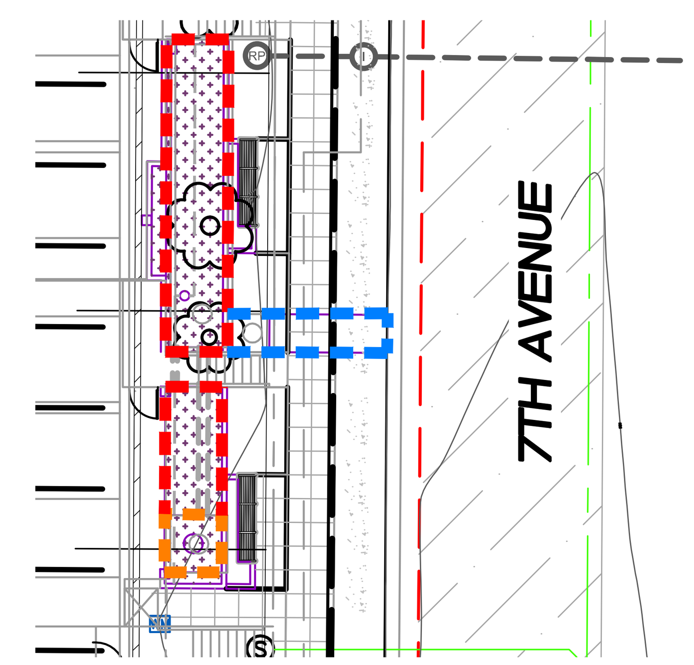
PRE–TREATMENT AREAS

DMA1–LS1B, DMA1–LS1C, DMA2–LS3, AND DMA2–LS5 ARE VEGETATED PRETREATMENT AREAS FOR THE MAXWELL DEEP INFILTRATION DEVICES. PLEASE REFER TO THE ASSOCIATED GRADING PLAN FOR FURTHER DETAIL AND INFORMATION ON THESE AREAS.

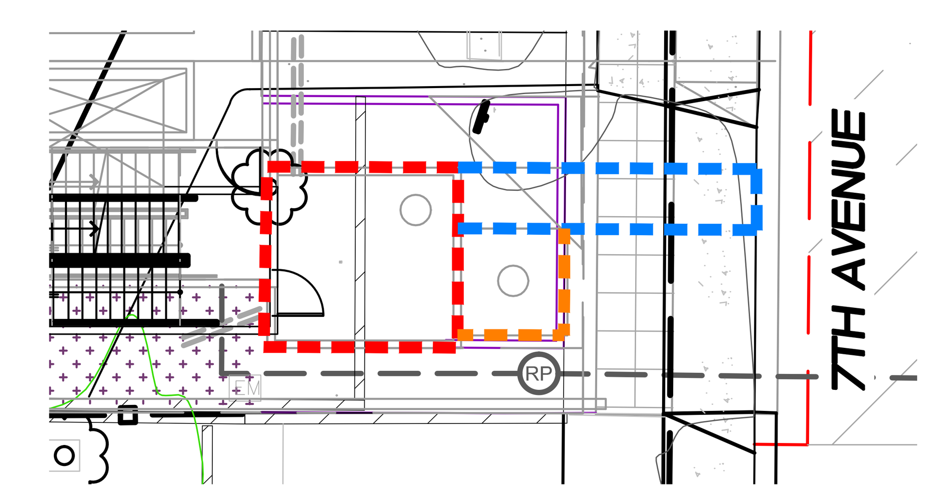
SUBAREA RUNOFF FACTOR CHART						
DMA	AREA ID	DISPERSION TO	PROPOSED CONDITION COVER TYPE	AREA (ACRES)	Cx RUNOFF FACTOR (TABLE B.1-1)	AREA X RUNOFF FACTOR
DMA1	R1	N/A	ROOF	0.374	0.9	0.337
	R2	N/A	ROOF	0.201	0.9	0.181
	LS1	N/A	LANDSCAPE	0.015	0.1	0.001
DMA2	R3	N/A	ROOF	0.243	0.9	0.219
	PV1	N/A	IMPERV PAVING	0.019	0.9	0.017
	LS2	N/A	LANDSCAPE	0.021	0.1	0.002
	LS3	N/A	LANDSCAPE	0.021	0.1	0.002
	LS4	N/A	LANDSCAPE	0.026	0.1	0.003
	LS5	N/A	LANDSCAPE	0.023	0.1	0.002
			TOTAL:	0.943		0.764

SELECTED BMP SUMMARY TABLE					
BMP ID	BMP TYPE	REQUIRED DCV (FT3)	AREA DRAINING TO BMP (FT^2/ACRE)	36-HOUR DRAWDOWN VOLUME (FT^3)	DCV MULTIPLE
DMA1-BMP1	MAXWELL IV DEEP INFILTRATOR	961	25,704 0.590	2,259 FT^3	+/- 2.3
DMA2-BMP2	MAXWELL IV DEEP INFILTRATOR	453	15,377 0.353	2,259 FT^3	+/- 4.9

AREAS NOT PART OF THE DCV CALCULATIONS				
DMA	AREA ID	PROPOSED CONDITION COVER TYPE	AREA (ACRES)	REASON EXCLUDED FROM DCV CALCULATIONS
N/A	ST1	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST2	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST3	LANDSCAPE	0.002	SELF-TREATING AREA DRAINING OFF-SITE
	ST4	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST5	LANDSCAPE	0.002	SELF-TREATING AREA DRAINING OFF-SITE
	DMS-A	IMPERV PAVING	0.001	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-B	IMPERV PAVING	0.002	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-C	IMPERV PAVING	0.002	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-D	IMPERV PAVING	0.004	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
			0.022	



DETAIL 'A' – NORTH BMP
NOT TO SCALE



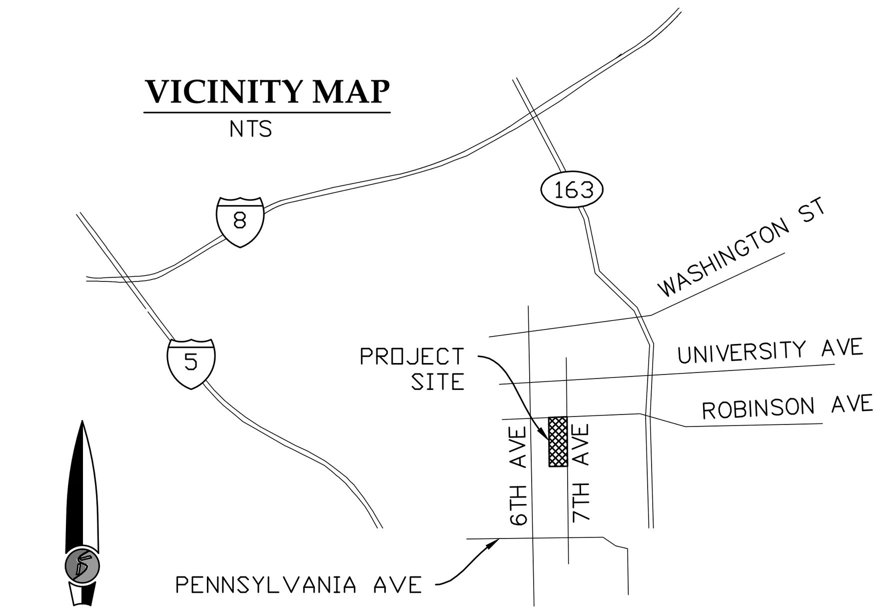
DETAIL 'B' – SOUTH BMP
NOT TO SCALE

DETAIL 'A' LEGEND

DCV VAULT (961 CU–FT MIN)
OVERFLOW TO CURB THROUGH D–25
MAXWELL DRYWELL IV INFILTRATION UNIT (SEE DETAIL SHT)

DETAIL 'B' LEGEND

DCV VAULT (453 CU–FT MIN)
OVERFLOW TO CURB THROUGH D–25
MAXWELL DRYWELL IV INFILTRATION UNIT (SEE DETAIL SHT)



GROUNDWATER STATEMENT:

THE DEPTH TO GROUNDWATER IS GREATER THAN 20 FEET.

HYDROLOGIC FEATURES STATEMENT:

THE FOLLOWING NATURAL HYDROLOGIC FEATURES ARE PRESENT, EXISTING, OR PROPOSED ON THE PROJECT SITE:

1. NATURAL WATERCOURSES: NONE
2. NATURAL SEEPS: NONE
3. NATURAL SPRINGS: NONE
4. NATURAL WETLANDS: NONE
5. MAN–MADE WETLANDS: NONE

CRITICAL COARSE SEDIMENT YIELD NOTE:

THE PROJECT SITE DOES NOT DISCHARGE TO A MAPPED CRITICAL COURSE SEDIMENT YIELD AREA PER THE WMAA.

INFILTRATION FEASIBILITY:

THE PROJECT SITE CLASSIFIED AS: PARTIAL INFILTRATION

SOILS NOTE:

THE PROJECT SITE CLASSIFIED AS TYPE D SOILS. TYPE D SOILS WILL BE USED FOR DESIGN AND CALCULATIONS.

SITE DRAINAGE NOTE

ALL SITE DRAINAGE FLOWS FROM THE SITE TO THE ADJACENT CURB AND GUTTERS. FLOWS ARE THEN DISCHARGED TO THE SAME POINT OF COMPLIANCE ON THE NORTHWEST PORTION OF THE SITE ON ROBINSON AVENUE.

HYDROMODIFICATION EXEMPTION

THE PROJECT SITE DISCHARGES TO AN EXEMPT CONVEYANCE SYSTEM PER THE WMAA AND THEREFORE, HYDROMODIFICATION DESIGN AND CONTROLS DO NOT APPLY TO THE PROJECT SITE.

DMA1–LS1 NOTE:

DMA1–LS1 IS A RAISED PLANTER THAT HAS MULTIPLE AREAS THAT ARE ALL CONSIDERED ONE AREA FOR CALCULATION PURPOSES.

STORM DRAIN PLAN

PLEASE REFER TO THE GRADING PLAN FOR THE PROPOSED STORM DRAIN LOCATIONS, SIZING, DETAILING, AND SPECIFICATIONS.

20 10 0 20 40
SCALE: 1" = 20'

SCHEMATIC NOTE:

THIS DMA EXHIBIT IS SCHEMATIC IN NATURE AND THEREFORE SHOULD NOT BE SCALED FOR DISTANCES AND MEASUREMENTS. THE SCALE PROVIDED IS AS CLOSE TO ACCURATE AS POSSIBLE.

PREPARED BY:
SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345–1149

PROJECT NUMBER: 522075
635 ROBINSON AVENUE
SAN DIEGO, CALIFORNIA 92103
ATT 1a/b - DMA EXHIBIT

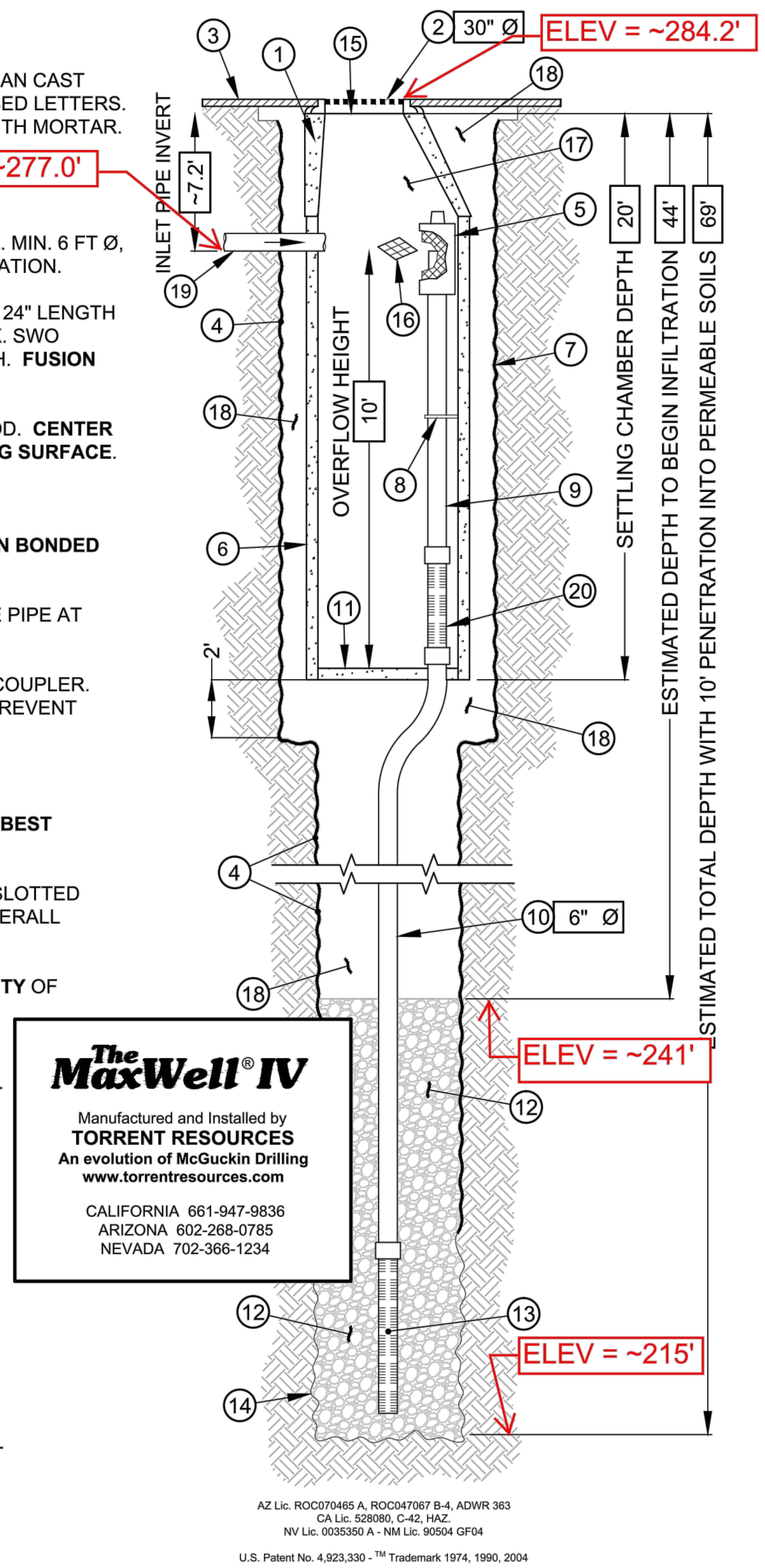
SDE 5709

7th and Robinson - ATT (South) - Ground Level

The MaxWell® IV Drainage System Detail And Specifications

ITEM NUMBERS

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **BOLTED RING & GRATE** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
3. **GRADED BASIN OR PAVING** (BY OTHERS).
4. NON-WOVEN GEOTEXTILE SLEEVE, MIRAFITM/ 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.
5. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.
6. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**.
7. **MIN. 6' Ø DRILLED SHAFT**.
8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
9. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
10. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
11. **BASE SEAL** - CONCRETE SLURRY OR GEOTEXTILE.
12. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
13. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.
14. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
15. **FABRIC SEAL** - U.V. RESISTANT GEOTEXTILE - **TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
16. **ABSORBENT** - HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO PER CHAMBER.
17. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE SETTLING CHAMBER DEPTH AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE OVERFLOW PIPE INLET.
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. **INLET PIPE** (BY OTHERS).
20. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT WRAPPED WITH NON WOVEN GEOTEXTILE FABRIC. 60" OVERALL LENGTH WITH TRI-B COUPLER.



DETAIL 'B' – SOUTH BMP

NOT TO SCALE

7th and Robinson - Mixed Use (North) - Ground Level

The MaxWell® IV Drainage System Detail And Specifications

ITEM NUMBERS

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
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6. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**.
7. **MIN. 6' Ø DRILLED SHAFT**.
8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
9. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
10. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
11. **BASE SEAL** - CONCRETE SLURRY OR GEOTEXTILE.
12. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
13. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.
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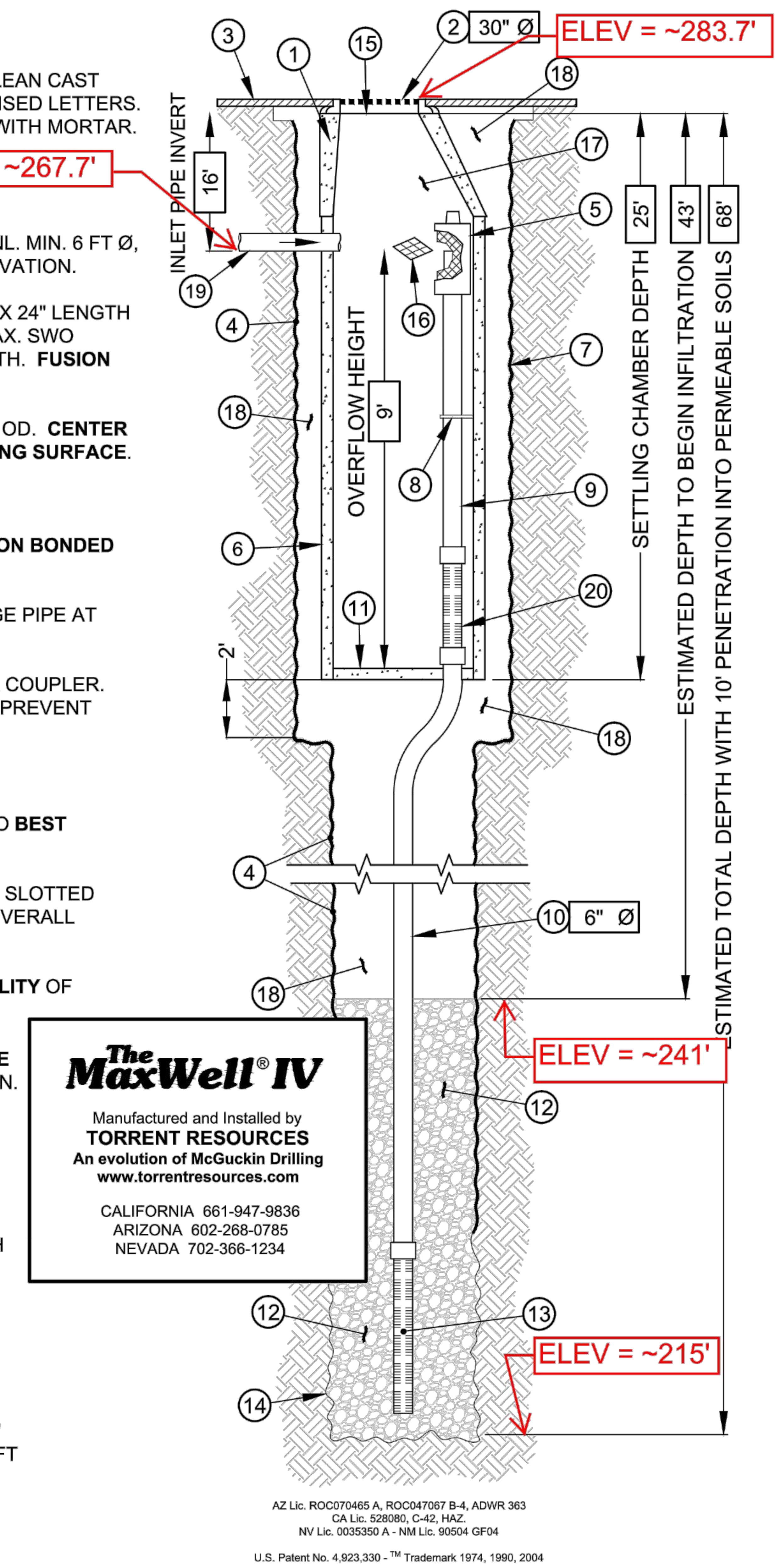


DETAIL 'A' – NORTH BMP

NOT TO SCALE

PREPARED BY:

SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345-1149

PROJECT NUMBER: 522075

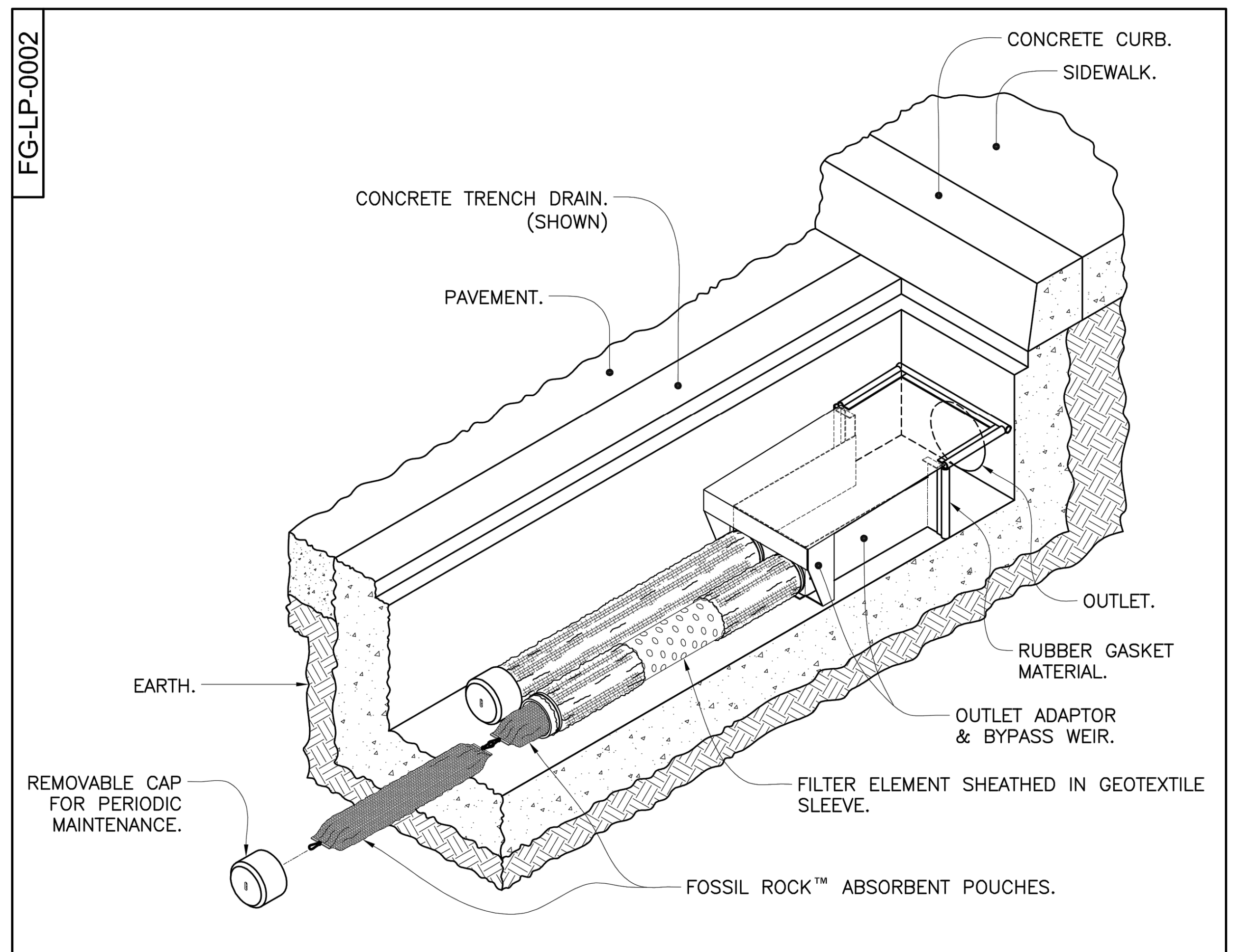
635 ROBINSON AVENUE

SAN DIEGO, CALIFORNIA 92103

ATT 1a/b - DETAILS 1

SDE 5709

FG-LP-0002



NOTES:

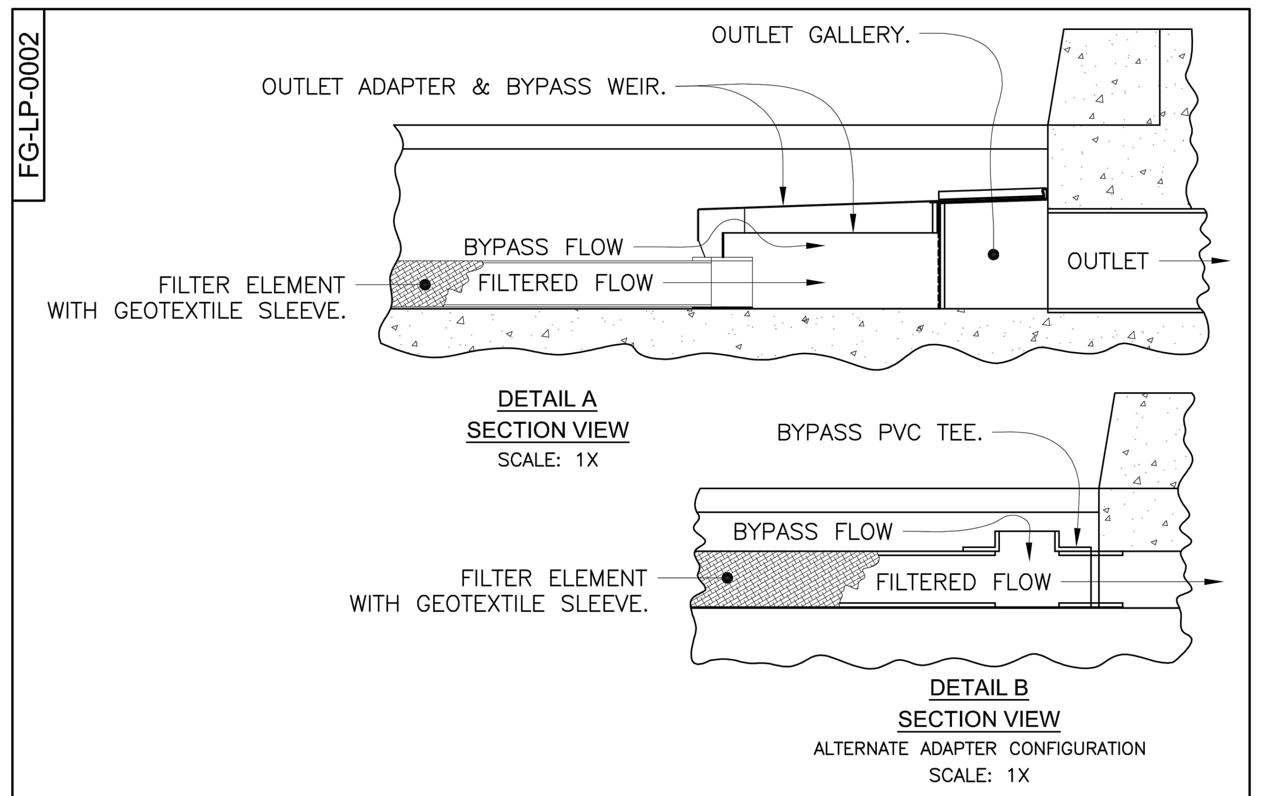
1. Filter insert shall have a high flow bypass feature.
2. Filter outlet adapter shall be constructed from stainless steel Type 304. Alternate outlet adaptor for shallow installations shall be PVC SCH-40. See detail B, sheet 2 of 2.
3. Filter medium shall be *Fossil Rock™*, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.
5. For alternate outlet adapter configurations used for extremely shallow trench drains contact Oldcastle Stormwater Solutions for engineering assistance.
6. Filter element should be a minimum of one half the length of trench. Confirm flow rate upon order.

FloGard® Catch Basin Insert Filter — Trench Drain Style

Oldcastle® Stormwater Solutions
7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO. FG-LP-0002 | REV G | ECO ECO-0127 JPR 5/18/15 | DATE JPR 2/21/07 | SHEET 1 OF 2

FG-LP-0002



SPECIFIER CHART

MODEL	FILTER TYPE	TRENCH WIDTH "ID" (CLEAR OPENING)	MINIMUM TRENCH DEPTH (FROM BOTTOM OF GRATE)	SOLIDS STORAGE CAPACITY CUBIC FEET **	FILTERED FLOW CUBIC FEET / SECOND **	TOTAL BYPASS CAPACITY CUBIC FEET /SECOND
FG-TDOF3	PIPE *	3.0	6.5	0.1	0.5	0.1
FG-TDOF4	PIPE *	4.0	6.5	0.2	0.5	0.1
FG-TDOF6	PIPE	6.0	6.5	0.4	0.5	0.2
FG-TDOF8	PIPE	8.0	6.5	0.7	0.5	0.3
FG-TDOF10	PIPE	10.0	6.5	0.9	0.5	0.5
FG-TDOF12	PIPE	12.0	6.5	0.9	1.0	0.6
FG-TDOF18	PIPE	18.0	6.5	1.3	1.5	1.1
FG-TDOF24	PIPE	24.0	6.5	1.8	2.0	1.5
FG-TDOA6	PANEL	6.0	4.5	0.4	0.2	0.2
FG-TDOA8	PANEL	8.0	4.5	0.7	0.2	0.3
FG-TDOA10	PANEL	10.0	4.5	0.8	0.3	0.5
FG-TDOA12	PANEL	12.0	4.5	1.0	0.4	0.6
FG-TDOA18	PANEL	18.0	4.5	1.4	0.8	1.1
FG-TDOA24	PANEL	24.0	4.5	1.8	1.1	1.5

* ALTERNATE ADAPTER CONFIGURATION. SEE DETAIL B.
**CAPACITY PER 4-FT. SEGMENT USED.

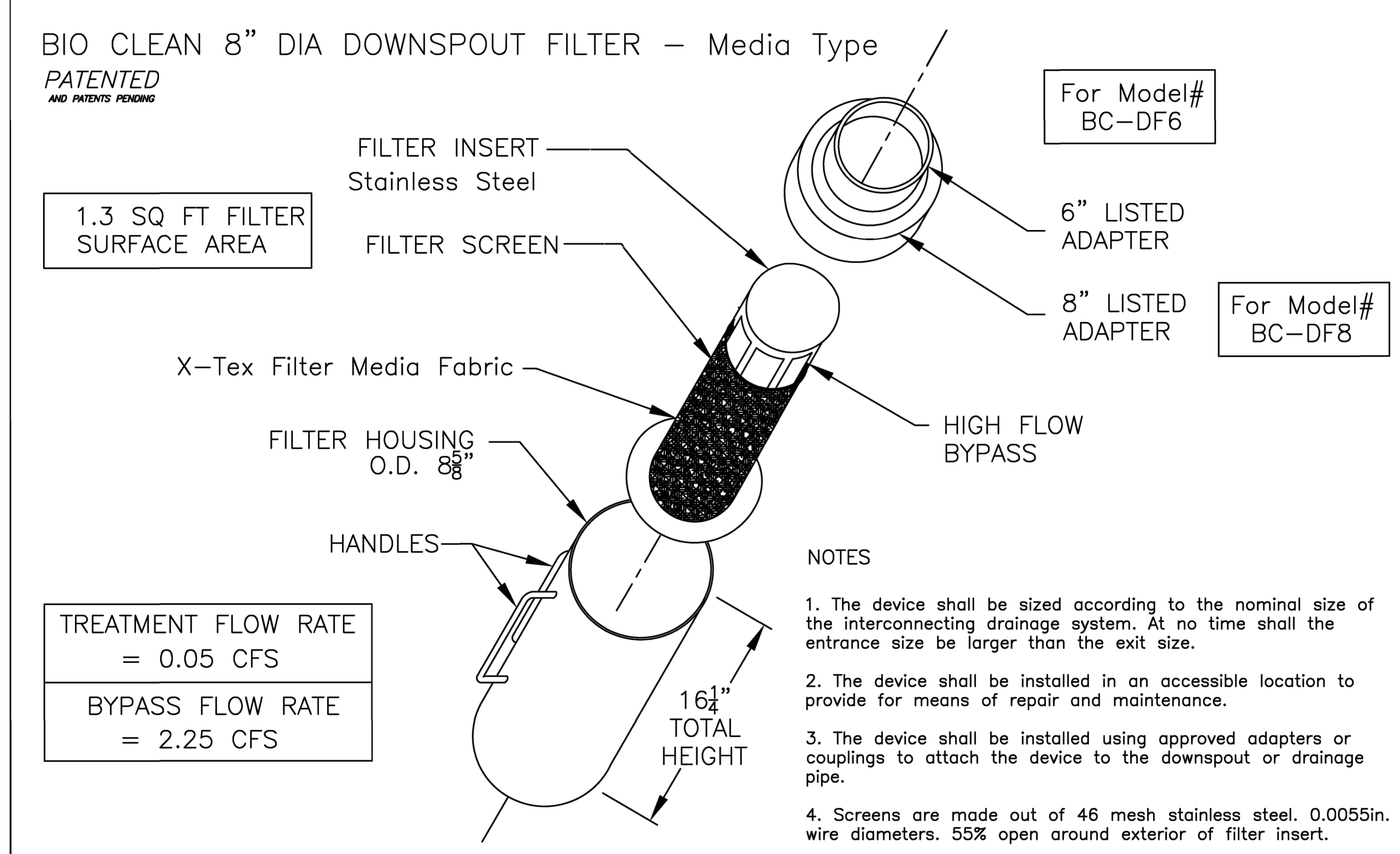
FloGard® Catch Basin Insert Filter — Trench Drain Style

Oldcastle® Stormwater Solutions
7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO. FG-LP-0002 | REV G | ECO ECO-0127 JPR 5/18/15 | DATE JPR 2/21/07 | SHEET 2 OF 2

BIO CLEAN 8" DIA DOWNSPOUT FILTER – Media Type

PATENTED
AND PATENTS PENDING



TREATMENT FLOW RATE = 0.05 CFS

BYPASS FLOW RATE = 2.25 CFS

NOTES

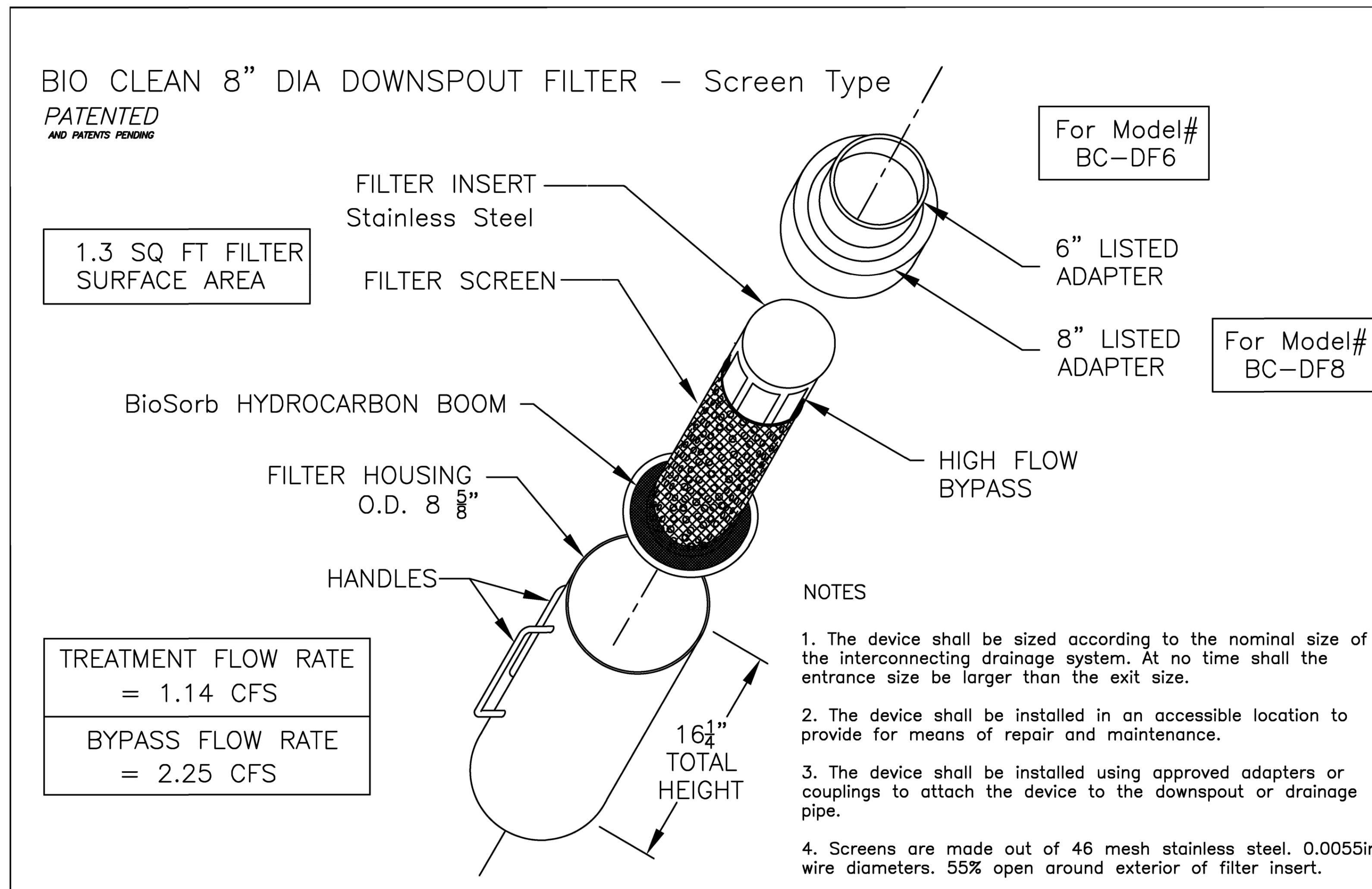
1. The device shall be sized according to the nominal size of the interconnecting drainage system. At no time shall the entrance size be larger than the exit size.
2. The device shall be installed in an accessible location to provide for means of repair and maintenance.
3. The device shall be installed using approved adapters or couplings to attach the device to the downspout or drainage pipe.
4. Screens are made out of 46 mesh stainless steel. 0.0055in. wire diameters. 55% open around exterior of filter insert.

Bio Clean
A Forterra Company

BIO CLEAN ENVIRONMENTAL
PO BOX 869, OCEANSIDE, CA
P 760.433.7640 F 760.433.3179
8" DOWNSPOUT FILTER MEDIA TYPE
MODEL NO. BC-DF6, BC-DF8
DATE: 12/18/2012 | SCALE: NTS
DRAFTER: T.H.H. | UNITS =INCHES
PROJECT:
DRAWING #:
FILE NAME:
REVISIONS: LM | DATE: 12/18/201
REVISIONS: | DATE:

BIO CLEAN 8" DIA DOWNSPOUT FILTER – Screen Type

PATENTED
AND PATENTS PENDING



TREATMENT FLOW RATE = 1.14 CFS

BYPASS FLOW RATE = 2.25 CFS

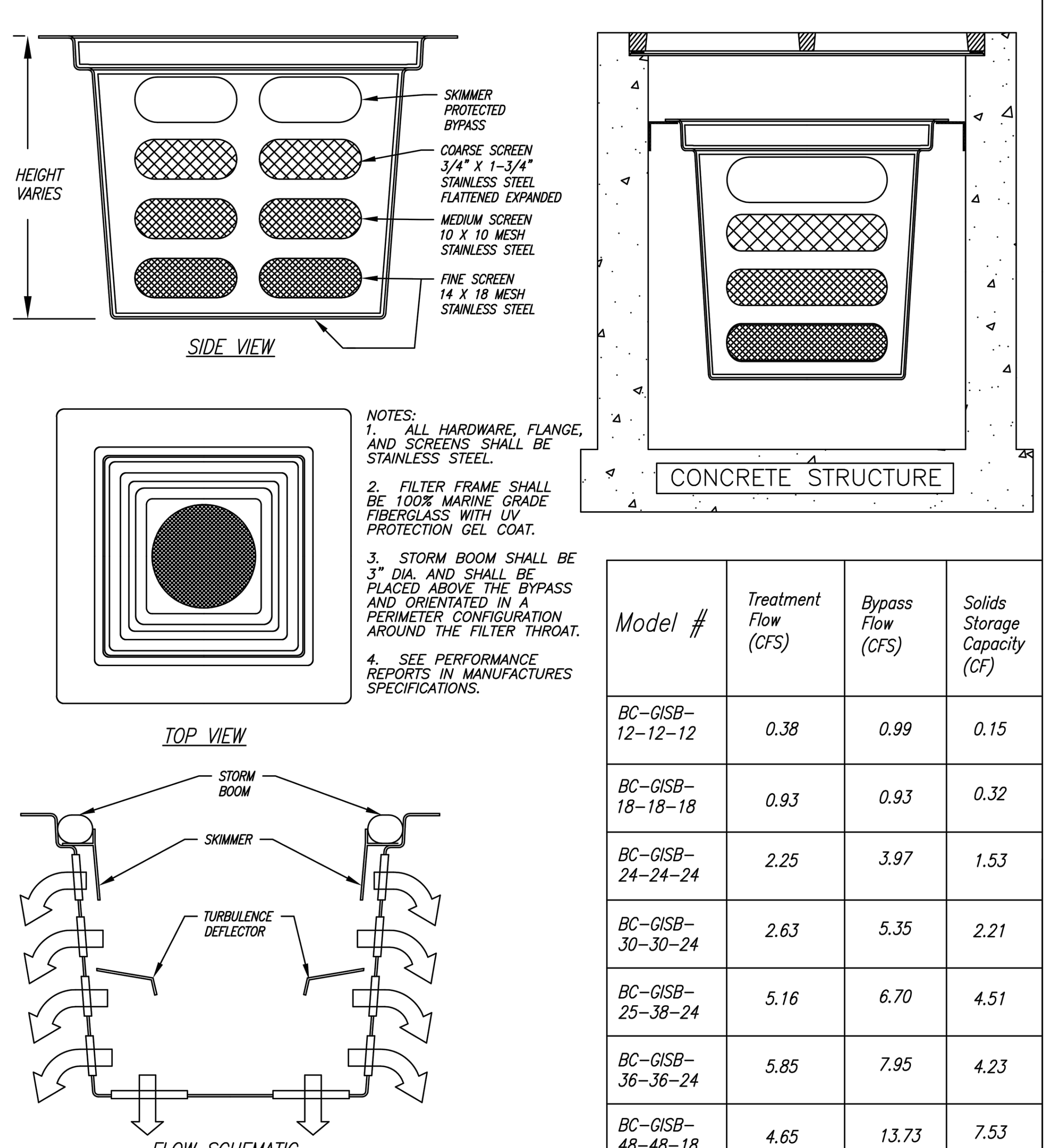
NOTES

1. The device shall be sized according to the nominal size of the interconnecting drainage system. At no time shall the entrance size be larger than the exit size.
2. The device shall be installed in an accessible location to provide for means of repair and maintenance.
3. The device shall be installed using approved adapters or couplings to attach the device to the downspout or drainage pipe.
4. Screens are made out of 46 mesh stainless steel. 0.0055in. wire diameters. 55% open around exterior of filter insert.

Bio Clean
A Forterra Company

BIO CLEAN ENVIRONMENTAL
PO BOX 869, OCEANSIDE, CA
P 760.433.7640 F 760.433.3179
8" DOWNSPOUT FILTER SCREEN TYPE
MODEL NO. BC-DF6, BC-DF8
DATE: 8/30/2012 | SCALE: NTS
DRAFTER: T.H.H. | UNITS =INCHES
PROJECT:
DRAWING #:
FILE NAME:
REVISIONS: LM | DATE: 8/30/2012
REVISIONS: | DATE:

BIO CLEAN GISB FILTER



NOTES:
1. ALL HARDWARE, FLANGE, AND SCREENS SHALL BE STAINLESS STEEL.
2. FILTER FRAME SHALL BE 100% MARINE GRADE FIBERGLASS WITH UV PROTECTION GEL COAT.
3. STORM BOOM SHALL BE 3" DIA. AND SHALL BE PLACED ABOVE THE BYPASS AND ORIENTATED IN A PERIMETER CONFIGURATION AROUND THE FILTER THROAT.
4. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS.

Model #	Treatment Flow (CFS)	Bypass Flow (CFS)	Solids Storage Capacity (CF)
BC-GISB-12-12-12	0.38	0.99	0.15
BC-GISB-18-18-18	0.93	0.93	0.32
BC-GISB-24-24-24	2.25	3.97	1.53
BC-GISB-30-30-24	2.63	5.35	2.21
BC-GISB-25-38-24	5.16	6.70	4.51
BC-GISB-36-36-24	5.85	7.95	4.23
BC-GISB-48-48-18	4.65	13.73	7.53

DRAWING: GRATE INLET SKIMMER BOX (GISB) FILTER DETAILS
TYPICAL MODEL DETAIL
WARRANTY: 5 YEAR MANUFACTURERS
BIO CLEAN ENVIRONMENTAL SERVICES, INC.
PO BOX 869 OCEANSIDE, CA 92049
PHONE: 760-433-7640 FAX: 760-433-3176
DATE: 12/7/15 | SCALE: SF = 15
DRAFTER: J.T.B. | UNITS = INCHES
PATENTED
PROJECT:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:

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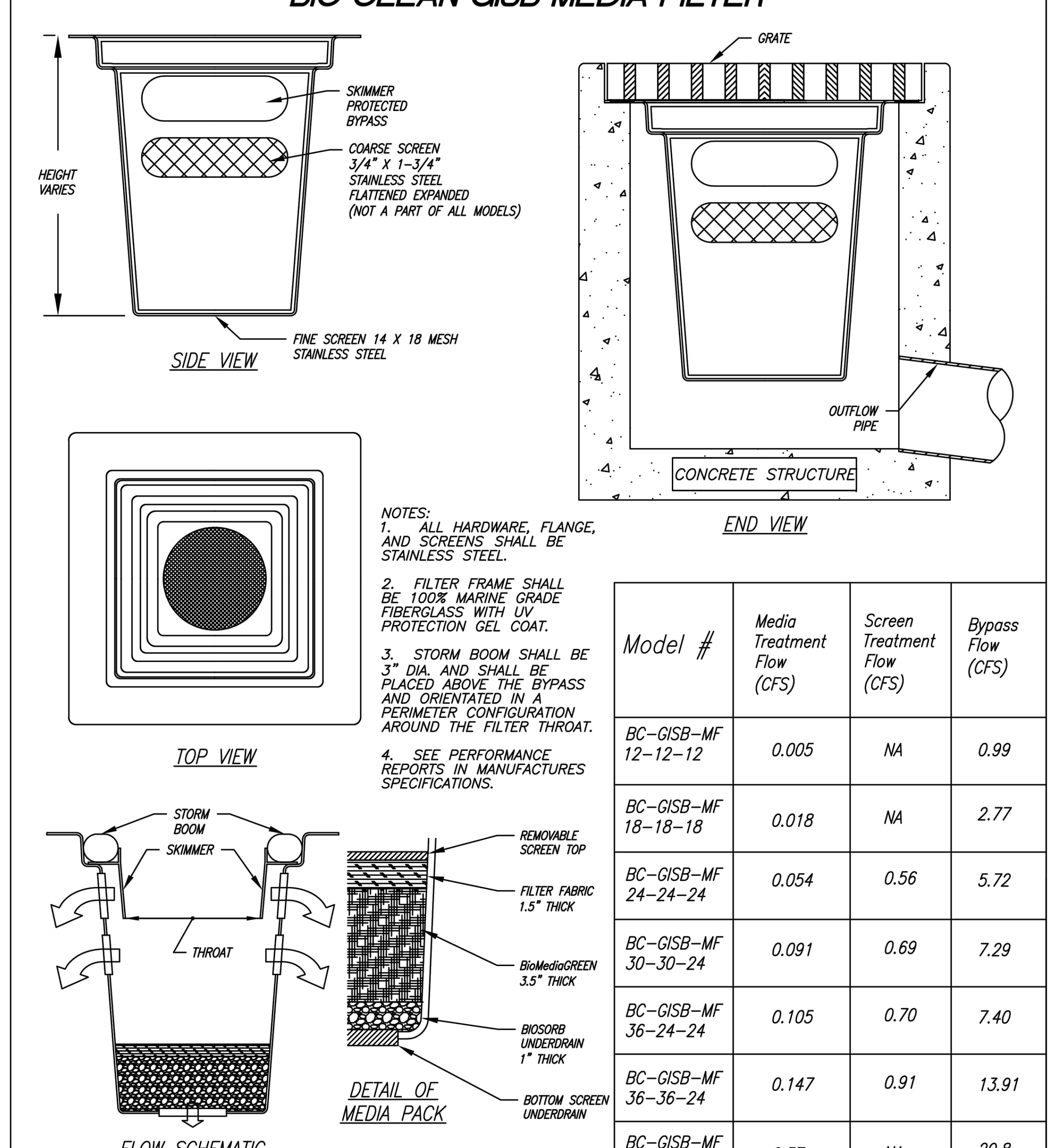
BIO CLEAN GISB MEDIA FILTER



NOTES:
1. ALL HARDWARE, FLANGE, AND SCREENS SHALL BE STAINLESS STEEL.
2. FILTER FRAME SHALL BE 100% MARINE GRADE FIBERGLASS WITH UV PROTECTION GEL COAT.
3. STORM BOOM SHALL BE 3" DIA. AND SHALL BE PLACED ABOVE THE BYPASS AND ORIENTATED IN A PERIMETER CONFIGURATION AROUND THE FILTER THROAT.
4. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS.

Model #	Media Treatment Flow (CFS)	Screen Treatment Flow (CFS)	Bypass Flow (CFS)
BC-GISB-MF 12-12-12	0.005	NA	0.99
BC-GISB-MF 18-18-18	0.018	NA	2.77
BC-GISB-MF 24-24-24	0.054	0.56	5.72
BC-GISB-MF 30-30-24	0.091	0.69	7.29
BC-GISB-MF 36-24-24	0.105	0.70	7.40
BC-GISB-MF 36-36-24	0.147	0.91	13.91
BC-GISB-MF 48-48-18	0.37	NA	20.8

DRAWING: GRATE INLET SKIMMER BOX (GISB) FILTER DETAILS
TYPICAL MODEL DETAIL
WARRANTY: 5 YEAR MANUFACTURERS
BIO CLEAN ENVIRONMENTAL SERVICES, INC.
PO BOX 869 OCEANSIDE, CA 92049
PHONE: 760-433-7640 FAX: 760-433-3176
DATE: 12/7/15 | SCALE: SF = 15
DRAFTER: J.T.B. | UNITS = INCHES
PATENTED
PROJECT:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:

BIO CLEAN® ENVIRONMENTAL SERVICES, INC.
WWW.BIOCLEANENVIRONMENTAL.COM
PAGE 1

PREPARED BY:
SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345-1149

PROJECT NUMBER: 522075

635 ROBINSON AVENUE

SAN DIEGO, CALIFORNIA 92103

ATT 1a/b - DETAILS 2

ATTACHMENT 1b – DMA AND DESIGN CAPTURE VOLUME CALCULATIONS

Please see the attached project site DMAs, sizing criteria, treatment control BMPs, calculations, and references.

DMA EXHIBIT

Please see Attachment 1a for the DMA Exhibit.

DESIGN CAPTURE VOLUME

Per the standards, DCV is defined as the volume of storm water resulting from the 85th percentile, 24-hours storm event. The DCV is calculated as follows:

DCV = C x d x A x 43560 sf/acre x 1/12 in/ft = 3630 x C x d x A ft^3

Where:

DCV = Design Capture Volume (ft^3)

C = Runoff Factor from the BMP Design Manual, Section B.1.1

d = 85th Percentile, 24-Hr Storm Event Rainfall Depth (inches) from the BMP Design Manual, Section B.1.3

A = Total tributary area draining into the BMP (acres)

RUNOFF FACTOR 'C'

The project site must look to its DMA mapping to get its composite runoff factor from the following equation from the BMP Design Manual, Section B.1.1: Runoff Factor as such:

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

Where: Cx = Runoff factor for area A per Table B.1-1.

Ax = Tributary area X (acres)

Table B.1-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs

Surface	Runoff Factor
Roofs[1]	0.90
Concrete or Asphalt[1]	0.90
Unit Pavers (grouted)[1]	0.90
Decomposed Granite	0.30
Cobbles or Crushed Aggregate	0.30
Amended, Mulched Soils or Landscape	0.10
Compacted Soil (e.g., unpaved parking)	0.30

1. Surface is considered impervious and could benefit from use of Site Design BMPs and adjustment of the runoff factor per Section B.2.1.

Using this data, the following are the project site's specific Runoff Factor calculations:

SUBAREA RUNOFF FACTOR CHART						
DMA	***AREA ID***	***DISPERSION TO***	***PROPOSED CONDITION COVER TYPE***	***AREA (ACRES)***	***Cx RUNOFF FACTOR (TABLE B.1-1)***	***AREA X RUNOFF FACTOR***
DMA1	R1	N/A	ROOF	0.374	0.9	0.337
	R2	N/A	ROOF	0.201	0.9	0.181
	LS1	N/A	LANDSCAPE	0.015	0.1	0.001
DMA2	R3	N/A	ROOF	0.243	0.9	0.219
	PV1	N/A	IMPERV PAVING	0.019	0.9	0.017
	LS2	N/A	LANDSCAPE	0.021	0.1	0.002
	LS3	N/A	LANDSCAPE	0.021	0.1	0.002
	LS4	N/A	LANDSCAPE	0.026	0.1	0.003
	LS5	N/A	LANDSCAPE	0.023	0.1	0.002
			TOTAL:	0.943		0.764

Using the Runoff Factor equation, C = 0.764 / 0.943 = 0.810

85TH PERCENTILE STORM DEPTH

The project site's d value for the 85th Percentile Storm has been determined using Figure B.1-1: 85th Percentile 24-hour Isopluvial Map and is 0.51 inches

TRIBUTARY AREA

The project site has a total tributary area of 0.943 acres.

DESIGN CAPTURE VOLUME

Based on the above mentioned factors, tables, and summary, the project site DCV is as follows:

C = 0.810
d = 0.51 inches
A = 0.943 acres

Therefore: DCV = C x d x A x 43560 sf/acre x 1/12 in/ft
= 3630 x C x d x A ft3
= 3630 x 0.810 x 0.51 x 0.943
= 1,415 ft^3

CHECK IMPERVIOUS AREA DISPERSIONS

Due to the infill and utilization of the entire lot for vertical construction components, there are no areas that meet the requirements of Impervious Area Dispersion per SD5.

SITE DCV SUMMARY

With impervious area dispersions checked, the following is the Full Site DCV Summary:

FULL SITE DCV SUMMARY			
RUNOFF FACTOR C	***85^{TH} % DEPTH (INCH)***	***AREA (ACRES)***	***DCV (FT^3)***
0.810	0.51	0.943	1,415

INDIVIDUAL BMP DCV CALCULATIONS

Each BMP is required to perform its own DCV calculations per the standards. Sizing for each BMP follows the same parameters as Section 6.1 with the following BMP Routing Summaries:

DMA1-BMP1 – MAXWELL IV DEEP INFILTRATOR ROUTING

SUBAREA RUNOFF FACTOR CHART FOR DMA1 - BMP1 – MAXWELL IV DEEP INFILTRATOR				
DMA	***Ax (ACRES)***	***PROPOSED CONDITION COVER TYPE***	***Cx RUNOFF FACTOR (TABLE B.1-1)***	***AREA X RUNOFF FACTOR***
DMA1 – R1	0.374	ROOF	0.9	0.337
DMA1 – R2	0.201	ROOF	0.9	0.181
DMA1 – LS1	0.015	LANDSCAPE	0.1	0.001
TOTAL:	0.590			0.519

Using the Runoff Factor equation, C = 0.519 / 0.590 = 0.880

Therefore: DMA1 DCV $= 3630 \times C \times d \times A\ ft^3$
$= 3630\ (0.88)\ (0.51)\ (0.590)\ ft^3$
$= 961\ ft^3$

Please refer to the attached Torrent Maxwell IV Deep Infiltration System Calculations. DMA1-BMP1 is referenced as the North Unit. A summary of the calculations are as follows:

- Mitigated volume is 1,278 ft^3, which is larger then the DCV volume of 961 ft^3
- Standard Allowed Maximum Draw Down Time of 36 hours will infiltrate a volume of 2,259 ft^3
- The 36 hour infiltration is +/- 2.3 x DCV
- Note, site is exempt from HMP

Project Name: 635 Robinson Avenue PTS 522075

Attachment 1b – DMA and DCV Calculations

DMMA2-BMP2 – MAXWELL IV DEEP INFILTRATOR ROUTING

SUBAREA RUNOFF FACTOR CHART FOR DMA2 - BMP2 – MAXWELL IV DEEP INFILTRATOR				
DMA	***Ax (ACRES)***	***PROPOSED CONDITION COVER TYPE***	***Cx RUNOFF FACTOR (TABLE B.1-1)***	***AREA X RUNOFF FACTOR***
DMA2 – R3	0.243	ROOF	0.9	0.219
DMA2 – PV1	0.019	IMPERVIOUS PAVING	0.9	0.017
DMA2 – LS2	0.021	LANDSCAPE	0.1	0.002
DMA2 – LS3	0.021	LANDSCAPE	0.1	0.002
DMA2 – LS4	0.026	LANDSCAPE	0.1	0.003
DMA2 – LS5	0.023	LANDSCAPE	0.1	0.002
TOTAL:	0.353			0.245

Using the Runoff Factor equation, C = 0.245 / 0.353 = 0.693

Therefore: DMA1 DCV = 3630 x C x d x A ft^3
= 3630 (0.693) (0.51) (0.353) ft^3
= 453 ft^3

Please refer to the attached Torrent Maxwell IV Deep Infiltration System Calculations. DMA2-BMP2 is referenced as the South Unit. A summary of the calculations are as follows:

- Mitigated volume is 765 ft^3, which is larger then the DCV volume of 453 ft^3
- Standard Allowed Maximum Draw Down Time of 36 hours will infiltrate a volume of 2,259 ft^3
- The 36 hour infiltration is +/- 4.9 x DCV
- Note, site is exempt from HMP

BMP SUMMARY

The following is a summary of the BMPs being used by the project site:

SELECTED BMP SUMMARY TABLE					
BMP ID	***BMP TYPE***	***REQUIRED DCV (FT3)***	***AREA DRAINING TO BMP (FT^2/ACRE)***	***36-HOUR DRAWDOWN VOLUME (FT^3)***	***DCV MULTIPLE***
DMA1-BMP1	MAXWELL IV DEEP INFILTRATOR	961	25,704 0.590	2,259 FT^3	+/- 2.3
DMA2-BMP2	MAXWELL IV DEEP INFILTRATOR	453	15,377 0.353	2,259 FT^3	+/- 4.9

AREAS NOT IN DESIGN CAPTURE VOLUME CALCULATIONS

Some areas of the project site have been excluded from the DCV calculations per the standards. The following is a summary of these areas:

AREAS NOT PART OF THE DCV CALCULATIONS				
DMA	***AREA ID***	***PROPOSED CONDITION COVER TYPE***	***AREA (ACRES)***	***REASON EXCLUDED FROM DCV CALCULATIONS***
N/A	ST1	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST2	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST3	LANDSCAPE	0.002	SELF-TREATING AREA DRAINING OFF-SITE
	ST4	LANDSCAPE	0.003	SELF-TREATING AREA DRAINING OFF-SITE
	ST5	LANDSCAPE	0.002	SELF-TREATING AREA DRAINING OFF-SITE
	DMS-A	IMPERV PAVING	0.001	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-B	IMPERV PAVING	0.002	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-C	IMPERV PAVING	0.002	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
	DMS-D	IMPERV PAVING	0.004	DEMINIMUS DRAINING TO R/W (< 250 SQ-FT)
			0.022	

WORKSHEET B-2.1 - DESIGN CAPTURE VOLUME (FULL SITE)				
1	85th Percentile 24-hr Storm Depth from Figure B.1-1	d=	***0.51***	INCHES
2	Area Tributary to BMP(s)	A=	***0.943***	ACRES
3	Area Weighted Runoff Factor	C=	***0.810***	UNITLESS
4	Stree Tree Volume Reductions	TCV=	***0***	CU-FT
5	Rain Barrel Volume Reductions	RCV=	***0***	CU-FT
6	Calculate DCV = (3630 x C x d X A) – TCV - RCV	DCV=	***1,415***	CU-FT

WORKSHEET B.4-1: SIMPLE SIZING METHOD				
1	DCV (Worksheet B-2.1)	DCV=	***1,415***	CU-FT
2	Estimated Design Infiltration Rate (Worksheet D.5-1)	K_{design}=	***9.6***	IN/HR
3	Available BMP Surface Area	A_{BMP}=	***58***	SQ-FT
4	Average Effective Depth (DCV / A_{BMP})	D_{avg}=	***24.4***	FEET
5	Drawdown Time, T (D_{avg} * 12 / K_{design})	T=	***30.5***	HOURS
6	Other Notes: This worksheet designed per manufacturer's specifications. A_{BMP} is for 2 devices.			

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TORRENT RESOURCES

May 3, 2017

San Dieguito Engineering - Solana Beach, CA
Attn: Michael Wolfe

Re: Maxwell® IV Drainage System Calculations for **7th and Robinson - Mixed Use (North) Ground Level - San Diego, CA**

Given:

Measured Infiltration Rate	4.61	in/hr
Safety Factor	2	
Mitigated Volume	1,278	ft^3
Required Drawdown Time	36	hours
Min. Depth to Infiltration	43	ft
Max. Drywell Depth	68	ft
Rock Porosity	40	%

Design:

Actual Depth to Infiltration	43	ft
Actual Drywell Bottom Depth	68	ft

Convert Measured Infiltration Rate from in/hr to ft/sec.

$$4.61 \frac{in}{hr} \times \frac{1\ ft}{12\ in} \times \frac{1\ hr}{3600\ sec} = 0.000107 \frac{ft}{sec}$$

Apply Safety Factor to get Design Rate.

$$0.000107 \frac{ft}{sec} \div 2 = 0.000053 \frac{ft}{sec}$$

A 4 foot diameter drywell provides 12.57 SF of infiltration area per foot of depth, plus 12.57 SF at the bottom.

For a 68 foot deep drywell, infiltration occurs between 43 feet and 68 feet below grade. This provides 25 feet of infiltration depth in addition to the bottom area. Total infiltration area is calculated below.

$$25\ ft \times 12.57 \frac{ft^2}{ft} + 12.57\ ft^2 = 327\ ft^2$$

Combine design rate with infiltration area to get flow (disposal) rate for drywell.

$$0.000053 \frac{ft}{sec} \times 327\ ft^2 = 0.0174 \frac{ft^3}{sec}$$

Volume of disposal based on various time frames are included below.

36 hours: 0.0174 CFS x 36 hours = 2,259 cubic feet of retained water disposed of.
24 hours: 0.0174 CFS x 24 hours = 1,506 cubic feet of retained water disposed of.

1 drywell(s) are required to drawdown mitigated volume in 36 hours.

Chamber diameter = 4 feet. Drywell rock shaft diameter = 4 feet.
Volume provided in each drywell with chamber depth of 25 feet and rock depth of 25 feet.

$$25\ ft \times 12.57\ ft^2 + 25\ ft \times 12.57\ ft^2 \times 40\ \% = 440\ ft^3$$

Bill De Jong, PE
Technical Engineer
Torrent Resources (CA), Inc.
909-915-9490

Torrent Resources (CA) Incorporated
9950 Alder Avenue
Bloomington, CA 92316

Phone 909-829-0740

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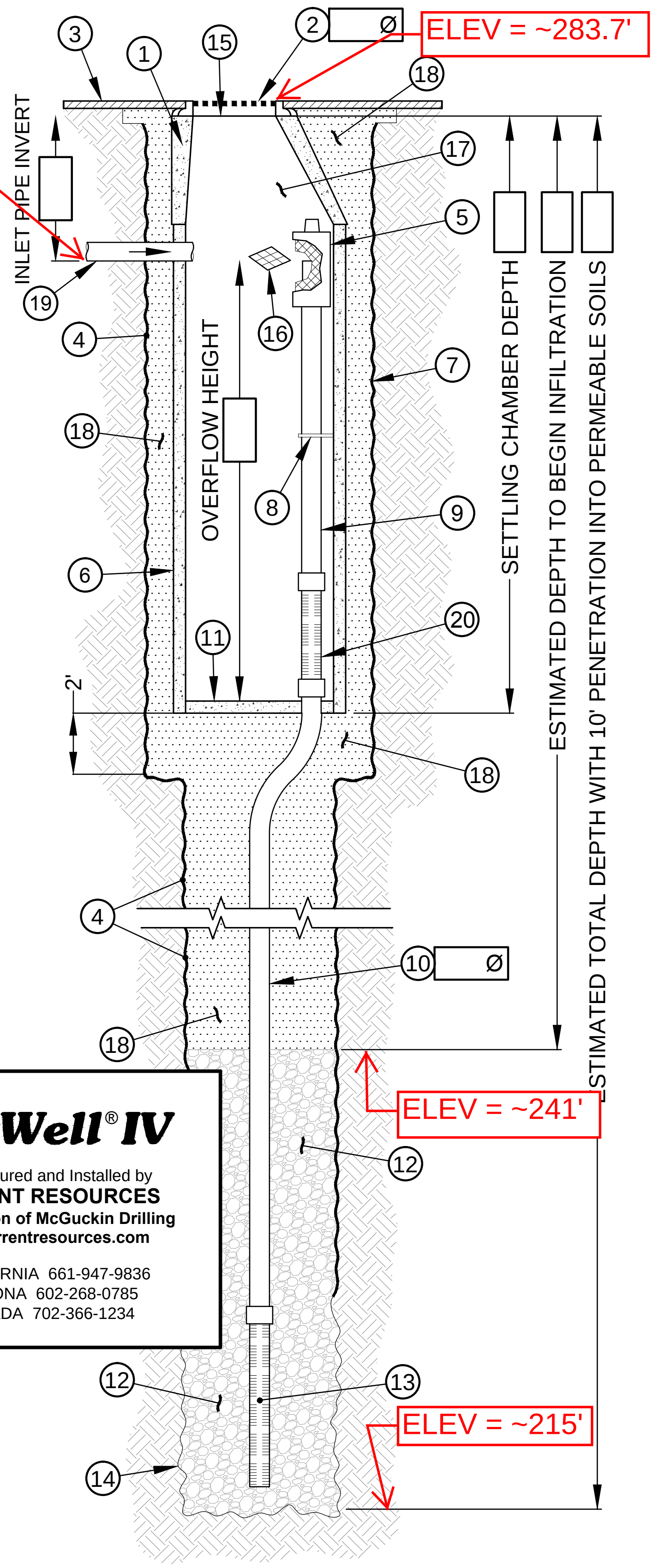
An Evolution of McGuckin Drilling

The MaxWell® IV Drainage System Detail And Specifications

ITEM NUMBERS

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **BOLTED RING & GRATE** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
3. **GRADED BASIN OR PAVING** (BY OTHERS).
4. NON-WOVEN GEOTEXTILE SLEEVE, MIRAFITM/ 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.
5. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.
6. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**.
7. **MIN. 6' Ø DRILLED SHAFT**.
8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
9. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
10. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
11. **BASE SEAL** - CONCRETE SLURRY OR GEOTEXTILE.
12. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
13. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.
14. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
15. **FABRIC SEAL** - U.V. RESISTANT GEOTEXTILE - **TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
16. **ABSORBENT** - HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO PER CHAMBER.
17. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE SETTLING CHAMBER DEPTH AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE OVERFLOW PIPE INLET.
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. **INLET PIPE** (BY OTHERS).
20. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT WRAPPED WITH NON WOVEN GEOTEXTILE FABRIC. 60" OVERALL LENGTH WITH TRI-B COUPLER.

ELEV = ~267.7'



The MaxWell® IV

Manufactured and Installed by
TORRENT RESOURCES
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www.torrentresources.com

CALIFORNIA 661-947-9836
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NEVADA 702-366-1234

AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ™ Trademark 1974, 1990, 2004

May 3, 2017

San Dieguito Engineering - Solana Beach, CA
Attn: Michael Wolfe

Re: Maxwell® IV Drainage System Calculations for **7th and Robinson - ATT (South) Ground Level - San Diego, CA**

Given:

Measured Infiltration Rate	4.61	in/hr
Safety Factor	2	
Mitigated Volume	765	ft^3
Required Drawdown Time	36	hours
Min. Depth to Infiltration	44	ft
Max. Drywell Depth	69	ft
Rock Porosity	40	%

Design:

Actual Depth to Infiltration	44	ft
Actual Drywell Bottom Depth	69	ft

Convert Measured Infiltration Rate from in/hr to ft/sec.

$$4.61 \frac{in}{hr} \times \frac{1\ ft}{12\ in} \times \frac{1\ hr}{3600\ sec} = 0.000107 \frac{ft}{sec}$$

Apply Safety Factor to get Design Rate.

$$0.000107 \frac{ft}{sec} \div 2 = 0.000053 \frac{ft}{sec}$$

A 4 foot diameter drywell provides 12.57 SF of infiltration area per foot of depth, plus 12.57 SF at the bottom.

For a 69 foot deep drywell, infiltration occurs between 44 feet and 69 feet below grade. This provides 25 feet of infiltration depth in addition to the bottom area. Total infiltration area is calculated below.

$$25\ ft \times 12.57 \frac{ft^2}{ft} + 12.57\ ft^2 = 327\ ft^2$$

Combine design rate with infiltration area to get flow (disposal) rate for drywell.

$$0.000053 \frac{ft}{sec} \times 327\ ft^2 = 0.0174 \frac{ft^3}{sec}$$

Volume of disposal based on various time frames are included below.

36 hours: 0.0174 CFS @ 36 hours = 2,259 cubic feet of retained water disposed of.
24 hours: 0.0174 CFS @ 24 hours = 1,506 cubic feet of retained water disposed of.

1 drywell(s) are required to drawdown mitigated volume in 36 hours.

Chamber diameter = 4 feet. Drywell rock shaft diameter = 4 feet.
Volume provided in each drywell with chamber depth of 20 feet and rock depth of 25 feet.

$$20\ ft \times 12.57\ ft^2 + 25\ ft \times 12.57\ ft^2 \times 40\ \% = 377\ ft^3$$

Bill De Jong, PE
Technical Engineer
Torrent Resources (CA), Inc.
909-915-9490

Torrent Resources (CA) Incorporated
9950 Alder Avenue
Bloomington, CA 92316

Phone 909-829-0740

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The MaxWell® IV Drainage System Detail And Specifications

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1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.

2. **BOLTED RING & GRATE** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.

3. **GRADED BASIN OR PAVING** (BY OTHERS).

4. NON-WOVEN GEOTEXTILE SLEEVE, MIRAFITM/ 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.

5. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.

6. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**.

7. **MIN. 6' Ø DRILLED SHAFT**.

8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.

9. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.

10. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.

11. **BASE SEAL** - CONCRETE SLURRY OR GEOTEXTILE.

12. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.

13. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.

14. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.

15. **FABRIC SEAL** - U.V. RESISTANT GEOTEXTILE - **TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.

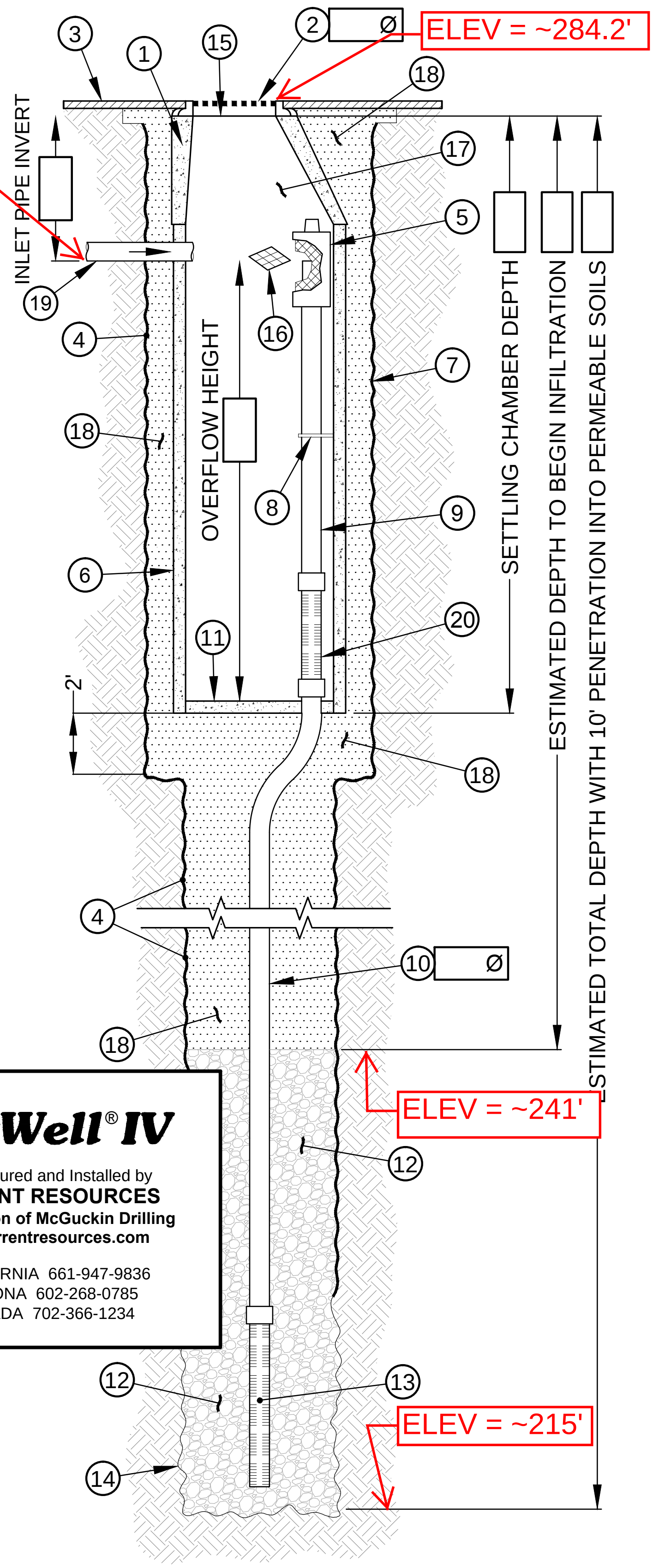
16. **ABSORBENT** - HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO PER CHAMBER.

17. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE SETTLING CHAMBER DEPTH AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE OVERFLOW PIPE INLET.

18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.

19. **INLET PIPE** (BY OTHERS).

20. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT WRAPPED WITH NON WOVEN GEOTEXTILE FABRIC. 60" OVERALL LENGTH WITH TRI-B COUPLER.



The MaxWell® IV

Manufactured and Installed by
TORRENT RESOURCES
An evolution of McGuckin Drilling
www.torrentresources.com

CALIFORNIA 661-947-9836
ARIZONA 602-268-0785
NEVADA 702-366-1234

AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

U.S. Patent No. 4,923,330 - ™ Trademark 1974, 1990, 2004

<table>
<tr><th colspan="2">Harvest and Use Feasibility Checklist</th><th colspan="2">Form I-7</th></tr>
<tr><td colspan="4">1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?
☒ Toilet and urinal flushing
☒ Landscape irrigation
☐ Other:_______________</td></tr>
<tr><td colspan="4">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.
[Provide a summary of calculations here]
MIXED USE ASSUMES 50 USERS
50 X 7 PER DAY = 350, THEN, 350 X 1.5 (36 HR DEMAND) = 525 CU-FT

LANDSCAPE DEMAND FROM TABLE B.3-1
LOW WATER USE = 390 GALLONS PER ACRE X 0.119 ACRES = 46 GALLONS = +/- 6 CU-FT

TOTAL = 525 CU-FT + 6 CU-FT = 531 CU-FT</td></tr>
<tr><td colspan="4">3. Calculate the DCV using worksheet B-2.1.
DCV = 1,390 (cubic feet)</td></tr>
<tr><td>3a. Is the 36 hour demand greater than or equal to the DCV?
☐ Yes / ☒ No ⇨
⇩</td><td colspan="2">3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?
☒ Yes / ☐ No ⇨
⇩</td><td>3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes
⇩</td></tr>
<tr><td>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.</td><td colspan="2">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.</td><td>Harvest and use is considered to be infeasible.</td></tr>
<tr><td colspan="4">Is harvest and use feasible based on further evaluation?
☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☒ No, select alternate BMPs.</td></tr>
</table>

Categorization of Infiltration Feasibility Condition		Form I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria 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: See Worksheet C.4-1 in Attachment 6 from Geo. 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	
Provide basis: See Worksheet C.4-1 in Attachment 6 from Geo. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 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	
Provide basis: See Worksheet C.4-1 in Attachment 6 from Geo. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
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	
Provide basis: See Worksheet C.4-1 in Attachment 6 from Geo. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration 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		

*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 the City Engineer to substantiate findings

Form I-8 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: See Worksheet C.4-1 in Attachment 6 from Geo. 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: See Worksheet C.4-1 in Attachment 6 from Geo. 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.			

Form I-8 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	
Provide basis: See Worksheet C.4-1 in Attachment 6 from Geo. 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.			
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	
Provide basis: See Worksheet C.4-1 in Attachment 6 from Geo. 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.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. 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.		

*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 the City Engineer to substantiate findings

85TH PERCENTILE ISO

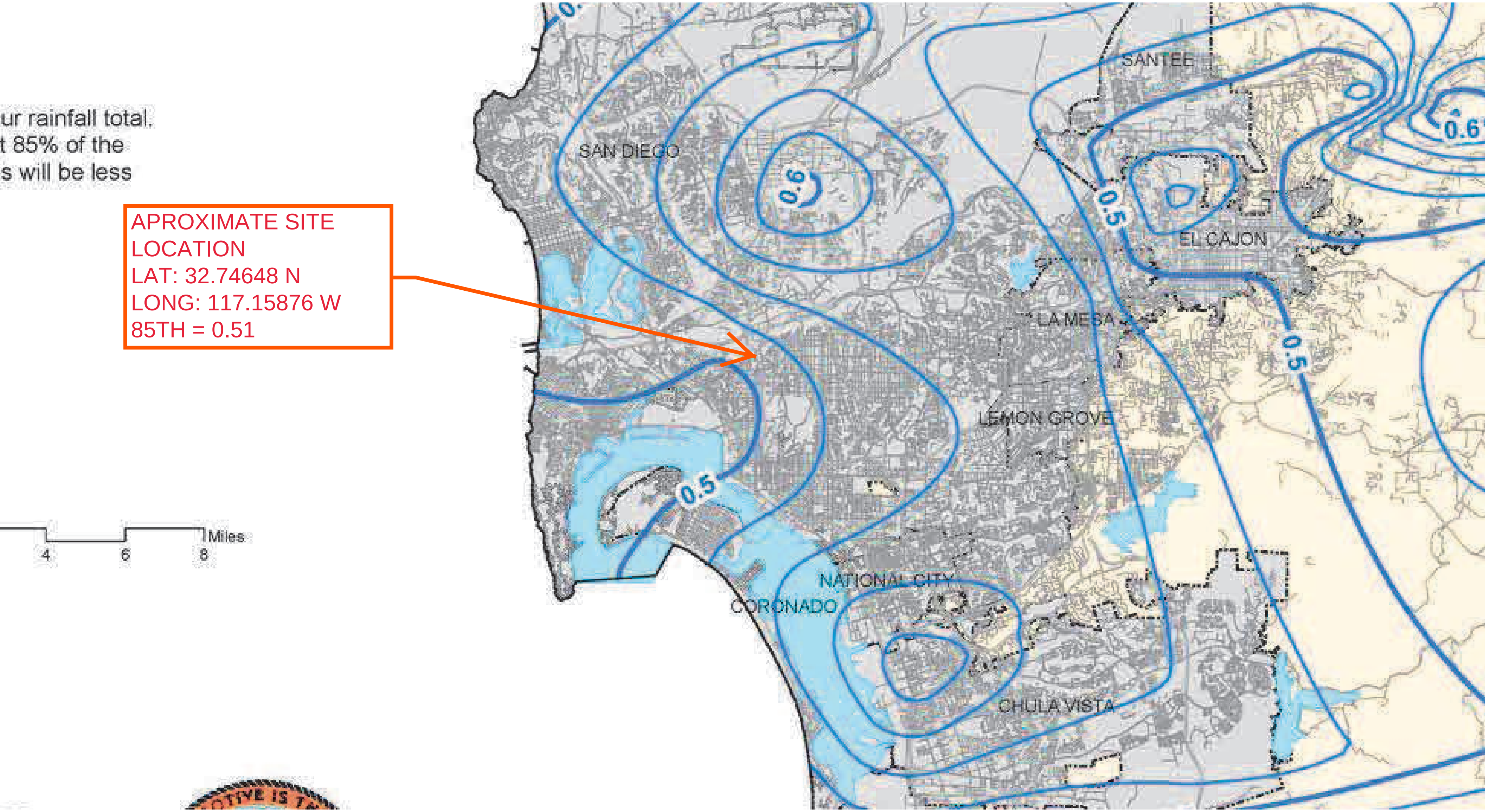


Table 2-3. BENEFICIAL USES OF COASTAL WATERS

Coastal Waters	Hydrologic Unit Basin Number	BENEFICIAL USE														
		IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
Pacific Ocean		●	●	●	●	●	●		●	●	●	●	●	●		●
Dana Point Harbor		●	●	●	●	●			●	●	●		●	●		●
Del Mar Boat Basin		●	●	●	●	●			●	●	●		●	●		●
Mission Bay		●		●	●	●		●	●	●	●		●	●		●
Oceanside Harbor		●	●	●	●	●			●	●	●		●	●		●
San Diego Bay [1, 3]		●	●	●	●	●	●	●	●	●	●		●	●		●
Coastal Lagoons																
Tijuana River Estuary	11.11			●	●	●	●	●	●	●	●		●	●		●
Mouth of San Diego River	7.11			●	●	●		●	●	●	●		●	●		●
Famosa Slough and Channel	7.11			●	●	●		●	●	●	●		●	●		●
Los Penasquitos Lagoon [2]	6.10			●	●		●	●	●	●	●		●	●		●
San Dieguito Lagoon	5.11			●	●		●	●	●	●	●		●	●		
Batiquitos Lagoon	4.51			●	●		●	●	●	●	●		●	●		
San Elijo Lagoon	4.61			●	●		●	●	●	●	●		●	●		
Agua Hedionda Lagoon	4.31	●		●	●	●	●	●	●	●	●	●	●	●		●

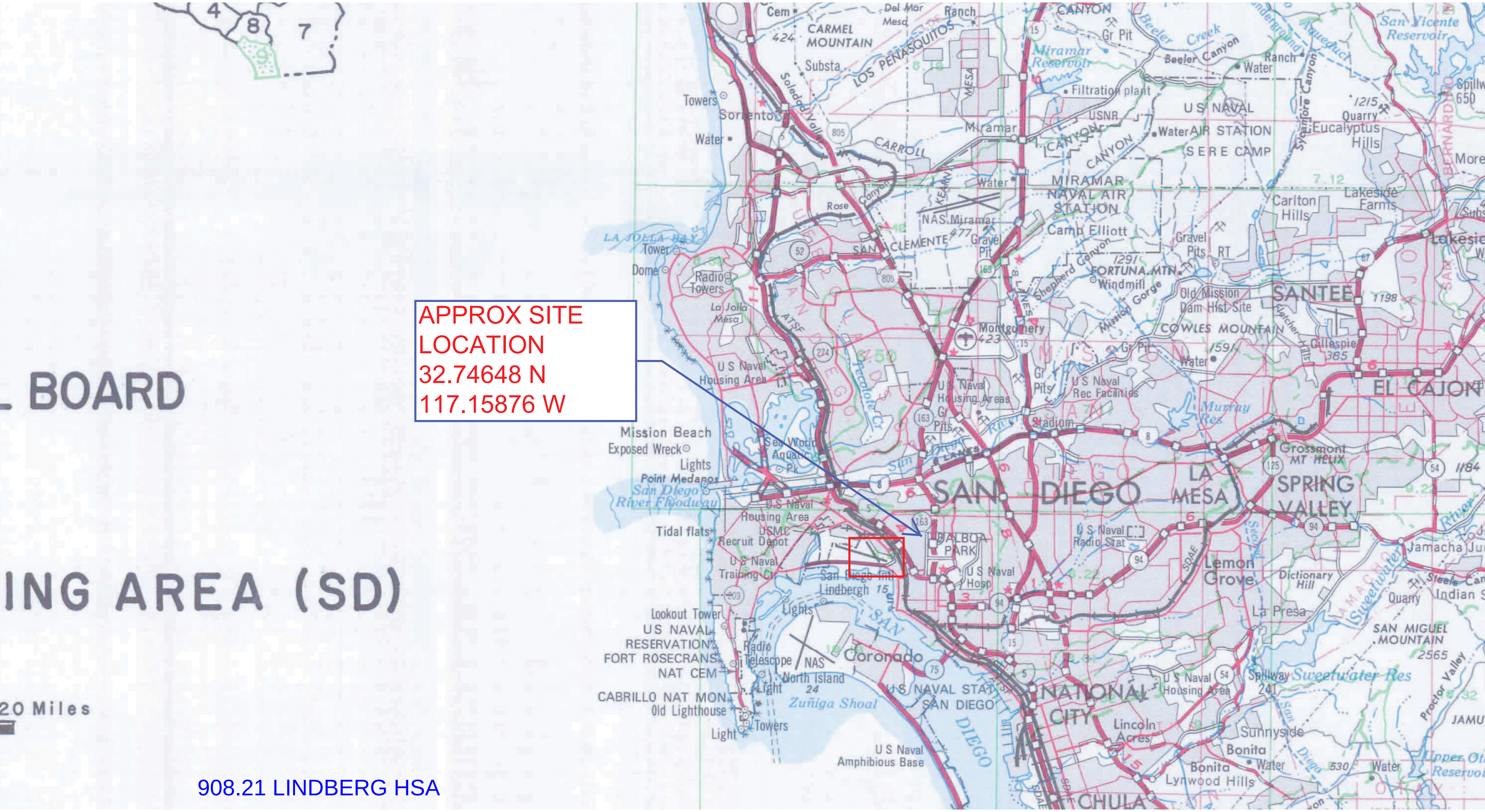
[1] Includes the tidal prisms of the Otay and Sweetwater Rivers.

[2] Fishing from shore or boat permitted, but other water contact recreational (REC-1) uses are prohibited.

[3] The Shelter Island Yacht Basin portion of San Diego Bay is designated as an impaired water body for dissolved copper pursuant to Clean Water Act section 303(d). A Total Maximum Daily Load (TMDL) has been adopted to address this impairment. See Chapter 3, Water Quality Objectives for Pesticides, Toxicity and Toxic Pollutants and Chapter 4, Total Maximum Daily Loads.

● Existing Beneficial Use

REGION 9 BASIN MAP LOCATION



908.21 LINDBERG HSA

PUEBLO SAN DIEGO HYDROLOGIC UNIT

SAN DIEGO MESA HA

LINDBERGH HSA

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.

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Project Name: 635 Robinson Avenue PTS522075

Indicate which Items are Included:

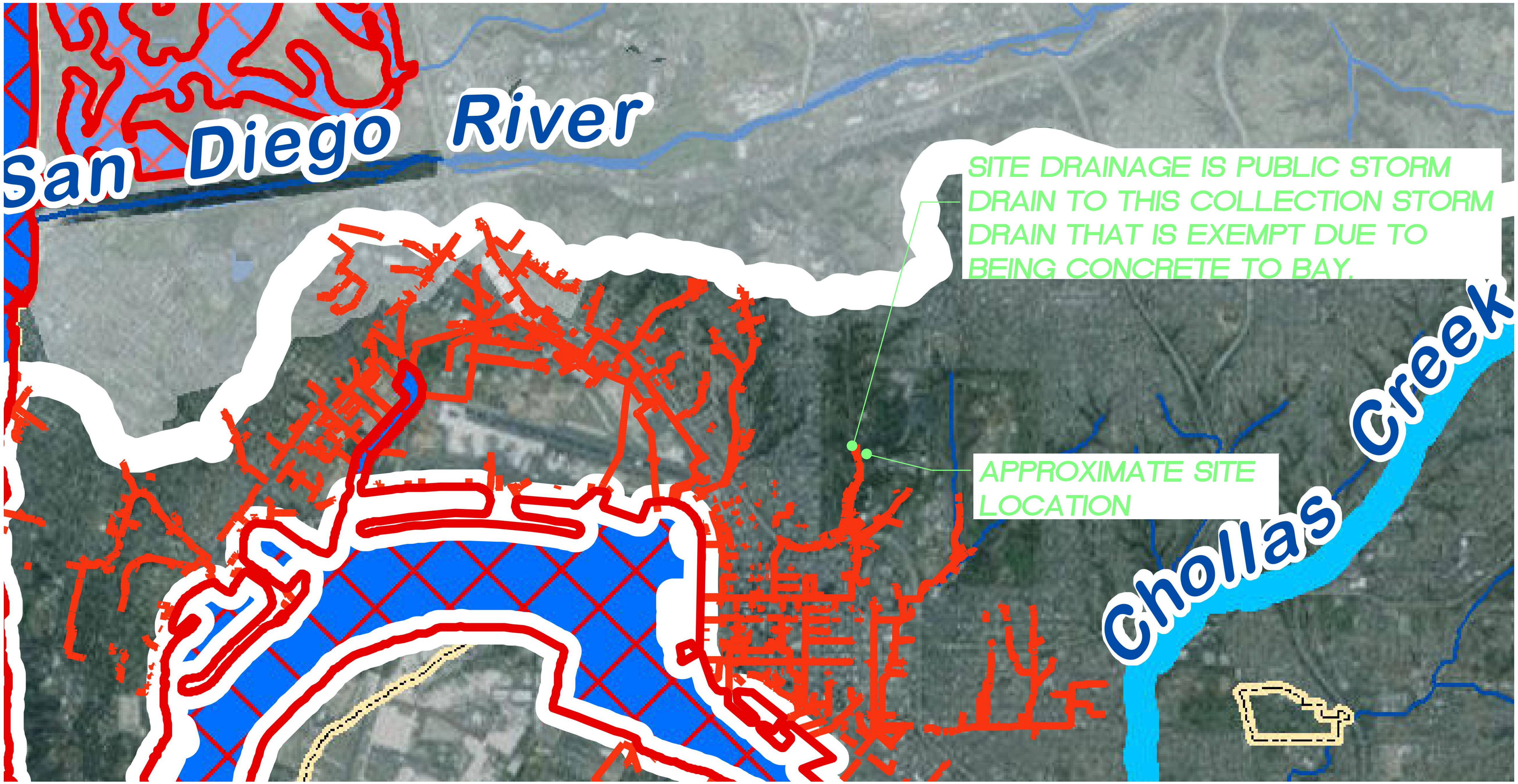
Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☐ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 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.	◉ Not Performed ○ Included ○ 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	◉ Included ○ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	○ Included ◉ Not required because BMPs will drain in less than 96 hours

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)

ATTACHMENT 2a – HYDROMODIFICATION EXEMPTION EXHIBIT



SDE 5709

PREPARED BY:

SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345–1149

SOURCE NOTE:

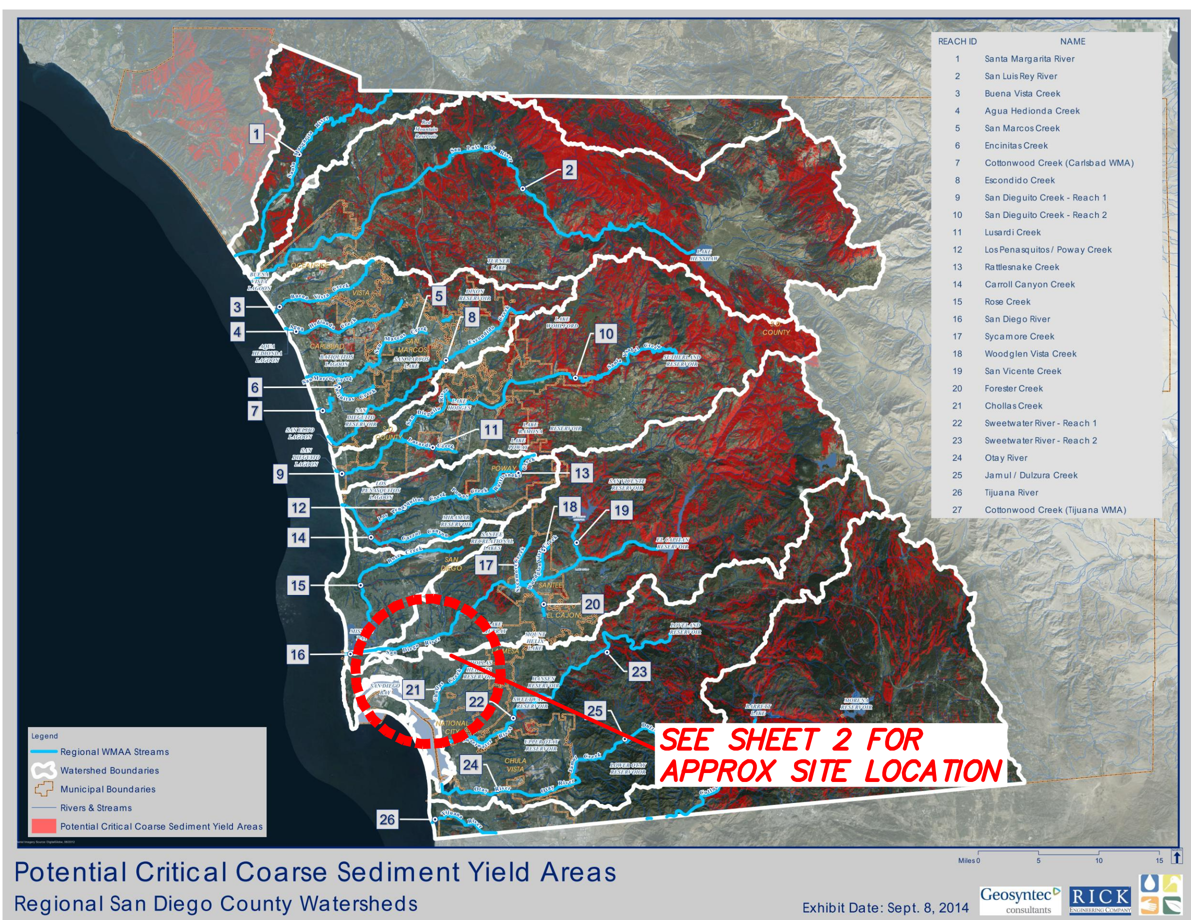
THIS EXHIBIT IS A SITE SPECIFIC PORTION OF THE REGIONAL SAN DIEGO COUNTY WATERSHEDS, RECEIVING WATERS AND CONVEYANCE SYSTEM EXEMPTION FROM HYDROMODIFICATION MANAGEMENT REQUIREMENTS MAP DATED SEPTEMBER 8, 2014 FROM THE WMAA OF SAN DIEGO COUNTY.

NOTE: EXHIBIT NOT TO SCALE

Legend

- Regional WMAA Streams
- Watershed Boundaries
- Municipal Boundaries
- Rivers & Streams
- Potential Critical Coarse Sediment Yield Areas

LEGEND FROM REGIONAL MAP



REGIONAL MAP (NOT TO SCALE)

17	Sycamore Creek
18	Woodglen Vista Creek
19	San Vicente Creek
20	Forester Creek
21	Chollas Creek
22	Sweetwater River - Reach 1
23	Sweetwater River - Reach 2
24	Otay River

REACH ID FROM REGIONAL MAP

SDE 5709

SOURCE NOTE:

THIS EXHIBIT IS A SITE SPECIFIC PORTION OF THE REGIONAL SAN DIEGO COUNTY WATERSHEDS, POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS MAP DATED SEPTEMBER 8, 2014 FROM THE WMAA OF SAN DIEGO COUNTY.

NOTE: EXHIBIT NOT TO SCALE

PREPARED BY:

SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345-1149

ATTACHMENT 2b – MANAGEMENT OF CRITICAL COARSE SEDIMENT YIELD AREAS SHEET 2 OF 2

SDE 5709

PREPARED BY:

SAN DIEGUITO ENGINEERING, INC.
462 STEVENS AVENUE, SUITE 305
SOLANA BEACH, CALIFORNIA 92075
(858) 345-1149

SOURCE NOTE:

THIS EXHIBIT IS A SITE SPECIFIC PORTION OF THE REGIONAL SAN DIEGO COUNTY WATERSHEDS, POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS MAP DATED SEPTEMBER 8, 2014 FROM THE WMAA OF SAN DIEGO COUNTY.

NOTE: EXHIBIT NOT TO SCALE

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

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Project Name: **635 Robinson Avenue PTS522075**

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	◉ Included ○ Not Applicable

Project Name: 635 Robinson Avenue PTS522075

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).

The City of SAN DIEGO

RECORDING REQUESTED BY:
THE CITY OF SAN DIEGO AND
WHEN RECORDED MAIL TO:

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92614

(THIS SPACE IS FOR RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSORS PARCEL NUMBER:	PROJECT NUMBER:
	312-290-05-00	522075

This agreement is made by and between the City of San Diego, a municipal corporation [City] and Greystar, the owner or duly authorized representative of the owner [Property Owner] of property located at

635 Robinson Avenue, San Diego, California 92103
(Property Address)

and more particularly described as: Lots 25 through 36 Block 4, of Crittenden Addition Map No. 303, filed in the office of the County Recorder of San Diego County, October 5, 1886.
(Legal Description of Property)

in the City of San Diego, County of San Diego, State of California.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s): 522075.

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s): 522075.

Continued on Page 2

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): 522075 .

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 SWQMP and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s) 522075 .

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 Exhibit(s): A through C

____
(Owner Signature)

____
(Print Name and Title)

____
(Company/Organization Name)

____
(Date)

THE CITY OF SAN DIEGO

APPROVED:

____
(City Control Engineer Signature)

____
(Print Name)

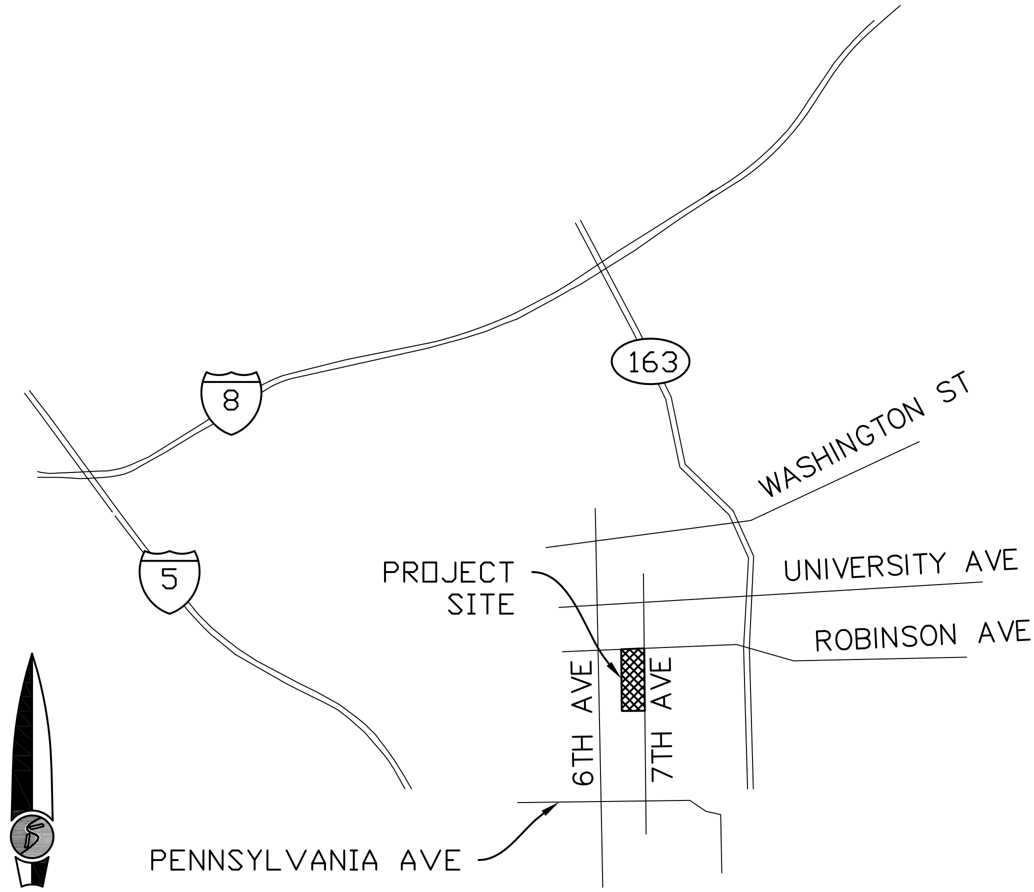
____
(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDGMENTS PER CIVIL CODE SEC. 1180 ET.SEQ.

Reset Button Page 2

EXHIBIT A

VICINITY MAP AND LEGAL DESCRIPTION



VICINITY MAP

NTS

SITE ADDRESS:

635 ROBINSON AVENUE
SAN DIEGO, CALIFORNIA 92103

A.P.N.:

452–103–61–00

LEGAL DESCRIPTION:

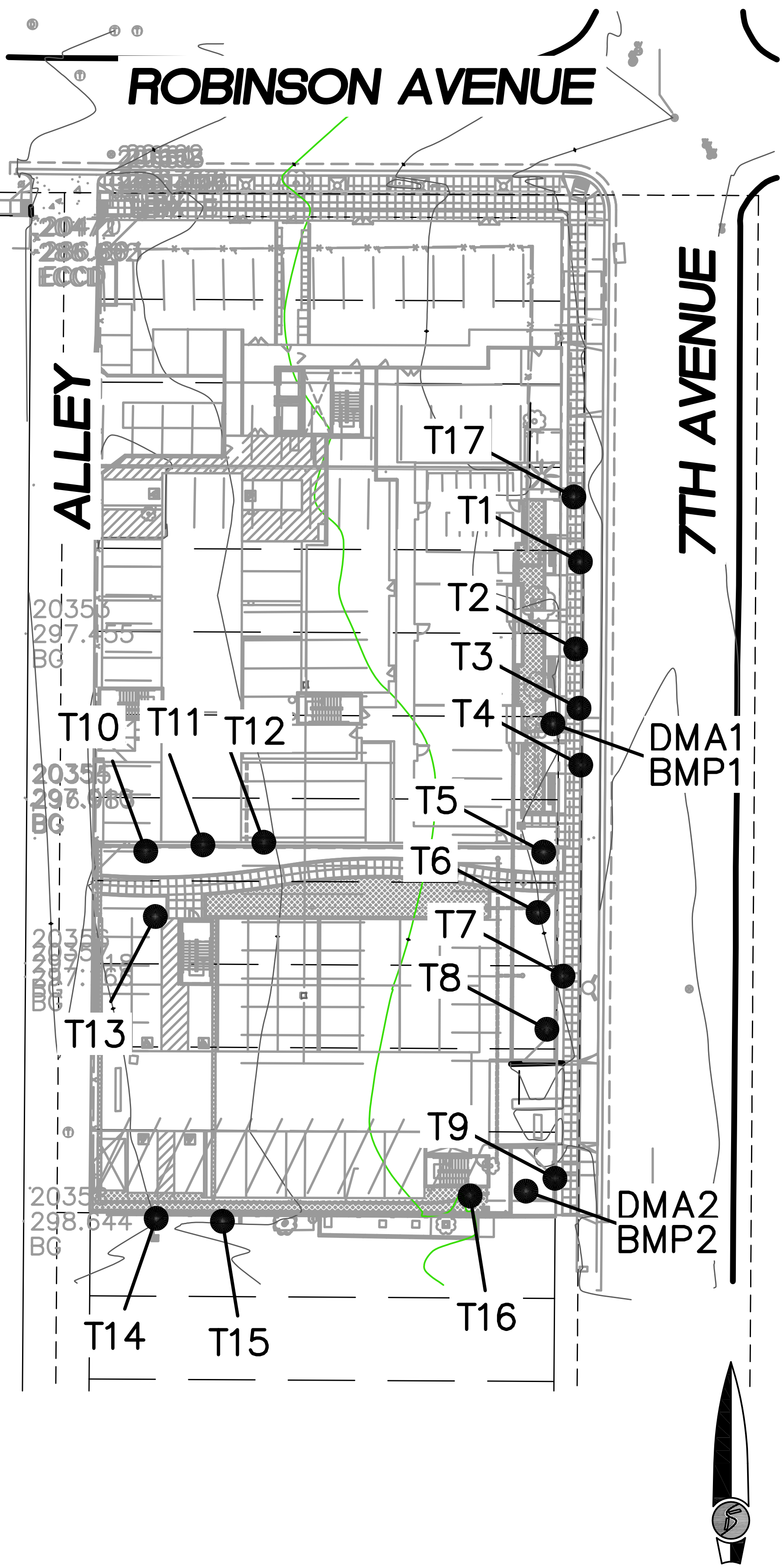
LOTS 25–36, BLOCK 4 OF CRITTENDEN ADDITION ACCORDING TO MAP 303 FILED IN O.R. WITH THE OFFICE OF THE COUNTY RECORDER OCTOBER 5, 1886.

PROJECT NO: 522075

SDE 5709

EXHIBIT B

BMP LOCATION MAP



APPROXIMATE TREE LOCATIONS	
T1	32.74648 N 117.15876 W
T2	32.74648 N 117.15876 W
T3	32.74648 N 117.15876 W
T4	32.74648 N 117.15876 W
T5	32.74648 N 117.15876 W
T6	32.74648 N 117.15876 W
T7	32.74648 N 117.15876 W
T8	32.74626 N 117.15852 W
T9	32.74611 N 117.15851 W
T10	32.74619 N 117.15891 W
T11	32.74619 N 117.15886 W
T12	32.74619 N 117.15881 W
T13	32.74618 N 117.15851 W
T14	32.74690 N 117.15893 W
T15	32.74690 N 117.15885 W
T16	32.74690 N 117.15859 W
T17	32.74663 N 117.15852 W
DMA1 BMP1	32.74648 N 117.15876 W
DMA2 BMP2	32.74611 N 117.15851 W

PROJECT NO: 522075

1″=50′

SDE 5709

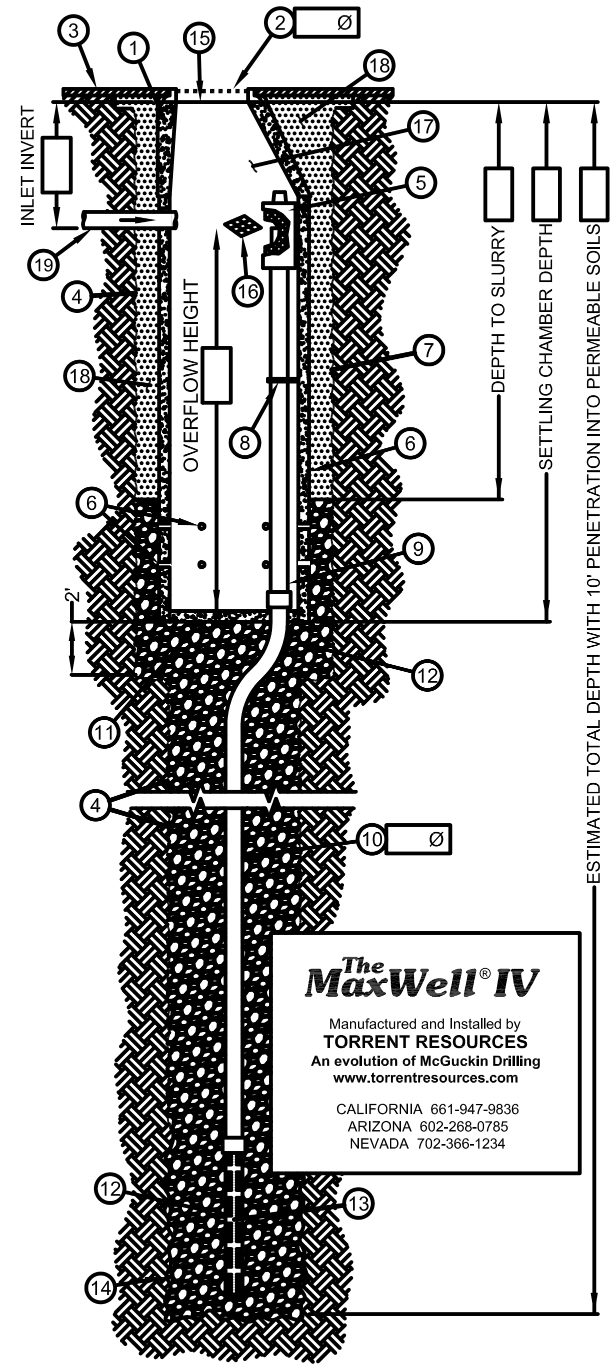
EXHIBIT C

DETAILS

The MaxWell® IV Drainage System Detail And Specifications

◯ ITEM NUMBERS

1. **MANHOLE CONE -** MODIFIED FLAT BOTTOM.
2. **BOLTED RING & GRATE -** DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
3. **GRADED BASIN OR PAVING** (BY OTHERS).
4. NON-WOVEN GEOTEXTILE SLEEVE, MIRAFITM/ 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.
5. **PUREFLO® DEBRIS SHIELD -** ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.
6. **PRE-CAST LINER -** 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**. **EIGHT (8) PERFORATIONS PER FOOT, 2 ROWS MINIMUM.**
7. **MIN. 6' Ø DRILLED SHAFT**.
8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
9. **OVERFLOW PIPE -** SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
10. **DRAINAGE PIPE -** ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
11. **BASE SEAL -** GEOTEXTILE OR CONCRETE SLURRY.
12. **ROCK -** WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
13. **FLOFAST® DRAINAGE SCREEN -** SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.
14. **MIN. 4' Ø SHAFT -** DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
15. **FABRIC SEAL -** U.V. RESISTANT GEOTEXTILE **- TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
16. **ABSORBENT -** HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO PER CHAMBER.
17. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE SETTLING CHAMBER DEPTH AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE OVERFLOW PIPE INLET.
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. **INLET PIPE** (BY OTHERS).



AZ Lic. ROC070465 A, ROC047067 B-4, ADWR 363
CA Lic. 528080, C-42, HAZ.
NV Lic. 0035350 A - NM Lic. 90504 GF04

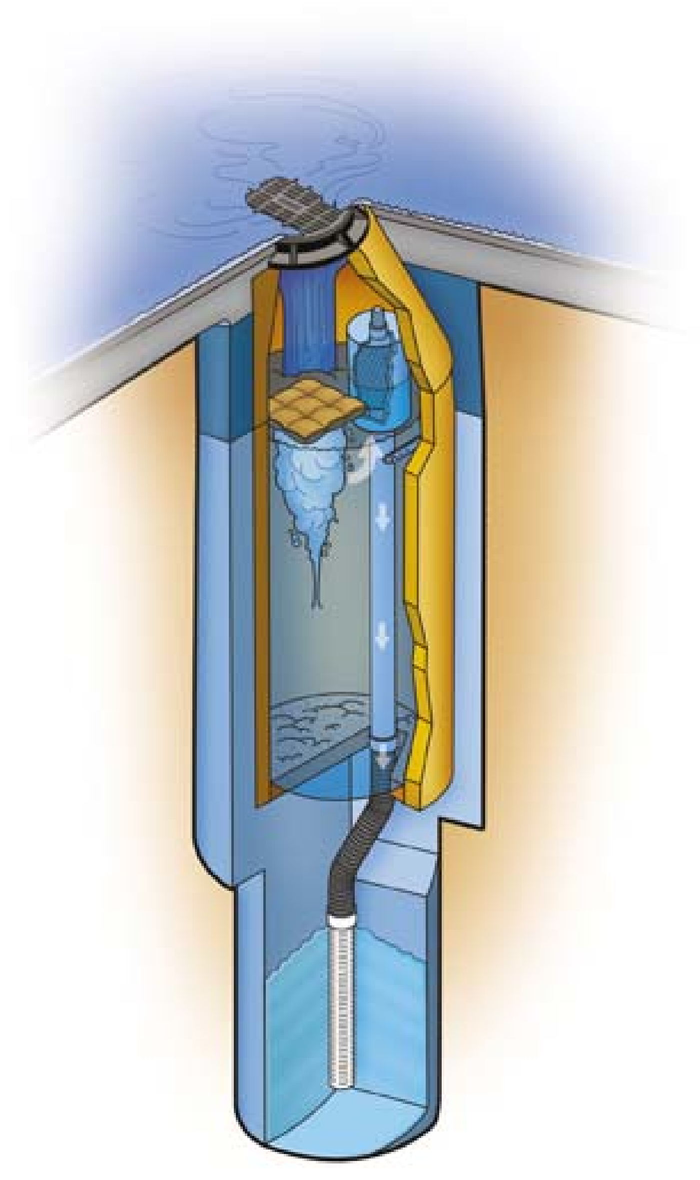
U.S. Patent No. 4,923,330 - TM Trademark 1974, 1990, 2004

PROJECT NO: 522075

SDE 5709

OPERATION AND MAINTENANCE MANUAL

The ***MaxWell® IV*** Drainage System



TORRENT RESOURCES

Torrent Resources Incorporated

The watermark for drainage solutions.®

Table of Contents

Company Overview

Torrent Resources Incorporated…an Employee-Owned Company.

First licensed as a drainage contractor, Torrent Resources has evolved into a full-service; drainage solutions partner to address ever-growing customer needs in California, Arizona, New Mexico, Nevada and Texas. The company is headquartered in Phoenix, with an additional office in Fontana, California.

Since 1972, Torrent Resources has set the standard in design and construction of water drainage systems for the mitigation of excess surface water. In 1974, the company revolutionized the industry with its exclusive, patented ***MaxWell***® systems – products unmatched in efficiency and reliability by any other type of stormwater disposal application. To date, more than 80,000 MaxWell drywells have been installed throughout the western United States.

General Purpose

With a greater awareness of the need to address the quality of urban stormwater runoff, on-site drainage systems used for the stormwater elimination have come under closer scrutiny. One such system is the drywell which has been used previously throughout the United States to dispose of retained or surplus surface water. The early versions of this structure were not much more than holes in the ground filled with rocks. This meant that maintenance on these primitive types was impossible, and inundation from silt-loading quickly led to clogging and failure of the drywells.

Fortunately, the introduction of the MaxWell concept provided a solution to this problem by incorporating a deep settling basin to trap out the suspended solids for easy removal during routine cleaning. To that end, all MaxWell drainage systems are designed to remove not only sediment and debris, but also floating hydrocarbons and organic compounds prior to recharging the treated stormwater back into the sub-grade. The water is then further polished by the soil envelope as it passes through the vadose zone to eventually replenish the resource.

The MaxWell is a treatment and infiltration BMP, which recharges cleaned stormwater back into the ground to recharge the aquifer beneath. In most cases, the system will be utilized in one of two applications: mitigation of the entire amount of retained water from a rainfall event of some historic frequency and duration, in which case the product would be considered volume-based; or, removal of only first flush constituents from an incremental portion of a larger rainfall event. In the latter, the system would be considered a flow-based BMP.

The system itself is <u>not intended to provide storage volume</u>, but instead is designed to gradually dispose of accumulated stormwater to ensure maximum pre-treatment efficiency. Therefore, in both applications described above, a means of storing the required capture volume should be provided separately. This can be done in shallow surface basins or planter areas with the drywells incorporated into the low spots, or by interconnecting the drainage systems to underground tanks or vaults. This allows the minimum number of drainage systems to be used to percolate the water into the sub soils, using the total allowable draw-down timeframe. More systems could be used in lieu of storage to increase processing rates, but this is generally not as cost-effective as providing a means or retaining the required volume.

MaxWell® IV Description

Initial treatment is provided in the deep sump of the MaxWell IV, which provides 1,000 gallons of volume to capture sediment and trash. Depending upon the permeability of the soils, the pilot-hole excavations for the drywells may be up to 120 feet deep.

The typical MaxWell IV processes incoming stormwater for the removal of suspended solids and floating hydrocarbons (gasoline and diesel). These chambers are constructed of 4000 PSI pre-cast concrete liner segments that are 48-inches I.D., 54-inches O.D. with a 3-inch wall thickness. In constructing the chambers, these sections are carefully aligned, centered, and stacked in the borehole to maximize bearing surfaces.

Next, a corrugated HDPE drainage pipe with a slotted Schedule 40 PVC drainage screen attached to the lower end is inserted into the pilot-hole excavation. This component is then capped and suspended slightly off the bottom of the borehole. Clean, washed aggregate sized between 3/8" to 1 ½" to best complement site soil conditions is utilized for the backfill material surrounding the drainage pipe in the lower excavation of the main well. The pre-cast concrete chambers are then erected in the 72-inch diameter reamed portions of the upper excavation.

An overflow pipe constructed of Schedule 40 PVC is installed in the main chamber, and is mated to the drainage pipe with a coupling under the chamber bottom. This vertical pipe is supported by a fusion-bonded epoxy-coated galvanized steel bracket attached to the liner wall. Our ***PureFlo***® Debris Shield equipped with an internal screen is then fitted onto the top of the overflow inlet. This cylindrical shield is approximately 24-inches in length, and is fabricated from rolled 16-gauge galvanized steel. The component is coated with fusion-bonded epoxy, and fitted with an anti-siphon vent. In operation, the shield forces water to be drawn into the system from several inches beneath the surface, effectively isolating and containing floating trash, paper, debris and pavement oils within the chambers. The internal screen effectively filters out suspended material, and the vent prevents floating debris from being sucked into the overflow pipe as the water level inside the chamber subsides.

The chamber is equipped with a hydrophobic floating absorbent pillows, which will remove a wide range of hydrocarbons and organic liquids. The sponges are 100% water repellant, and literally "wick" floating petrochemical compounds from the surface of the water. Each pillow has a removal capacity of at least 128 ounces to accommodate effective, long-term treatment.

At the surface of the ground, the inlet structure will be equipped with a 24" or 30" diameter cast-iron grate and ring assembly capable of handling H-20 loads. See Appendix 1-A for MaxWell detail.

Installation

Once the locations of any utilities have been identified, the exact locations of the drywell on the jobsite is laid out and identified by an onsite survey team. When installed with standard inverts, the layout requires a center stake for the chamber, with a 10' offset.

The installation begins with the excavation of a 48" pilot-hole boring down to the bottom of the proposed gravel pack. The upper part of this excavation, where the chamber will sit, must then be enlarged to 72" in order to provide sufficient space to stack the liner segments and place the aggregate backfill in the annular space around the outside of the chamber.

It is vital to the function of the finished drainage system that a 10' minimum penetration into permeable soil is achieved. As the drilling progresses and each load of cuttings is discharged, the composition of the drainage soils is assessed for suitable permeability. Optimum permeability is found in soils comprised of clean sand, gravel, and small cobbles, with an absence of silt, clay or excessive fines. However, other materials may possess acceptable transmissibility, such as clean sand or decomposed granite.

When the drilling is completed, the drilling crew will leave the site protected by covering the open holes with steel plates, and constructing a berm around the immediate well site. Barricades and flagging are additionally utilized to protect the drilled shafts after the excavation is complete. A construction crew will then arrive within a day or two to finish the installation process.

The actual construction sequence begins with pulling the plates back far enough to allow the placement of a setting platform over the first open boring. The first component lowered into the excavation is the slotted drainage screen, connected to the lower end of the drainage pipe. The material used for the drainage pipe is heavy-duty ADS Highway Grade corrugated polyethylene. This HDPE drainage pipe is lowered into position, and held slightly off the bottom of the pilot-hole. The pipe is then capped and suspended by a chain, which has been secured to the setting platform above the excavation.

As the fabrication progresses, the protective steel plates are pulled completely away so that there is access for the backfill operation. A skip loader is utilized to place the gravelpack into the entire length of the 48-inch pilot hole around the suspended drainage pipe. Next, the lower perforated section of 48-inch precast liner for the main well is lowered into place within the enlarged 6-foot diameter excavation. Additional liner segments are carefully aligned and stacked in the enlarged portion of the shaft to create the settling chamber of the system. The last section to be placed at grade is a modified manhole cone. The opening in the manhole cone is covered to prevent the accidental introduction of gravel as the upper excavation is backfilled with this same washed, graded aggregate.

In order to prevent subsidence and lock all of the components in place, a 1-sack slurry mixture is used to backfill the upper 5' of annular space and around the cone. This material effectively encapsulates the components and exceeds the compaction of native soil. With the chamber completed, the interior components are installed. The overflow pipe is lowered into position in the main well chamber as assembly progresses.

After securing the grate to the cast-iron ring, a layer of ultraviolet-resistant geotextile fabric is applied over the grate. This UV-resistant fabric layer is banded to the grated inlet, and is intended to prevent incidental introduction of trash or debris before the well goes into service. This fabric will be removed by the General Contractor after final landscaping and paving are completed. Premature fabric removal could result in system damage and may void some, or all warranty conditions.

The metal grates and covers used are embossed with “Torrent Resources”, the MaxWell trade name, and the words “Storm Water Only” as a general reminder to the public as to the intended usage of the structure.

The final step in the installation process is the application of a mortar mix to affix the ring and grate assemblies securely to the manhole cone. This completes the construction sequence.

MaxWell Operation

Influent stormwater enters the system either through the grate at the ground surface or through a piped inlet. Upon entering the drywell chamber, stormwater will accumulate, giving silt and other heavy particles a chance to settle. A vented, screened, and shielded inlet ensures containment of floating debris within the chamber and elimination of petroleum constituents through the floating absorbent pillows. The system is drained as water rises under the PureFlo™ Debris Shield, and spills into the top of the overflow pipe. The drainage assembly returns the cleaned water to the surrounding soil through the FloFast™ Drainage Screen.

All MaxWell IV Systems are equipped with bolted, theft-deterrent cast iron grates as standard security features. Special inset castings are available for use in landscaped applications, which are resistant to loosening from accidental impact. Machined mating surfaces, and “Storm Water Only” wording are standard on these components.

Maintenance

The responsible property owner, such as a Property Management Company or Homeowners Association, is responsible for maintaining the drywell(s) after development.

Standing water problems are usually caused by inadequate performance of the existing drainage systems on the property. Reasons are varied but may be due to system aging, reduced soil permeability, inefficient or outdated design, pavement settlement, ineffective site maintenance, property expansions and additions, or changed property usage.

If a drywell is draining slowly or water stands on the surface for longer than regulations allow, debris may simply be blocking the inlet. The maintenance guidelines begin with the performance of an annual inspection which will include assessing the need for cleaning, and inspecting the functional and structural continuity of the system. At the same time, surface aspects of the drainage way are evaluated for evidence of staining or standing water.

Cleaning with a truck-mounted hydro-vactor (see below) is recommended when silt and sediment are found to occupy 15% or more of the original effective settling capacity of the inlet chamber. The maintenance operation utilizes air and high-pressure water to dislodge this built-up material, which is then suctioned through a piping system into the vactor truck and disposed of off-site.

Inlet grates and covers are removed for this operation, and all filters and screens are serviced during this procedure. At the same time, any obstructions or accumulated debris in remote inlets and connecting piping is removed by jet-rodding. The cleaning operation also involves replacement of the floating absorbent pillows and changing out the filter fabric at the bottom of the chambers, if so equipped. If there are no obvious blockages noted during the inspection procedure, it is possible that a thorough cleaning may restore the well to optimal service.

After the initial cleaning, most systems generally will not require subsequent cleaning for 3-5 years. If afforded reasonable maintenance practices, our records indicate that our MaxWell Drywells will provide many years of efficient, reliable service.

Typical Hydrovactor Truck used for Drywell Maintenance

APPENDIX
1-A

The MaxWell® IV Drainage System Detail And Specifications

NOTES

1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **MOISTURE MEMBRANE** - 6 MIL. PLASTIC. APPLIES ONLY WHEN NATIVE MATERIAL IS USED FOR BACKFILL. PLACE MEMBRANE SECURELY AGAINST ECCENTRIC CONE AND HOLE SIDEWALL.
3. **BOLTED RING & GRATE** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
4. **GRADED BASIN OR PAVING** (BY OTHERS).
5. **STABILIZED BACKFILL** - 1 SACK SLURRY.
6. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED.**
7. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS TO **MAXIMIZE BEARING SURFACE**.
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9. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
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12. **BASE SEAL** - GEOTEXTILE OR CONCRETE SLURRY.
13. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
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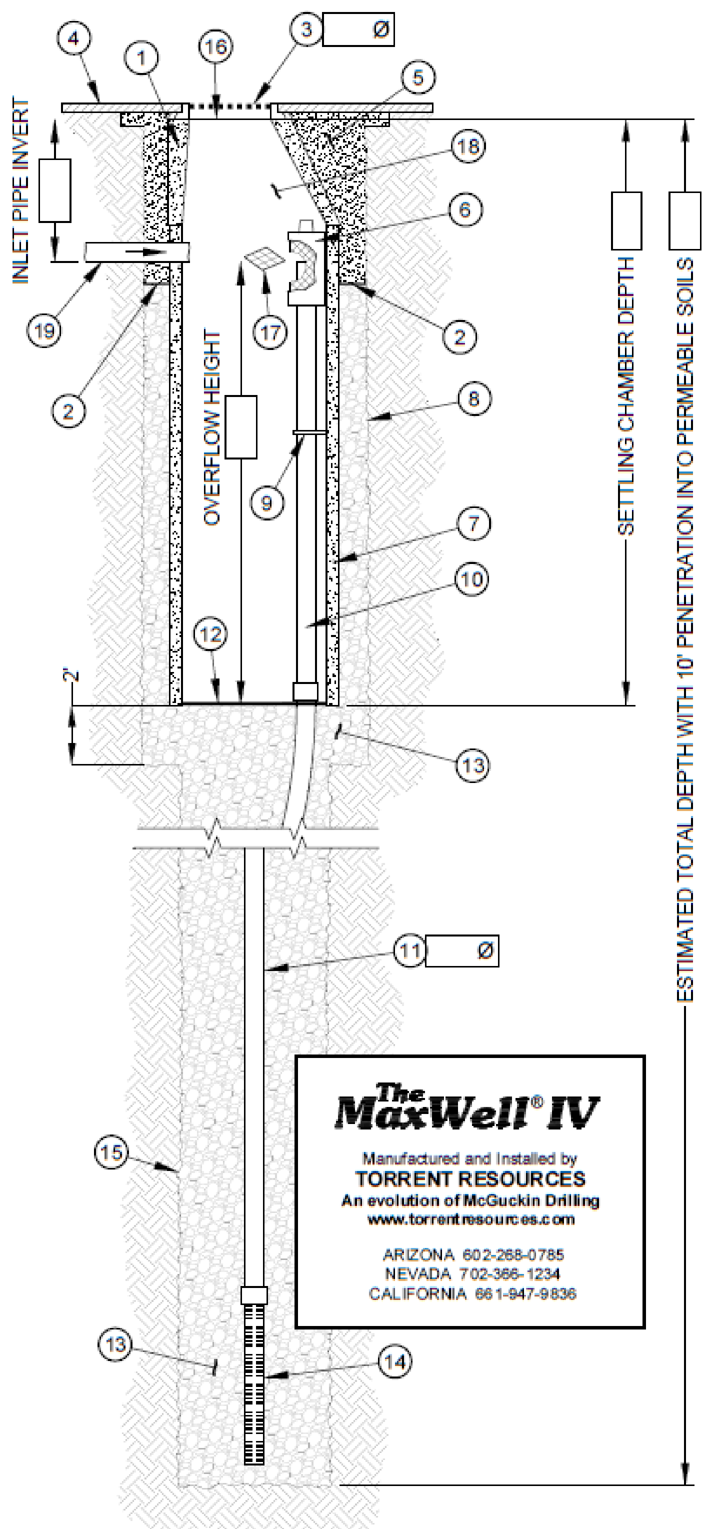
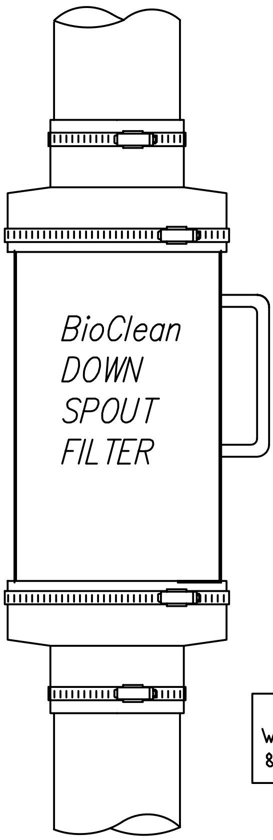
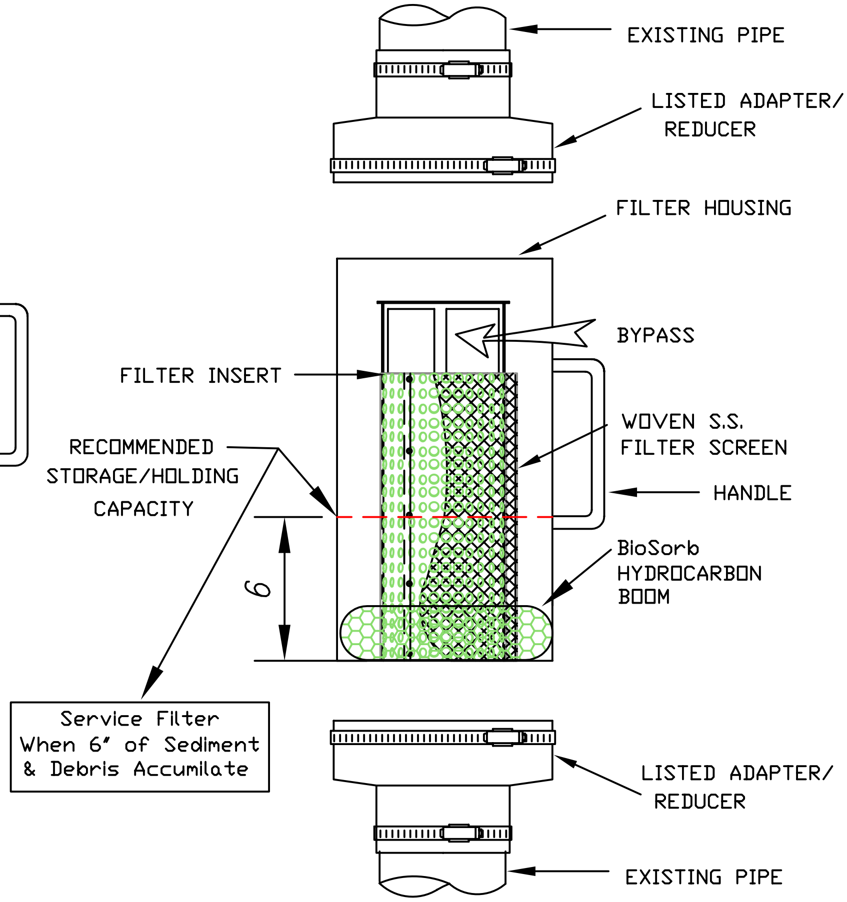


SERVICE MANUAL
(Cleaning Procedures)

Bio Clean DOWNSPOUT FILTER
Screen Type With Hydrocarbon Boom





TOOLS AND EQUIPMENT NEEDED:

DETAIL OF PARTS

1. Medium size flat scred driver
2. BioSorb hydrocarbon boom. 25-1/2" X 2" dia.
   (Call Bio Clean to order)
3. Trash container or bag
4. Wooden dowel approx. 3' x 1/2' dia.

P.O. BOX 869, Oceanside, Ca. 92049
(760) 433-7640 Fax (760) 433-3176
www.biocleanenvironmental.net

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
P.O. BOX 869, Oceanside, Ca. 92049
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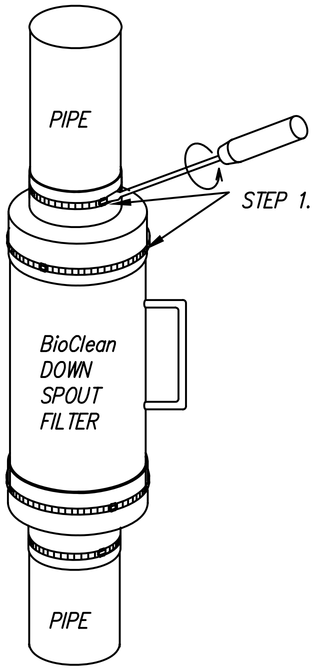
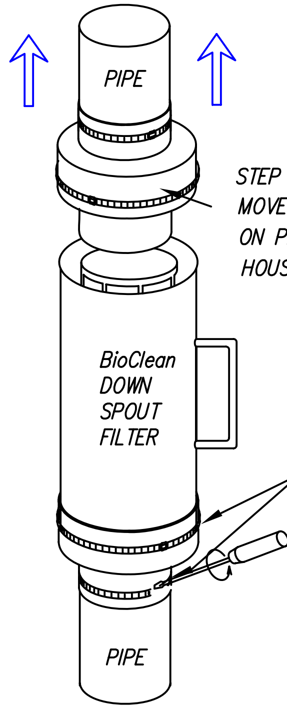
REMOVING FILTER



STEP 1. LOOSEN BOTH TOP CLAMPS WITH SCREW DRIVER.

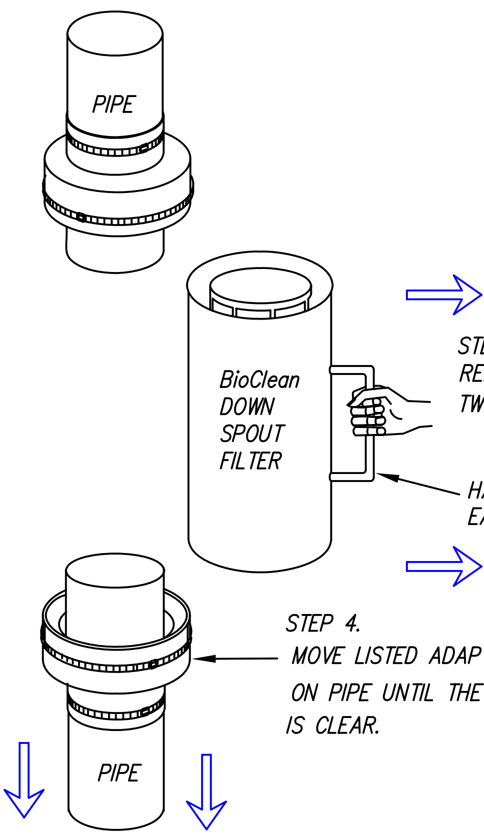


STEP 2.
MOVE LISTED ADAPTER/REDUCER UP ON PIPE UNTIL THE FILTER HOUSING IS CLEAR TO REMOVE.

STEP 3.
LOOSEN BOTH BOTTOM CLAMPS WITH SCREW DRIVER.

(STEP 4. AT BOTTOM LEFT OF PAGE)

CLEANING FILTER

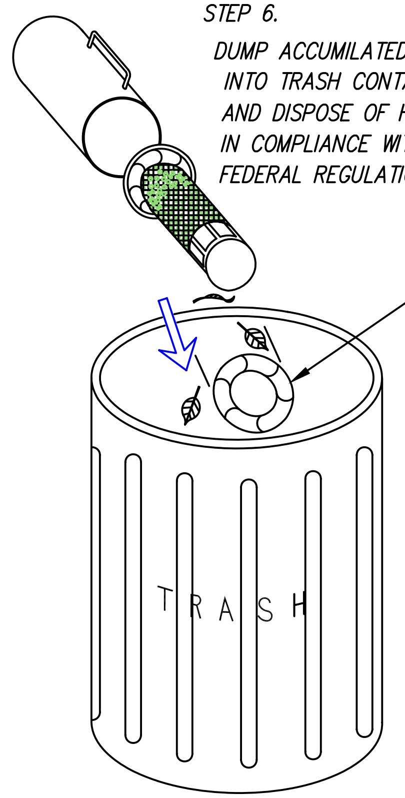


STEP 5.
REMOVE FILTER USING TWO HANDS.

HANDLES FOR EASY REMOVAL.

STEP 4.
MOVE LISTED ADAPTER/REDUCER DOWN ON PIPE UNTIL THE FILTER HOUSING IS CLEAR.

STEP 6.
DUMP ACCUMILATED DEBRIS OUT OF FILTER INTO TRASH CONTAINER. REMOVE FILTER INSERT AND DISPOSE OF HYDROCARBON BOOM IN COMPLIANCE WITH LOCAL STATE & FEDERAL REGULATIONS.



HYDROCARBON BOOM

BIO CLEAN ENVIRONMENTAL SERVICES, INC.
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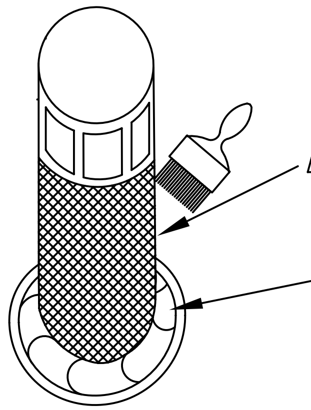
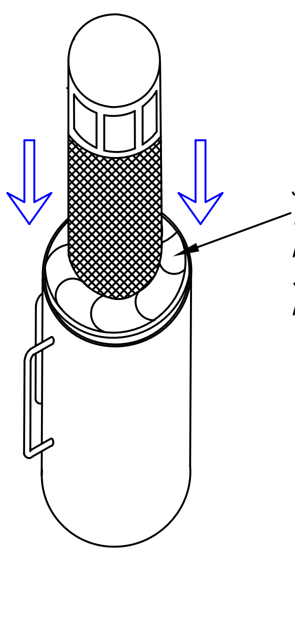


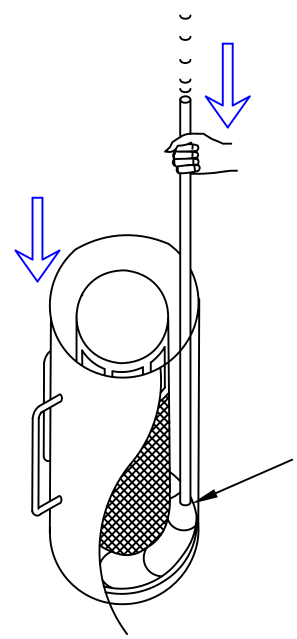
STEP 7.
BRUSH DEBRIS OFF SCREEN.

STEP 8.
INSTALL NEW BOOM AROUND
BASE OF FILTER INSERT

REPLACING FILTER INSERT



STEP 9.
POSITION FILTER INSERT
INTO HOUSING.
STUFF HYDROCARBON BOOM
INSIDE.



STEP 10.
PUSH FILTER INSERT
TO BOTTOM OF HOUSING.
AND STUFF HYDROCARBON BOOM
TO BOTTOM OF FILTER USING
DOWEL FOR ASSISTANCE.

REPLACING FILTER

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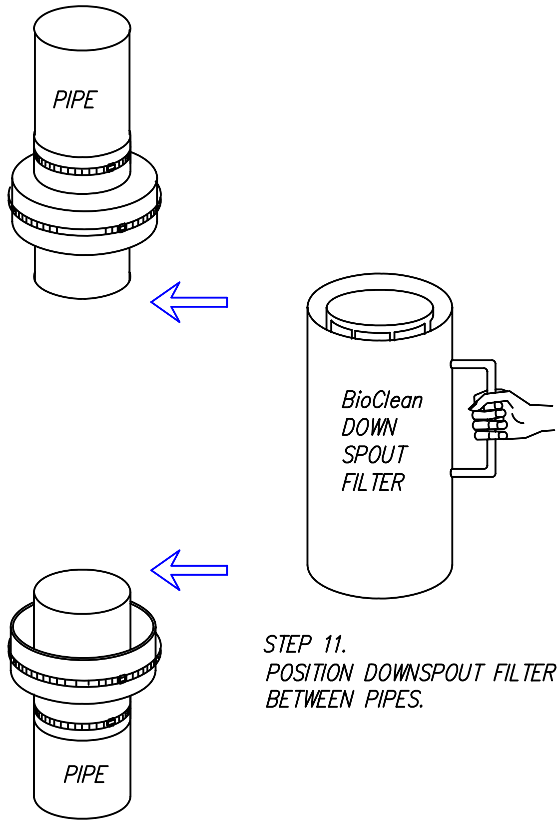
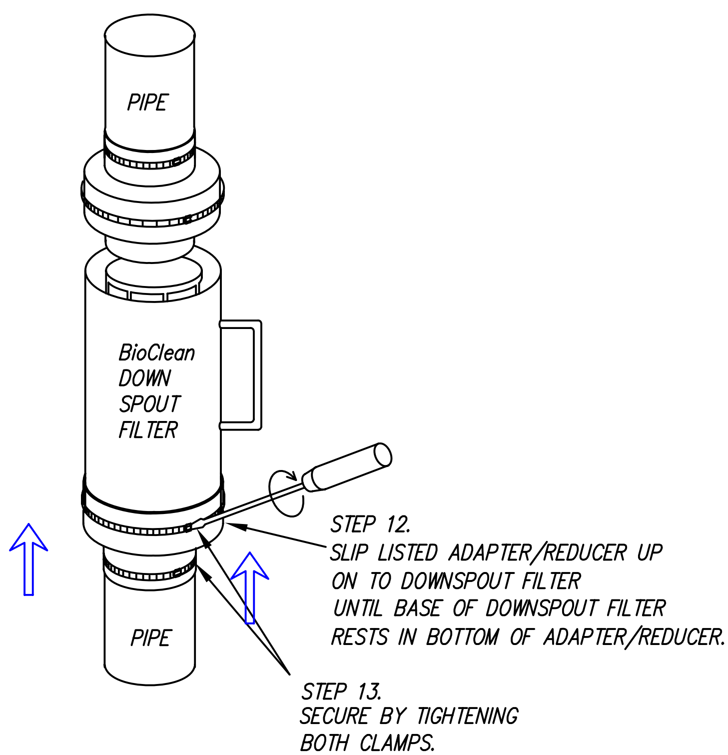
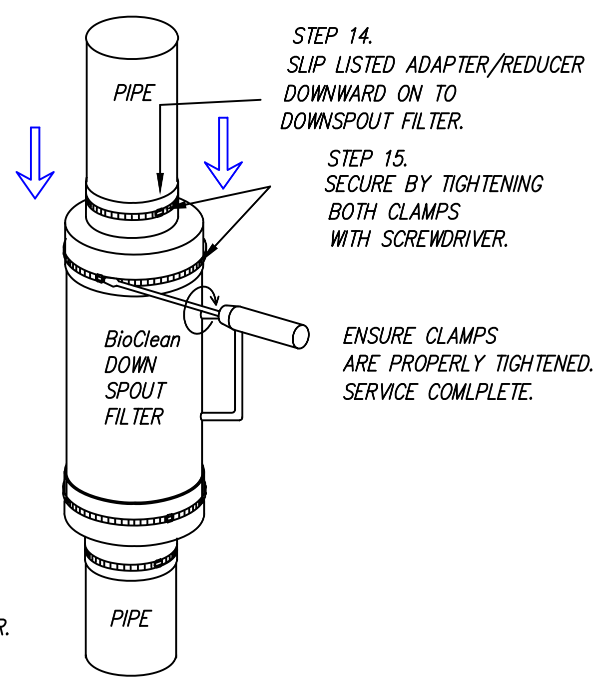
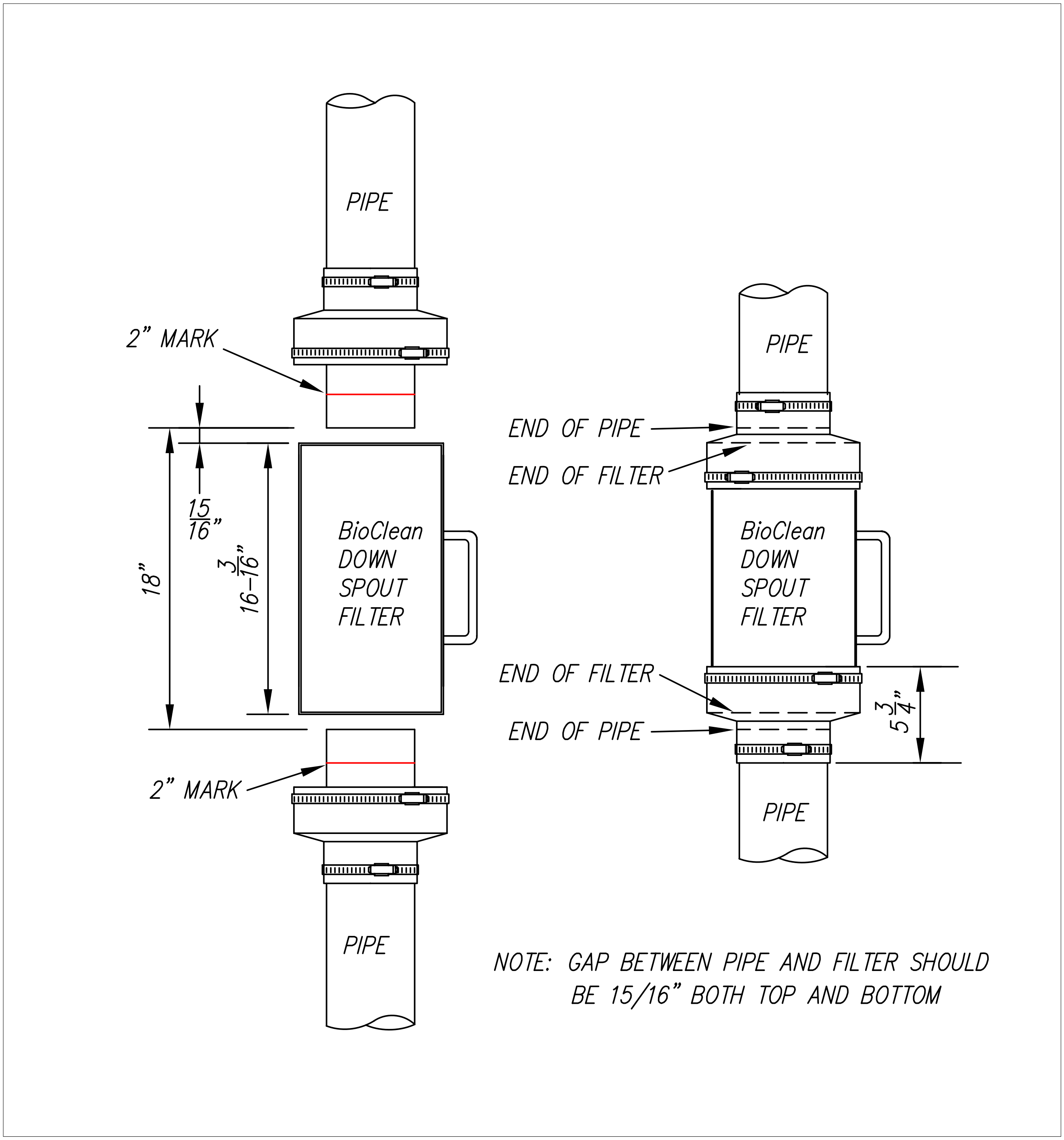






APPROPRIATE INSTALLATION

FILTER CENTERED BETWEEN PIPES WITH EVEN GAPS ON TOP AND BOTTOM



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GENERAL SPECIFICATIONS FOR MAINTENANCE OF
FLOGARD® LOPRO TRENCH DRAIN FILTERS

SCOPE:

Federal, State and Local Clean Water Act regulations and those of insurance carriers require that stormwater filtration systems be maintained and serviced on a recurring basis. The intent of the regulations is to ensure that the systems, on a continuing basis, efficiently remove pollutants from stormwater runoff thereby preventing pollution of the nation's water resources. These Specifications apply to the FloGard® LoPro Trench Drain Filter.

RECOMMENDED FREQUENCY OF SERVICE:

Drainage Protection Systems (DPS) recommends that installed FloGard® LoPro Trench Drain Filters be serviced on a recurring basis. Ultimately, the frequency depends on the amount of runoff, pollutant loading and interference from debris (leaves, vegetation, cans, paper, etc.); however, it is recommended that each installation be serviced a minimum of three times per year, with a change of filter medium once per year. DPS technicians are available to do an on-site evaluation, upon request.

RECOMMENDED TIMING OF SERVICE:

DPS guidelines for the timing of service are as follows:

1. For areas with a definite rainy season: Prior to, during and following the rainy season.
2. For areas subject to year-round rainfall: On a recurring basis (at least three times per year).
3. For areas with winter snow and summer rain: Prior to and just after the snow season and during the summer rain season.
4. For installed devices not subject to the elements (wash racks, parking garages, etc.): On a recurring basis (no less than three times per year).

SERVICE PROCEDURES:

1. The trench drain grate(s) shall be removed and set to one side.
2. The service shall commence with collection and removal of sediment and debris (litter, leaves, papers, cans, etc.)
3. The trench drain shall be visually inspected for defects and possible illegal dumping. If illegal dumping has occurred, the proper authorities and property owner representative shall be notified as soon as practicable.
4. Using an industrial vacuum, the collected materials shall be removed from the filter liner. (Note: DPS uses a truck-mounted vacuum for servicing FloGard® LoPro Trench Drain Filters.)
5. When all of the collected materials have been removed, the filter assembly shall be removed from the drainage inlet. The outer filter liner shall be removed from the filter assembly and filter medium pouches shall be removed by unsnapping the tether from the interior ring and set to one side. The filter liner, PVC body and fittings shall be inspected for continued serviceability. Minor damage or defects found shall be corrected on the spot and a notation made on the Maintenance Record. More extensive deficiencies that affect the efficiency of the filter (torn liner, etc.), if approved by the customer representative, will be corrected and a quote submitted to the representative along with the Maintenance Record.
6. The filter liner and filter medium pouches shall be inspected for defects and continued serviceability and replaced as necessary and the pouch tethers re-attached to the PVC body interior ring.
7. The grate(s) shall be replaced.

REPLACEMENT AND DISPOSAL OF EXPOSED FILTER MEDIUM AND COLLECTED DEBRIS

The frequency of filter medium pouch exchange will be in accordance with the existing DPS-Customer Maintenance Contract. DPS recommends that the medium be changed at least once per year. During the appropriate service, or if so determined by the service technician during a non-scheduled service, the filter medium pouches will be replaced. Once the exposed pouches and debris have been placed in the container, DPS has possession and must dispose of it in accordance with local, state and federal agency requirements.

DPS also has the capability of servicing all types of catch basin inserts and catch basins without inserts, underground oil/water separators, stormwater interceptors and other treatment devices. All DPS personnel are highly qualified technicians and are confined space trained and certified. Call us at (888) 950-8826 for further information and assistance.

04/07

Grate Inlet Filter (GISB)

PROVEN STORMWATER TREATMENT TECHNOLOGY

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

OPERATION & MAINTENANCE

Bio Clean Environmental Services, Inc.
2972 San Luis Rey Road
Oceanside, CA 92054

www.BioCleanEnvironmental.com
P 760-433-7640
F 760-433-3176

OPERATION & MAINTENANCE

Maintenance Summary –

- Clean filter as needed based on local loading conditions.
- Evaluate and replace hydrocarbon media booms (BioSorb) as needed.

Notes:

- Loading varies at every location due to variations in pollutant and flow volumes.
- Maintenance typically occurs before and after the rainy season.
- Media booms and replacement parts can be provided by Bio Clean Environmental Services, Inc.

Operation –

A. Maintenance can be provided by the Supplier, or a Supplier approved contractor. The cost of this service varies among providers.

B. The Bio Clean Grate Inlet Skimmer Box (GISB) is a multi-stage catch basin filter. These stages include: absorption of hydrocarbons and multi-level screening. It is recommended that the system be inspected every 6 months to evaluate its condition. The first year of inspection and maintenance can be used to predict maintenance requirements for subsequent years.

1. Absorption - is provided by sorbent media booms. This boom is positioned in a tray around the top perimeter of the filtration basket. This booms targets hydrocarbons including diesel, gasoline and oil. This booms utilizes a poly known as BioSorb which permanently absorbs and retains captured hydrocarbons. It is recommended the media boom is replaced when its visual appearance is black in color. This procedure can be performed by hand. *This procedure takes approximately 3-6 minutes depending on size of the filter.*

2. Multi-Level Screening - is provided by a series of filtration screens. The surface area of the screens varies depending on the model number. The lower level contains the finest screens and as you move up the sides of the filter the screens

become larger. This ensures the filter can capture both fine and coarser sediments and associated pollutants while maintaining maximum flow rate capacity. These screens target trash, TSS, debris, and particulate metals and nutrients. **It is recommended that the filter screens cleaned and captured debris removed one the filter is 50% full.** *Removal of captured debris and cleaning of the screens can be done by hand with with a vacuum truck. This procedure takes approximately 10-15 minutes depending on the size of the filter.*

The Bio Clean Grate Inlet Skimmer Box is designed to allow for the use of vacuum removal of captured materials in the sediment chamber. The chamber is serviceable by centrifugal compressor vacuum units without causing damage to the filter or during normal cleaning and maintenance. Filters can be cleaned and vacuumed without entering the catch basin from finish surface. Filter does not need to be removed to replace media or clean.

Maintenance Procedures:

1. Bio Clean Environmental Services, Inc. recommends the **filter and media boom** be inspected annually and cleaned when needed depending on loading. The procedure is easily done with the use of any standard vacuum truck.

    - Remove grate to gain access to the fitler.
    - Remove skimmer tray containing media booms and replace if needed by cutting zip ties, removing old boom, replace with new boom, zip tie into place.
    - Use a vacuum truck hose and insert into the catch basin. Lower the vacuum hose into the bottom of the filter. Begin vacuuming out accumulated sediments until the filter is empty. A pressure washer may be needed to assist with removing sediments that are compacted or stuck to the walls, screens and floor of the filter.
    - Once the filterr is cleaned remove vacuum hose.
    - Remove vacuum hose and replace grate cover.
    - Where possible the maintenance should be performed from the ground surface.

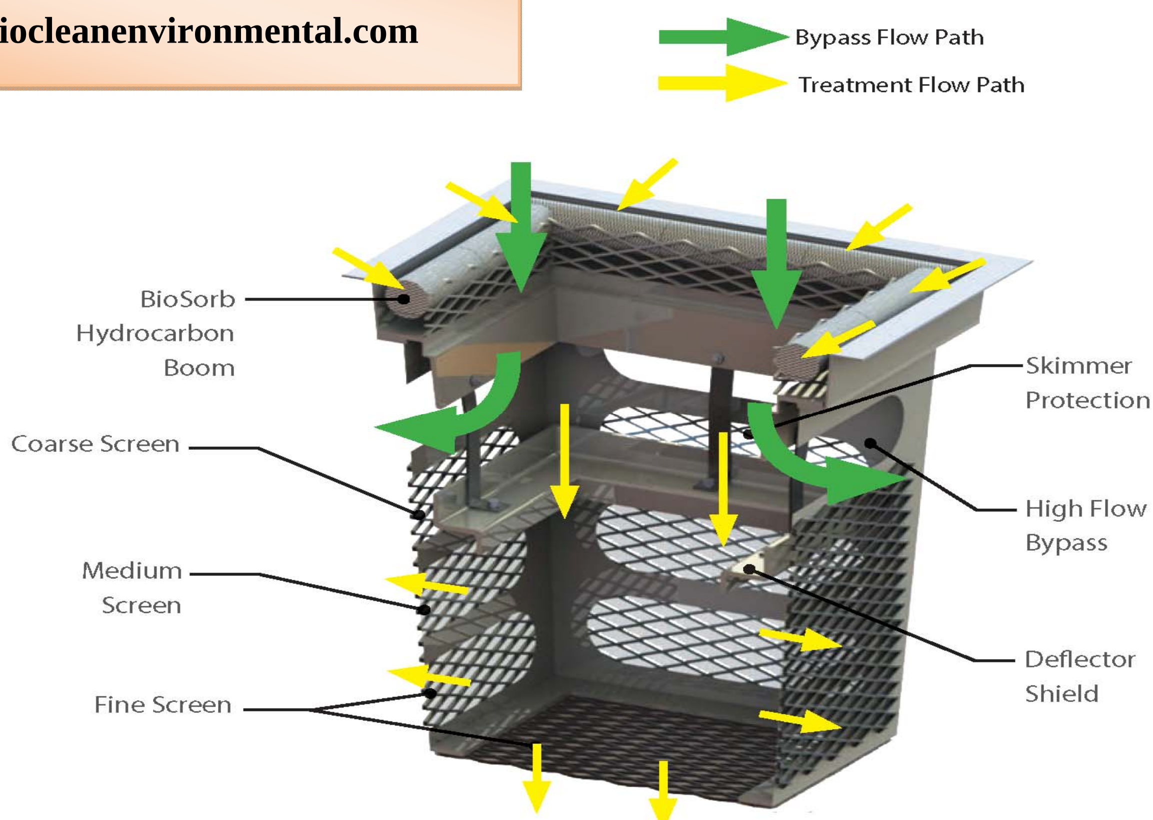
- Note: entry into an underground stormwater catch basin requires certification of confined space training.
- Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

2. Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanism.

3. The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.

4. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

For Maintenance Services or Replacement Media Please Contact Us At:
760-433-7640
info@biocleanenvironmental.com



Maintenance Sequence

Remove grates from catch basins to gain access to the GISB filters. Special hooks are available from various manufactures which are designed to remove the grates.

Remove skimmer tray and attached media booms.

Remove old media boom by cutting zip ties. Replace with new media boom and fasten with zip ties.

Vacuum out accumulated trash, sediment, and debris OR clean by hand. A pressure washer or metal brush can be used to clean of the screens.

Replace grates. Make sure they are properly re-installed.

Inspection and Maintenance Report
Catch Basin Inserts

BIO CLEAN ENVIRONMENTAL SERVICES, INC.

Project Name ______________________

Project Address ______________________ (city) (Zip Code)

Owner / Management Company ______________________

Contact ______________________ Phone ( ) –

Inspector Name ______________________ Date ___/___/______ Time ________ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm

Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition ______________________ Additional Notes ______________________

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation (lbs)	Foliage Accumulation (lbs)	Sediment Accumulation (lbs)	Total Debris Accumulation (lbs)	Condition of Media 25/50/75/100 (will be replaced @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							
	Lat: Long:							

Comments:

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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Project Name: 635 Robinson Avenue PTS522075

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 propritery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

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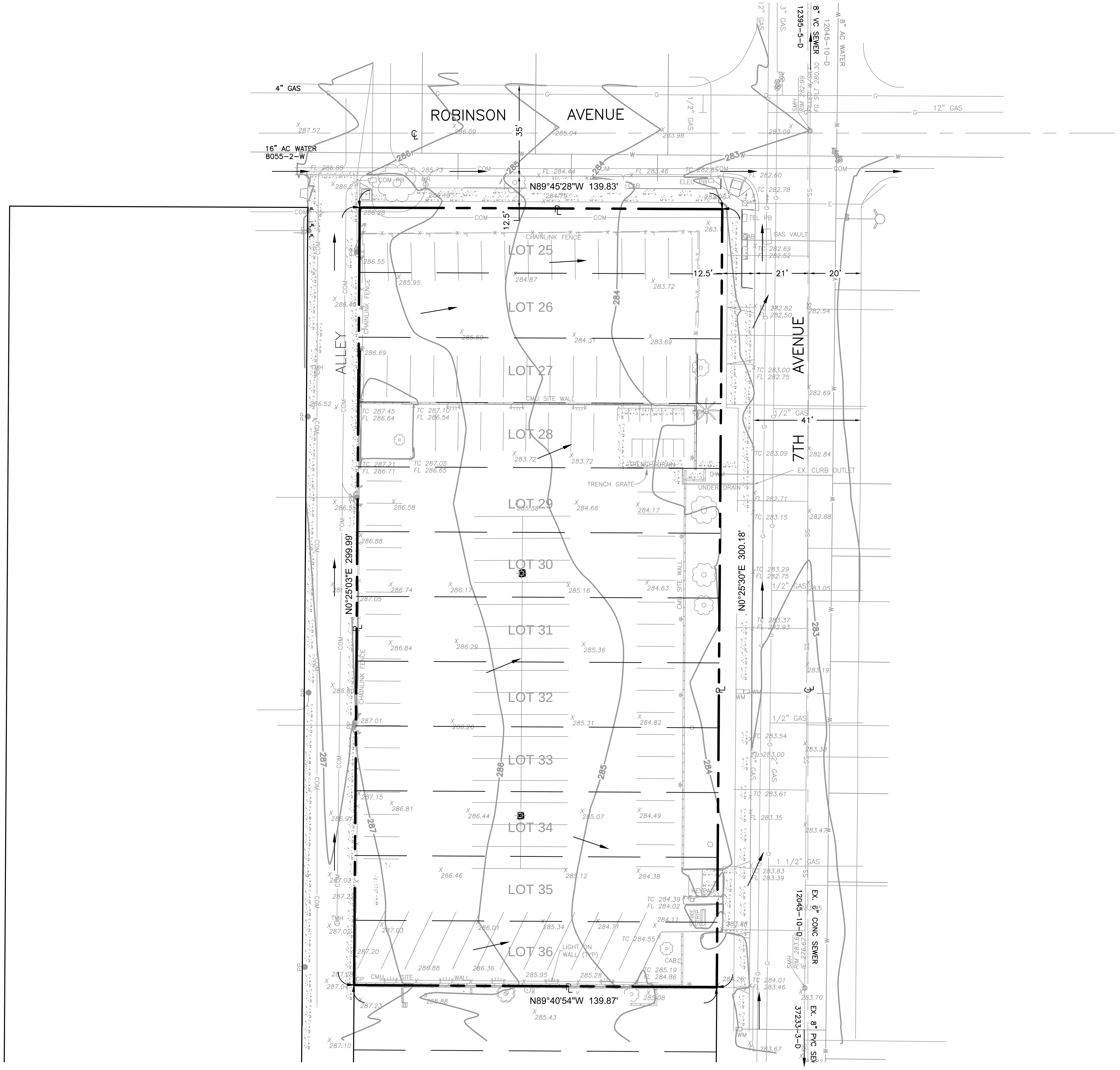

LEGEND

	FIRE HYDRANT
GV	GAS VALVE
S	SEWER MANHOLE
T	COMM MANHOLE
D	STORM MANHOLE
WV	WATER VALVE
PP	POWER POLE
	DRAINAGE PATTERN
COM	UNDERGROUND COMMUNICATION
E	UNDERGROUND ELEC
G	GAS
SS	SEWER
SD	STORM DRAIN
W	WATER

LEGAL DESCRIPTION
LOTS 25 THROUGH 36 BLOCK 4, OF CRITTENDEN ADDITION MAP NO. 303, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 5, 1886, SITUATED IN THE CITY OF SAN DIEGO, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA

DATUM: CALIFORNIA COORDINATE SYSTEM, ZONE 6, NAD83 (NA2011) DATUM, EPOCH 2016.250

BENCHMARK: THE BASIS OF ELEVATIONS FOR THIS DRAWING IS THE CITY OF SAN DIEGO VERTICAL CONTROL POINT, A BRASS PLUG LOCATED AT THE NORTH WEST CORNER OF 3RD AVENUE AND PENNSYLVANIA AVENUE, AS SHOWN ON CITYTY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK.
ELEV. = 285.46 (MSL)

COORDINATES: 206 - 1725

EASEMENTS: NONE

REFERENCE DRAWINGS:
12045-10-D
12395-5-D
8055-2-W

REVISION LOG

No.	DESCRIPTION	DATE
1	ORIGINAL SUBMITTAL	11.08.16
2	2ND SUBMITTAL	02.22.17
3	3RD SUBMITTAL	05.19.17
4		

N

GRAPHIC SCALE
0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

C-1
2016-421

EXISTING CONDITIONS

HILLCREST 111 SAN DIEGO, CA PTS 522075

GREYSTAR
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SAN DIEGUITO ENGINEERING, INC
462 STEVENS AVE. Ste. 305
SOLANA BEACH, CA 92075-2066
PHONE: (858) 345-1149
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WWW.ARCHITECTSORANGE.COM

CONSTRUCTION NOTES

1. REMOVE CONCRETE ALLEY SURFACING & INSTALL PER G-21 (SEE LANDSCAPE PLANS FOR ADDITIONAL PAVEMENT ENHANCEMENTS)
2. REMOVE EXIST CURB, CONSTRUCT CURB & GUTTER (TYPE G) PER SDG-151
3. CURB RAMP (TYPE D) PER SDG-137
4. ALLEY APRON PER SDG-120
5. 24' WIDE CONCRETE DRIVEWAY PER SDG-160
6. REMOVE EXIST SIDEWALK, CONSTRUCT NEW 5' SIDEWALK PER SDG-155
7. CURB OUTLET PER D-25
8. TRENCH DRAIN W/ FILTER INSERT
9. SUBDRAIN W/ FILTER SOCK
10. NYLAPLAST OVERFLOW INLET
11. ROOF DRAIN W/ DOWNSPOUT FILTER
12. RAISED PLANTER W/ DRAIN TO STORM SYSTEM
13. SAWCUT, REMOVE & REPLACE 2' AC PAVING PER SDG-113 SCHEDULE J, SEE (14)
14. COLD PLANE & OVERLAY AC TO ℄
15. SIGHT VISIBILITY TRIANGLE (ALSO SEE ARCHITECTURAL DRAWINGS)
16. SDG&E TRANSFORMER VAULT WITH MATCHING SIDEWALK TOP SECTION (SEE ARCHITECTURAL PLANS AND DETAIL ON SHEET C-4)
17. EMRA REQUIRED FOR ALL PRIVATE IMPROVEMENTS IN PUBLIC R/W, SIDEWALKS, LANDINGS, LANDSCAPE & CURB OUTLETS
18. AN EMA WILL BE REQUIRED FOR ALL BUILDING APPURTENANCES SUBTERRANEAN AND PATIO OVERHANGS IN PUBLIC R/W
19. UNDERGROUND PARKING STRUCTURE LIMITS
20. CURB RAMP (TYPE A) PER SDG-133
21. 12" PVC STORM DRAIN
22. PROPOSED STREET TREE/TREE GRATE (SEE LANDSCAPE PLANS)
23. STORM WATER VAULT, SEE DETAIL ON SHEET C-4
24. DRYWELL, SEE DETAIL ON SHEET C-4
25. GRATE INLET W/ FILTER INSERT

SPECIAL GEOTECHNICAL NOTES:

1. THE INFILTRATION RATE USED FOR DESIGN SHALL BE CONFIRMED WITH A MINIMUM OF TWO TESTS LOCATED WITHIN 50 FEET AND AT THE SAME ELEVATION AS THE BOTTOM OF EACH PROPOSED FULL INFILTRATION BIO-FILTRATION BASIN. THE TEST METHOD SHALL BE IN ACCORDANCE WITH A DESIGN-PHASE, DIRECT METHOD PER TABLE D.3-1 OF THE STORM WATER STANDARDS.

EARTHWORK QUANTITIES:

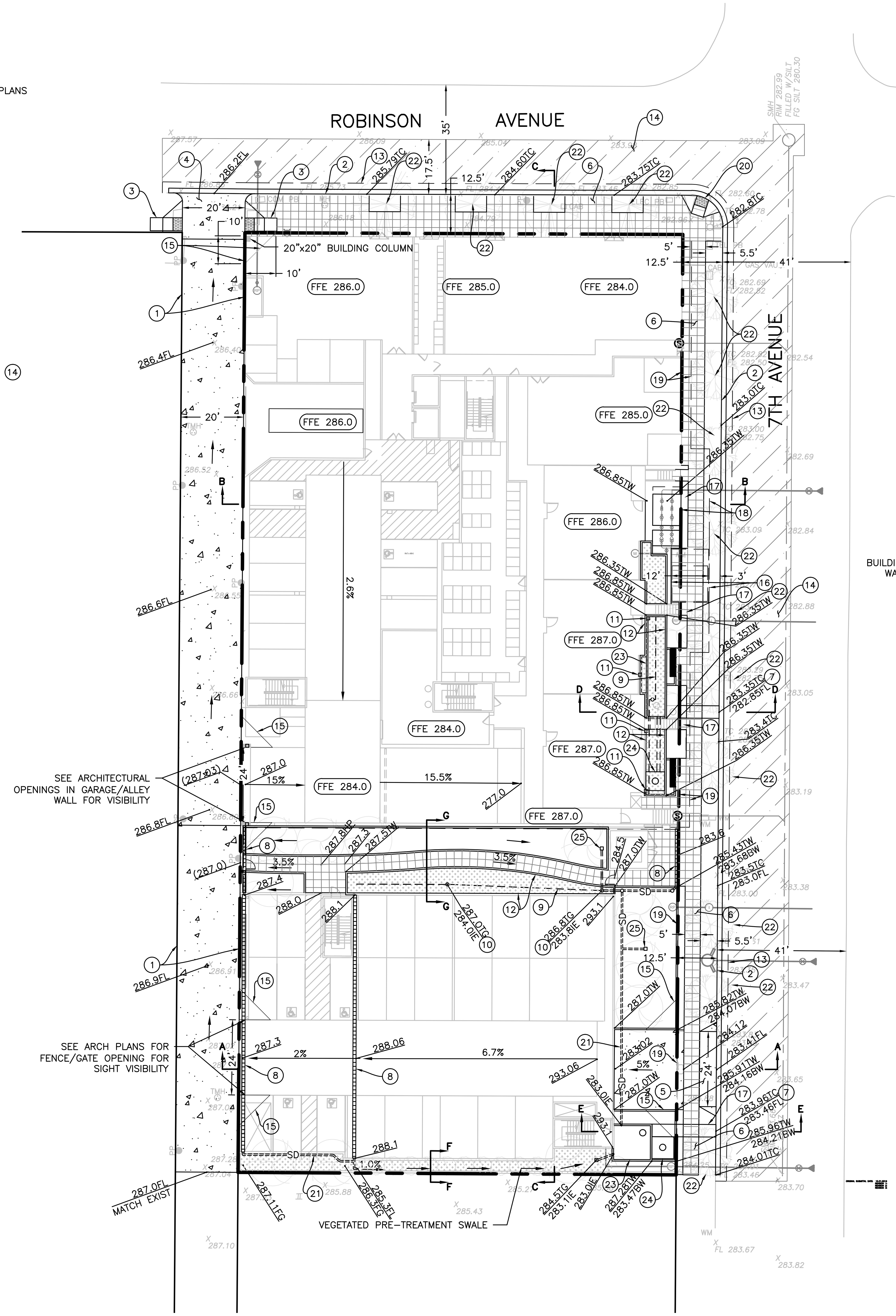
*STRUCTURE EXCAVATION AT&T =	14,000 CY
*STRUCTURE EXCAVATION MIXED USE =	25,000 CY
SURFACE GRADING AT&T =	105 CY
SURFACE GRADING MIXED USE =	35 CY
*MAXIMUM CUT DEPTH (BASEMENT PAD) =	32 FT

*INCLUDES UNDERGROUND PARKING STRUCTURE

FAA SELF CERTIFICATION:

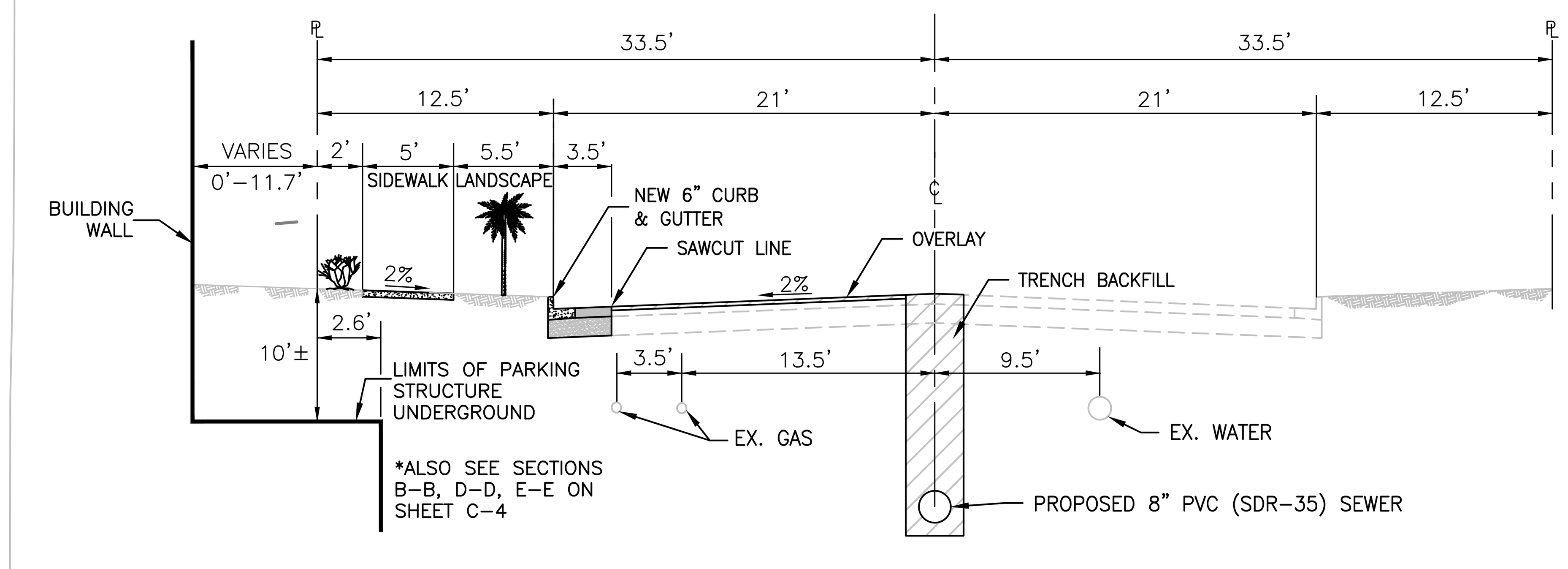
I, MICHAEL D. WOLFE, DO HEREBY CERTIFY THAT THE STRUCTURES SHOWN ON THESE PLANS DO NOT REQUIRE FEDERAL AVIATION ADMINISTRATION NOTIFICATION BECAUSE PER SECTION 77.15(a) OF TITLE 14 OF THE CODE OF FEDERAL REGULATIONS CFR PART 77, NOTIFICATION IS NOT REQUIRED.

MICHAEL D. WOLFE, R.C.E 44271



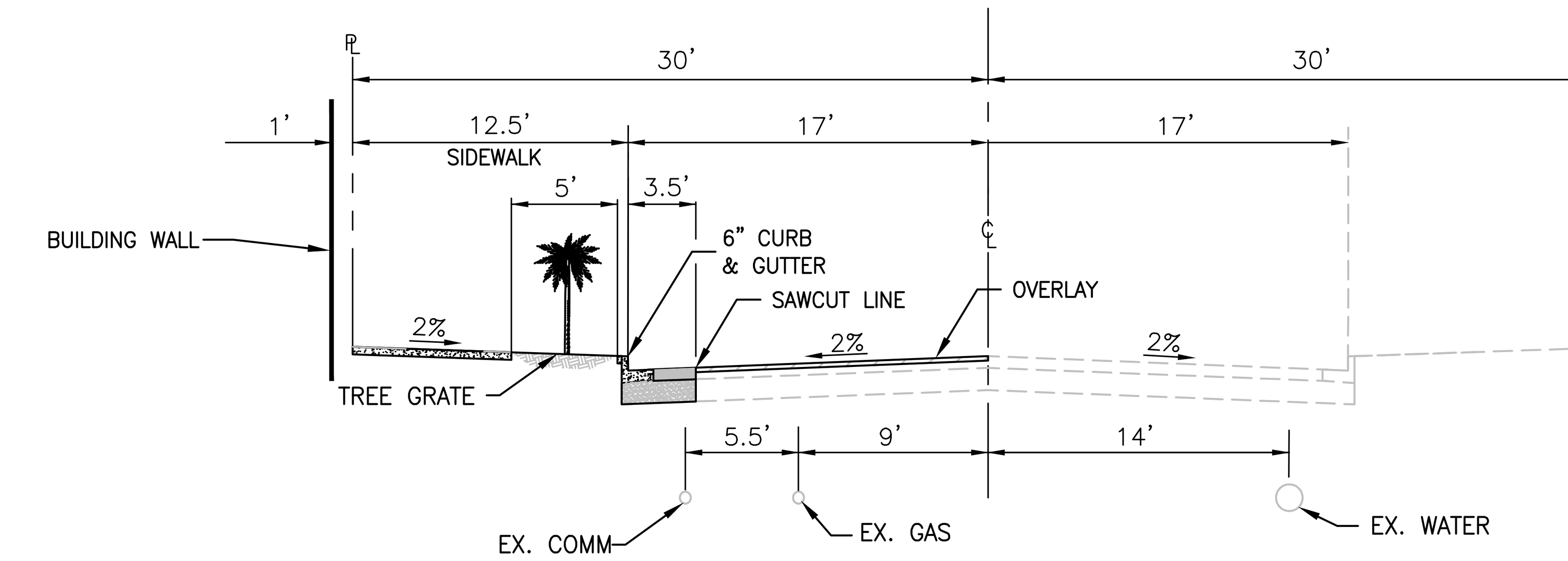
LEGEND

PP	EXIST POWER POLE	— — —	SAWCUT
	EXIST CURB		CURB RAMP
	CURB & GUTTER	- - - - - -	SUBDRAIN
	SIDEWALK	==:SD:==	12" PVC STORM DRAIN
	CURB OUTLET		RAISED PLANTER
	CONC PAVEMENT	x 282.54	EXIST SPOT ELEVATION
	COLD PLANE & OVERLAY AC	284.2	PROPOSED ELEVATION
	STORM WATER VAULT	(284.2)	EXISTING ELEVATION
	DRYWELL		



7th AVENUE

N.T.S.



ROBINSON AVENUE

N.T.S.

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GRAPHIC SCALE

0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

C-2

2016-421

GRADING PLAN

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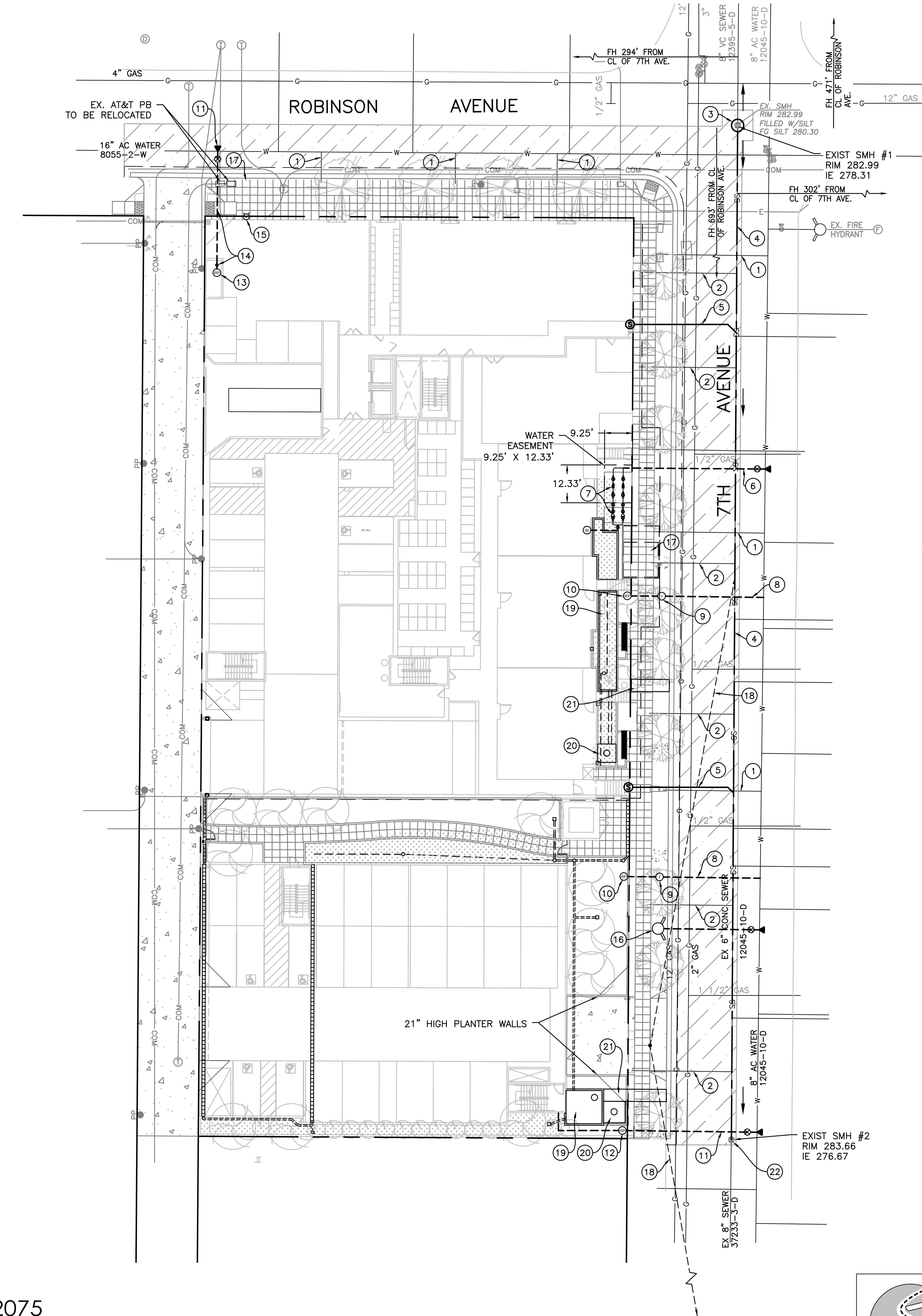
W W W . A R C H I T E C T S O R A N G E . C O M

CONSTRUCTION NOTES

1. ABANDON WATER SERVICE, KILL AT MAIN
2. ABANDON SEWER LATERAL
3. REMOVE AND REPLACE SEWER MANHOLE PER SDS-107
4. REMOVE EXIST 6" CONCRETE SEWER. CONSTRUCT 330' 8" PVC SEWER (SDR-35) @ 0.5%
5. 6" PVC (SDR-35) SEWER LATERAL
6. 4" PVC (C-900) WATER SERVICE. CONNECTION TO MAIN
7. DUAL ABOVE GROUND 3" METER AND PRIVATE BACKFLOW PER SDW-157
8. 2" IRRIGATION SERVICE. CONNECTION TO MAIN
9. 2" IRRIGATION WATER METER
10. 2" BACKFLOW PREVENTOR (PRIVATE)
11. 8" PVC (C-900) FIRE SERVICE CONNECTION AND ASSEMBLY (PRIVATE)
12. 8" BACKFLOW PREVENTOR W/FDC (PRIVATE)
13. 8" BACKFLOW PREVENTOR (PRIVATE) IN WET UTILITY ROOM REQUIRES APPROVAL FROM THE CROSS CONNECTION SECTION PER SDW-141
14. 8" IBR-SS, SET FLANGE 3" ABOVE FF
15. FIRE DEPARTMENT CONNECTION
16. FIRE HYDRANT PER SDW-104
17. SDG&E TRANSFORMER VAULT W/ MATCHING SIDEWALK TOP SECTION (SEE ARCH PLANS)
18. SIGHT DISTANCE LINE ~ 155' CLEAR REQUIRED. DRIVER LOCATION IS 15' FROM EDGE OF STREET PARKING.
19. STORM WATER STORAGE VAULT
20. DRYWELL INFILTRATION
21. CURB OUTLET
22. MAKE CONNECTION TO EXISTING SEWER MANHOLE TO REMAIN



LEGEND

- EXIST FIRE HYDRANT
- GV EXIST GAS VALVE
- EXIST SEWER MANHOLE
- EXIST COMM HANDHOLE
- EXIST STORM MANHOLE
- WV EXIST WATER VALVE
- PP EXIST POWER POLE
- SEWER LATERAL
- WATER SERVICE/METER
- IRRIGATION SERVICE/METER
- RP BACKFLOW PREVENTOR
- GATE VALVE
- FIRE DEPARTMENT CONNECTION
- CURB OUTLET (SEE GRADING PLAN)
- PROPOSED FIRE HYDRANT
- COM EXIST UNDERGROUND COMM
- E EXIST UNDERGROUND ELEC
- G EXIST GAS
- SS EXIST SEWER
- SD SD EXIST STORM DRAIN
- W EXIST WATER
- WATER LATERAL
- 8" PVC SEWER MAIN (SDR-35)
- PROPERTY LINE

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GRAPHIC SCALE

0 10 20 40 80

(IN FEET)
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C-3

2016-421

UTILITY PLAN

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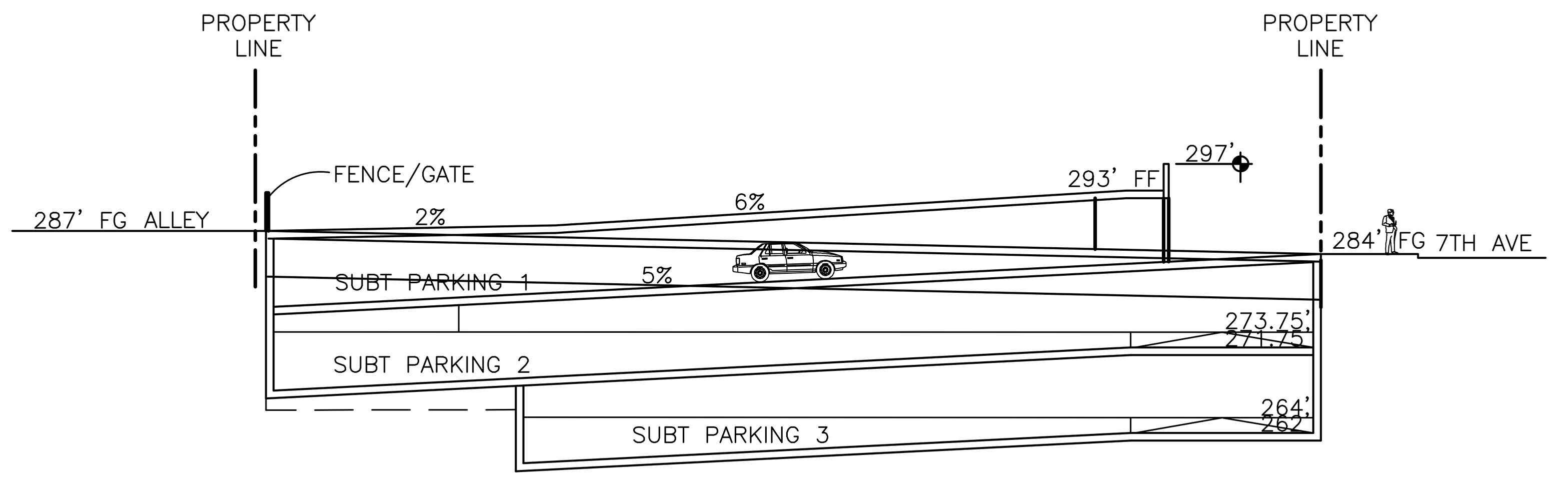
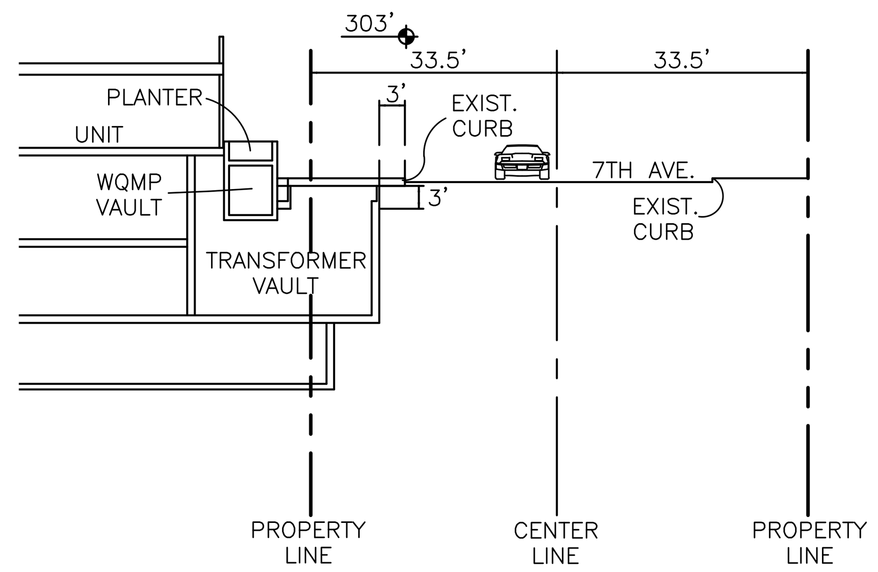
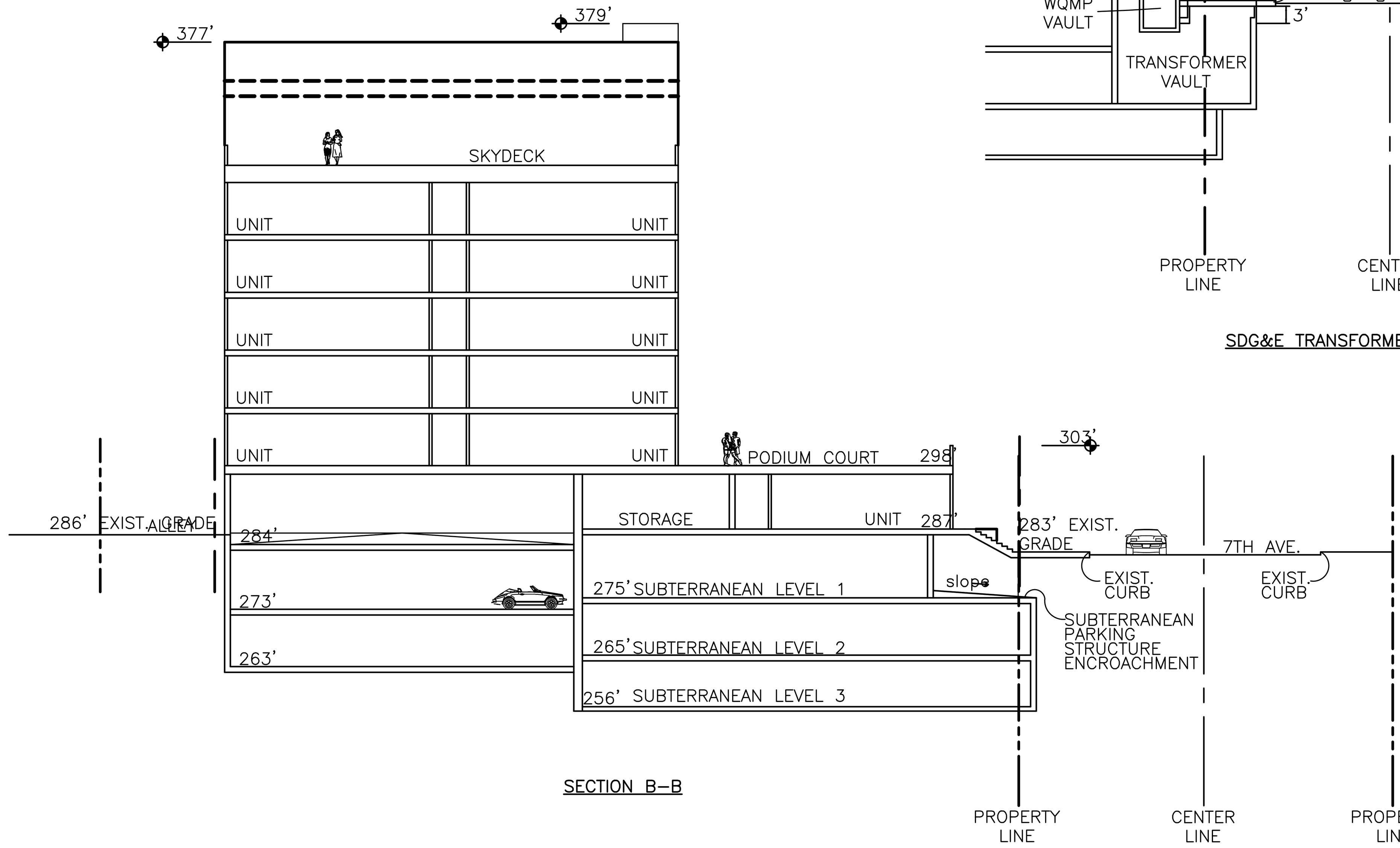


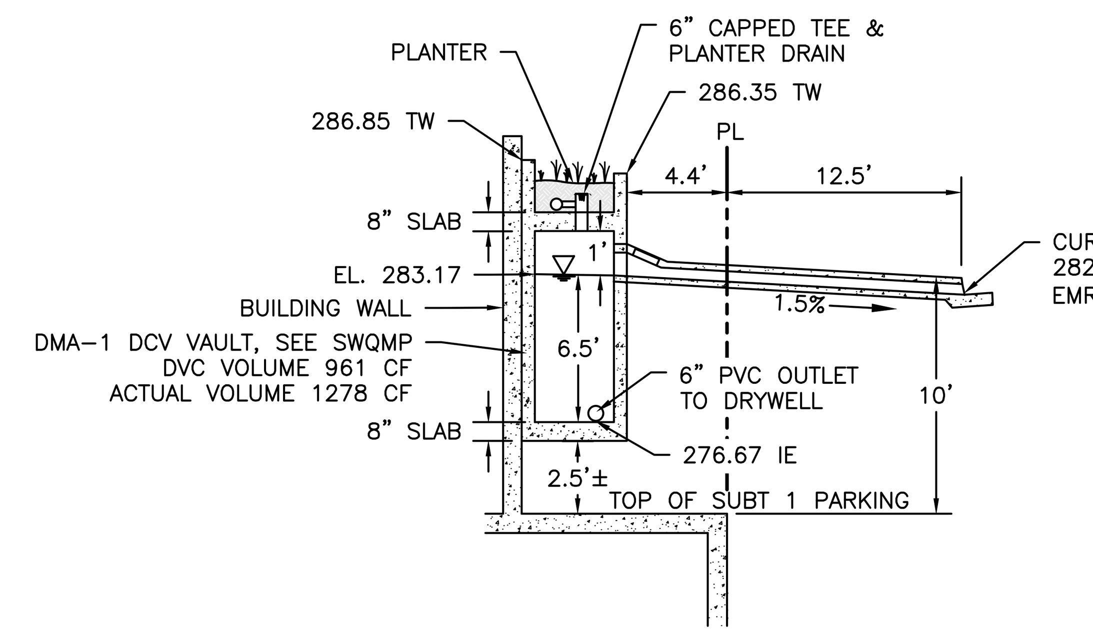
SECTION A–A



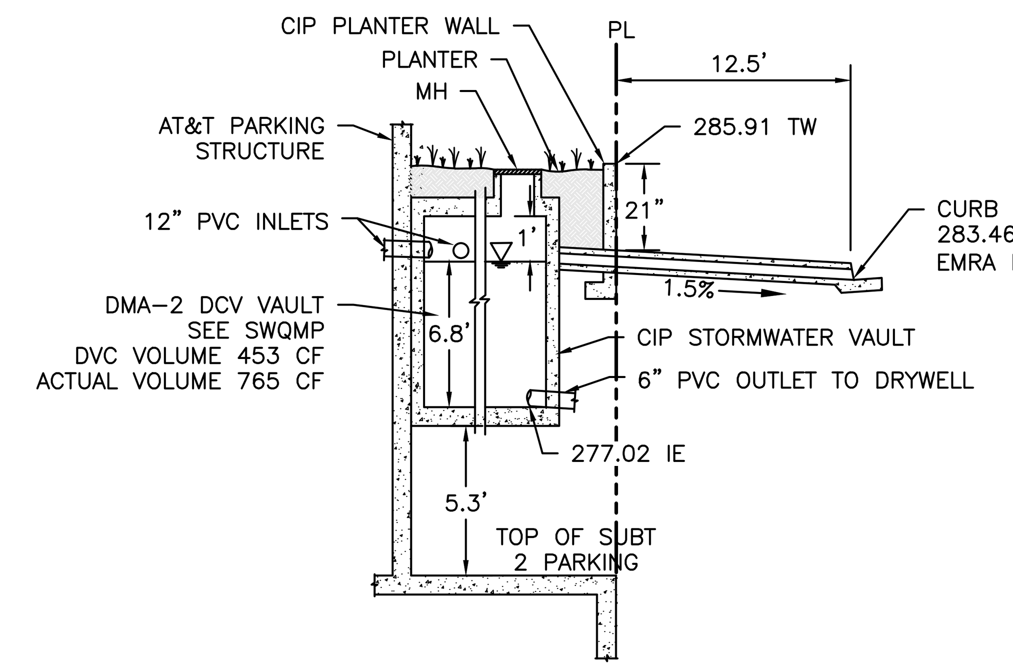
SDG&E TRANSFORMER VAULT TYPICAL



SECTION B–B



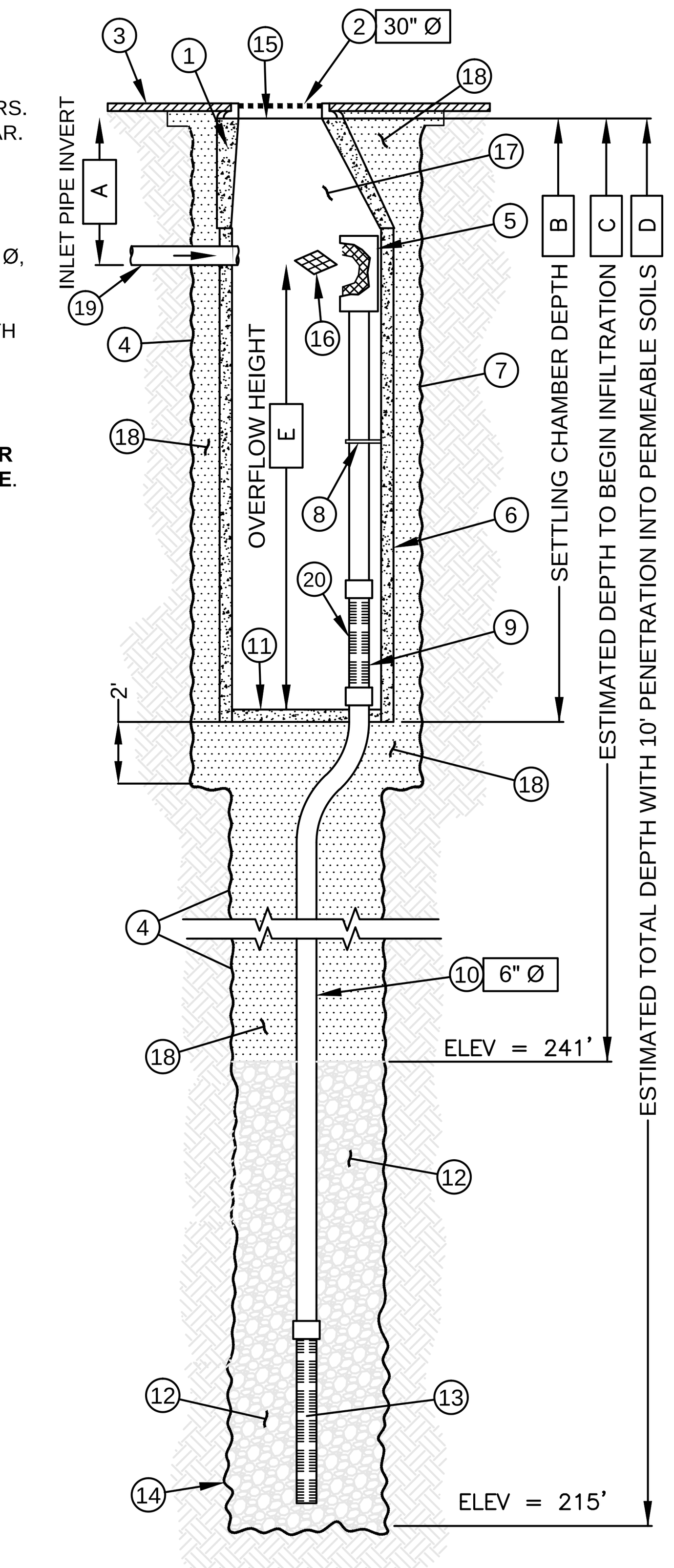
SECTION D–D
STORM WATER VAULT @ MIXED USE

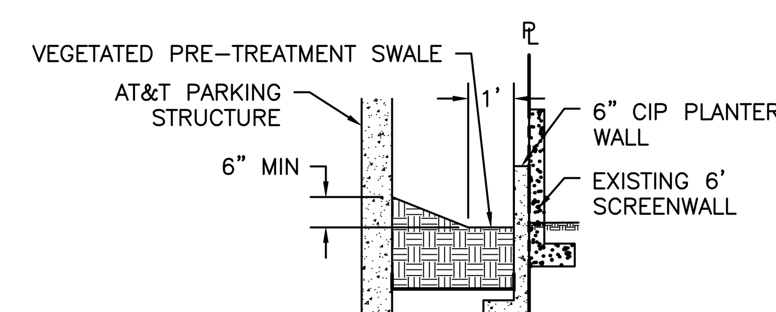


SECTION E–E
STORM WATER VAULT @ AT&T GARAGE

ITEM NUMBERS

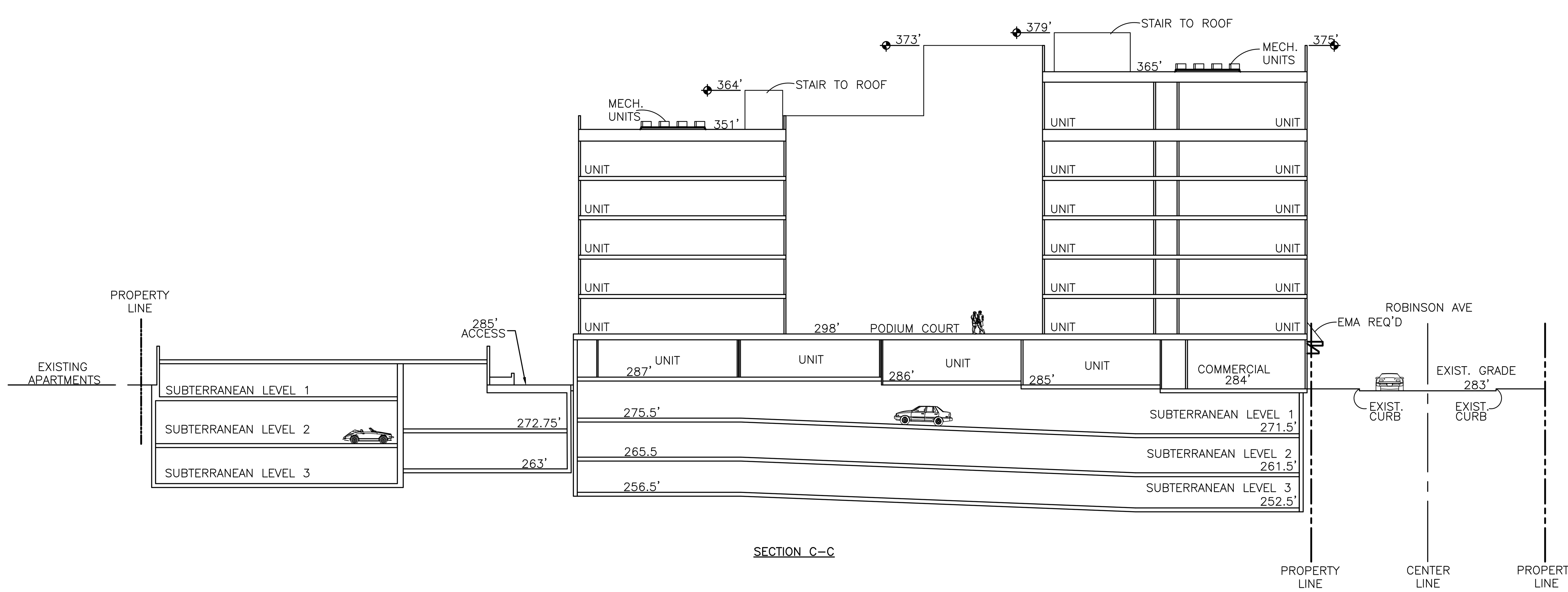
1. **MANHOLE CONE** - MODIFIED FLAT BOTTOM.
2. **BOLTED RING & GRATE** - DIAMETER AS SHOWN. CLEAN CAST IRON WITH WORDING **"STORM WATER ONLY"** IN RAISED LETTERS. **BOLTED IN 2 LOCATIONS** AND SECURED TO CONE WITH MORTAR. RIM ELEVATION ±0.02' OF PLANS.
3. **GRADED BASIN OR PAVING** (BY OTHERS).
4. NON-WOVEN GEOTEXTILE SLEEVE, MIRAFITM/ 140 NL. MIN. 6 FT Ø, HELD APPROX. 10 FEET OFF THE BOTTOM OF EXCAVATION.
5. **PUREFLO® DEBRIS SHIELD** - ROLLED 16 GA. STEEL X 24" LENGTH WITH VENTED ANTI-SIPHON AND INTERNAL .265" MAX. SWO FLATTENED EXPANDED STEEL SCREEN X 12" LENGTH. **FUSION BONDED EPOXY COATED**.
6. **PRE-CAST LINER** - 4000 PSI CONCRETE 48" ID. X 54" OD. **CENTER IN HOLE** AND ALIGN SECTIONS **TO MAXIMIZE BEARING SURFACE**.
7. **MIN. 6' Ø DRILLED SHAFT**.
8. **SUPPORT BRACKET** - FORMED 12 GA. STEEL. **FUSION BONDED EPOXY COATED**.
9. **OVERFLOW PIPE** - SCH. 40 PVC MATED TO DRAINAGE PIPE AT BASE SEAL.
10. **DRAINAGE PIPE** - ADS HIGHWAY GRADE WITH TRI-A COUPLER. **SUSPEND PIPE** DURING BACKFILL OPERATIONS TO PREVENT BUCKLING OR BREAKAGE. DIAMETER AS NOTED.
11. **BASE SEAL** - CONCRETE SLURRY OR GEOTEXTILE.
12. **ROCK** - WASHED, SIZED BETWEEN 3/8" AND 1-1/2" TO **BEST COMPLEMENT SOIL CONDITIONS**.
13. **FLOFAST® DRAINAGE SCREEN** - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT. 120" OVERALL LENGTH WITH TRI-B COUPLER.
14. **MIN. 4' Ø SHAFT** - DRILLED TO **MAINTAIN PERMEABILITY** OF DRAINAGE SOILS.
15. **FABRIC SEAL** - U.V. RESISTANT GEOTEXTILE - **TO BE REMOVED BY CUSTOMER** AT PROJECT COMPLETION.
16. **ABSORBENT** - HYDROPHOBIC PETROCHEMICAL SPONGE. MIN. 128 OZ. CAPACITY. TYPICAL, TWO PER CHAMBER.
17. **FREEBOARD DEPTH VARIES** WITH INLET PIPE ELEVATION. INCREASE SETTLING CHAMBER DEPTH AS NEEDED TO MAINTAIN ALL INLET PIPE ELEVATIONS ABOVE OVERFLOW PIPE INLET.
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. **INLET PIPE** (BY OTHERS).
20. FLOFAST®/ DRAINAGE SCREEN - SCH. 40 PVC 0.120" SLOTTED WELL SCREEN WITH 32 SLOTS PER ROW/FT WRAPPED WITH NON WOVEN GEOTEXTILE FABRIC. 60" OVERALL LENGTH WITH TRI-B COUPLER.



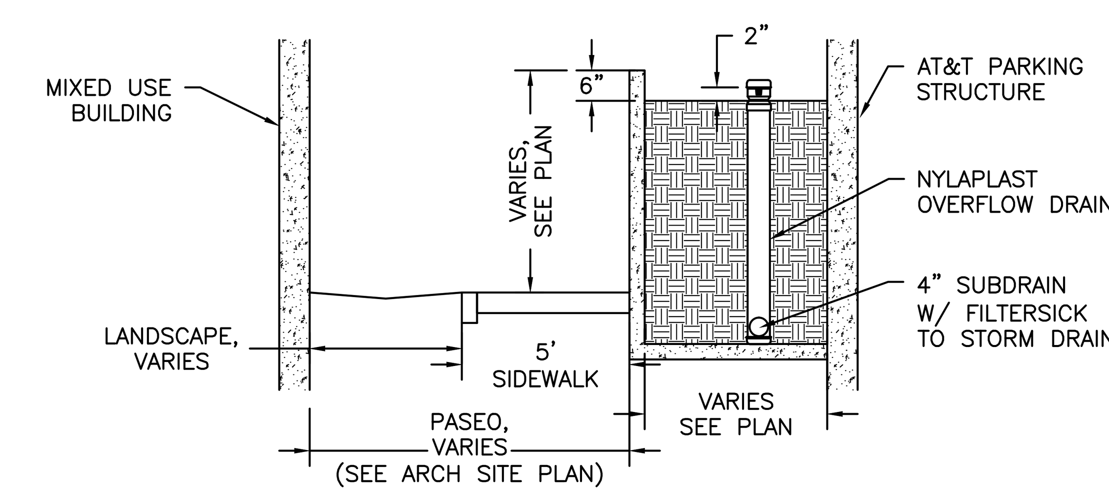


SECTION F–F

DRYWELL DIMENSIONS	A	B	C	D	E	3 HR. DRAW DOWN VOLUME
MIXED–USE (NORTH	16'	25'	43'	68'	9'	2259 CF
AT&T (SOUTH)	7.2'	20'	44'	69'	10'	2259 CF



SECTION C–C



SECTION G–G

REVISION LOG

No.	DESCRIPTION	DATE
1	ORIGINAL SUBMITTAL	11.08.16
2	2ND SUBMITTAL	02.22.17
3	3RD SUBMITTAL	05.19.17
4		

N

GRAPHIC SCALE
0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

C-4
2016-421

SECTIONS & DETAILS

HILLCREST 111 SAN DIEGO, CA PTS 522075

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ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

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Preliminary Drainage Study

PTS 522075

Hillcrest 111

635 Robinson Avenue

APN 452-10-61

City of San Diego, California

Prepared for:
Greystar
17855 Von Karman Avenue, Suite 450
Irvine, CA 92614

Prepared by:

SAN DIEGUITO ENGINEERING, INC.
Engineering | Surveying | Planning

San Dieguito Engineering, Inc.
462 Stevens Avenue, Suite 305
Solana Beach, CA 92075
Project Number 5709
May 2017

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. WOLFE
44271
Exp. 9.30.17
CIVIL
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Michael D. Wolfe, R.C.E.
Principal

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This report summarizes the hydrology and hydraulic calculations for the Preliminary Grading Plan for the property at 635 Robinson Avenue, APN 452-10-61. Hydrology calculations have been performed in accordance with the current City of San Diego Hydrology Manual.

EXISTING CONDITIONS

The existing property is currently utilized as a parking facility for the AT&T office building at 650 Robinson Avenue to the north and is fully paved, with landscape and screen walls along the perimeter of Robinson Avenue and 7th Avenue. All of the property gently slopes toward the east to 7th Avenue. The total lot size is approximately 0.96 acres. The existing parking lot has two points of study that are located in the gutter as shown in the attached Existing Conditions Exhibit. These existing Basins EX-A and EX–B are 0.61 and 0.36 acres respectively. Both basins drain to the intersection at 7th Avenue and Robinson Avenue and thence east to a catch basin at 8th Avenue and Robinson Avenue per existing plan (see attached as-built plan 1297-L). This City system thence drains directly to Caltrans State Route 163 storm drain system and south to the City Exempted conveyance system to San Diego Bay. (An Exempted Water Body for Hydro-modification). The existing Q_{50} of 2.30 cfs and 1.38 cfs respectively were calculated from determination of the T_c and a C factor of 0.88 (see Rational Method Calculations).

PROPOSED CONDITIONS

The proposed development maintains the existing drainage basins A and B (Basins PR-A and PR-B) and the points of study in the 7th Avenue gutter shown on the attached Proposed Conditions Exhibit. The developed site has extended the T_c for each point of interest which results in a reduction of the Q_{50}. The flows in Basins PR-A and PR-B in the proposed condition are 1.79 cfs and 1.04 cfs respectively which are approximately 20 percent less than the existing Q_{50} flows. All onsite drainage will be collected through surface drains and/or sub-drains in landscape planters and routed to vaults that are sized to contain the Design Capture Volume (DCV). The vaults outlet to drywell systems, which allow for full infiltration of the DCV. Overflow volumes above the DCV are outlet through D-25 curb outlets to the gutter on 7th Avenue. The surface drainage system will honor the current flow patterns and drain to the City's exempted conveyance system to the Bay.

RATIONAL METHOD HYDROLOGY CALCULATIONS

HYDROLOGY STUDY

PRE & POST CONSTRUCTION

PROJECT NAME: Greystar-7th and Robinson
PROJECT NUMBER: 5709
DATE: 5/19/2017
COMMENT:

COORD: N 32d 44' 47" W 117d 09' 31"

HYDROLOGIC SOIL GRP. D Ur

Q100	Q100	Q50	Q10	Q2	85th
P6 (in):	2.50	2.20	1.70	1.25	
P24 (in):	4.20	3.70	2.80	1.75	0.63
P6/P24:	0.60	0.59	0.61	0.71	
ADJUSTED P6:	2.50	2.20	1.70	1.14	

PRE CONSTRUCTION

BASIN	HYDROLOGIC SOIL GROUP	AREA (sf)	AREA (Ac)	PRE IMPERV AREA (sf)	IMPERVIOUS %	C	Tc (min)	I100 (iph)	Q100 (cfs)	I50 (iph)	Q50 (cfs)	I10 (iph)	Q10 (cfs)	I2 (iph)	Q2 (cfs)	0.1Q2 (cfs)	85th VOLUME (cf)	Q100 VOLUME (cf)
EX-A	D	26,525	0.61	23,255	88%	0.84	7.4	5.13	2.62	4.51	2.30	3.49	1.78	2.33	1.19	0.12	1393	4631
EX-B	D	15,500	0.36	13,840	89%	0.84	7.2	5.23	1.57	4.60	1.38	3.55	1.07	2.38	0.71	0.07	814	2725
	Total	**42,025**	**0.96**	**37,095**	**88%**			Total	**4.19**		**3.68**							

TIME OF CONCENTRATION (PRE CONSTRUCTION)

LOCATION	NODE	% IMPERV	ELEMENT	SLOPE		LM	Ti	LENGTH	HI PT	LOW PT	DELTA E	Tt	Tc	Tc Used			
EX-A		88	NC or Com	1.5%		67.5	4.25	293	287	282.6	4.4	3.1	7.4	7.4			
EX-B		89	NC or Com	1.5%		67.5	4.25	269	287	282.9	4.1	2.9	7.2	7.2			

POST CONSTRUCTION

BASIN	HYDROLOGIC SOIL GROUP	AREA (sf)	AREA (Ac)	POST IMPERV AREA (sf)	IMPERVIOUS %	C	Tc (min)	I100 (iph)	Q100 (cfs)	I50 (iph)	Q50 (cfs)	I10 (iph)	Q10 (cfs)	I2 (iph)	Q2 (cfs)	0.1Q2 (cfs)	85th VOLUME (cf)	Q100 VOLUME (cf)
PR-A	D	26,525	0.61	24,450	92%	0.86	11.3	3.90	2.04	3.43	1.79	2.65	1.39	1.78	0.93	0.09	1393	4741
PR-B	D	15,500	0.36	10,700	69%	0.73	8.8	4.56	1.19	4.01	1.04	3.10	0.81	2.07	0.54	0.05	814	2362
	Total	**42,025**	**0.96**	**35,150**	**84%**			Total	**3.23**		**2.84**							

TIME OF CONCENTRATION (POST CONSTRUCTION)

LOCATION	NODE	% IMPERV	ELEMENT	SLOPE		LM	Ti	LENGTH	HI PT	LOW PT	DELTA E	Tt	Tc	Tc Used			
PR-A		92	OP/Com/LI	0.6%		50	4.2	517	285.5	282.6	2.9	7.1	11.3	11.3			
PR-B		69	HDR 24.0	2.3%		75	5.1	463	293.7	282.9	10.8	3.7	8.8	8.8			

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

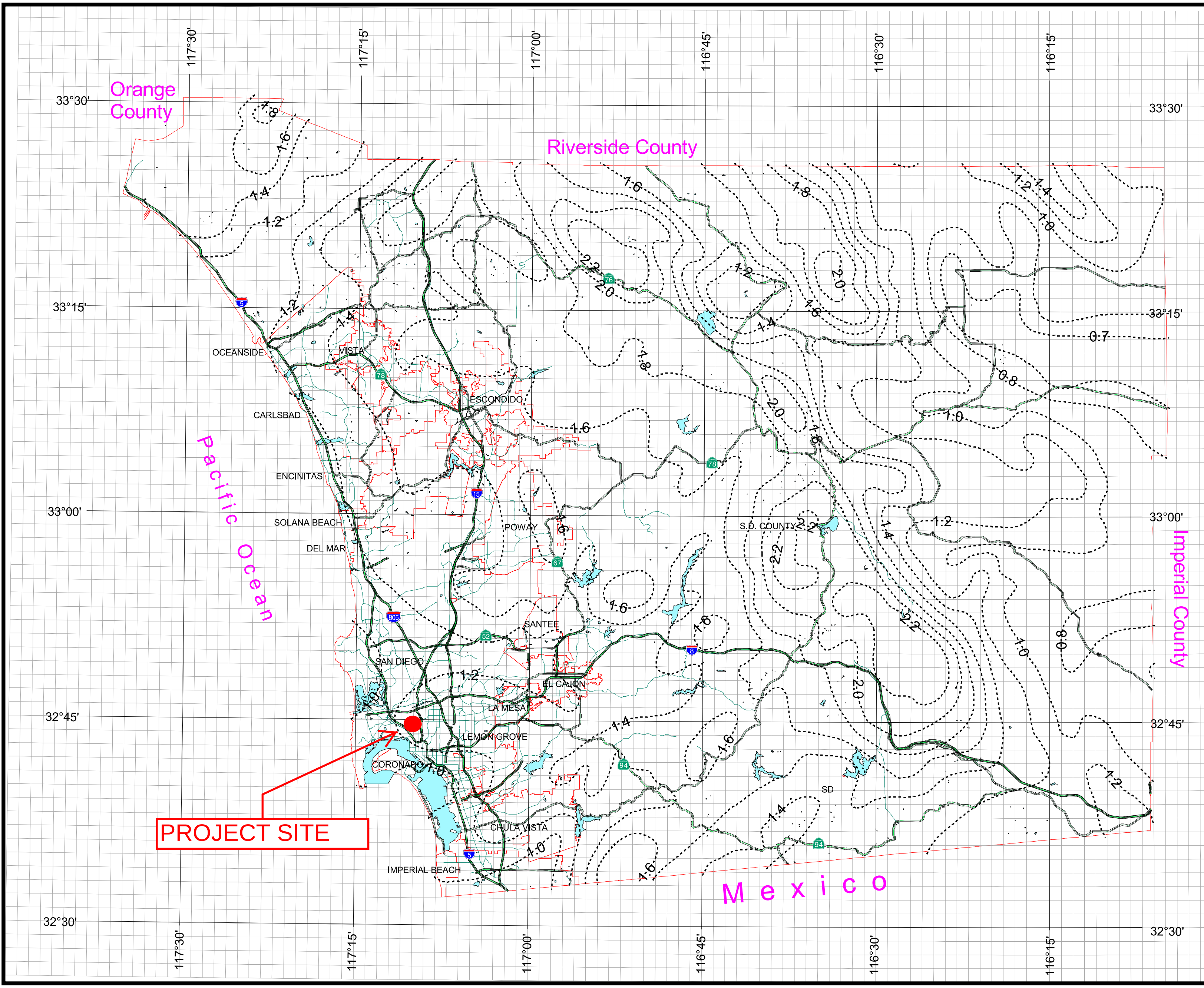
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

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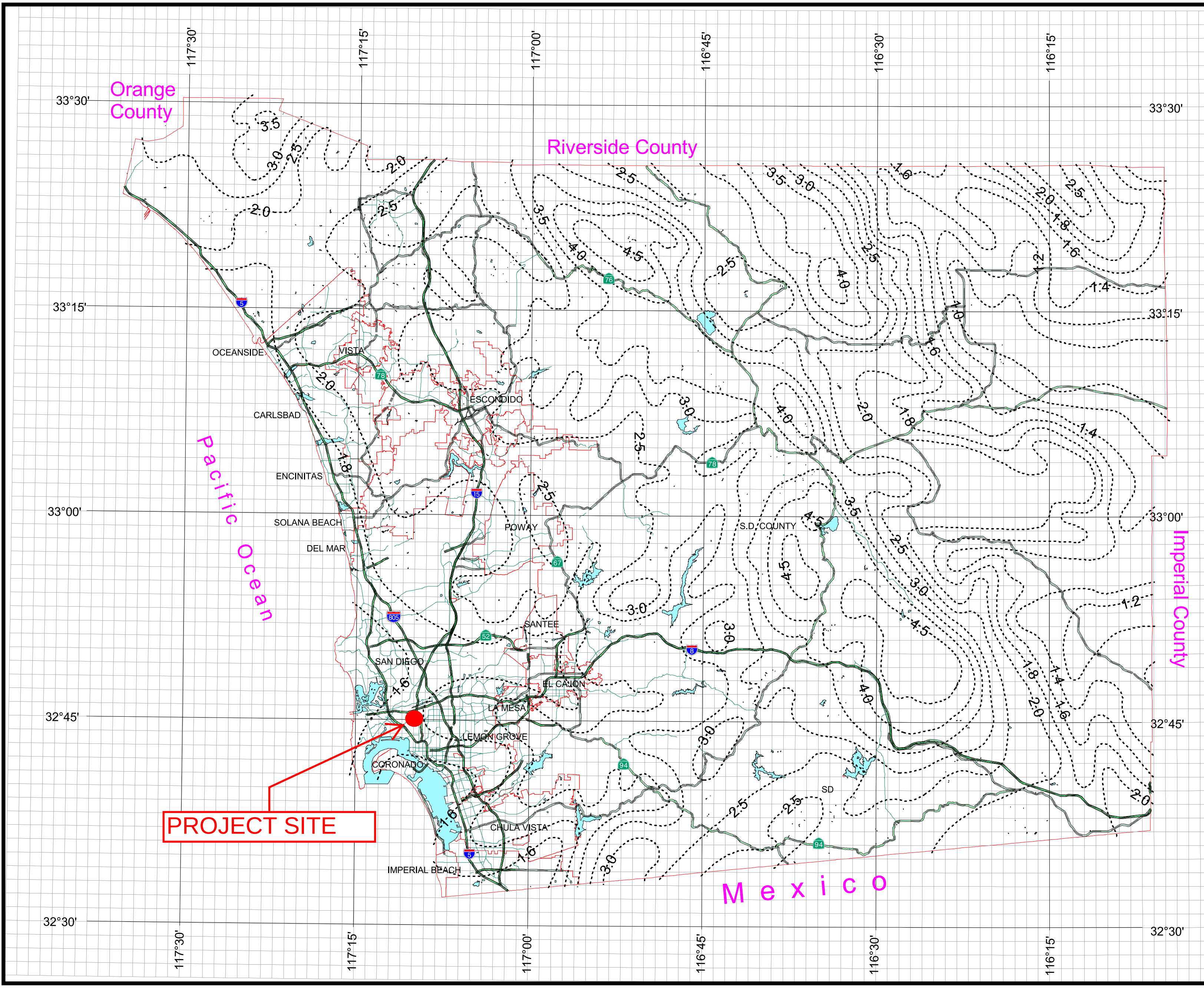

County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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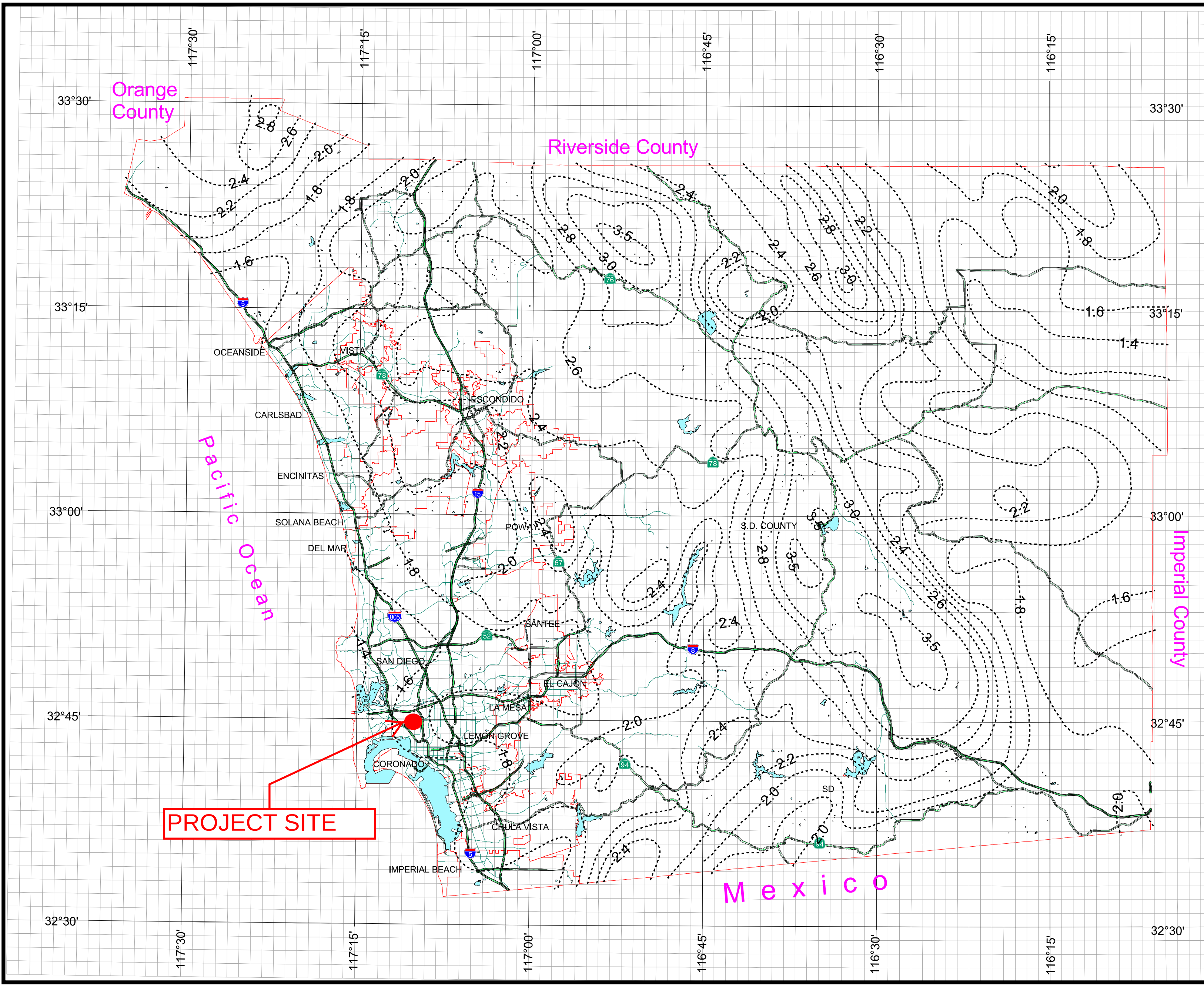

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Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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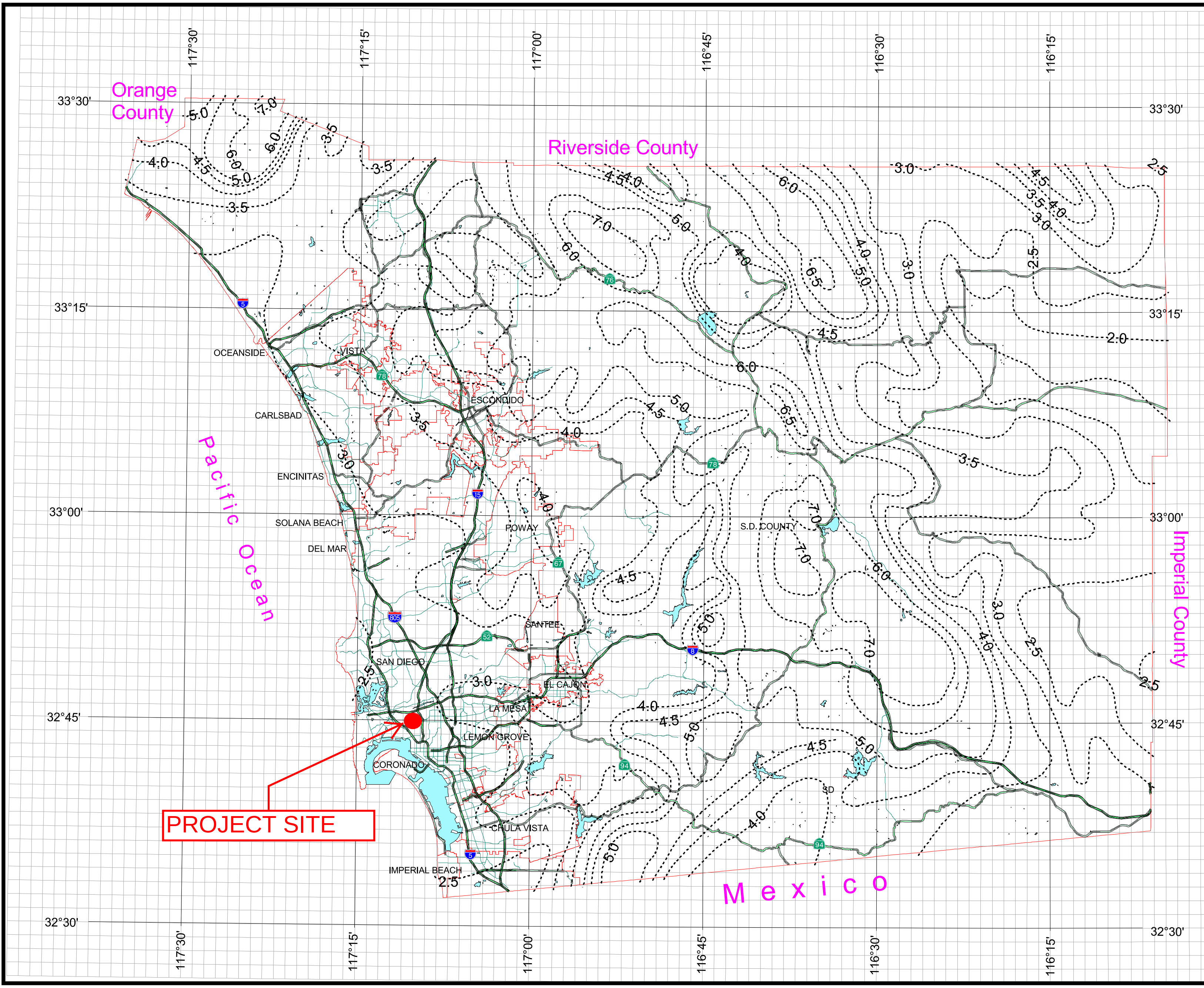

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Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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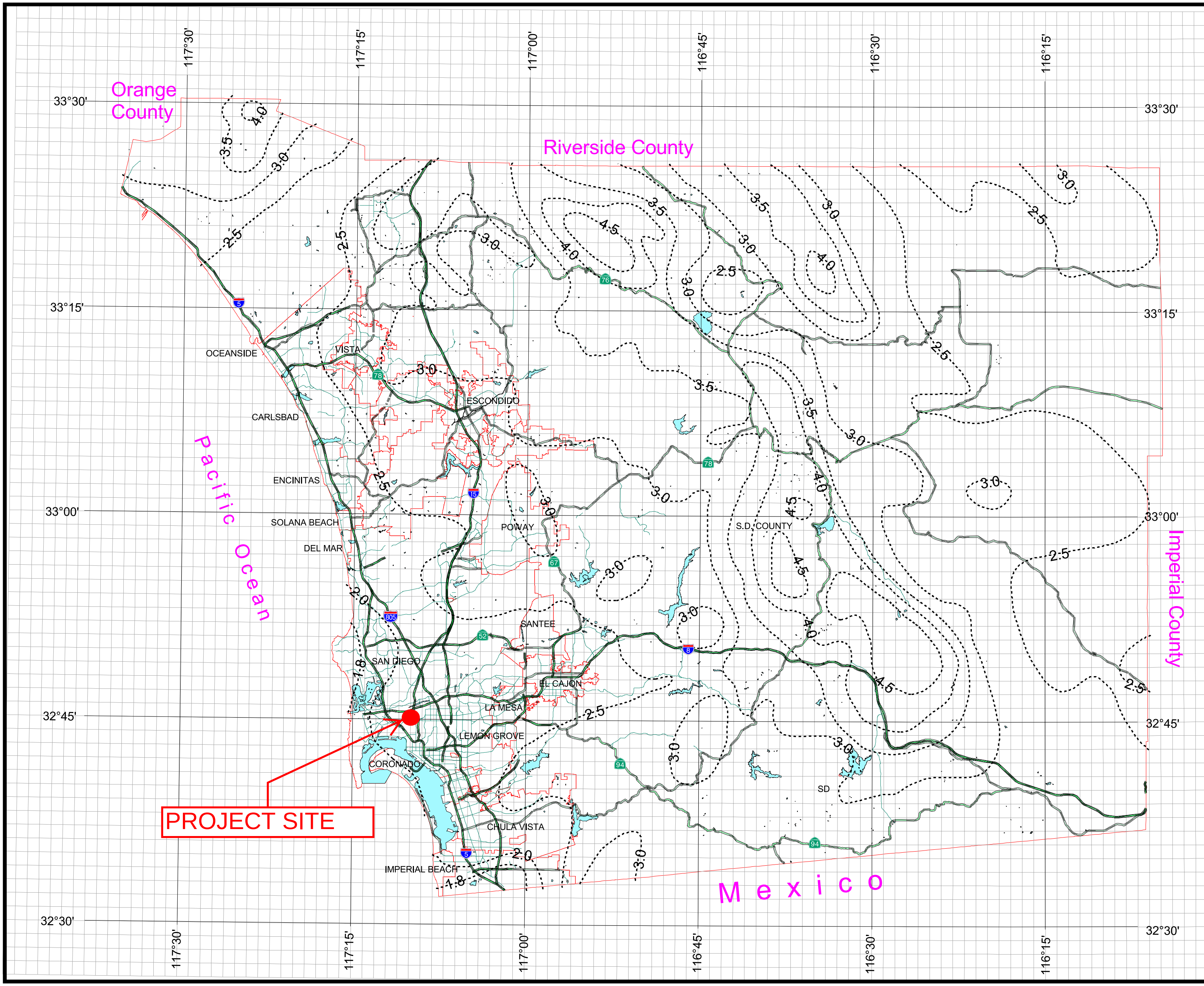

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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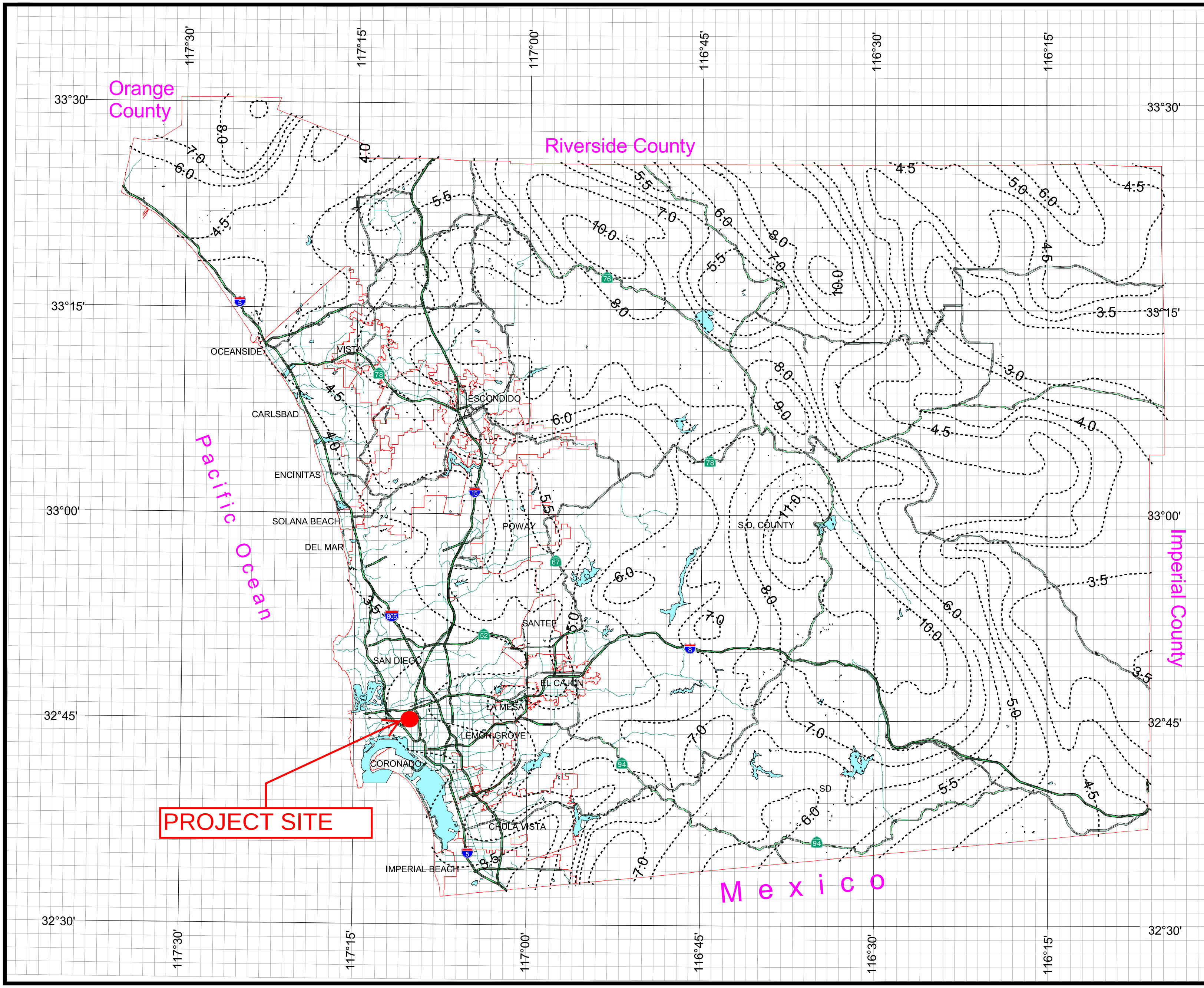

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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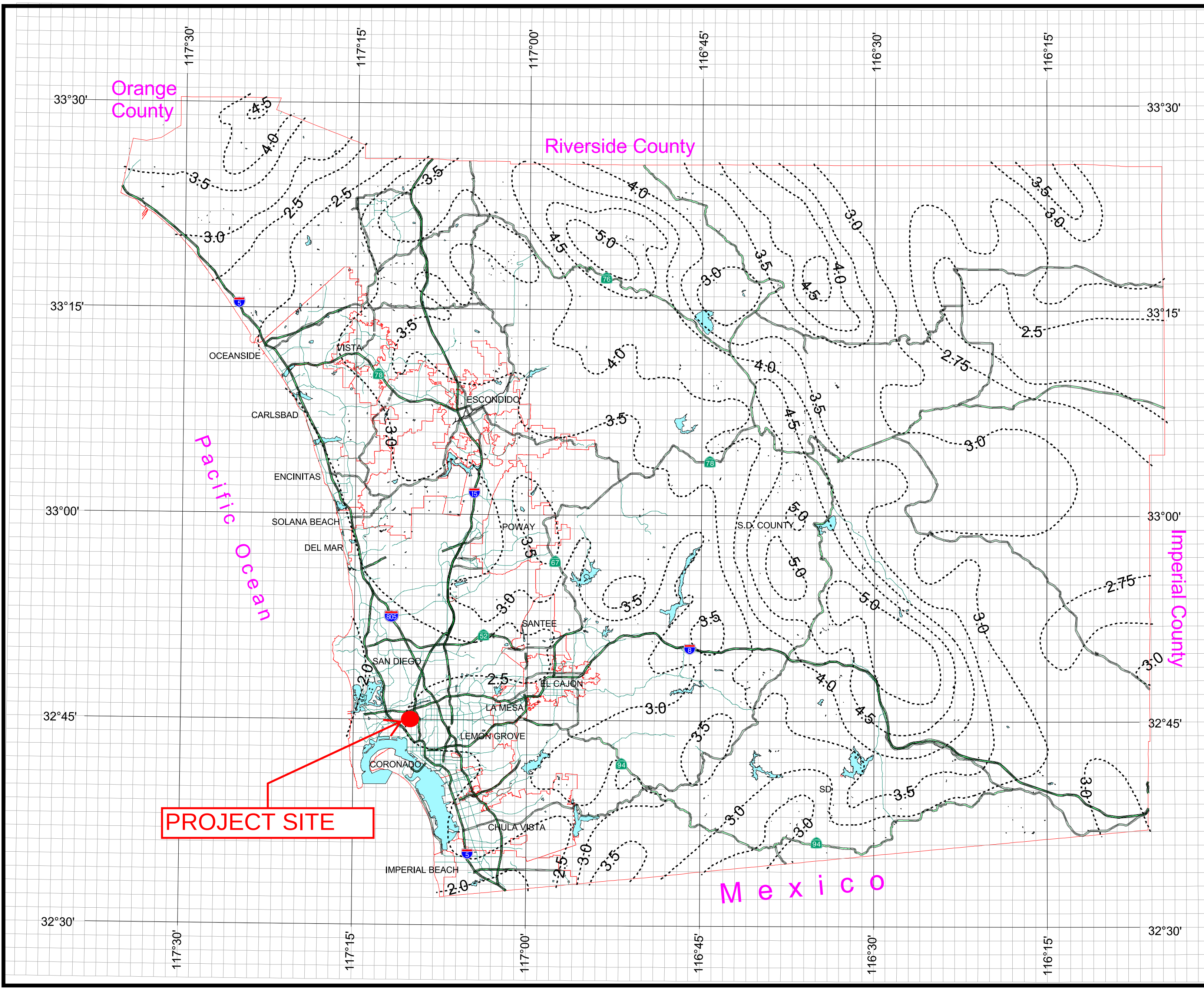

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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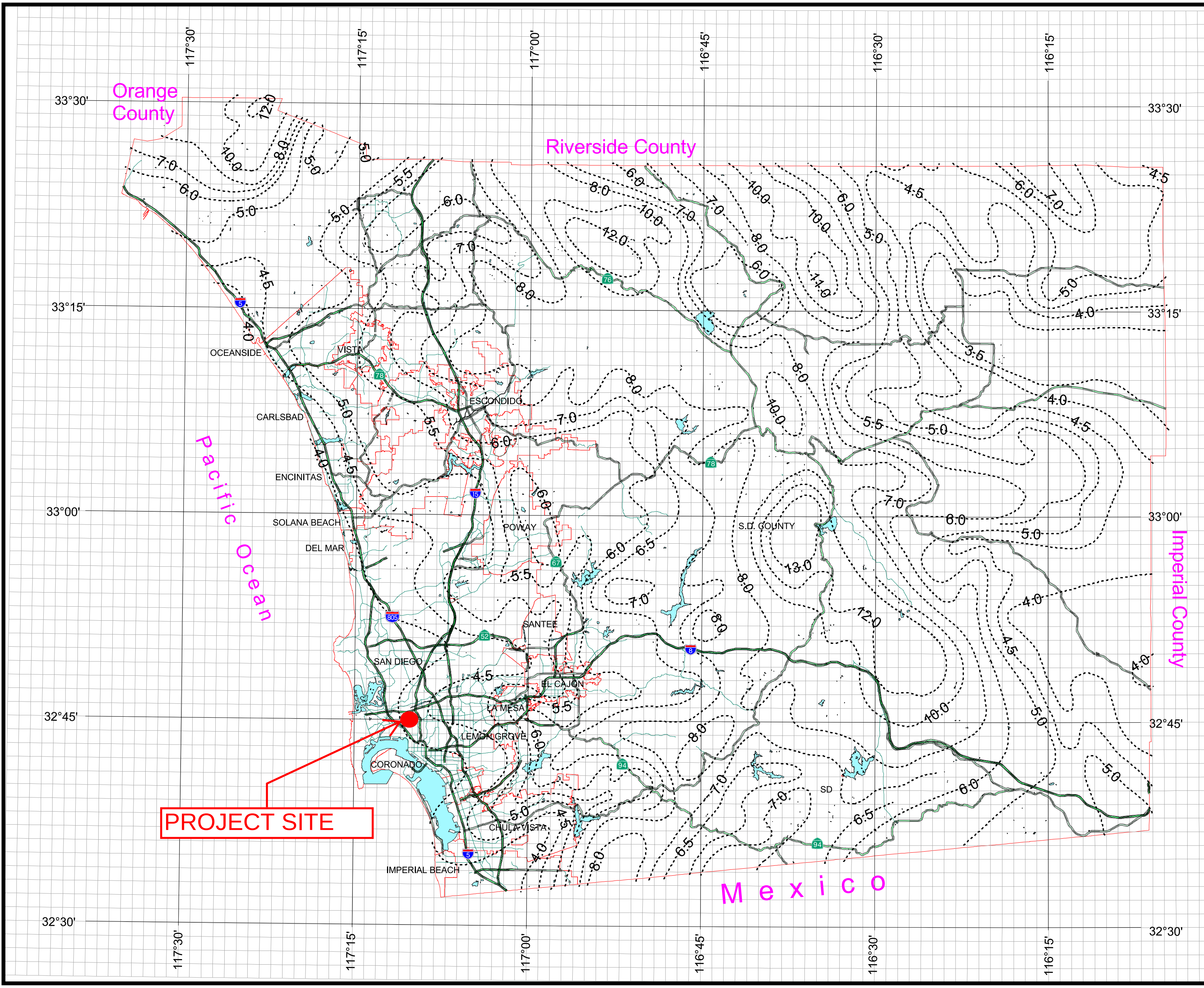

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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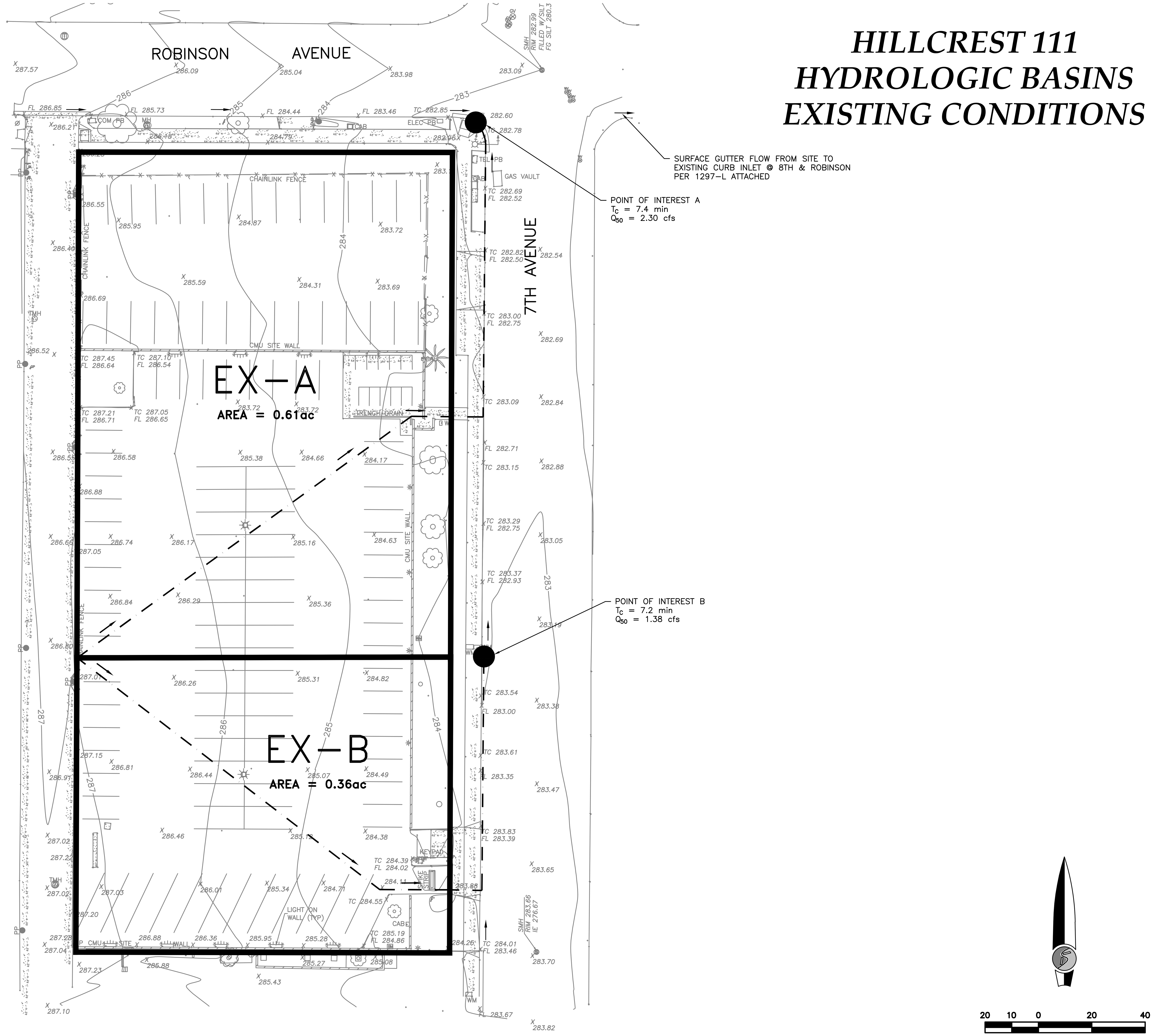
EXISTING AND PROPOSED DRAINAGE MAPS

HILLCREST 111
HYDROLOGIC BASINS
EXISTING CONDITIONS



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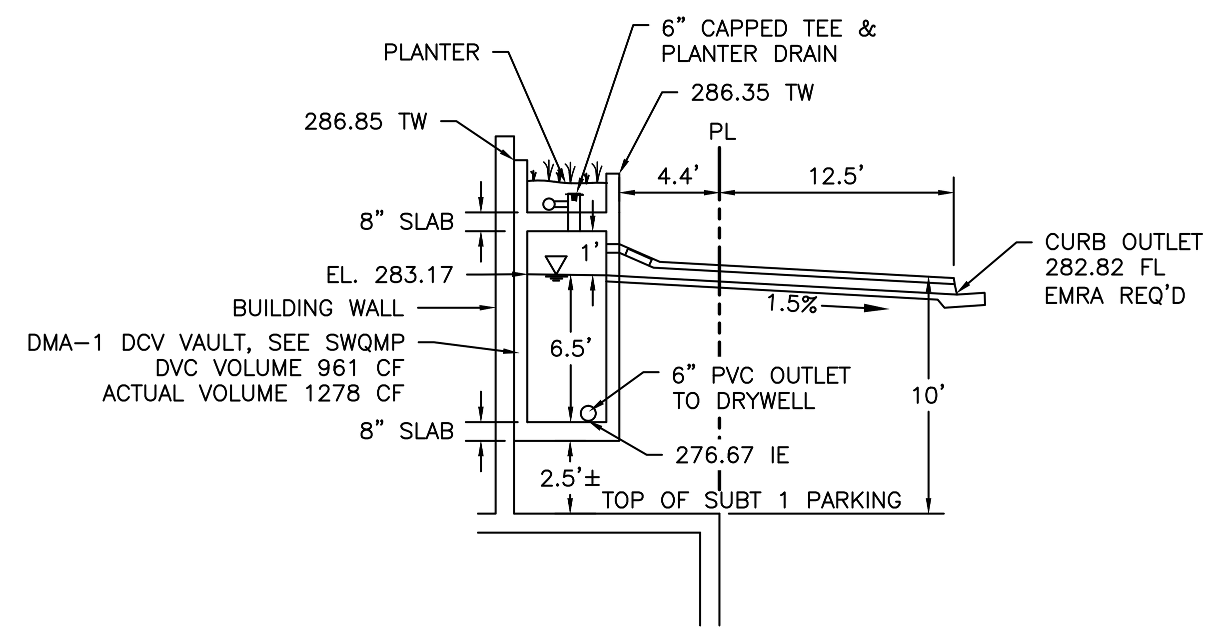
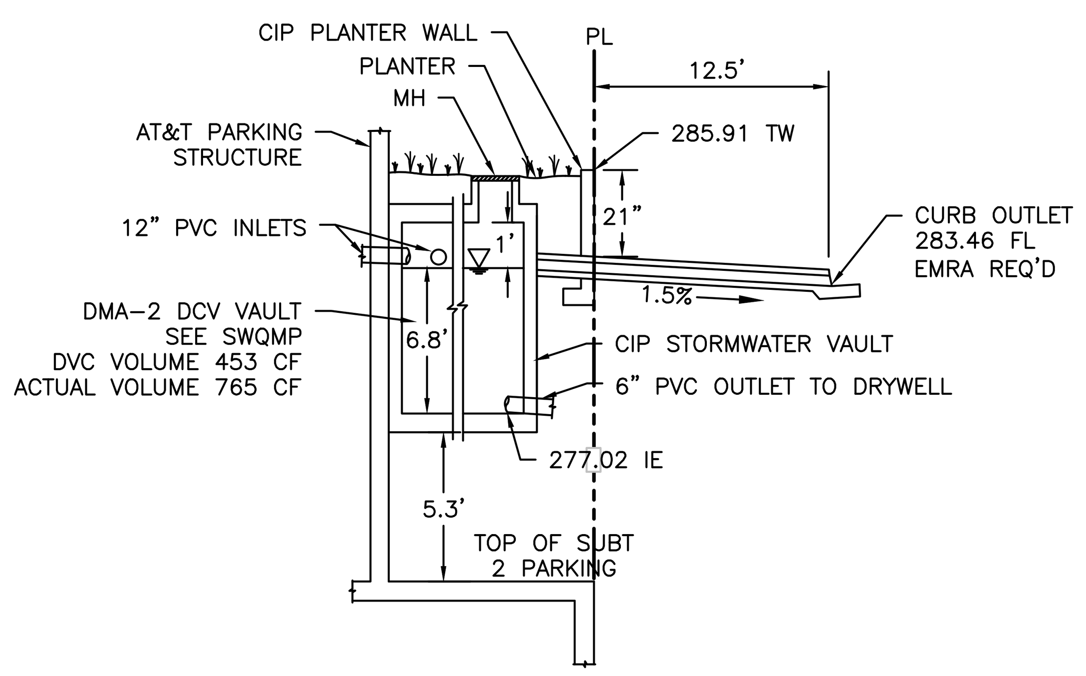
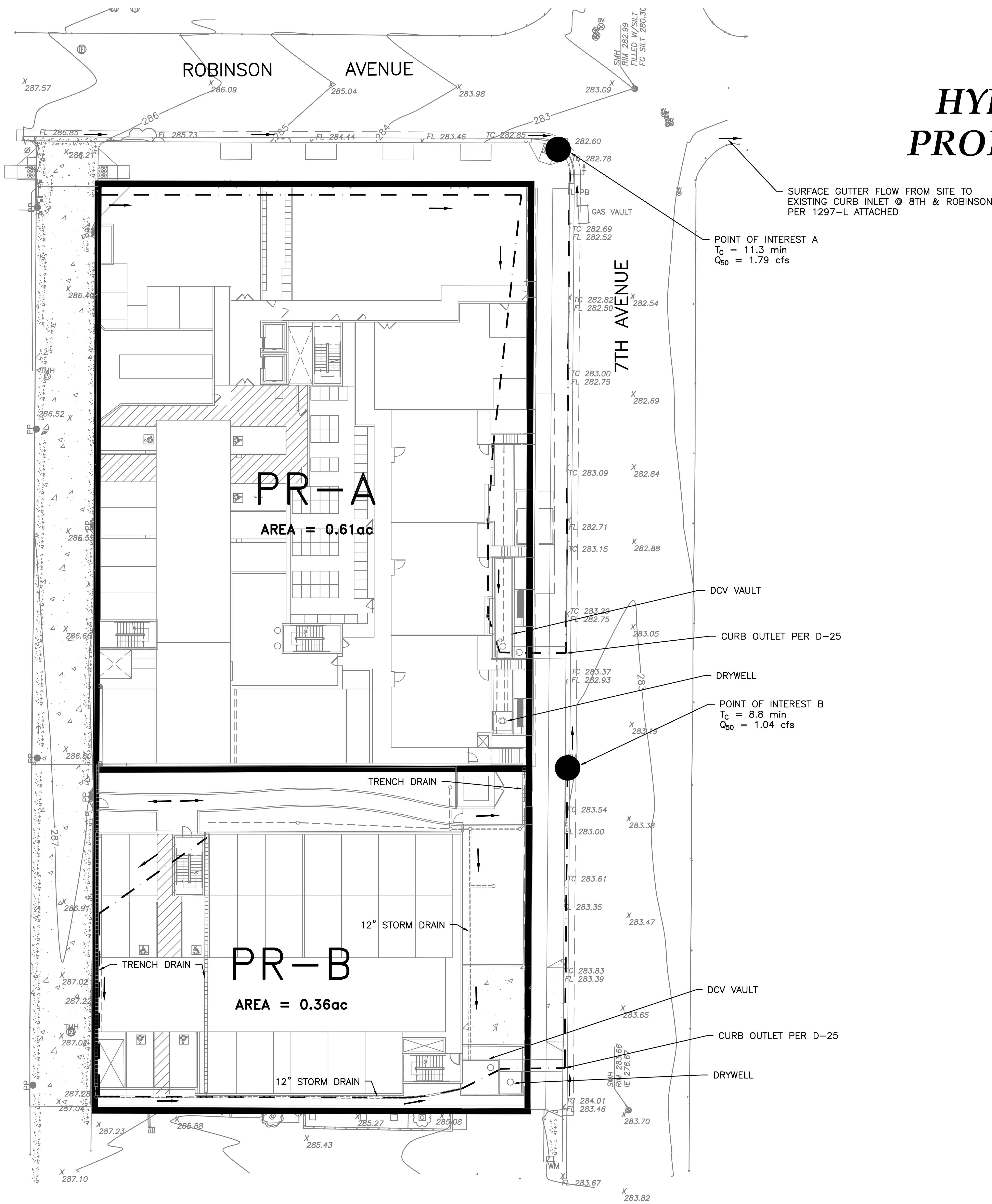
HILLCREST 111
HYDROLOGIC BASINS
PROPOSED CONDITIONS

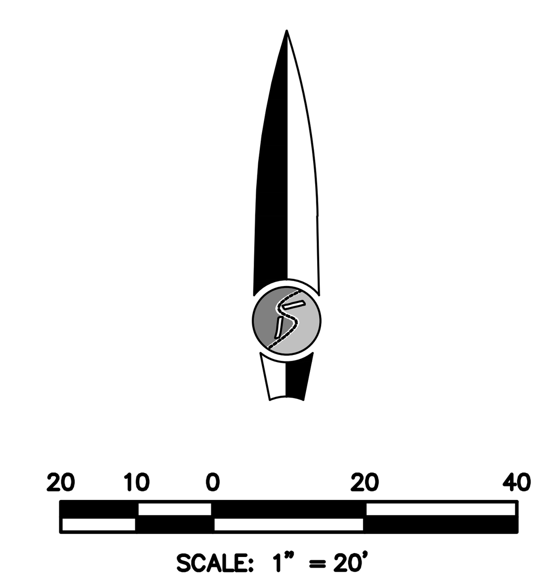


STORM WATER VAULT @ MIXED USE



STORM WATER VAULT @ AT&T GARAGE





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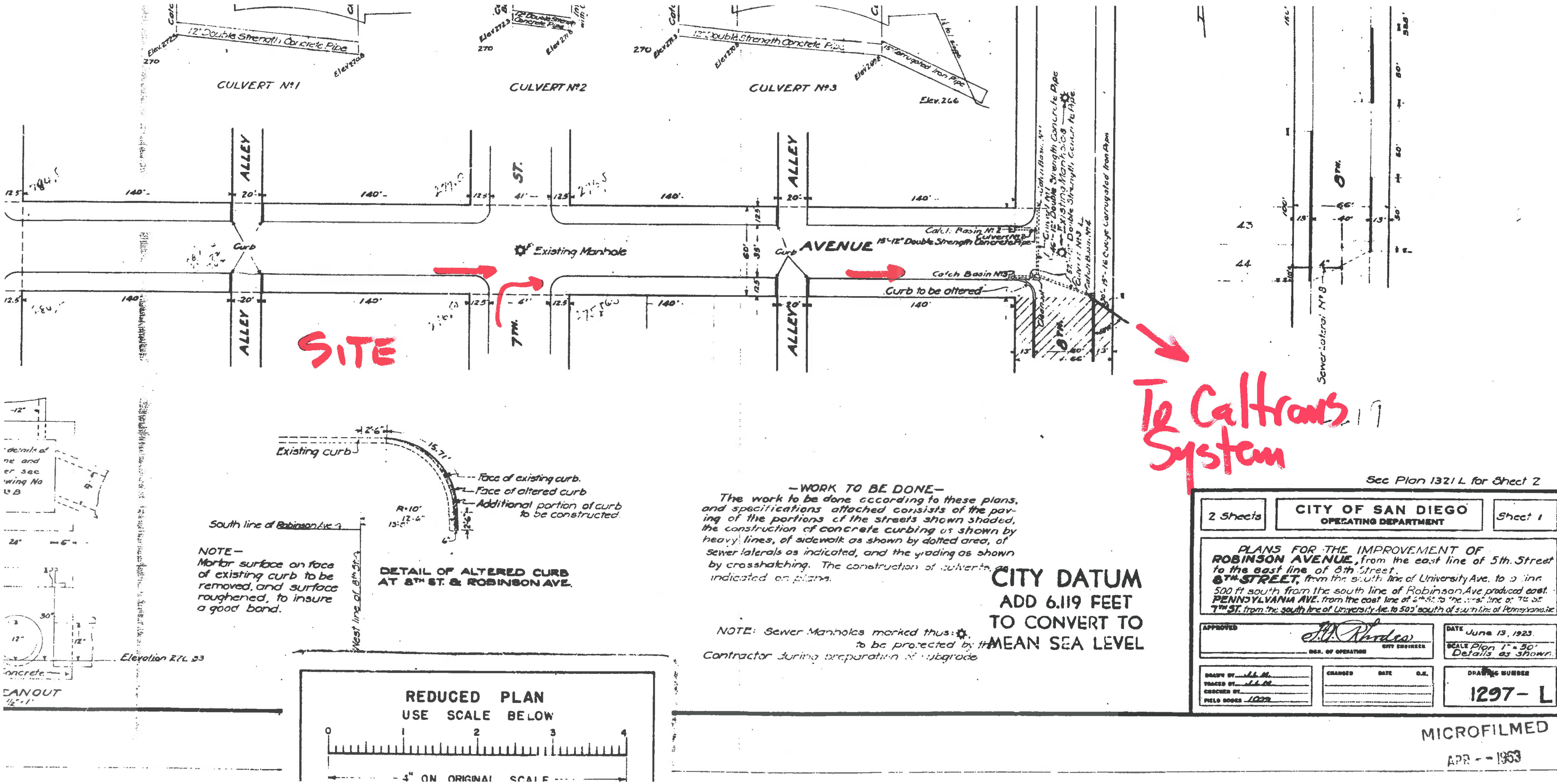
AS BUILT EXHIBIT MAPS



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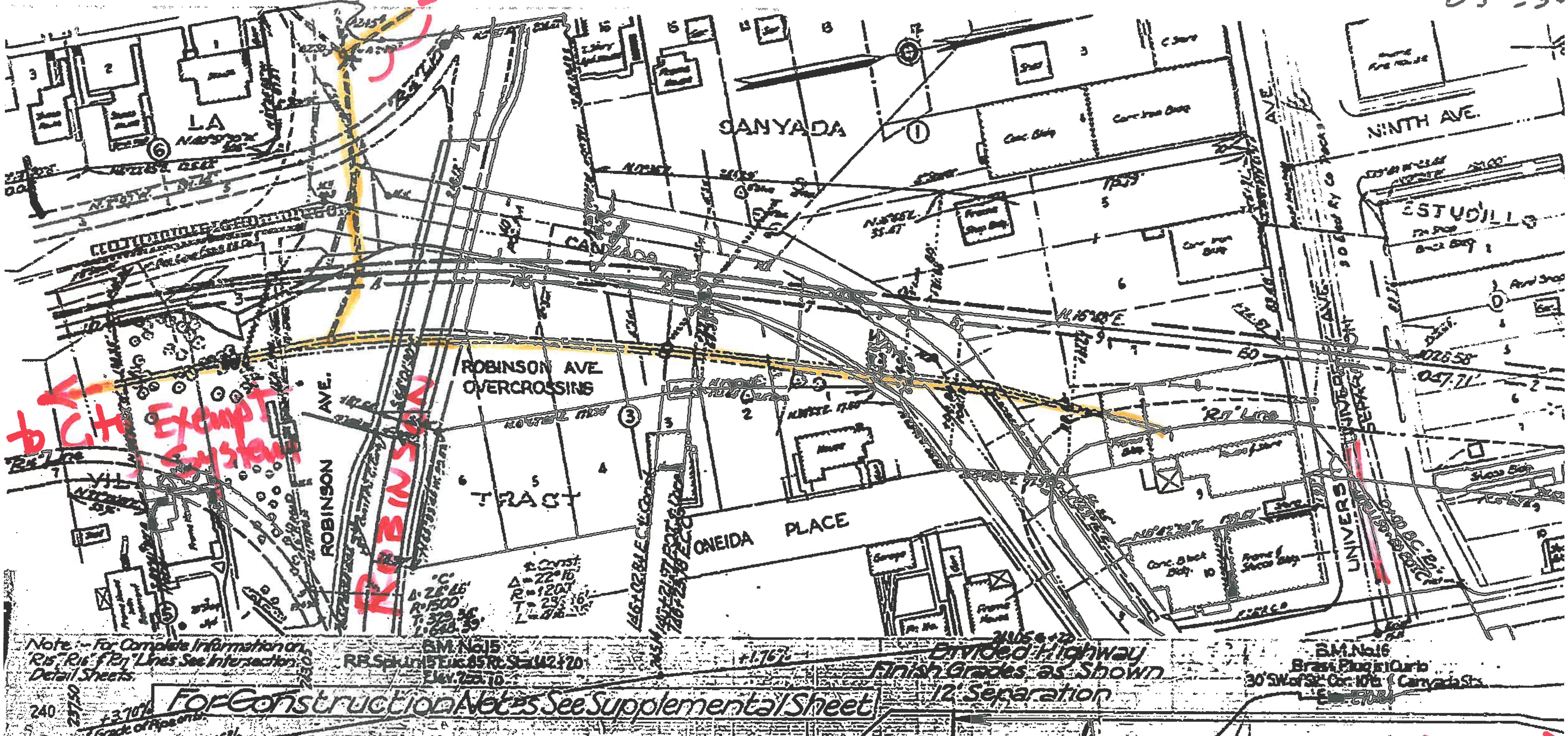

CALTRANS 11-SD-77 (395/163)
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ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

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Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

May 23, 2017

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92677

Attention: Mr. Jim Ivory

Subject: Geotechnical Update Letter, Proposed Mixed-Use Development, 7th and Robinson, San Diego, California

Reference: Leighton and Associates, Inc., Geotechnical Investigation, 7th and Robinson, San Diego, California, dated June 27, 2016.

San Dieguito Engineering, Inc., Civil Plans, Hillcrest III, San Diego, California, Sheet C-1 through C-4, dated May 19, 2017.

In accordance with your request, we have prepared this Geotechnical Update letter for the 7th and Robinson project in San Diego, California. The purpose of this letter is to provide updated recommendations for proposed drywells and to provide the City of San Diego's Appendix C, Worksheet C.4-1, which is based on our current understanding of the City's requirements and our professional judgement.

In support of the proposed project, Leighton and Associates, Inc. (Leighton) previously prepared the referenced geotechnical investigation including subsurface exploration and a deep percolation test for a proposed drywell system. In preparation of this letter, we have reviewed the referenced report (Leighton) and civil drawings (San Dieguito Engineering, Inc).

Based upon our review of the civil drawings, we understand that the proposed development will include a multi-story mixed-used residential development with three levels of subterranean parking and a separate parking garage, also with three subterranean levels. We understand that site stormwater will be collected and routed into two drywells (one drywell each in the basement of the multi-use building and parking structure) with infiltration occurring over a depth interval of 50 to 75 feet below ground surface.

Unfactored infiltration rates were previously provided in our 2016 report. We recommend applying a factor of safety of 2 to calculated infiltration rates as provided in Table 1 below. Additional recommendations with regard to infiltration measures are

3934 Murphy Canyon Road, Suite B205 ■ San Diego, CA 92123-4425
858.292.8030 ■ Fax 858.292.0771 ■ www.leightongroup.com

included in our referenced 2016 geotechnical investigation. It should be emphasized that the infiltration test results are only representative of the tested location and depth where they are performed. At the time infiltration testing was performed specific locations of stormwater infiltration BMPs were not known. Based upon the results of our percolation testing at the depths indicated, the site classifies as a "full infiltration" site.

Table 1
Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)	Infiltration Rate, with F.S.=2 (inches/hr)
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7	0.85
B-3	75	San Diego Formation (Tsd)	0.14	428	4.61	2.30

We have included Worksheet C.4-1 as Appendix A of this letter.

If you have any questions regarding this letter, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

David B. Nevius, GE 2789
Associate Engineer

Robert C. Stroh, CEG 2099
Associate Geologist

Attachment: City of San Diego Worksheet C.4-1

Distribution: (1) Addressee

Appendix A

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

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

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria 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: Results of our percolation testing indicates an infiltration rate greater than 0.5 inches/hour with an applied factor of safety 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	
Provide basis: Infiltration can be allowed provided that infiltration measures are designed in accordance with the requirements provided in our June 27, 2016 Geotechnical Investigation. 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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. In addition, a groundwater separation of at least 10 feet needs to be provided for the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration 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		X Full

*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.

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: Results of our percolation testing indicates an infiltration rate greater than 0.5 inches/hour with an applied factor of safety of 2. 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: Infiltration can be allowed provided that infiltration measures are designed in accordance with the requirements provided in our June 27, 2016 Geotechnical Investigation. 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			

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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. 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.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. 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.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. 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.		

*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

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

February 13, 2017

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92614

Attention: Mr. Jim Ivory

Subject: Response to City Cycle Issues, 7th and Robinson, City of San Diego Cycle 1 LDR – Geology, Multi-Discipline Review, dated December 13, 2016.

Reference: Leighton and Associates, Geotechnical Investigation, 7th and Robinson, San Diego, California, Project Number 11347.001, dated June 27, 2016.

San Dieguito Engineering, Inc., Grading Plan, Hillcrest III, San Diego, California, Sheet C-2, dated February 14, 2017.

In accordance with your request, we have addressed City Cycle Issue Comments which include providing this letter as an update to our report for the proposed 7th Avenue and Robinson Street project located in San Diego, California. Specifically, we have prepared a response to the City of San Diego Cycle 1 LDR - Geology Cycle Issues for the proposed project, completed December 13, 2016. For clarity, the City of San Diego cycle issues are italicized and numbered in accordance with the order presented on City's issues sheet. It should also be noted that issues addressed below are specific to the geotechnical aspects of the project and other issues for other disciplines are not addressed in this letter.

Issue No. 2

The project consultants could note that a NPDES permit may be required by the Regional Water Quality Control Board for groundwater discharged through basement

3934 Murphy Canyon Road, Suite B205 ▪ San Diego, CA 92123-4425
858.292.8030 ▪ Fax 858.292.0771 ▪ www.leightongroup.com

wall drains and pumped to a stormwater conveyance system. The Geology Section will defer to LDR-Engineering for discharge permit requirements.

<u>Response</u>

This condition has been noted in Section 7.4.4 of our above-referenced 2016 report.

<u>Issue No. 4</u>

Apply the appropriate factor of safety to the calculated infiltration rates.

<u>Response</u>

We recommend applying a factor of safety of 2 to calculated infiltration rates as provided in Table 1 below. Additional recommendations with regard to infiltration measures are included in our referenced 2016 geotechnical investigation. It should be emphasized that the infiltration test results are only representative of the tested location and depth where they are performed. At the time infiltration testing was performed specific locations of stormwater infiltration BMPs were not known.

Table 1

Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)	Infiltration Rate, with F.S.=2 (inches/hr)
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7	0.85

<u>Issue No. 5</u>

Provide the information required in the Storm Water Standards, Work Sheet C.4-1 or Form I-8 (https://www.sandiego.gov/sites/default/files/storm-water-standards-manual-2016-1.pdf).

Response

We have included Worksheet C.4-1 of Appendix C as Appendix A of this letter.

If you have any questions regarding this letter, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

REGISTERED PROFESSIONAL ENGINEER
DAVID B. NEVIUS
2789
Expires 6/30/17
GEOTECHNICAL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
ROBERT C. STROH
NO. 2099
CERTIFIED ENGINEERING GEOLOGIST
EXP. 10/31/17
STATE OF CALIFORNIA

David B. Nevius, GE 2789
Associate Engineer

Robert C. Stroh, CEG 2099
Associate Geologist

Attachment: City of San Diego Worksheet C.4-1

Distribution: (1) Addressee

City of San Diego Worksheet C.4-1

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

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria 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: Results of our shallow percolation test indicate a percolation rate greater than 0.5 inches/hour with an applied factor of safety 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	
Provide basis: Infiltration can be allowed provided that infiltration measures are designed in accordance with the setback requirements provided in our June 29, 2016 Geotechnical Investigation. 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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. In addition, a groundwater separation of at least 10 feet needs to be provided for the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration 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	X Full	

*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.

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: Results of our shallow percolation test indicate a percolation rate greater than 0.5 inches/hour with an applied factor of safety of 2. 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: Infiltration can be allowed provided that infiltration measures are designed in accordance with the setback requirements provided in our June 27, 2016 Geotechnical Investigation. 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			

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	
Provide basis: It may be possible that the risk of groundwater contamination would not be increased provided there are no contaminated soil or groundwater sites within 250 feet of the proposed infiltration site. 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.			
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	
Provide basis: It may be possible that potential water balance issues would not be affected provided there are no unlined site drainages/creeks/streams within 250 feet of the proposed infiltration site. 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.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. 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.		

*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

GEOTECHNICAL INVESTIGATION
7^{TH} AND ROBINSON
SAN DIEGO, CALIFORNIA

Prepared for:

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California

Project No. 11347.001

June 27, 2016

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

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.

Geotechnical 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 civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you 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 the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- 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. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* 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 environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of 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. Confer with you GBC-Member geotechnical engineer for more information.

GBC GEOTECHNICAL BUSINESS COUNCIL *of the Geoprofessional Business Association*

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

June 27, 2016

Project No. 11347.001

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, California 92677

Attention: Mr. Jim Ivory

Subject: Geotechnical Investigation
7th and Robinson
San Diego, California

In accordance with your request and authorization, Leighton and Associates, Inc. (Leighton) has conducted a geotechnical investigation for the proposed residential and mixed use development located at 635 Robinson Avenue in the Hillcrest neighborhood of San Diego, California. We understand that this development may include a 4-level above ground parking garage as well as a 6-level residential/retail mixed-use building with three levels underground parking. Based on the results of our study, it is our professional opinion that the site is suitable for development of such a project. The accompanying geotechnical report presents a summary of our current investigation and provides geotechnical conclusions and recommendations.

If you have any questions regarding our report, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

PROFESSIONAL GEOLOGIST
ROBERT C. STROH
NO. 2099
CERTIFIED
ENGINEERING
GEOLOGIST
EXP. 10/31/17
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
DAVID B. NEVIUS
2789
Expires 6/30/17
GEOTECHNICAL
STATE OF CALIFORNIA

Robert C. Stroh, CEG 2099
Associate Engineering Geologist
Extension: 4090, rstroh@leightongroup.com

David B. Nevius, GE 2789
Associate Engineer
Extension:8484, dnevius@leightongroup.com

DBN/RCS/dbn/jss

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APPENDICES

1.0 INTRODUCTION

1. 1 Site Location and Description

The proposed project site is located at 635 Robinson Avenue, southwest of Robinson Avenue and 7th Avenue in the Hillcrest neighborhood of San Diego, California (see Figure 1, *Site Location Map*). The block is bounded by Robinson Avenue to the north, 7th Avenue to the east, multi-family residential properties to the south, and commercial/retail properties to the west. The site is currently occupied by two parking lots which service the AT&T facility to the north (see Figure 2, *Geotechnical Map*).

Site topography is nearly level with a ground surface elevation of approximately 286 feet.

Site Latitude and Longitude
32.7465º N
117.1588º W

1. 2 Proposed Development

The proposed project will include a mixed-use residential, retail, and commercial building with basement parking, along with an additional parking structure to serve the adjacent AT&T facility. Based on our review of the conceptual plans by Carrier Johnston + Culture (Appendix D), the proposed mixed-use development consists of six levels of residential and retail space with three levels of basement parking. The separate AT&T parking garage, located south of the mixed-use development, will provide 4 levels of parking.

1.3 Purpose and Scope

This report presents the results of our geotechnical investigation for the 7th and Robinson project site. The intent of this report is to characterize engineering properties of onsite soils, identify geologic and seismic hazards that may impact the proposed improvements, and to provide preliminary geotechnical recommendations for the currently proposed project.

We recommend that all individuals utilizing this report read the preceding information sheet prepared by GBC (the Geotechnical Business Council of the Geoprofessional Business Association) and Section 8.0, Limitations, located at the end of this report.

2.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

2.1 Site Investigation

The subsurface exploration consisted of excavating five (5) small diameter (8-inch) hollow-stem auger borings (B-1 through B-5) drilled to depths ranging from approximately 31 feet to 91 feet below the existing ground surface (bgs). Logs of exploratory borings are provided in Appendix B, and boring locations are provided on Figure 2. A deep percolation test was conducted in Boring B-3. An additional shallow percolation test (P-1) was performed on the east of the site (Figure 2). Results of the percolation tests are also included in Appendix B.

The borings were performed within the limits of the current project site to characterize the onsite soils, including those likely to be encountered at and below the proposed foundation elevations for this project. Prior to drilling, we marked proposed boring locations and notified Underground Service Alert (USA) to identify buried utilities. A private utility locator service was also used to identify utilities in the parking lots.

The borings were logged by a staff geologist during drilling in accordance with the Unified Soil Classification System (ASTM D2488). Relatively undisturbed samples were collected using a California Ring sampler, disturbed Standard Penetration Test (SPT) samples, and bulk soil samples were obtained from these borings at selected depth intervals. The soil samples were transported to our in-house geotechnical laboratory for evaluation and appropriate testing. After logging and sampling, the boreholes were backfilled with bentonite grout in accordance with DEH standards. The boring logs are presented in Appendix B. Figure 2 depicts the location of the excavated borings.

2.2 Laboratory Testing

Laboratory testing performed on representative soil samples obtained during the recent subsurface exploration included tests of moisture and density, sieve analysis, shear strength, expansion index, and geochemical analysis for corrosion. A discussion of the laboratory tests performed and a summary of the laboratory test results are presented in Appendix C. In-situ moisture and density test results are provided on the boring logs in Appendix B.

3.0 SUMMARY OF GEOTECHNICAL CONDITIONS

3.1 Geologic Setting

The project area is situated in the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California, and varies in width from approximately 30 to 100 miles (Norris and Webb, 1990). The province is characterized by mountainous terrain on the east composed mostly of Mesozoic igneous and metamorphic rocks, and relatively low-lying coastal terraces to the west underlain by late Cretaceous-age, Tertiary-age, and Quaternary-age sedimentary units. Most of the coastal region of the County of San Diego, including the site, occur within this coastal region and are underlain by sedimentary units. Specifically, the subject site is located within the coastal plain section of the Peninsular Range Geomorphic Province of California, which generally consists of subdued landforms underlain by sedimentary bedrock. A regional geology map is provided as Figure 3

3.2 Site-Specific Geology

Based on the subsurface exploration and review of pertinent geologic literature and maps, the geologic units underlying the site consist of Undocumented Fill, underlain in turn by Quaternary-aged Very Old Paralic Deposits and Tertiary-aged San Diego Formation. The approximate areal distribution of these units is depicted on the Geotechnical Map (Figure 2). The approximate vertical distribution of lithologic units underlying the site is shown on the geologic Cross-Section A-A’ (Figure 4). A brief description of the geologic units encountered on the site is presented below.

3.2.1 Undocumented Fill (Afu)

A generally thin (1 to 5-foot thick) layer of undocumented artificial fill soils, apparently placed during the site’s initial construction were observed across the site. An as-graded report was not available for our review, and it is assumed that no engineering observations of these fill soils were provided at the time of grading. The character of these fill soils varied across the site, but generally included reddish brown to dark reddish brown, moist, loose to medium dense, silty sand, gravelly sand, and clayey sand as well as localized clay. Based upon our field investigation, we anticipate that the more plastic, clayey soils may be located below the proposed parking garage site. These soils are also expected to have greater potential for expansion.

3.2.2 Very Old Paralic Deposits (Map Symbol – Qvop)

Previously the site was mapped as being underlain by the Lindavista Formation (Kennedy, 1975). More recent mapping by Kennedy and Tan, 2008 has renamed the previously mapped geologic formation as Very Old Paralic Deposits - Subunit 9 (Figure 3). As encountered during our field investigation, this unit consists of reddish brown to orange-brown, dense to very dense, silty and clayey sands with trace gravels and sandy clays. Cemented interbeds, gravel layers, and hard concretionary layers were also encountered in this unit. Although not encountered during drilling operations, discrete cobbles or cobble layers are commonly encountered in this unit. These soils are suitable for use as structural fill provided they are free of rock fragments larger than 6 inches in maximum dimension. This unit, as encountered, varied in thickness from 3 feet (at Boring B-3), to approximately 12 feet (at Boring B-4).

3.2.3 San Diego Formation (Map Symbol –Tsd)

Tertiary-aged San Diego Formation underlies the entire site at depth and was observed extending to the total depth explored (91 feet below ground surface). As encountered, the San Diego Formation generally consisted of dense to very dense, brown to grayish brown and pale to light gray, moist, sandstone with silt and some interbedded gravel layers. Well cemented gravel conglomerate and concretions were also encountered during drilling.

Based on our experience with similar sites in the area, excavations within this unit will encounter zones of poorly graded cohesionless sands that may cave or slough during unsupported site excavation and the performance of drilling excavation.

3.3 Surface and Groundwater

Groundwater was observed in the exploratory hollow-stem boring B-3 at a depth of approximately 83 feet bgs (approximate elevation 205 feet). The groundwater table may fluctuate with seasonal variations and irrigation, and local perched groundwater conditions may exist.

Based on our review of the conceptual plans and our experience with similar projects, groundwater is not expected to be a constraint to site development. We do not anticipate that temporary dewatering will be necessary to complete the excavation of the proposed basement.

3.4 Engineering Characteristics of On-site Soils

Based on the results of our laboratory testing of representative on-site soils (Appendix C), and our professional experience on similar sites with similar soils conditions, the engineering characteristics of the on-site soils are discussed below.

3.4.1 Expansion Potential

The expansion potential of the on-site soil is anticipated to be very low to medium. Based upon our field exploration and sampling, we anticipate that the fill soils may have the greatest potential for expansion, with the underlying formational soils having very low to low potential for expansion. However, localized more expansive soils may be encountered during construction operations. Geotechnical observations and/or laboratory testing upon completion of site grading are recommended to determine the actual expansion potential of finish grade soils on the site at the location of improvements.

3.4.2 Soil Corrosivity

A preliminary screening of the on-site soils was performed to evaluate their potential corrosive effect on concrete and ferrous metals. In summary, laboratory testing on one representative soil sample obtained during our subsurface exploration evaluated pH, minimum electrical resistivity, and chloride and soluble sulfate content. The sample tested had measured pH value of 7.57, and a measured minimum electrical resistivity of 824 ohm-cm. Test results also indicated that the sample had a chloride content of 66.7 parts per million (ppm), and soluble a sulfate content of 180 ppm.

3.4.3 Excavation Characteristics

The site is underlain by undocumented fill, Paralic Deposits with silty to clayey sandstone and gravel conglomerate, and the San Diego Formation consisting of generally friable and poorly graded sandstone with siltstone and interbedded gravel conglomerate. Isolated cobbles and cobble layers should also be anticipated.

With regards to the proposed project, it is anticipated these on-site soils can be excavated with conventional heavy-duty construction equipment. Note that zones of poorly graded and friable sand and sandstone may cave or slough during unsupported excavations and drilling. It should be noted that localized gravel layers (and potentially cobble layers) exist that may impede drilling for deep foundations and shoring. Oversize cobble material, if encountered, should be placed in non-structural areas or hauled off-site.

3.4.4 Percolation and Infiltration Characteristics

Based on our field percolation testing, the in-situ percolation rates and calculated infiltration rates at tested locations and depths are summarized in Table 1 below. The percolation test locations (B-3 and P-1) are shown on Figure 2. Field data and calculated percolation rate for each percolation test location is presented in Appendix B. It should be noted that the deep percolation test on Boring B-3 was tested over a depth interval of 50 to 75 feet.

We have used the following equation based upon the Porchet Method to convert measured percolation rates to infiltration rates:

$$I_t = \frac{\Delta H * 60 * r}{\Delta t(r+2H_{AVG})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = radius of test hole
H_{AVG} = average head over the time interval, inches

Table 1
Field Percolation Test Results

Perc Test No.	Tested Depth (ft)	Soil Type	Measured Percolation Rate (mins/in)	Measured Percolation Rate (inches/hr)	Calculated Infiltration Rate (inches/hr)
B-3	75	San Diego Formation (Tsd)	0.14	428	4.61
P-1	1.6	Artificial Fill (Afu)	9.6	6.25	1.7

It should be emphasized that the percolation test results are only representative of the tested location and depth where they are performed. Varying subsurface conditions may exist outside of the test location, which could alter the measured percolation rate or calculated infiltration rate indicated above. In addition, it is important to note that percolation rates are not equal to infiltration rates. As a result, we have made a distinction between percolation rates where water movement is considered laterally and vertically versus infiltration rates where only the vertical direction is considered. We have used the Porchet Method to convert measured percolation rates to calculated infiltration rates in accordance with County of Riverside Standards (2011) and as recommended in the City of San Diego Storm Water Standards BMP Design Manual (2016).

It is possible that the long term rate of infiltration of permeable soil strata may be much lower than the values obtained by testing. Specifically, infiltration may be influenced by: variable vertical character and limited lateral extent of more permeable soil strata; reduction of infiltration over time due to silting of the soil pore spaces; and other unknown factors. Accordingly, the possibility of future surface ponding of water as well as shallow groundwater impacts on subterranean structures such as basements, underground utilities, etc. should be anticipated as possible future conditions in all design aspects of the site. Additional recommendations are provided in Section 7.7.

Considering the variance in materials encountered in our borings at the subject site, a factor of safety should applied to the above measured percolation rates and calculated infiltration rates to be used for BMP design. It should be noted that the above rates represent stabilized values and that these rates may degrade over time due to complete saturation of underlying soils, and fines build-up and plugging if pre-treatment and maintenance of the storm water device is not performed. As such, the selected percolation or infiltration rates should be reduced by a factor of safety determined by the design engineer to establish a conservative design rate for the service life of the proposed system.

4.0 FAULTING

4.1 Regional Tectonic Setting

During the late Pliocene, several new faults developed in Southern California, creating a new tectonic regime superposed on the flat-lying section of Tertiary and late Cretaceous rocks in the San Diego region. One of these fault systems is the Rose Canyon Fault Zone, which is considered the most significant fault within the San Diego Metropolitan area.

The principal known onshore faults in southernmost California are the San Andreas, San Jacinto, Elsinore, Imperial, and Rose Canyon faults, which collectively transfer the majority of this deformation (Figure 5, *Regional Fault Map*). The balance of the plate margin slip is taken by the offshore zone of faults which include the Coronado Bank, Descanso, San Diego Trough, and San Clemente faults, which lie off of the San Diego and northern Baja California coastline. Most of the offshore faults coalesce south of the international border, where they come onshore as the Agua Blanca fault which transects the Baja, California peninsula (Jennings, 2010).

4.2 Rose Canyon Fault Zone in San Diego

The Rose Canyon Fault was first recognized by Fairbanks (1893). He described the feature as an area of uplifting or folding from La Jolla Bay to the Soledad Hills. Since that time, numerous others have mapped the Rose Canyon Fault and have attributed the formation of several physiographic features such as, Mount Soledad, Mission Bay, and San Diego Bay to the activity along the fault. The Rose Canyon Fault Zone (RCFZ) consists of predominantly right-lateral strike-slip faults that extend southwest to southeast through the San Diego metropolitan area (Figure 6, *Rose Canyon Fault Map*). Movement along the fault zone is generally complex and consists of various combinations of oblique, normal and strike-slip motion. The fault zone extends offshore at La Jolla and continues north-northwest subparallel to the coastline. To the south in the San Diego downtown area the fault zone appears to splay out into a group of generally right-normal oblique faults extending into San Diego Bay (Treiman, 1993).

5.0 SEISMICITY

5.1 Seismicity

The site is considered to lie within a seismically active region, as can all of Southern California (Jennings, 2010). Specifically, the Rose Canyon fault zone located approximately 1.2 miles west of the site is the ‘active’ fault considered having the most significant effect at the site from a design standpoint (USGS, 2008).

5.1.1 Site Class

Utilizing 2013 California Building Code (CBC procedures), we have characterized the site soil profile to be Site Class D based on our experience with similar sites in the project area and the results of our subsurface evaluation.

5.1.2 Building Code Mapped Spectral Acceleration Parameters

The effect of seismic shaking may be mitigated by adhering to the California Building Code and state-of-the-art seismic design practices of the Structural Engineers Association of California. Provided below in Table 2 are the risk-targeted spectral acceleration parameters for the project determined in accordance with the 2013 California Building Code (CBSC, 2013a) and the USGS U.S. Seismic Design Maps Web Application (2014).

Table 2
CBC Mapped Spectral Acceleration Parameters

Site Class	D
Site Coefficients	F_a = 1.025 F_v = 1.543
Mapped MCE_R Spectral Accelerations	S_S = 1.187g S_1 = 0.457g
Site Modified MCE_R Spectral Accelerations	S_{MS} = 1.217g S_{M1} = 0.705g
Design Spectral Accelerations	S_{DS} = 0.811g S_{D1} = 0.470g

Utilizing ASCE Standard 7-10, in accordance with Section 11.8.3, the following additional parameters for the peak horizontal ground acceleration are associated with the Geometric Mean Maximum Considered Earthquake (MCE_G). The mapped MCE_G peak ground acceleration (PGA) is 0.527g for the site. For a Site Class D, the F_{PGA} is 1.000 and the mapped peak ground acceleration adjusted for Site Class effects (PGA_M) is 0.527g for the site.

5.1.3 Shallow Ground Rupture

As previously discussed, the site is not underlain by known active or potentially active faults. Therefore, the potential for ground rupture due to faulting at the site is considered low. Ground lurching is defined as movement of low density materials on a bluff, steep slope, or embankment due to earthquake shaking. Since the site is relatively flat and removed from any over-steepened slopes, lurching or cracking of the ground surface as a result of nearby or distant seismic events is unlikely.

5.1.4 Liquefaction and Dynamic Settlement

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, saturated, granular soils are susceptible to liquefaction and dynamic settlement. Liquefaction is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to behave as a viscous liquid. This effect may be manifested by excessive settlements and sand boils at the ground surface.

Based on our evaluation, the on-site soils are not considered liquefiable due to their dense condition and absence of a shallow groundwater condition. Considering planned grading and foundation design measures, dynamic settlement potential is also considered negligible.

5.1.5 Tsunamis, Seiches, and Flood Hazard

Based upon the California Emergency Management Agency Tsunami Inundation Map (CalEMA, 2009), the site is not located within a tsunami inundation area. In addition, based on the distance between the site and large, open bodies of water, and the elevation of the site with respect to sea level, the possibility of seiches and/or tsunamis is considered to be nil.

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2012); the site is not located within a floodplain. Based on our review of topographic maps, the site is not located downstream of a dam or within a dam inundation area. Based on this review and our site reconnaissance, the potential for flooding of the site is considered nil.

6.0 CONCLUSIONS

Based on the results of our geotechnical investigation of the site, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the project plans and specifications.

The following items are geotechnical factors that may affect the development and/or support our opinion:

- Based on the results of our subsurface explorations and our experience with similar projects in the site area, the depth to groundwater is anticipated to be approximately 83 feet or more below the existing ground surface (approximate elevation of 205 feet msl).

- The underlying Old Paralic Deposits and San Diego Formation are not subject to liquefaction or lateral spreading based on their geologic age, dense to very dense character and the lack of a shallow groundwater table. In addition, other geologic hazards such as landsliding are not present at the site.

- Excavations at the site will require temporary shoring to facilitate construction and to reduce the potential vertical and horizontal ground movements (i.e., damage) beneath the existing public streets and adjacent improvements.

- The undocumented fill soils onsite are potentially compressible. These soils are not considered suitable for structural loads or support of engineered fill soils or site improvements in their present condition. We anticipate that these materials will be removed during performance of the proposed basement excavation for the mixed-use residential improvements. In addition, these soils should be removed and replaced as engineered fill under shallow foundations supporting the AT&T parking structure and other ancillary improvements.

- Based on the results of our subsurface exploration, we anticipate that the onsite materials should be generally rippable with conventional heavy-duty earthwork equipment. However, it should be noted that localized gravel and cobble layers exist that may impede drilling for deep foundations and shoring.

- Based on our experience with similar sites and the results of our subsurface investigation of the site, excavations within the underlying soil materials may encounter zones of poorly graded cohesionless and friable sands that will likely cave or slough during site excavation and drilling. Care in these cases should be exercised which may include the excavation of shorter open-face segments or casing of drilled excavations.

- Based on laboratory testing and visual classification, materials derived from the on-site soil materials are anticipated to have very low to medium expansion potential, although locally more expansive materials may be encountered.

- Although Leighton does not practice corrosion engineering, laboratory test results indicate the soils present on the site have a negligible potential for sulfate attack on normal concrete. However, the onsite soils are considered to be corrosive to buried uncoated ferrous metals. A corrosion consultant may be consulted to provide additional information.

- The existing onsite soils are suitable for reuse as engineered fill provided they are relatively free of organic material, debris, and rock fragments larger than 6 inches in maximum dimension.

- Based upon limited percolation testing, the existing geologic conditions may be suitable for Low Impact Development or BMP measures provided the recommendations in this report are followed.

7.0 RECOMMENDATIONS

7.1 Earthwork

We anticipate that earthwork at the site will consist of site preparation, installation of shoring, excavation, and placement of backfill. We recommend that earthwork on the site be performed in accordance with the following recommendations and the General Earthwork and Grading Specifications for Rough Grading included in Appendix E. In case of conflict, the following recommendations supersede those presented in Appendix E.

7.1.1 Site Preparation

Prior to grading, all areas to receive structural fill or engineered structures should be cleared of surface and subsurface obstructions, including any existing debris and undocumented or loose fill soils, and stripped of vegetation. Removed vegetation and debris should be properly disposed off-site. All areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 6 inches, brought to above-optimum moisture conditions, and recompacted to at least 90 percent relative compaction (based on ASTM Test Method D1557).

7.1.2 Excavations and Oversize Material

Excavations of the onsite materials may generally be accomplished with conventional heavy-duty earthwork equipment in good working condition. Although not anticipated, local heavy ripping or breaking may be required if strongly cemented formational material is encountered. Oversized material, if any, should be handled in accordance with Appendix E.

Surficial soils along with friable underlying sands present on site may cave during trenching and excavation operations. In accordance with OSHA requirements, excavations deeper than 5 feet should be shored or be laid back in accordance with Section 7.2 if workers are to enter such excavations. Shoring recommendations are presented in Section 7.4.6.

7.1.3 Removal and Recompaction

Undocumented fill soils not removed by the planned grading should be excavated, moisture-conditioned, and then compacted prior to placing any additional fill or improvements (such as flatwork, etc.). In areas surrounding the planned excavation that receive fill or other surface improvements, these soils should be removed down to competent paralic deposits and recompacted to proposed grades. The thickness of these soils may vary across the site and may be locally deeper in certain areas.

7.1.4 Engineered Fill Placement and Compaction

The onsite soils are generally suitable for use as compacted fill provided they are free of organic material, debris, and rock fragments larger than 6 inches in maximum dimension. The onsite soils typically possesses a moisture content below optimum and may require moisture conditioning prior to use as compacted fill. All fill soils should be brought to above-optimum moisture conditions and compacted in uniform lifts to at least 90 percent relative compaction based on laboratory standard ASTM Test Method D 1557 and 95 percent relative compaction for wall backfill soils if used for structural purposes, such as to support a footing, supporting subgrade soils, and supporting slab-on-grade concrete subjected to vehicle loading. The optimum lift thickness required to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in lifts not exceeding 8 inches in thickness.

Placement and compaction of fill should be performed in general accordance with the current City of San Diego grading ordinances, sound construction practice, and the General Earthwork and Grading Specifications for Rough Grading presented in Appendix E.

7.1.5 Expansive Soils and Selective Grading

It is not anticipated that highly expansive soils will be encountered during site grading. We anticipate that the cuts for the mixed-use residential structure will be excavated into material that has a very low to low potential for expansion. Soils with low to medium expansion potential may be encountered within the fill soils underlying the AT&T parking garage site.

Expansion testing should be performed on the finish grade soils to verify their expansion potential. If highly expansive soils are present within 5 feet of finish grade, special foundation and slab considerations may be required. Alternatively, it is expected that very low to low expansion material will be excavated as part of the mixed-use below grade parking structure, and could be used as engineered fill supporting shallow foundations elsewhere on the site.

7.1.6 Utility Trench Excavation and Backfill

All excavation work should comply with the current requirements of OSHA. Trenches (either open or backfilled) which parallel structures, pavements, or flatwork should be planned so that they do not extend below a plane having a downward slope of one vertical and one horizontal from a line nine inches above the bottom edge of footings, pavements, or flatwork. Also, no parallel trenches should be closer than 1.5 feet from the closest edge of footings, pavements, or flatwork. Should it be necessary to locate parallel trenches which do not meet the criteria recommended above for footings at conventional depth, we recommend that the footing depths be increased until the criteria are met. A check should be made by the civil designer to verify that all trenches comply with the setback recommendations of this paragraph. If there are special cases where these requirements are not practical, the civil designer should communicate with the project geotechnical engineer and architect on a case-by-case basis.

Pipe bedding should consist of sand with a sand equivalent (SE) of not less than 30. Bedding should be extended the full width of the trench for the entire pipe zone, which is the zone from the bottom of the trench, to one foot above the top of the pipe. The sand should be brought up evenly on each side of the pipe to avoid unbalanced loads. Onsite materials will probably not meet bedding requirements. Except for predominantly clayey soils, the onsite soils may be used as trench backfill above the pipe zone provided they are free of organic matter and have a maximum particle size of three inches. Compaction by jetting or flooding is not recommended.

7.2 Temporary Excavations

Sloping excavations may be utilized when adequate space allows. Based on the results of our evaluation, we provide the following recommendations for sloped excavations in undocumented fill soils or dense formational materials without seepage conditions.

Table 3
Maximum Slope Ratios

Excavation Depth (feet)	Maximum Slope Ratio Undocumented Fill Soils	Maximum Slope Ratio In Dense Formation
0 to 5	1:1 (Horizontal to Vertical)	Vertical
5 to 20	1.5:1 (Horizontal to Vertical)	1:1 (Horizontal to Vertical)

The above values are based on the assumption that no surcharge loading or equipment is present within 10 feet of the top of slope. Care should be taken during design of excavations adjacent to the existing structures so that foundation support is preserved. A “competent person” should observe the slope on a daily basis for signs of instability.

7.3 Surface Drainage and Erosion

Surface drainage should be controlled at all times and carefully taken into consideration during precise grading, landscaping, and construction of site improvements. The proposed development should have appropriate drainage systems to collect roof runoff. Positive surface drainage should be provided to direct surface water away from the structures toward the street or suitable drainage facilities. Planters should be designed with provisions for drainage to the storm drain. Ponding of water adjacent to structures or pavements should be avoided.

The impact of heavy irrigation or inadequate runoff gradient can create perched water conditions, resulting in seepage or shallow ground water conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to change in moisture content of foundation soils, which may cause distress to structures and improvements, moisture content of the soils surrounding the improvements should be kept as relatively constant as possible.

All area drain inlets should be maintained and kept clear of debris in order to function properly. In addition, landscaping should not cause any obstruction to site drainage.

7.4 Preliminary Foundation and Slab Considerations

Conventional foundations (spread and continuous footings) and/or structural mat foundations are considered suitable for support of the proposed structures provided the footings are embedded into competent dense formational materials as recommended herein.

These recommendations are preliminary and should be reviewed and revised, as necessary, once the actual size and configuration of the project has been confirmed. Foundations and slabs should be designed in accordance with structural considerations and the following recommendations. These recommendations assume that the soils encountered within 5 feet of finish grade have a very low to medium potential for expansion. If highly expansive soils are encountered selective grading is recommended. If selective grading cannot be accomplished, additional foundation and slab design may be necessary.

7.4.1 Foundation Design

Preliminary foundation recommendations have been developed for the Mixed-Use Residential Structure, the AT&T Parking Garage, and ancillary structures.

Mixed-Use Residential Structure

The following recommendations assume that the planned structure will be founded over a basement parking structure. Accordingly, surficial soils are expected to be removed, rather than replaced as compacted fills. Should at grade structures be included in the design, we should be contacted to provide additional recommendations. For footings located 20 or more feet below existing site grades, bearing on competent formational material, the allowable bearing capacities of Table 4 below may be utilized.

Table 4
Allowable Bearing Values for Conventional Foundations

Depth Below Finish Grade (feet)	Isolated Spread Footing (minimum width of 2 feet)	Continuous Wall Footing (minimum width of 2 feet)
2*	5,000	4,000
3*	7,000	5,000

* For depths of 20 feet or more below existing site grades

Parking Garage Foundations

Regarding shallow conventional foundations for the proposed AT&T parking garage at existing site elevations, we recommend an allowable bearing capacity of 2,500 psf for foundations in engineered fill. This capacity assumes a minimum foundation depth of 24 inches and minimum width of 24 and 18 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 3,500 psf.

For shallow foundations bearing on formation, including Paralic Deposits (expected at a depth of 4 to 5 feet below existing grade), we recommend an allowable bearing capacity of 3,500 psf for foundations in competent formation. This capacity assumes a minimum foundation depth of 24 inches and minimum width of 24 and 18 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 4,500 psf.

Ancillary Structures

Regarding shallow conventional foundations for associated ancillary structures at existing site elevations, we recommend an allowable bearing capacity of 2,000 psf for foundations in engineered fill or formation. This capacity assumes a minimum foundation depth of 18 inches and minimum width of 18 and 12 inches for spread and continuous footings, respectively. This capacity may also be increased by 500 psf per each additional foot of embedment up to a maximum of 3,000 psf.

The above capacities for all of the above foundations are for dead plus live loads and may be increased by one-third for short-term wind or seismic loads. The recommended allowable-bearing capacities are based on a maximum total settlement of 1 to 1.5 inches and a differential settlement of ¾-inch in fill soils, and a maximum total settlement of 1 inch and a differential settlement of 1/2-inch in formation.

7.4.2 Mat Foundation Design

A structural mat foundation may be used for support of the mixed-use residential structure. Thickness and reinforcement of the mat foundation should be in accordance with the design of the project structural engineer. If any of the soils exposed at foundation grades are disturbed during the excavation process, they should be excavated to suitable competent formational materials.

We recommend that the structure may be founded on a mat foundation supported on competent formational material using a static long term allowable bearing capacity not to exceed 9,000 pounds per square foot, considering basement footing depths will likely vary between 20 and 30 feet for the project. The bearing capacity may be increased when considering loads of a short duration such as wind or seismic forces.

Mat foundations typically experience some deflection due to loads placed on the mat and the reaction of the soils underlying the mat. A design coefficient of subgrade reaction K_1, 150 to 200 pounds per cubic inch (pci) may be used for evaluating such deflections at the site. These values are based on the soil conditions encountered in exploratory excavations and are considered as applied to a unit square foot area. The value should be adjusted for the design mat size. The coefficient of subgrade reaction K_b for a mat of a specific width may be evaluated using the following equation:

$$K_b = K_1 [(b+1)/2b]^2$$

where b is the least width of the foundation

To account for edge conditions, the lower value should be considered at the center of the mat increasing to the higher value at the edges. Following preliminary foundation design by the structural engineer, the contact pressure distribution and estimated settlement should be reviewed by Leighton.

7.4.3 Slab Design

Slabs-on-grade should be reinforced with reinforcing bars placed at mid-height in the slab. Slabs should have crack joints at spacings designed by the structural engineer. Columns should be structurally isolated from slabs. Slabs should be a minimum of 5 inches thick and reinforced with No. 3 rebars at 18 inches on center or No. 4 rebars at 24 inches on center (each way). If additional loading is anticipated (i.e., basement floor slab with traffic loading), a slab thickness of at least 6 inches with reinforcement should be used. A moisture barrier should be placed at mid-height in a 4 inch thick sand layer if reduction of moisture vapor up through the concrete slab is desired (such as below equipment, living/office areas, etc.), otherwise the sand layer may be deleted.

7.4.4 Lateral and Hydrostatic Pressures

Lateral loads may be resisted by assuming a passive pressure of 350 psf per foot of depth and coefficient of friction of 0.35 between concrete and soil. Below the water table, the passive pressure should be reduced to 150 psf. The lateral resistance may be taken as the sum of the passive and frictional resistance, provided the passive resistance does not exceed two-thirds of the total resistance.

For design purposes, the following lateral earth pressure values for level or sloping backfill are recommended for walls backfilled with onsite soils of very low to low expansion potential or undisturbed in-place materials.

Table 5
Static Equivalent Fluid Weight, pounds per cubic foot (pcf)

Conditions	Level	2:1 Slope
Active	35	55
At-Rest	55	75

Unrestrained (yielding) cantilever walls should be designed for an active equivalent pressure value provided above. In the design of walls restrained from movement at the top (non-yielding) such as basement walls, the at-rest pressures should be used. To account for potential redistribution of forces during a seismic event, retaining walls providing lateral support where exterior grades on opposites sides differ by more than 6 feet fall under the requirements of 2013 CBC Section 1803.5.12 and/or ASCE 7-10 Section 15.6.1 and should also be analyzed for seismic loading. For that analysis, an additional uniform lateral seismic force of 9H should be considered for the design of the retaining walls with level backfill, where H is the height of the wall. This value should be increased by 150% for restrained walls. For this equation, H equals the overall retained height in feet. If conditions other than those covered herein are anticipated, the equivalent fluid pressure values should be provided on an individual case basis by the geotechnical engineer.

For portions of the wall not placed against shoring, the above values assume granular backfill and free-draining conditions to prevent buildup of hydrostatic pressure in the backfill. Backfill should meet the requirements for engineered fill materials described in Section 7.1.4 of this report, and should have an expansion index of 30 or less. Wall backfill should be compacted by mechanical methods to at least 90 percent relative compaction in accordance with ASTM D 1557 per Section 7.1.4. All walls should be properly waterproofed.

Special cases such as combinations of sloping and shoring or other surcharge loads (not specified above) 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. Based on groundwater measurements made during our field investigation, it is not anticipated that braced excavations will be constructed below the groundwater table; therefore, the above pressures do not include hydrostatic pressures.

However, to mitigate the potential for hydrostatic build-up behind the basement walls, drainage board should be extended from 2 feet below the ground surface to relief valves or by piping to a sump at the lowest wall elevations. Waterproofing of the basement walls should be as designed by the structural engineer and/or architect. It should be noted that a NPDES permit may be required for groundwater discharged through basement wall drains/relief valves which is then discharged to a storm water conveyance system. As an alternative to discharging potential ground water to a storm water conveyance system, ground water may be discharged to infiltration wells if located more than 10 feet above groundwater. If infiltration wells are proposed, our office should review the proposed infiltration well design and provide supplemental recommendations for infiltration rates.

As an alternative to mitigating for hydrostatic build-up behind the basement walls by the use of basement wall drainage devices, basement walls may be water proofed and designed to resist hydrostatic conditions. In that case, an additional pressure equal to 62.4 pcf multiplied by the depth below the design elevation should be applied in a direction normal to the surface being considered. In this case, a NPDES permit is not required.

Since design of retaining systems is sensitive to surcharge pressures behind the excavation, we recommend that this office be consulted if unusual load conditions are anticipated.

7.4.5 Shoring of Excavations

Based on our present understanding of the project, excavations on the order of 20 to 30 feet deep are anticipated below the proposed residential mixed-use improvements. Accordingly, and because of the limited space, temporary shoring of vertical excavations may be required. We recommend that vertical excavations be retained either by a cantilever shoring system deriving passive support from cast-in-place soldier piles (i.e. lagging-shoring system) or a restrained tie-back and pile system. Based on our experience with similar projects, if lateral movement of the shoring system on the order of more than 1 inch cannot be tolerated, we recommend the utilization of a restrained tie-back and pile system. Shoring of excavations of this size is typically performed by specialty contractors with knowledge of the metropolitan San Diego area soil conditions. Lateral earth pressures for design of shoring are presented below:

Cantilever Shoring System
Active pressure = 35 (pcf), triangular distribution
Passive Pressure = 250 (pcf) in fill, 350 (pcf) competent formation

Tie-Back Shoring System
Restrained Active Pressure = Rectangular distribution of 23H psf, where H is wall height (or wall and slope height above) in feet.
Passive Pressure = 250 (pcf) in fill, 350 (pcf) competent formation

General
All shoring systems should consider adjacent surcharging loads. The design wall height should consider loss of passive support associated with footing excavations.

For design of tie-backs, we recommend a concrete-soil bond stress of 600 psf of the concrete-soil interface area for straight shaft anchors. This value should be considered only behind the 30 degree line (measured from the vertical) up from the base of the excavation. This portion should also be used for calculating resisting forces. Tie-back anchors should be individually proof-tested to 130 percent of design capacity. Further details and design criteria for tie-backs can be provided as appropriate. Since design of retaining systems is sensitive to surcharge pressures behind the excavation, we recommend that this office be consulted if unusual load conditions are anticipated. Care should be exercised when excavating into the on-site soils since caving or sloughing of these materials is possible. We recommend that the void space behind lagging be filled with sand/cement slurry. Field testing of tie-backs and observation of soldier pile excavations should be performed during construction.

Settlement monitoring of adjacent sidewalks and adjacent structures should be considered to evaluate the performance of the shoring. Shoring of the excavation is the responsibility of the contractor. Extreme caution should be used to minimize damage to existing pavement, utilities, and/or structures caused by settlement or reduction of lateral support.

7.4.6 Design Groundwater Elevation

Based on the results of our subsurface exploration and our experience with similar projects in the site area, we anticipate groundwater to be at a depth of 83 or more feet bgs or at an elevation of 205 feet msl. We do not anticipate that the static groundwater will be encountered during the construction of the proposed project; however groundwater levels may fluctuate during periods of precipitation.

7.4.7 Monitoring of Shoring

Settlement monitoring of adjacent sidewalks and structures should be performed to evaluate the performance of the shoring. Shoring of the excavation is the responsibility of the contractor. Extreme caution should be used to minimize damage to existing pavement, utilities, and/or structures caused by settlement or reduction of lateral support. Sequencing of underpinning, shoring installation, excavation and dewatering will be critical to control of deflections and settlement. Once the shoring contractor is selected, a detailed excavation phasing plan should be submitted and reviewed by the shoring designer and geotechnical engineer.

The shoring should be surveyed for vertical and horizontal deflection by the Civil Engineer at the top, mid-point, and bottom of each wall face (4 faces) at 50-foot intervals along the wall length. Vertical settlements should be surveyed along an alignment behind the wall at each of the mid-wall monitoring points to a distance behind the wall equal to 1/2 times the wall height. The survey points should be established prior to the start of construction and continued on a weekly basis as the construction proceeds and while the excavation remains open. After completion of the excavation, the survey interval may be extended based on evaluation by the geotechnical consultant.

7.5 Dewatering

We do not anticipate that groundwater will be encountered during construction and the proposed subterranean levels, and foundation excavations will not extend below the groundwater table. Therefore, dewatering during construction is not anticipated, excluding the construction of solider piles for the shoring system.

7.6 Concrete Flatwork

Concrete sidewalks and other flatwork (including construction joints) should be designed by the project civil engineer and should have a minimum thickness of 4 inches. Should mitigation of potential cracking be desired, 8x8 WWM or No. 3 bars at 24 inches on center may be utilized. For all concrete flatwork, the upper 12 inches of subgrade soils should be moisture conditioned to at least 4 to 6 percent above optimum moisture content depending on the soil type and compacted to at least 90 percent relative compaction based on ASTM Test Method D1557 prior to the concrete placement. Moisture testing should be confirmed 24 hours prior to concrete placement. In areas of high expansive soil, we recommend the inclusion of dowels between curbs and/or exterior flatwork near exterior and interior walkways.

7.7 Infiltration Best Management Practices

Foundation and subsurface improvements (e.g., basements) of residential structures located adjacent to proposed infiltration systems should be evaluated to ensure that they may not be adversely impacted from infiltration of surface water.
Where setbacks cannot be attained a 30-mil impermeable liner should be placed along the sides and bottom of the infiltration basins. We recommend setbacks for stormwater infiltration devices as summarized in the table below:

Table 6 Stormwater Infiltration System Setbacks (measured from bottom of infiltration device)	
Setback from	Distance
Any foundation	No closer than a 1:1 plane drawn away from 9" above the bottom of foundation
Face of any slope	H/2, 5 feet minimum (H is height of slope)

Also, surface drainage should be controlled at all times and carefully taken into consideration during precise grading, landscaping, and construction of site improvements. Positive drainage (e.g., roof gutters, downspouts, area drains, etc.) should be provided to direct surface water away from structures and improvements and towards the street or suitable drainage devices. Ponding of water adjacent to structures or pavements should be avoided. Roof gutters, downspouts, and area drains should be aligned so as to transport surface water to a minimum distance of 5 feet away from structures. The performance of structural foundations is dependent upon maintaining adequate surface drainage away from structures.

Water should be transported off the site in approved drainage devices or unobstructed swales. We recommend a minimum flow gradient for unpaved drainage within 5 feet of structures of 2 percent sloping away. All area drain inlets should be maintained and kept clear of debris in order to function properly. In addition, landscaping should not cause any obstruction to site drainage. Rerouting of drainage patterns and/or installation of area drains should be performed, if necessary, by a qualified civil engineer or a landscape architect.

7.8 Construction Observation and Plan Reviews

The recommendations provided in this report are based on preliminary design information and subsurface conditions disclosed by widely spaced borings. The interpolated subsurface conditions should be checked in the field during construction. Construction observation of all onsite excavations and field density testing of all compacted fill should be performed by a representative of this office so that construction is in accordance with the recommendations of this report. We recommend that where possible, excavation exposures be geologically mapped by the geotechnical consultant during grading for the presence of potentially adverse geologic conditions. In addition, during the installation of perimeter shoring systems, we also recommend that a geologist be on-site to log sidewalls for potential faults, since the City will require an “as-built” letter regarding existing fault hazards prior to the approval of building permit inspection services.

Final project drawings should be checked by Leighton and Associates, Inc. before excavation to see that the recommendations provided in this report are incorporated in the project plans.

8.0 LIMITATIONS

The conclusions and recommendations presented in this report are based in part upon data that were obtained from a limited number of observations, site visits, excavations, samples, and tests. Such information is by necessity incomplete. The nature of many sites is such that differing geotechnical or geological conditions can occur within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions, and recommendations presented in this report can be relied upon only if Leighton has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site.

Figures

Project: 11347.001	Eng/Geol: DNB/RCS
Scale: 1 " = 2,000 '	Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: (mmurphy)

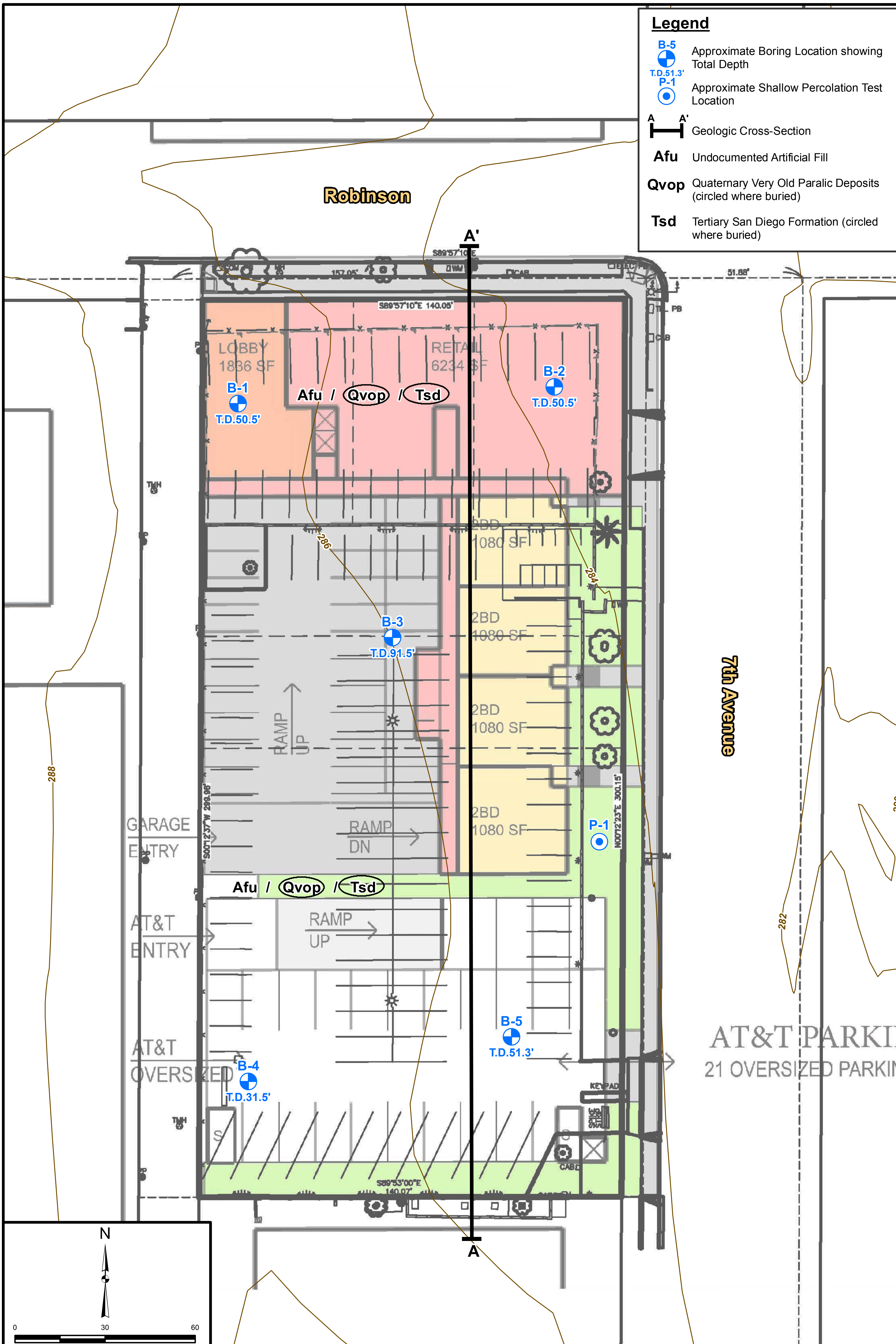
SITE LOCATION MAP

7th and Robinson
San Diego, California

Figure 1

Leighton

Map Saved as P:\Drafting\11347\001\Maps\11347-001_F01_SLM_2016-06-13.mxd on 6/13/2016 9:43:06 AM



Project: 11347.001	Eng/Geol: DBN/RCS
Scale: 1 " = 30 '	Date: June 2016

Base Map: Lvl-1, 7th & Robinson by Carrier Johnson+Culture3, 6/5/2016.

Author: (mmurphy)

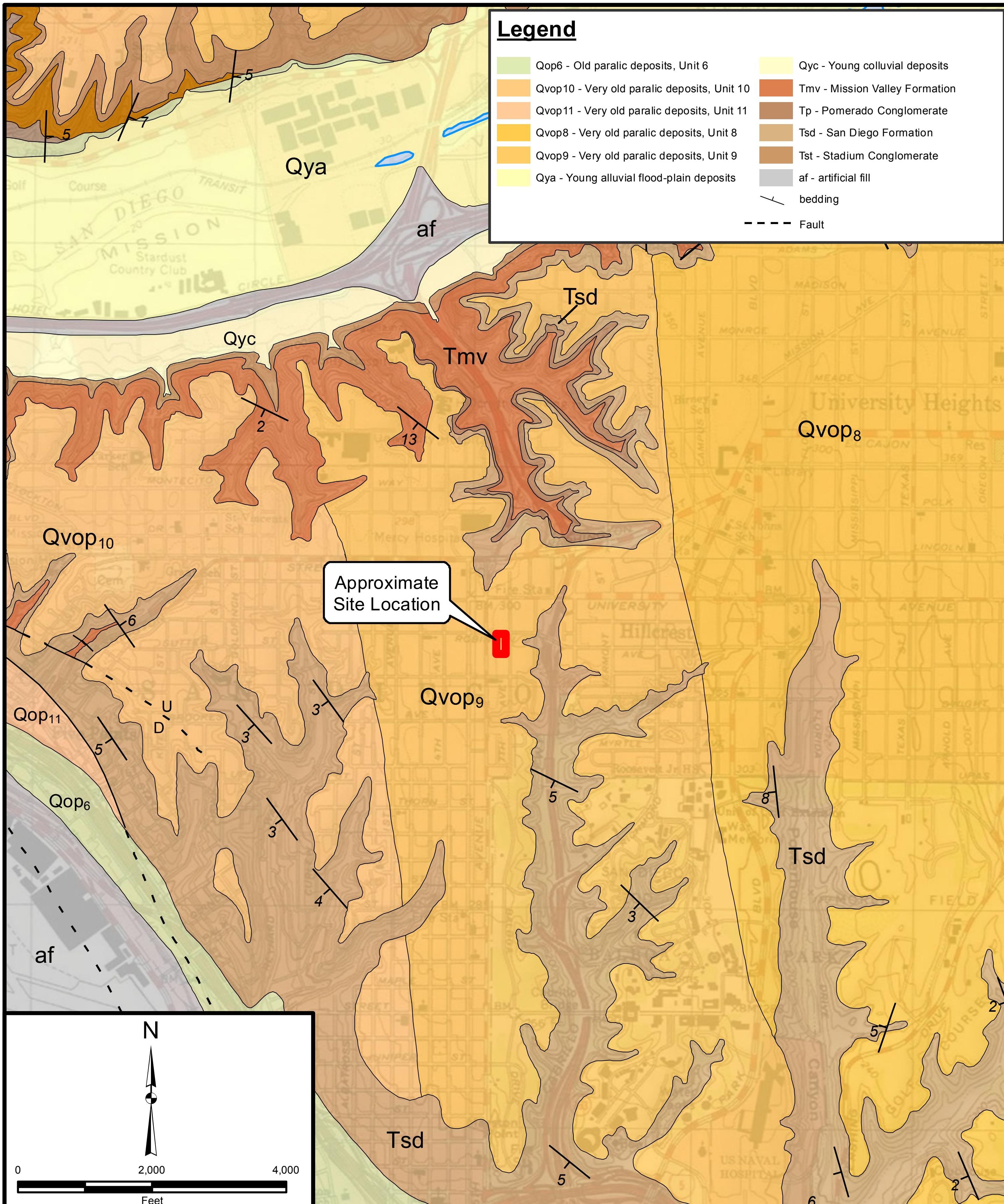
GEOTECHNICAL MAP

7th and Robinson
San Diego, California

Figure 2

Leighton

Map Saved as P:\Drafting\11347\001\Maps\11347-001_F02_GM_2016-06-17.mxd on 6/24/2016 2:13:03 PM



Project: 11347.001 | Eng/Geol: DBN/RCS
Scale: 1 " = 2,000 ' | Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: (mmurphy)

REGIONAL GEOLOGY MAP

7th and Robinson
San Diego, California

Figure 3

Leighton

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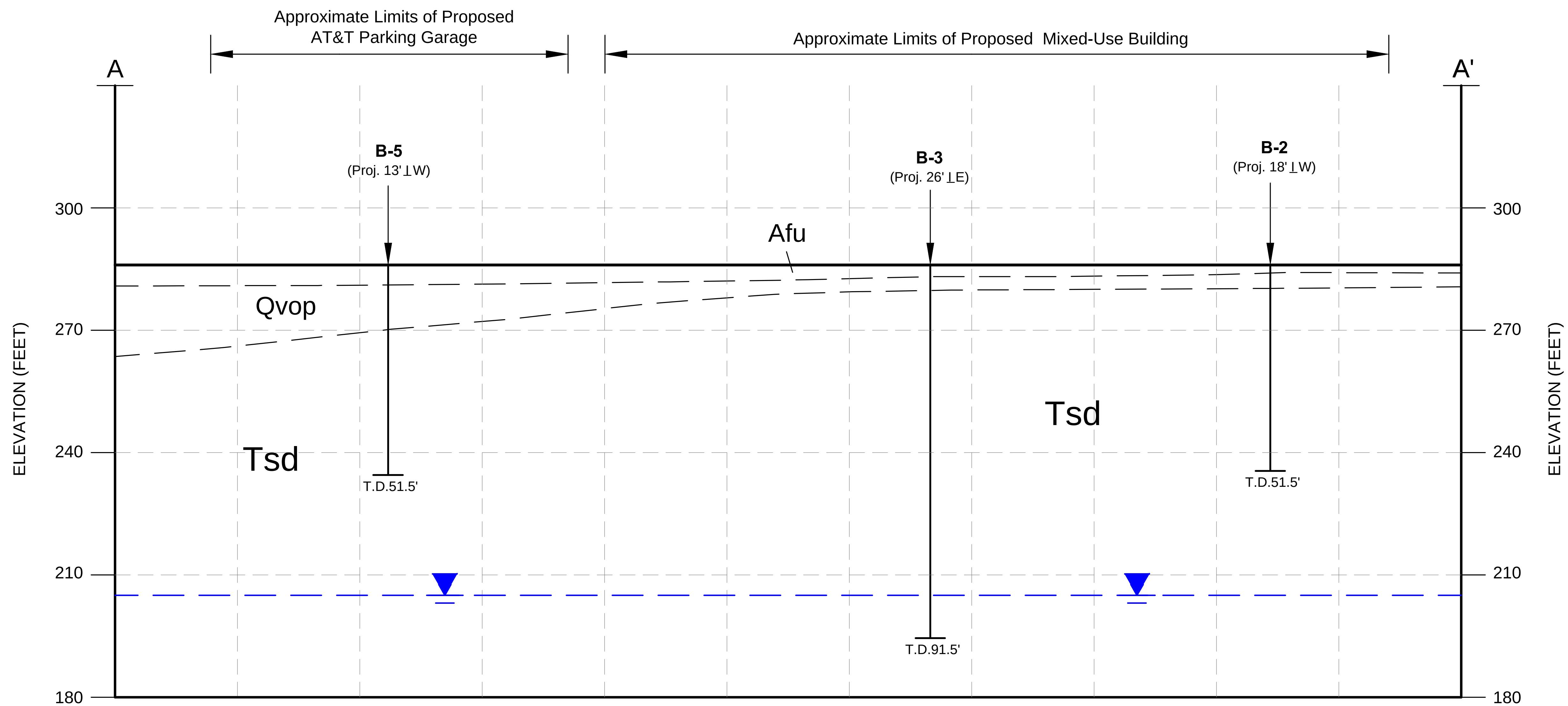
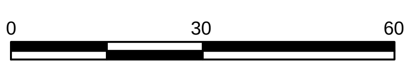


LEGEND

B-5 T.D.51.5'	APPROXIMATE BORING LOCATION SHOWING TOTAL DEPTH	Afu	UNDOCUMENTED ARTIFICIAL FILL
	APPROXIMATE GEOLOGIC CONTACT	Qvop	QUATERNARY VERY OLD PARALIC DEPOSITS
	GROUNDWATER TABLE	Tsd	TERTIARY SAN DIEGO FORMATION



Project: 11347.001	Eng/Geol: DBN/RCS
Scale: 1"=30'	Date: June 2016
Reference:	
Author: MAM	

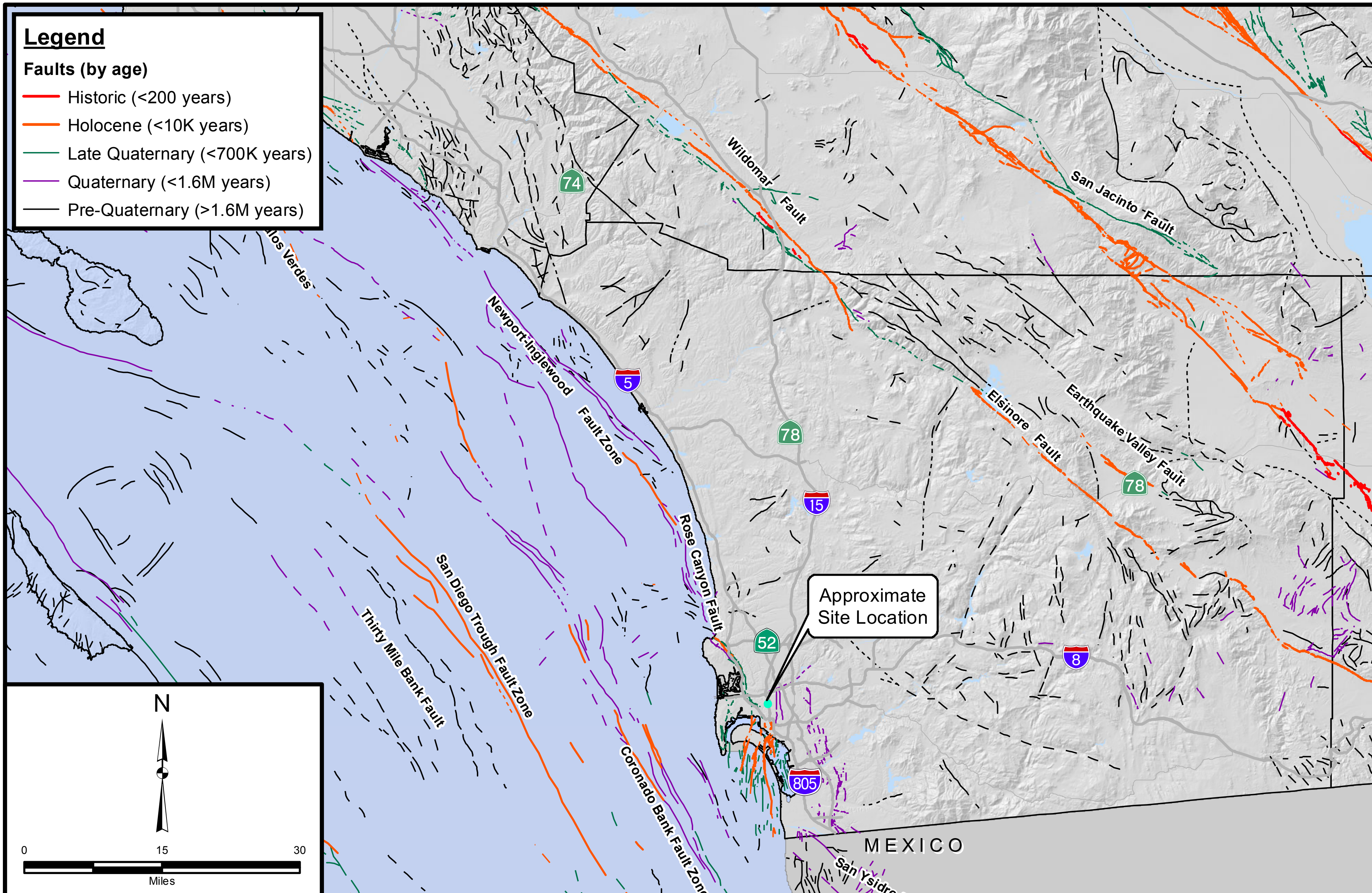
GEOLOGIC CROSS-SECTION A-A'

7th and Robinson
San Diego, California

Figure 4

Leighton

P:\DRAFTING\11347\001\CAD\11347-001_F00_CSA-A_2016-06-17.DWG (06-24-16 3:17:15PM) Plotted by: mmurphy



Project: 11347.001	Eng/Geol:DBN/RCS
Scale: 1 " = 15 miles	Date: June 2016

Faults: Bryant, Bryant CGS 2010
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

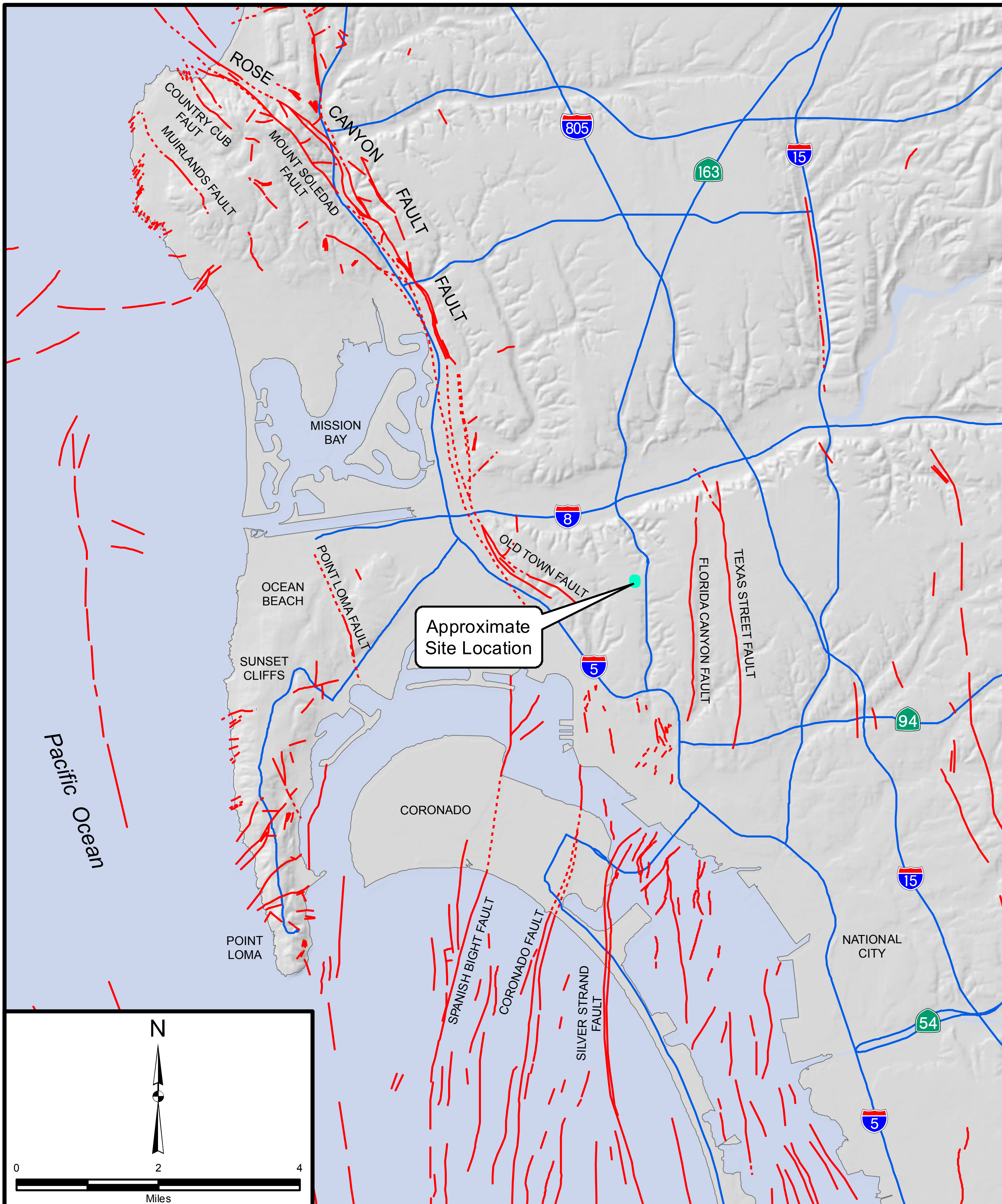
REGIONAL FAULT MAP

7th and Robinson
San Diego, California

Figure 5

Leighton

Map Saved as P:\Drafting\11347\001\Maps\11347-001_F05_RFM_2016-06-13.mxd on 6/13/2016 10:53:06 AM



Project: 11297.001	Eng/Geol: DBN/RCS
Scale: 1 " = 2 miles	Date: June 2016

Base Map: ESRI ArcGIS Online 2016
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

ROSE CANYON FAULT MAP

7th and Robinson
San Diego, California

Figure 6

Leighton

Map Saved as P:\Drafting\11347\001\Maps\11347-001_F06_RCFM_2016-06-13.mxd on 6/13/2016 10:57:46 AM

Appendix A
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APPENDIX A

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Appendix B
Boring Logs and Percolation Test Results

GEOTECHNICAL BORING LOG KEY

Project No.		**Date Drilled**	
Project	KEY TO BORING LOG GRAPHICS	**Logged By**	
Drilling Co.		**Hole Diameter**	
Drilling Method		**Ground Elevation**	
Location		**Sampled By**	

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								Asphaltic concrete	
									Portland cement concrete	
								CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay	
								CH	Inorganic clay; high plasticity, fat clays	
								OL	Organic clay; medium to plasticity, organic silts	
	5							ML	Inorganic silt; clayey silt with low plasticity	
								MH	Inorganic silt; diatomaceous fine sandy or silty soils; elastic silt	
								ML-CL	Clayey silt to silty clay	
								GW	Well-graded gravel; gravel-sand mixture, little or no fines	
								GP	Poorly graded gravel; gravel-sand mixture, little or no fines	
	10							GM	Silty gravel; gravel-sand-silt mixtures	
								GC	Clayey gravel; gravel-sand-clay mixtures	
								SW	Well-graded sand; gravelly sand, little or no fines	
								SP	Poorly graded sand; gravelly sand, little or no fines	
								SM	Silty sand; poorly graded sand-silt mixtures	
	15							SC	Clayey sand; sand-clay mixtures	
									Bedrock	
									Ground water encountered at time of drilling	
				B-1					Bulk Sample	
	20			C-1					Core Sample	
				G-1					Grab Sample	
				R-1					Modified California Sampler (3" O.D., 2.5 I.D.)	
				SH-1					Shelby Tube Sampler (3" O.D.)	
				S-1					Standard Penetration Test SPT (Sampler (2" O.D., 1.4" I.D.)	
	25			PUSH					Sampler Penetrates without Hammer Blow	
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- TR THERMAL RESISTIVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-1

Project No.	11347.001	**Start Date Drilled**	6-9-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	ASPHALT CONCRETE, approximately 3" over AGGREGATE BASE, approximately 4" over ARTIFICIAL FILL (Afu) @ 1': Silty SAND, medium dense, reddish brown, moist, fine to medium SAND	
285								CL		
	5			S-1	11 18 22			CL	VERY OLD PARALIC DEPOSITS (Qvop) @ 4': CLAY, dark reddish brown, moist, plastic	
									TERTIARY SAN DIEGO FORMATION @ 6': Poorly-graded SANDSTONE with SILT, dense, grayish brown, moist, fine SAND, well-cemented, sampler over packed	
280	10			R-1	18 26 37	122	10	SM	@ 10': Silty SANDSTONE, dense, brown, very moist to wet, fine to medium SAND, some larger well-rounded GRAVEL, over packed, damaged rings stress quality samples with driller damaged rings	
275	15			S-2	8 7 11			SP-SM	@ 15': Poorly-graded SANDSTONE with SILT, medium dense, pale to light gray, moist, fine SAND, friable	
270	20			R-2	10 18 30	94	11	SP	@ 20': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND, friable	DS
265	25			S-3	18 21 29			SP-SM	@ 25': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	
260	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG B-1

Project No.	11347.001	**Start Date Drilled**	6-9-16
End Date Drilled	6-9-16		
Project	Greystar	**Hole Diameter**	8"
Drilling Co.	Baja Exploration	**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop	**Logged By**	CDL
Location	See Figure 2	**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	**SOIL DESCRIPTION** *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
	30			R-3	17 50/5"			SP-SM	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	DS
255	35			S-4	13 24 31				@ 35': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, some orange-brown mottling, moist, fine SAND, friable	
250	40			R-4	22 50/5"	88	17		@ 40': Poorly-graded SANDSTONE with SILT, very dense, trace very thin gray and orange-brown bedding	
245	45								@ 44': Concretion	
240	50			S-5	16 23 33				@ 50': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, tracely mottled with orange-brown nodules, sharply becomes light orange-brown with 1" oxidized bed, very dense, moist fine SAND	
235	55								**Total Deepth = 51.5 Feet** **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete on 6/9/16**	
230	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-2

Project No.	11347.001	**Start Date Drilled**	6-9-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	286'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							GP	ASPHALT CONCRETE 2.5" thick over AGGREGATE BASE 4" thick over	
285								SP	ARTIFICIAL FILL @ .4": Gravelly SAND, orange-brown, moist, fine to coarse SAND and well-rounded gravel	
									VERY OLD PARALIC DEPOSITS (Qvop) @ 2': Gravelly SANDSTONE, very dense, orange-brown, moist, fine to coarse SAND, fine well-rounded gravel	
	5			R-1	14 50/3"	108	9	SP		
280								SP	TERTIARY SAN DIEGO FORMATION (Tsd) @ 6': Poorly-graded SANDSTONE, pale light gray, moist, very dense, fine SAND	
	10			S-1	8 11 17			SP-SM	@ 10': Interbedded poorly-graded SANDSTONE and SANDSTONE with SILT, light orange-brown, moist, very dense, thinly bedded, trace very thin beds of pale gray, laminated interbeds	
275										
	15			R-2	16 18 29	93	7	SP	@ 15': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND, shoe exhibits laminated brownish gray, silty SAND	
270										
	20			S-2	13 17 30			SP-SM	@ 20': Poorly-graded SANDSTONE, dense, pale to light gray, moist, fine SAND	
265										
	25			R-3	21 3 50/4"	103	5		@ 25': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
260										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

GEOTECHNICAL BORING LOG B-2

Project No.	11347.001	**Start Date Drilled** 6-9-16	**End Date Drilled** 6-9-16
Project	Greystar		**Hole Diameter** 8"
Drilling Co.	Baja Exploration		**Ground Elevation** 286'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop		**Logged By** CDL
Location	See Figure 2		**Sampled By** CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	Type of Tests
255	30			S-3	12 27 39			SP-SM	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale to light gray, moist, fine SAND, vertical open fractures, concoidal orientation from sampling	
250	35			R-4	23 50/3"	92	9		@ 35': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
245	40			S-4	12 14 26				@ 40': Poorly-graded SANDSTONE with SILT, dense, olive-brown, moist, fine SAND	
240	45								@ 47': Concretion	
235	50			R-5	50/5"	92	10		@ 50': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND	
									Total Depth = 50.5 Feet **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete on 6/9/16**	
230	55									
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Graphic Log: N S

Elevation Feet	Depth Feet	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	Soil Description	Type of Tests
	0							ASPHALT CONCRETE, approximately 3" over AGGREGATE BASE, approximately 5" over	
							GP		
			B-1 1'-5'				SM	ARTIFICIAL FILL (Afu) @ .5": Clayey SAND, brown, moist, fine SAND, some fine to medium GRAVEL, sandy CLAY, stiff, dark reddish brown, moist, fine SAND	
285							CL		
							SP	TERTIARY SAN DIEGO FORMATION (Tsd)	
	5		R-1	34 50/3"	108	9		@ 5': Poorly-graded SANDSTONE, very dense, pale olive-brown, damp, very fine SAND, cemented	
280									
	10		S-1	50/4"			GP	@ 9.5': CONGLOMERATE, well-cemented bed @ 10': No recovery, dense drilling to 15', gravels in spoil cuttings	
275									
	15		R-2	50/6"	93	7	SP	@ 15': Poorly-graded SANDSTONE, very dense, pale olive, moist, very fine SAND, dense drilling to 20'	
270									
	20		S-2	12 15 16				@ 20': Poorly-graded SANDSTONE, dense, pale olive, moist, very fine SAND, dense drilling to 20'	
265									
	25		R-3	19 50/6"	103	5		@ 25': Poorly-graded SANDSTONE, very dense, pale white mottled with orange-brown, damp, fine SAND, trace medium angular SILTSTONE, rip-up clasts	
260									
	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16
End Date Drilled	6-8-16	**Project**	Greystar
Hole Diameter	8"	**Drilling Co.**	Baja Exploration
Ground Elevation	288'	**Drilling Method**	CME-75 - 140lb - Autohammer - 30" Drop
Logged By	CDL	**Location**	See Figure 2
Sampled By	CDL		

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	30			S-3	16 24 37			SP	@ 30': Poorly-graded SANDSTONE, very dense, pale olive-brown, mottled with orange-brown, moist, fine SAND, very friable	
255										
	35			R-4	24 50/4"	92	9		@ 35': Poorly-graded SANDSTONE, very dense, pale olive-brown, mottled with orange-brown, moist, fine SAND, very friable	
250										
	40			S-4	21 21 36			SP-SM	@ 40': Poorly-graded SAND with SILT, very dense, light gray, moist, fine SAND, friable	
245										
	45									
240										
	50			R-5	50/6"	92	10	SP	@ 50': Poorly-graded SANDSTONE, very dense, pale yellow-brown to light brown, damp, fine SAND, friable	
235										
	55									
230										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
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GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	60			S-5	29 36 50/6"			SP	@ 60': Poorly-graded SANDSTONE, very dense, pale to light gray, moist, fine SAND, friable	
225										
	65									
220										
	70			R-6	29 50/5"				@ 70': Poorly-graded SANDSTONE, very dense, light brown, very moist, fine SAND, very thin bed of gray silty SANDSTONE, gravel in shoe, well-rounded (broken)	
215										
								GP	@ 74'-80': Well-cemented, GRAVEL CONGLOMERATE, large gravel, hole collapsed during cleanout	
	75									
210										
	80			S-6	50/6"			SP-SM	@ 80': Poorly-graded SANDSTONE with SILT, very dense, grayish brown, very moist to wet, fine SAND, fine well-rounded GRAVEL, lodged in shoe, recovered sluff	
205										
									@ 84': Cemented bed 1' thick	
	85									
200										
	90									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-3

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	288'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	90			R-7	17 28 34			SP-SM	@ 90': Poorly-graded SANDSTONE with SILT, dense, gray mottled with olive greenish brown, wet, fine SAND	
195									**Total Depth = 91.5 Feet** **Groundwater encountered at 83 feet at time of drilling** **<u>NOTES FOR PERCOLATOIN TEST</u>** **0-50': 2" I.D. Solid Pipe** **50-75': 2" I.D. Slotted Pipe** **75'-91.5': Bentonite Seal** **After Percolation, backfilled with bentonite grout with concrete on 6/8/16**	
	95									
190										
	100									
185										
	105									
180										
	110									
175										
	115									
170										
	120									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-4

Project No.	11347.001	**Start Date Drilled** 6-8-16	**End Date Drilled** 6-8-16
Project	Greystar		**Hole Diameter** 8"
Drilling Co.	Baja Exploration		**Ground Elevation** 289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop		**Logged By** CDL
Location	See Figure 2		**Sampled By** CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							GP	ASPHALT CONCRETE, approximately 4" over AGGREGATE BASE approximately 6" over	
				B-1 1'-5'				SC	ARTIFICIAL FILL (Afu) @ 1': Clayey SAND, loose to medium dense, dark reddish brown, some fine SAND	EI, CR
285										
	5			R-1	16 50/3"			SM	VERY OLD PARALIC DEPOSITS (Qvop) @ 5': Silty SANDSTONE, very dense, mottled reddish brown, moist, fine to medium SAND, disturbed sample, damaged all rings	
280										
	10			S-1	10 10 19			SC	@ 10': Clayey SANDSTONE, medium dense, reddish brown, very moist, fine to medium SAND, micaceous, approximately 25% CLAY	SA, H
								GP		
275										
	15			R-2	50/4"				@ 25': No recovery	
								SP	TERTIARY SAN DIEGO FORMATION (Tsd)	
270										
	20			S-2	29 12 19				@ 20': Poorly-graded SANDSTONE, medium dense, light to pale gray, moist, fine SAND, grades with depth to silty SANDSTONE, mechanically broken gravel in waste barrel	
265										
	25			R-3	50/5"				@ 25': Poorly-graded SANDSTONE, very dense, pale gray, moist, fine SAND	
260										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-4

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-8-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	289'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	30			S-3	14 27 38			SP	@ 30': Poorly-graded SANDSTONE with SILT, very dense, pale gray, moist, fine SAND	
									Total Depth = 31.5 Feet **No groundwater encountered at time of drilling** **Backfilled with bentonite grout, capped with concrete**	
255	35									
250	40									
245	45									
240	50									
235	55									
230	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG B-5

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	287'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	Soil Description	Type of Tests
	0						GP	ASPHALT CONCRETE, approximately 2.5" over AGGREGATE BASE, approximately 3" over	
285			B-1 1'-4'				SC	ARTIFICIAL FILL (Afu) @ .5': Clayey SAND, loose to medium dense, dark reddish brown	
	5		S-1	8 8 8			SM	VERY OLD PARALIC DEPOSITS (Qvop) @ 5': Silty SANDSTONE, medium dense, light brown, moist, fine SAND, mottled with clayey sand pockets	SA
280									
	10		R-1	19 18 50/5"			GP	@ 10': Gravelly SANDSTONE, very dense, orange-brown, moist, fine to medium SAND, moderately friable, driller notes well-cemented, low sample recovery, gravels from 11' to 15', large well-rounded GRAVEL in shoe	
275									
	15		S-2	10 17 20			SP-SM	TERTIARY SAN DIEGO FORMATION @ 15': Poorly-graded SANDSTONE with SILT, medium dense, pale gray, slightly mottled with orange-brown stringers, moist, fine SAND, 40/1" on first blows, Qln/Tsd contact	
270									
	20		R-2	16 20 42				@ 20': Poorly-graded SANDSTONE, very dense, light to pale gray, moist, fine SAND	
265									
	25		S-3	18 18 26				@ 25': Poorly-graded SANDSTONE with SILT, dense, light to pale gray, moist, fine SAND	
260									
	30								

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-5

Project No.	11347.001	**Start Date Drilled**	6-8-16	**End Date Drilled**	6-9-16
Project	Greystar			**Hole Diameter**	8"
Drilling Co.	Baja Exploration			**Ground Elevation**	287'
Drilling Method	CME-75 - 140lb - Autohammer - 30" Drop			**Logged By**	CDL
Location	See Figure 2			**Sampled By**	CDL

SOIL DESCRIPTION

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-3	50/5"			SP	@ 30': Poorly-graded SANDSTONE, very dense, light to pale gray, moist, fine SAND	
255										
	35			S-4	20 29 44			SP-SM	@ 35': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, trace mottling of orange-brown, moist, fine SAND	
250										
	40			R-4	40 50/2"				@ 40': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, trace mottling of orange-brown, moist, fine SAND	
245										
	45								@ 45': Encountered concretion to 50'	
240										
	50			S-5	24 37 50/4"				@ 50': Poorly-graded SANDSTONE with SILT, very dense, light to pale gray, undulatory, lamination, sampler over packed	
235									**Total Depth = 51.3 Feet** **No groundwater encountered at time of drilling** **Backfilled with bentonite grout on 8/9/16**	
	55									
230										
	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
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Leighton

FIELD PERCOLATION TEST DATA SHEET

Project Name:	Grey Star	Project No.:	11347.001
Proj. Address:	635 Robinson Avenue, San Diego, CA		

SOIL TYPE / TEST LOCATION / BOREHOLE

Soil Type: Poorly Graded SANDSTONE

Location: B-3

Hole Dia: 8"

Depth 50'-75'

Tested by: CDL Pre-Saturation Date: 6-8-16 Test Date: 6-9-16

Notes: Measurements in Inches (in)

Time of Day	Interval / Notes	Initial Depth to Water (in)	Final Depth of Water (in)	Δ in Water Level (in.)	Percolation Rate (min/inch)
0924	30 minutes	772.80	853.92	81.12	0.37
0958	30 minutes	672.00	842.52	170.52	0.18
1032	30 minutes	636.00	838.44	202.44	0.15
1107	30 minutes	651.60	834.60	183.00	0.16
1143	30 minutes	600.00	826.32	226.32	0.13
1218	30 minutes	600.00	824.88	224.88	0.13
1308	30 minutes	600.00	820.92	220.92	0.14

Notes: 0.14 min/inch or 428 inch/hour

Last 30 minute testing reading used to detmine percolation rate

Leighton

FIELD PERCOLATION TEST DATA SHEET

Project Name:	Grey Star	Project No.:	11347.001
Proj. Address:	635 Robinson Avenue, San Diego, CA		

SOIL TYPE / TEST LOCATION / BOREHOLE

Soil Type: Poorly Graded SANDSTONE

Location: P-1

Hole Dia: 6"

Depth 13"-19"

Tested by: CDL Pre-Saturation Date: 6-8-16 Test Date: 6-9-16

Notes: Measurements in Inches (in)

Time of Day	Interval / Notes	Initial Depth to Water (in)	Final Depth of Water (in)	Δ in Water Level (in.)	Percolation Rate (min/inch)
0948	30 minutes	12.250	17.250	5.00	6.00
1019	30 minutes	13.250	17.375	4.13	7.27
1050	30 minutes	13.625	17.125	3.50	8.57
1121	30 minutes	13.625	17.125	3.50	8.57
1152	34 minutes	13.500	17.125	3.63	9.38
1227	43 minutes	12.875	17.625	4.75	9.05
1311	30 minutes	13.500	16.375	2.88	10.43
1342	30 minutes	13.250	16.500	3.25	9.23
1427	30 minutes	13.375	16.500	3.125	9.60

Notes: 9.6 min/inch or 6.25 inch/hour

Last 30 minute testing reading used to detmine percolation rate

Appendix C
Laboratory Testing Procedures and Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

Moisture and Density Determination Tests: Moisture content and dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The results of these tests are presented in the boring logs.

Direct Shear Test: Direct shear tests were performed on two selected relatively undisturbed samples which were soaked for a minimum of 24 hours under a surcharge equal to the applied normal force during testing. After transfer of the samples to the shear box and reloading of the samples, the pore pressures set up in the samples (due to the transfer) were allowed to dissipate for a period of approximately 1 hour prior to application of shearing force. The samples were tested under various normal loads utilizing a motor-driven, strain-controlled, direct-shear testing apparatus at a strain rate of 0.05 inches per minute. The test results are presented on the attached figures.

Classification or Grain Size Tests: Typical materials were subjected to mechanical grain-size analysis by sieving from U.S. Standard brass screens (ASTM Test Methods C136 or D422). Hydrometer analyses were performed where applicable quantities of fines were encountered. The data was evaluated in determining the classification of the materials. The grain-size distribution curves are presented in the test data and the Unified Soil Classification (USCS) is presented in both the test data and the boring logs.

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with Caltrans Test Method CT643 for Steel or CT532 for concrete and standard geochemical methods. The results are presented in the table below:

Sample Location	Sample Description	pH	Minimum Resistivity (ohms-cm)
B-4 @ 1-5’	Reddish Brown Clayey Sand	7.57	824

APPENDIX C (continued)

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method CT422. The results are presented below:

Sample Location	Sample Description	Chloride Content, ppm
B-4 @ 1-5’	Reddish Brown Clayey Sand	66.7

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (Caltrans Test Method CT417). The test results are presented in the table below:

Sample Location	Sample Description	Sulfate Content, ppm
B-4 @ 1-5’	Reddish Brown Clayey Sand	180

Expansion Index Tests (ASTM Test Method 4829):

The expansion potential of selected materials was evaluated by the Expansion Index Test, U.B.C. Standard No. 18-2. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch thick by 4-inch diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of this test are presented in the table below:

Sample Location	Sample Description	Expansion Index	Expansion Potential
B-4 @ 1-5’	Reddish Brown Clayey Sand	47	Low

SOIL RESISTIVITY TEST
DOT CA TEST 643

Leighton

Project Name: GREYSTAR / 7TH & ROBINSON   Tested By : BCC   Date: 6/19/15
Project No. : 11347.001   Data Input By: BCC   Date: 6/20/15
Boring No.: B-4   Checked By: BCC   Date: 6/20/15
Sample No. : B-1   Depth (ft.) : 1.0-5.0
Visual Soil Identification: SC

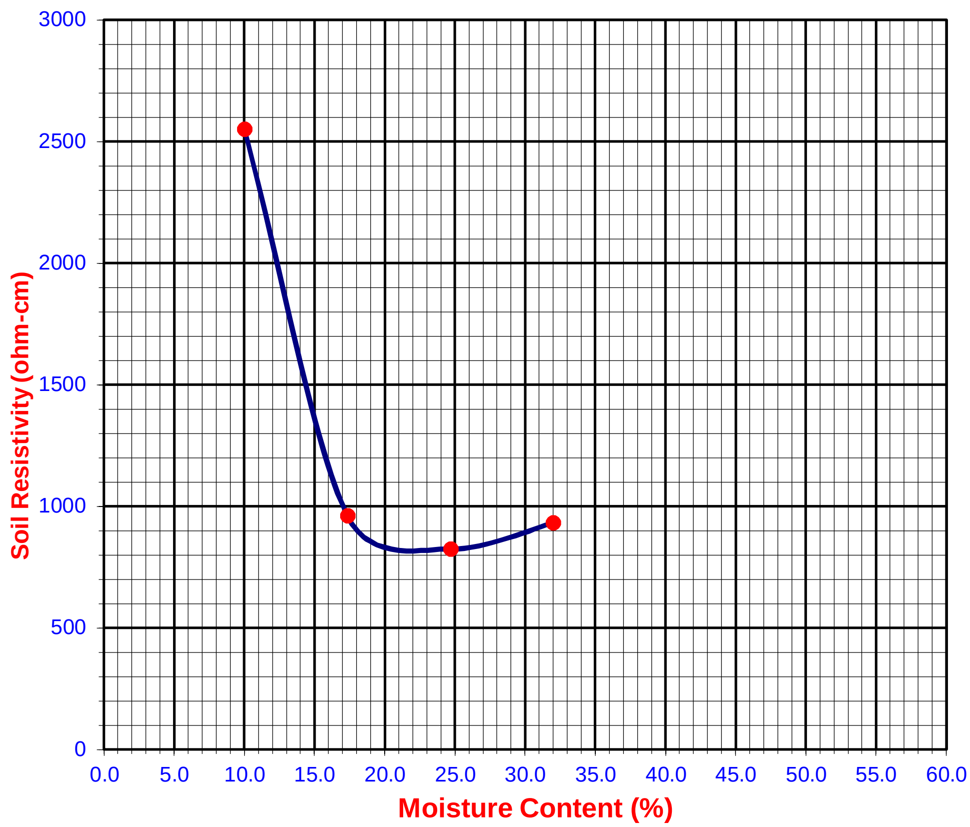
** NOTE: ASTM G-187 REQUIRES SOIL SPECIMENS TO PASS THROUGH NO.8 SIEVE PRIOR TO TESTING. THEREFORE, THIS TEST METHOD MAY NOT BE REPRESENTATIVE FOR COARSER MATERIALS.

Initial Moisture Content (%)

Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	90.90
Wt. of Container (g)	0.00
Moisture Content (%)	10.01

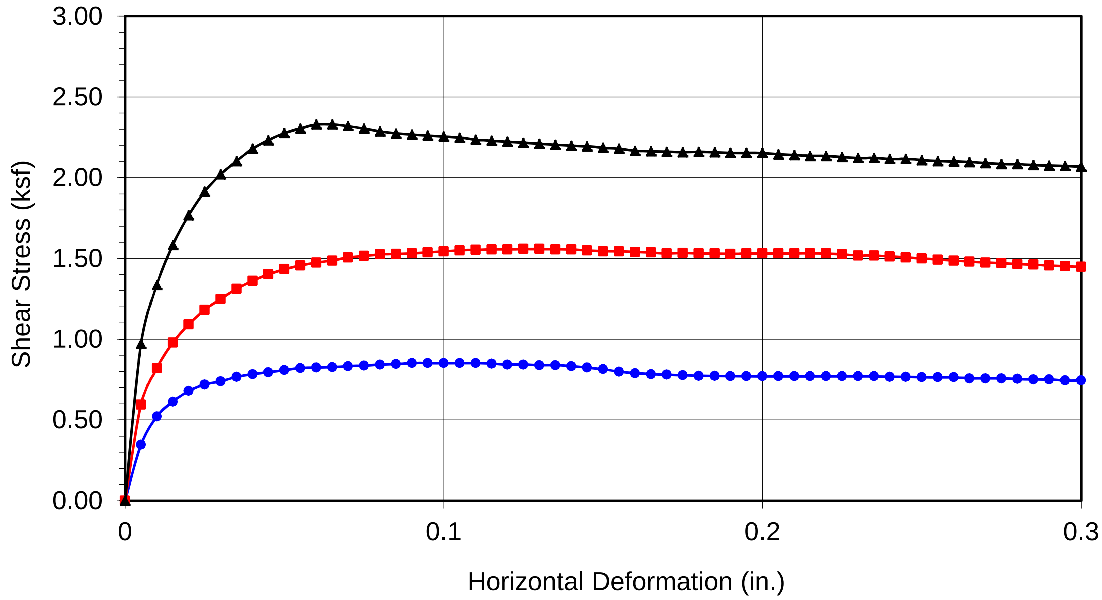
Initial Soil Weight (g)(Wt)	150.0
Box Constant:	0.981

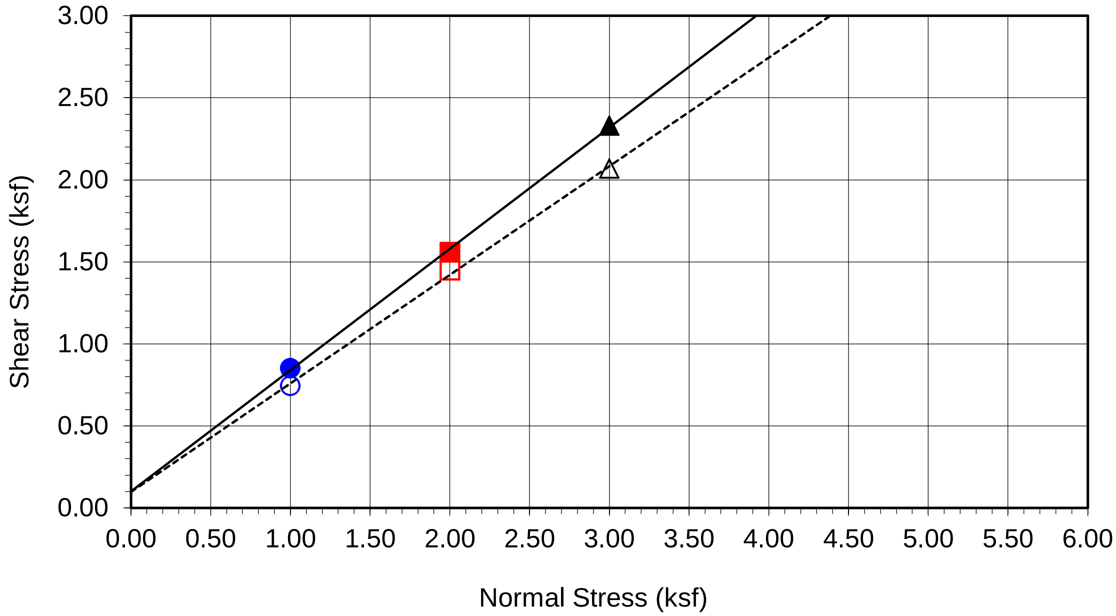
Remolded Specimen	Moisture Adjustments				
Water Added (ml)	0	10	20	30	
Adj. Moisture Content	10.01	17.35	24.68	32.01	
Resistance Rdg. (ohm)	2600	980	840	950	
Soil Resistivity (ohm-cm)	2551	961	824	932	



Minimum Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content	Soil pH
AASHTO T-288, DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	AASHTO T-288, DOT CA Test 643
824	24.68	180	66.7	7.57

Rev. 12-04





Boring No.	**B-1**
Sample No.	**R-2**
Depth (ft)	**21-21.5**
Sample Type:	Ring

Soil Identification:
Pale olive silt (ML)

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	102	36
Ultimate	97	34

Normal Stress (kip/ft²)	1.000	2.000	3.000
Peak Shear Stress (kip/ft²)	● 0.852	■ 1.559	▲ 2.330
Shear Stress @ End of Test (ksf)	○ 0.745	□ 1.449	△ 2.069
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.34	11.34	11.34
Dry Density (pcf)	90.3	91.4	92.6
Saturation (%)	35.3	36.2	37.3
Soil Height Before Shearing (in.)	0.9933	0.9915	0.9852
Final Moisture Content (%)	27.8	27.8	26.7

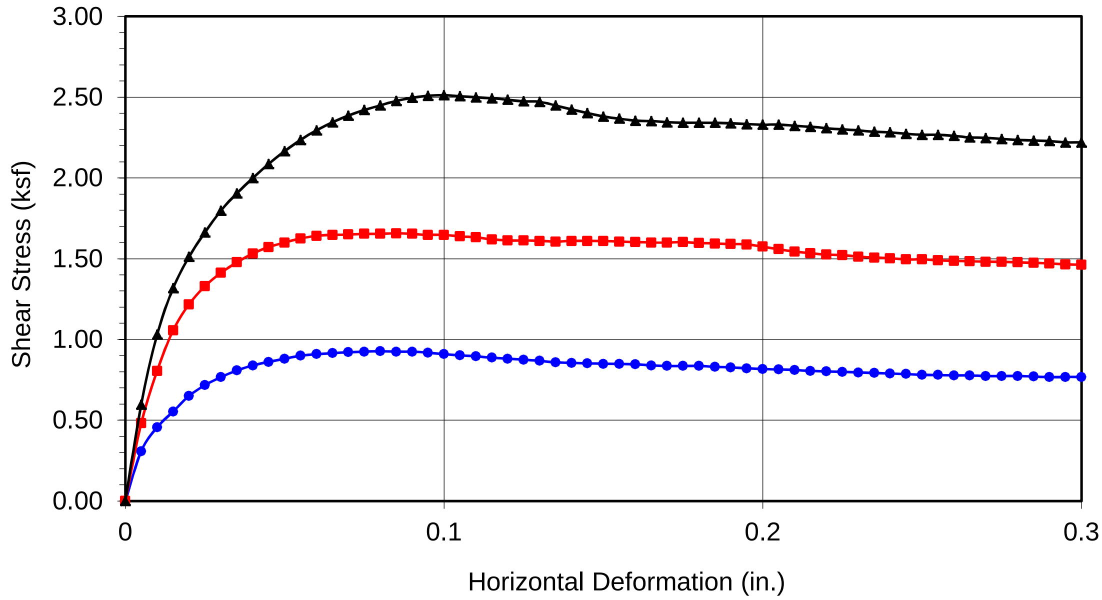
Leighton

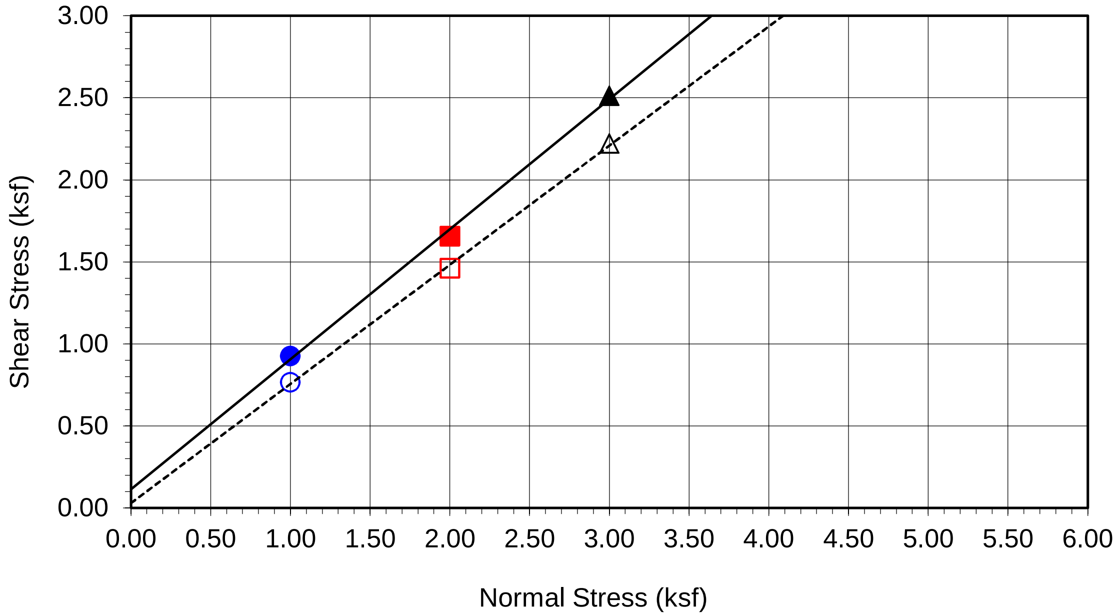
DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 11347.001

Greystar/7th & Robinson

06-16





Boring No.	**B-1**
Sample No.	**R-3**
Depth (ft)	**31-31.5**
Sample Type:	Ring

Soil Identification:
Light olive gray silt (ML)

Strength Parameters

	C (psf)	ϕ (°)
Peak	114	38
Ultimate	30	36

Normal Stress (kip/ft²)	1.000	2.000	3.000
Peak Shear Stress (kip/ft²)	● 0.927	■ 1.657	▲ 2.512
Shear Stress @ End of Test (ksf)	○ 0.767	□ 1.462	△ 2.220
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	13.52	13.52	13.52
Dry Density (pcf)	86.9	88.3	89.5
Saturation (%)	38.8	40.2	41.4
Soil Height Before Shearing (in.)	0.9939	0.9876	0.9848
Final Moisture Content (%)	31.5	30.6	29.4

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DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 11347.001

Greystar/7th & Robinson

06-16

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	GREYSTAR / 7TH & ROBINSON	Tested By:	BCC	Date:	22-Jun-2016
Project No. :	10347.001	Checked By:	BCC		23-Jun-2016
Boring No:	B-4	Depth (ft.)	1.0-5.0		
Sample No. :	B-1	Location:	**		
Sample Description:	SC: REDDISH-BROWN CLAYEY SAND				

Dry Wt. of Soil + Cont. (g)	2250.0
Wt. of Container No. (g)	0.0
Dry Wt. of Soil (g)	2250.0
Weight Soil Retained on #4 Sieve	16.5
Percent Passing # 4	99.3

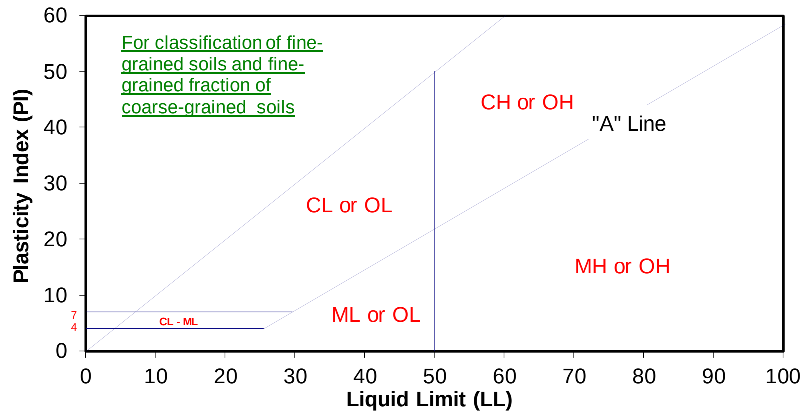
MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0468
Wt. Comp. Soil + Mold (g)	615.3	644.6
Wt. of Mold (g)	203.8	203.8
Specific Gravity (Assumed)	2.70	2.70
Container No.	e-3	e-3
Wet Wt. of Soil + Cont. (g)	300.0	644.6
Dry Wt. of Soil + Cont. (g)	275.7	378.2
Wt. of Container (g)	0.0	203.8
Moisture Content (%)	8.8	16.5
Wet Density (pcf)	124.1	132.8
Dry Density (pcf)	114.1	113.9
Void Ratio	0.478	0.547
Total Porosity	0.323	0.354
Pore Volume $(cm)^3$	66.9	76.6
Degree of Saturation (%) [S meas]	**49.7**	**81.7**

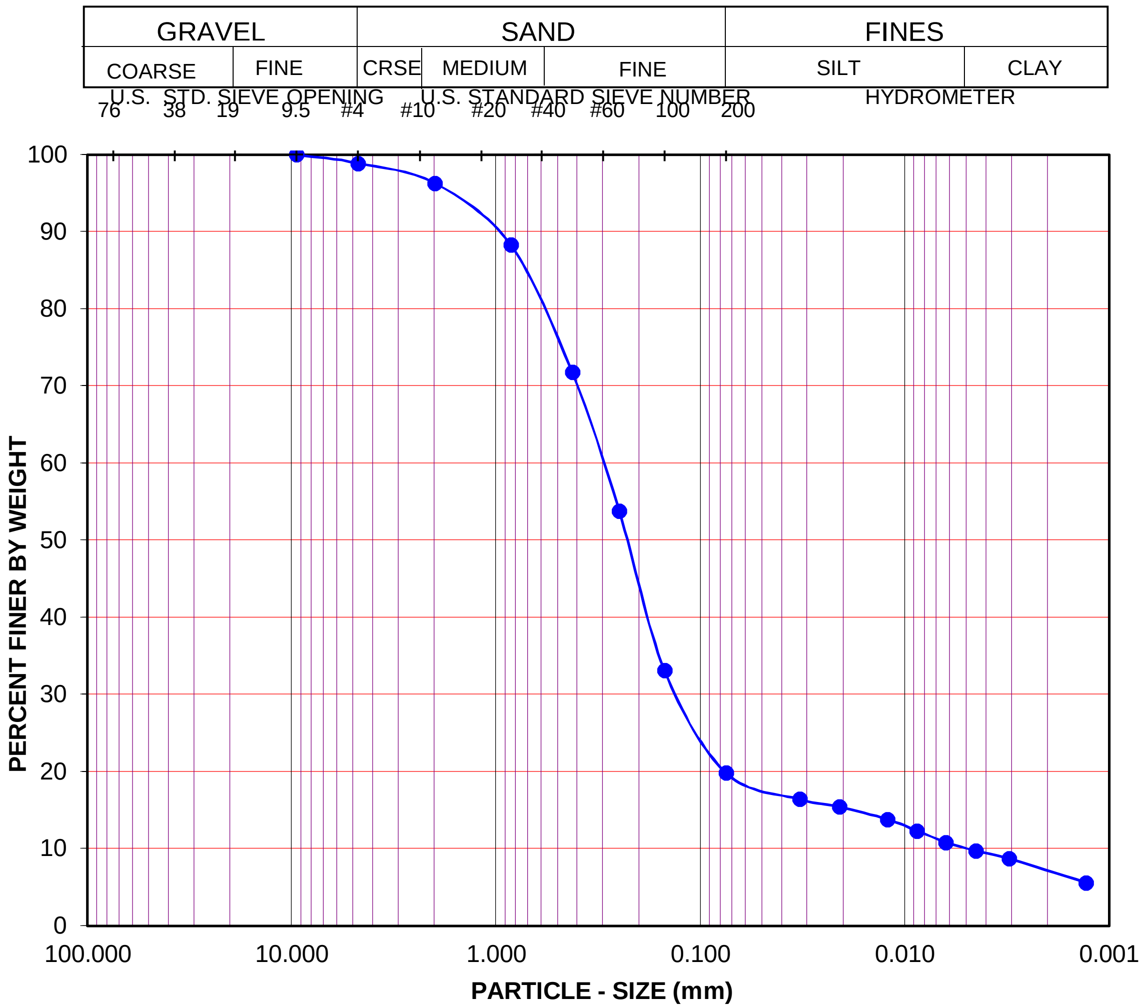
SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
6/22/16	19:12	1.0	0	1.0000
6/22/16	19:22	1.0	10	1.0000
	Add Distilled Water to the Specimen			
6/23/16	16:19	1.0	1257	1.0468
6/23/16	17:19	1.0	1317	1.0468

Expansion Index (EI meas) =	((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	46.8
Expansion Index (Report) =	Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**47**

Rev. 05-09





Location	Sample No.	Depth (ft)	Soil Type	GR:SA:FI (%)	LL,PL,PI
B-4	S-1	10.0-11.5	SC	1:79:20	N/A

Sample Description:
SC: REDDISH-BROWN CLAYEY SAND

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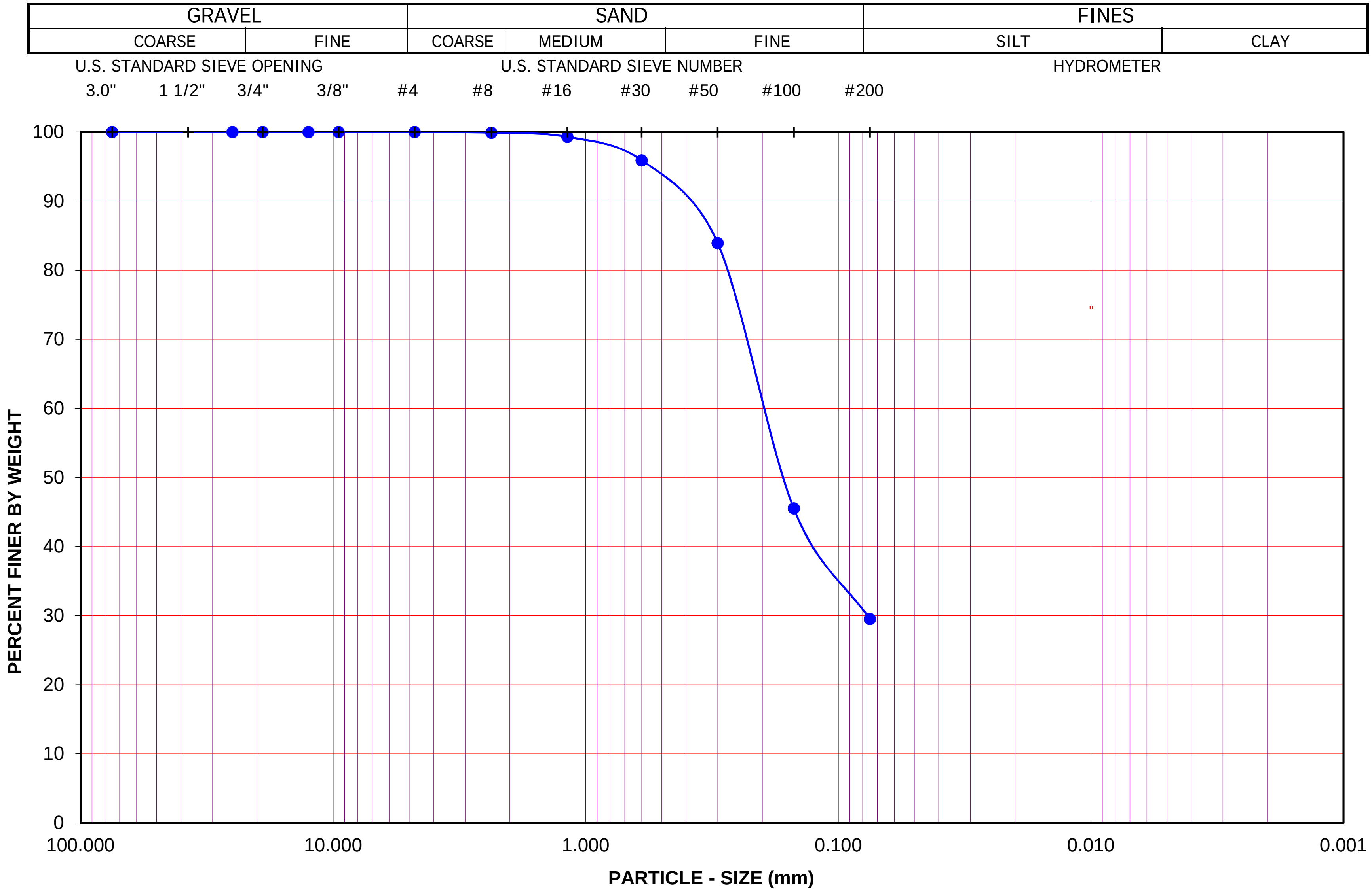
Project No.: 11347.001

GRAYSTAR / 7TH &

ATTERBERG LIMITS, PARTICLE - SIZE CURVE
ASTM D 4318, D 422

Rev. 12-04



Project Name: GRAYSTAR / 7TH & ROBINSON

Project No.: 11347.001

Exploration No.: B-5 | Sample No.: S-1

Depth (feet): 5.0-6.5 | Soil Type : SM

Soil Identification: SM: BROWN SILTY SAND

Leighton

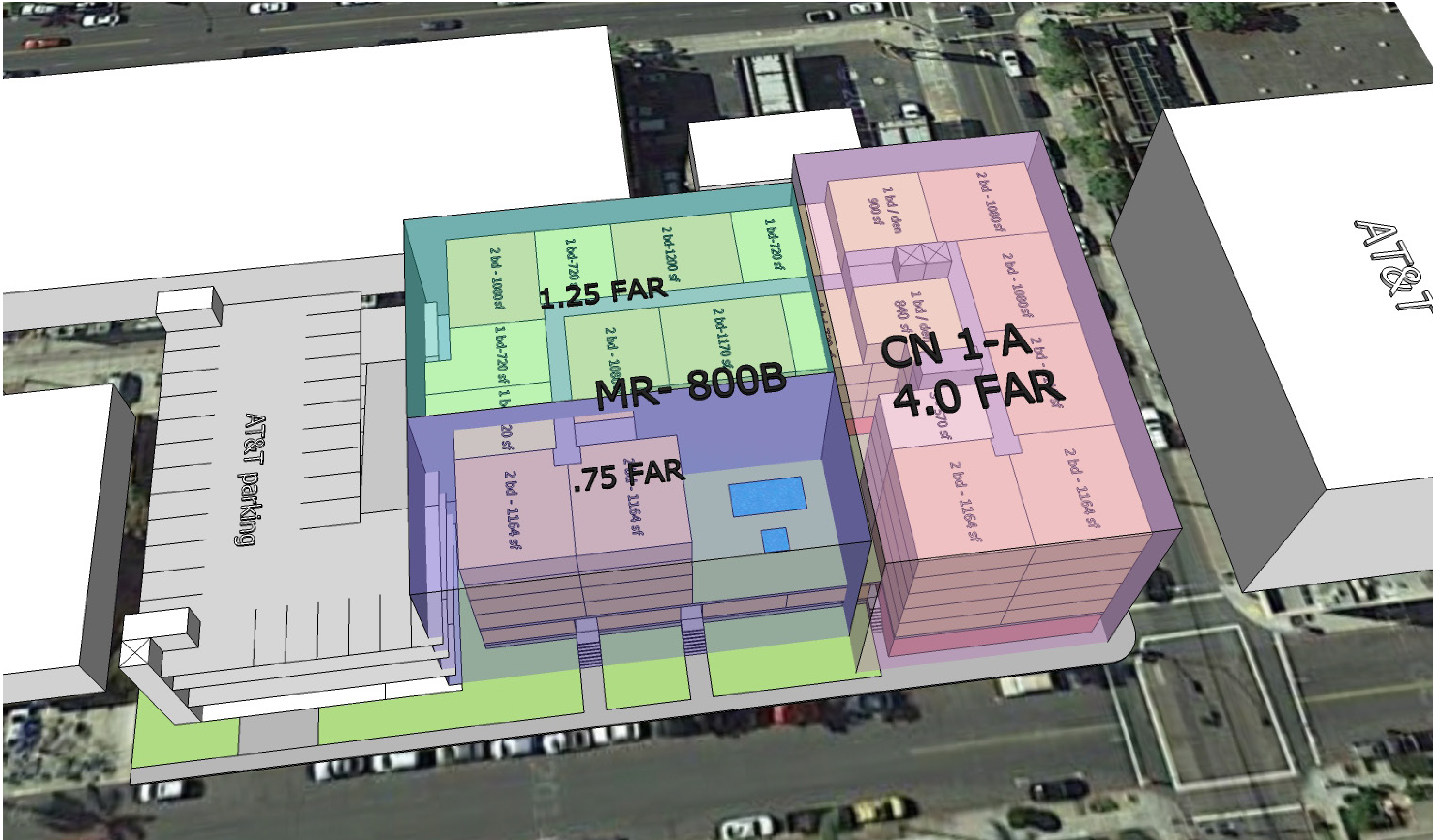
PARTICLE - SIZE DISTRIBUTION ASTM D 6913

GR:SA:FI : (%) 0 : 70 : 30

Jun-16

Appendix D
Conceptual Plans


Robinson
7th Ave.
7TH &
ROBINSON
YIELD STUDY



ZONING

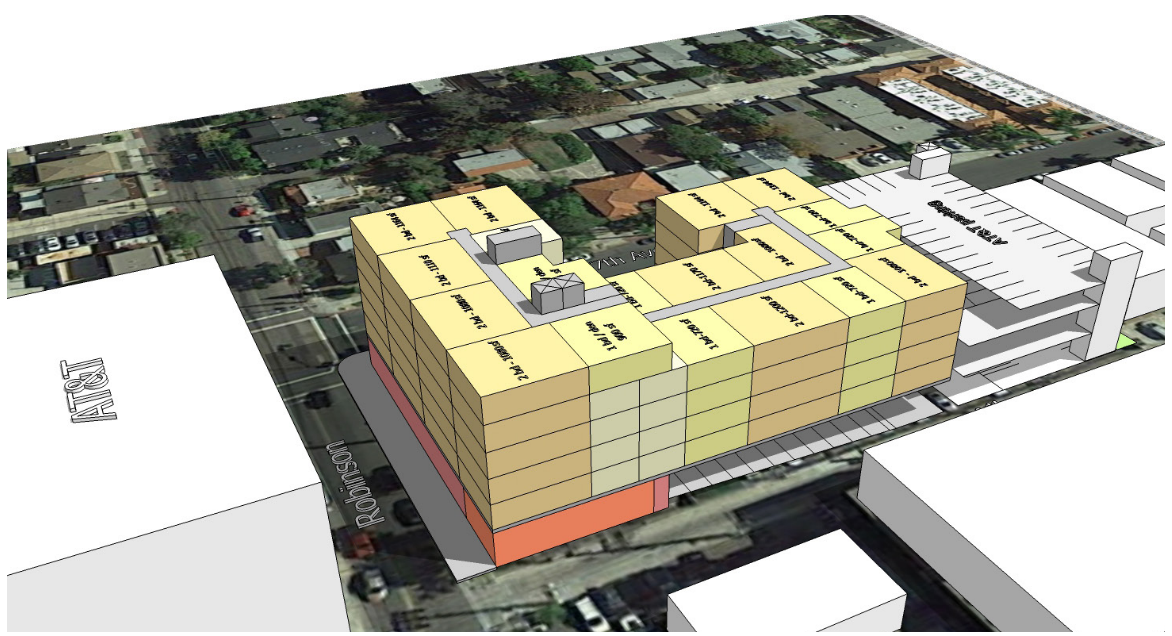
7TH & ROBINSON

N.T.S.

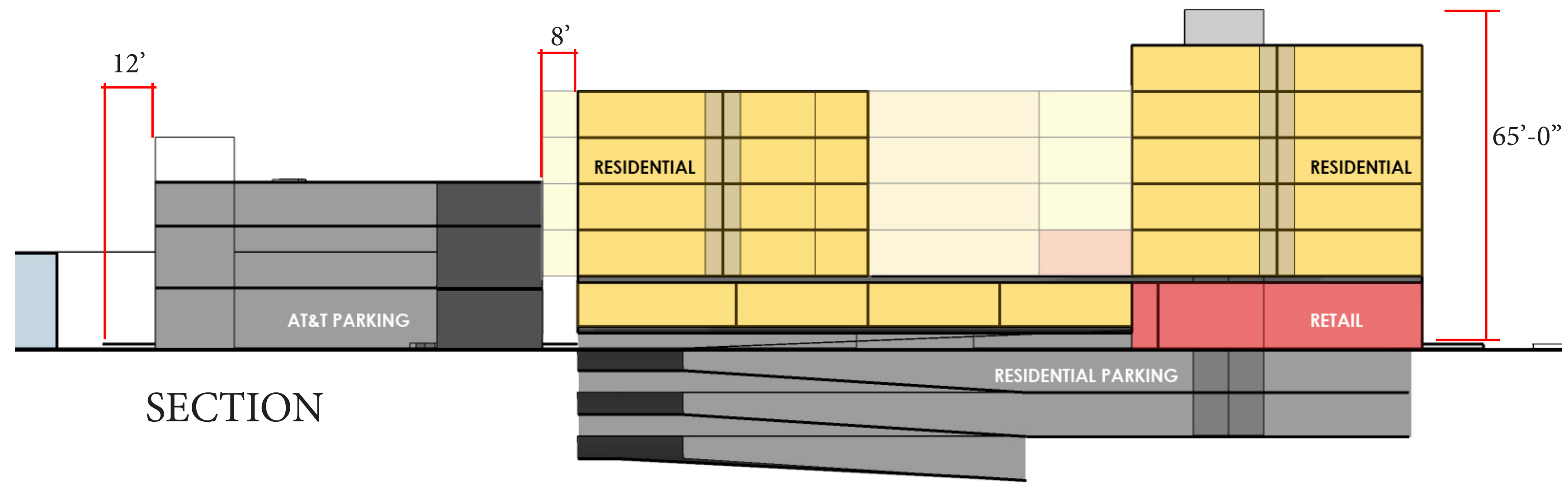
Yield Study Option #3 04.05.16

carrierjohnson + CULTURE

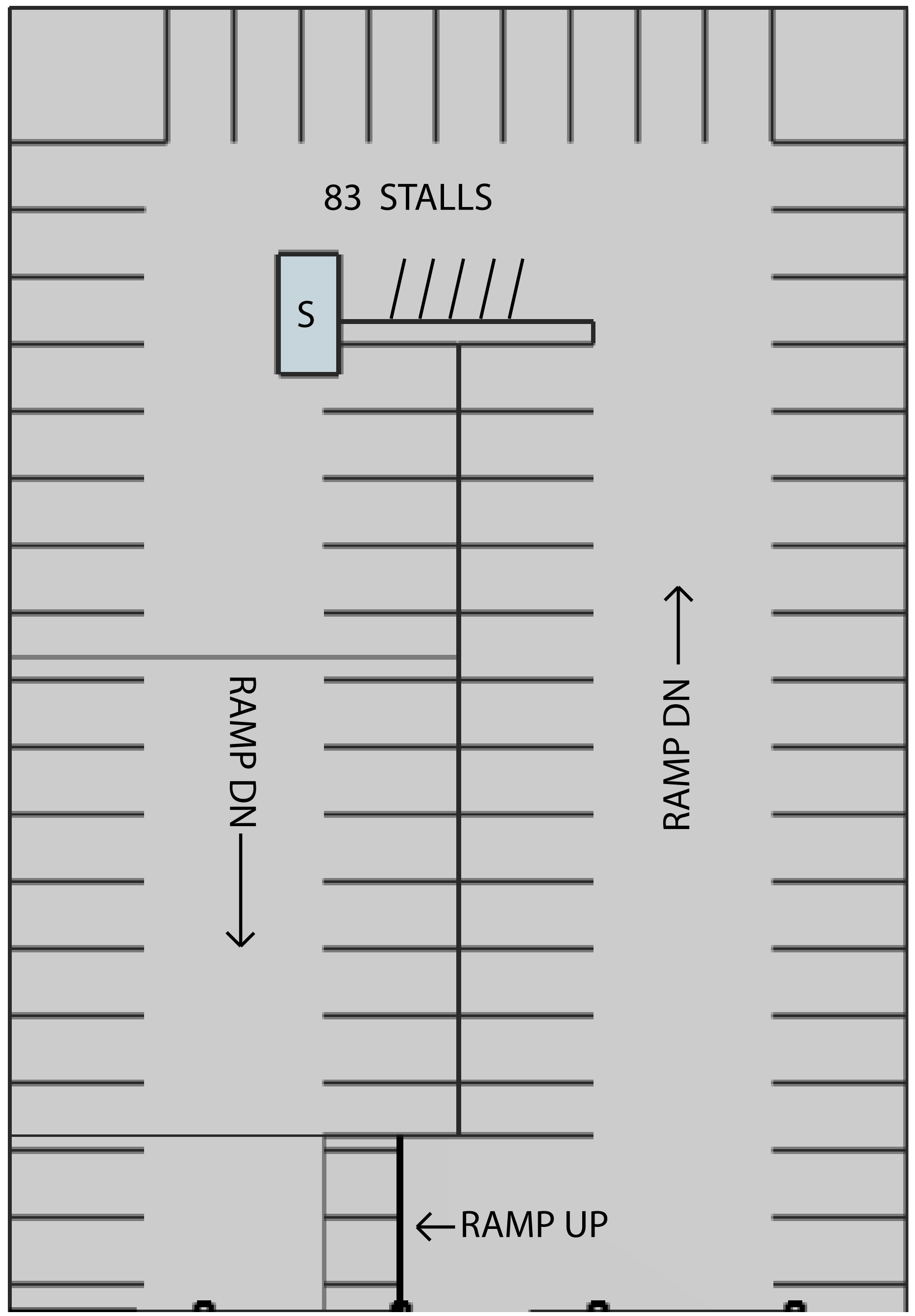
VIEW- WEST



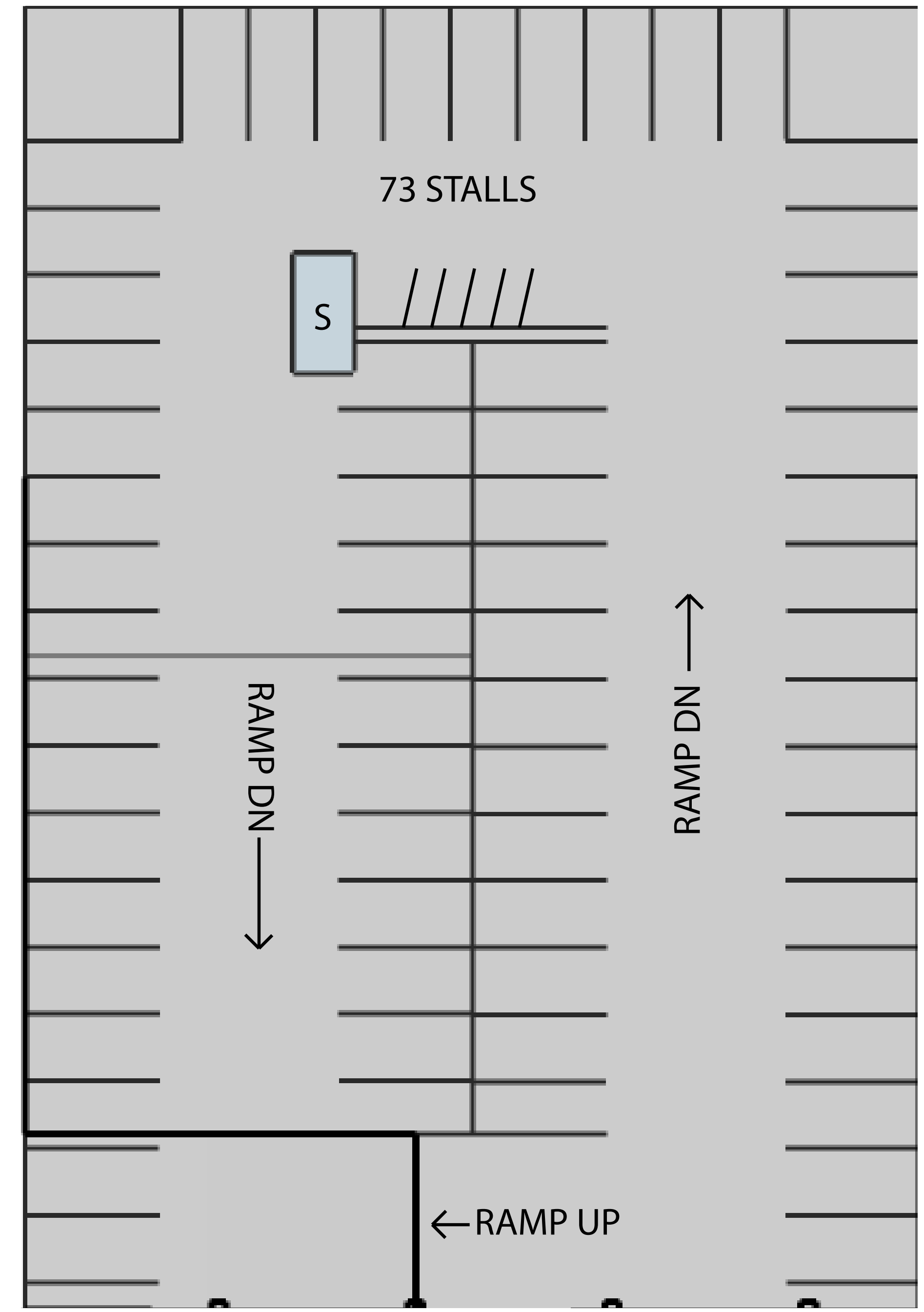
VIEW- EAST



SECTION



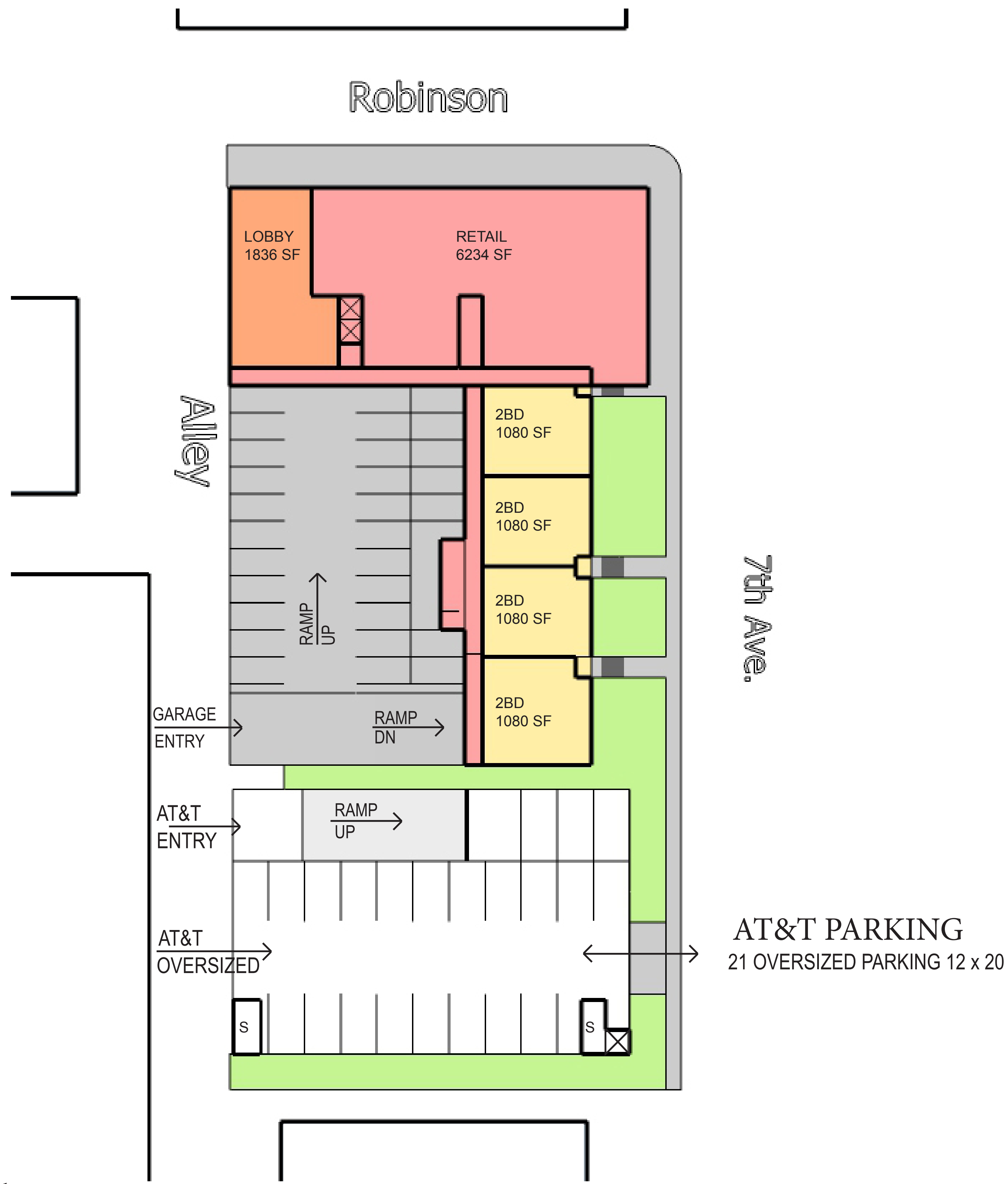
83 STALLS
S
RAMP DN
RAMP DN
RAMP UP



73 STALLS
S
RAMP DN
RAMP DN
RAMP UP

LVL- B2

LVL- B1



LVL- 1

7TH & ROBINSON

N.T.S.

Yield Study Option #3

04.05.16

carrierjohnson + CULTURƎ

AT&T PARKING

9 OVERSIZED PARKING 12 x 20

10 STANDARD PARKING 9 x 18

LVL- 2

7TH & ROBINSON

N.T.S.

Yield Study Option #3 04.05.16

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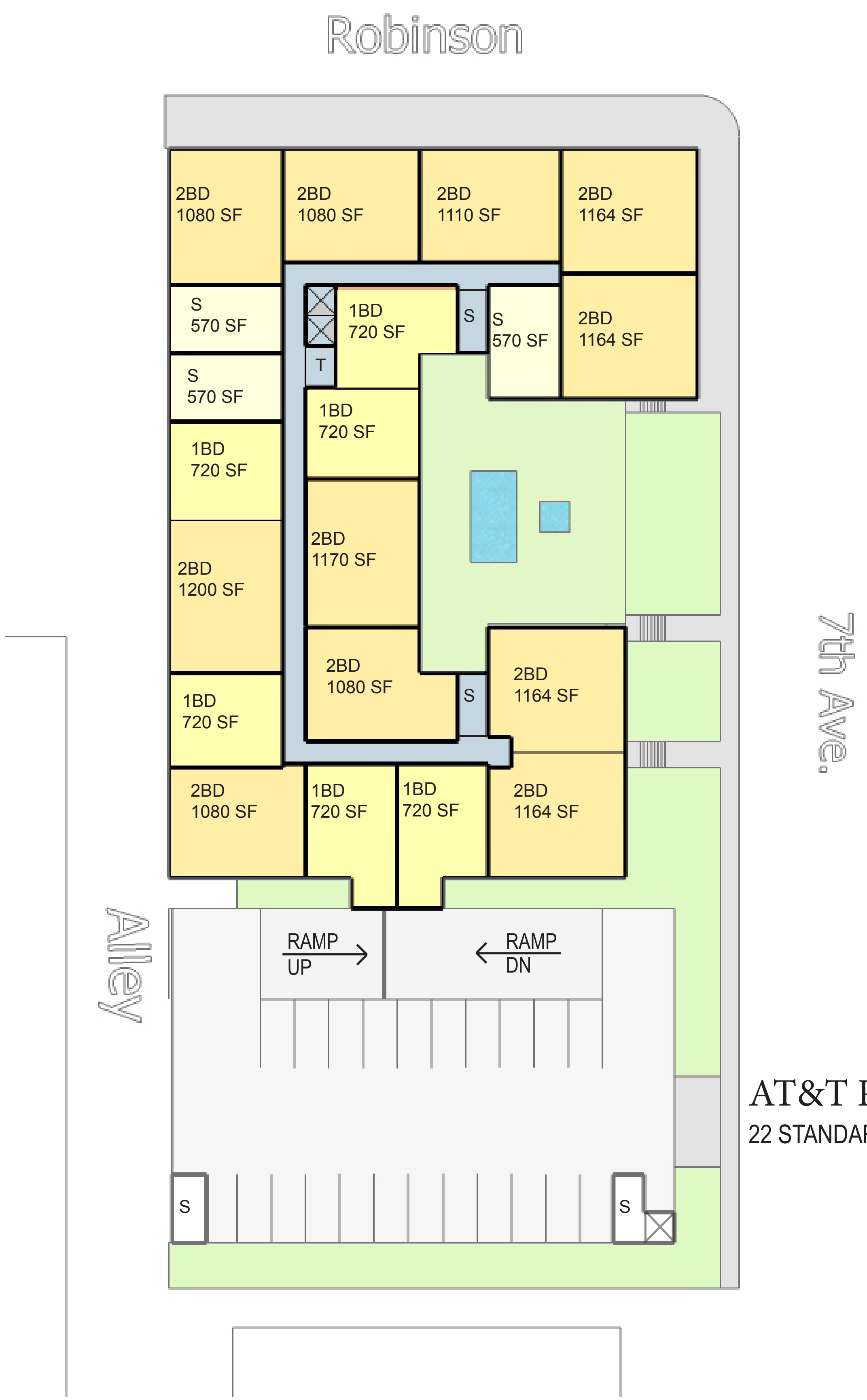

AT&T PARKING
22 STANDARD PARKING

LVL-3

AT&T PARKING
28 STANDARD PARKING

LVL-4

7TH & ROBINSON

N.T.S.

Yield Study Option #3

04.05.16

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LVL-5

LVL-6

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N.T.S.

Yield Study Option #3 04.05.16

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Appendix E
General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical

Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

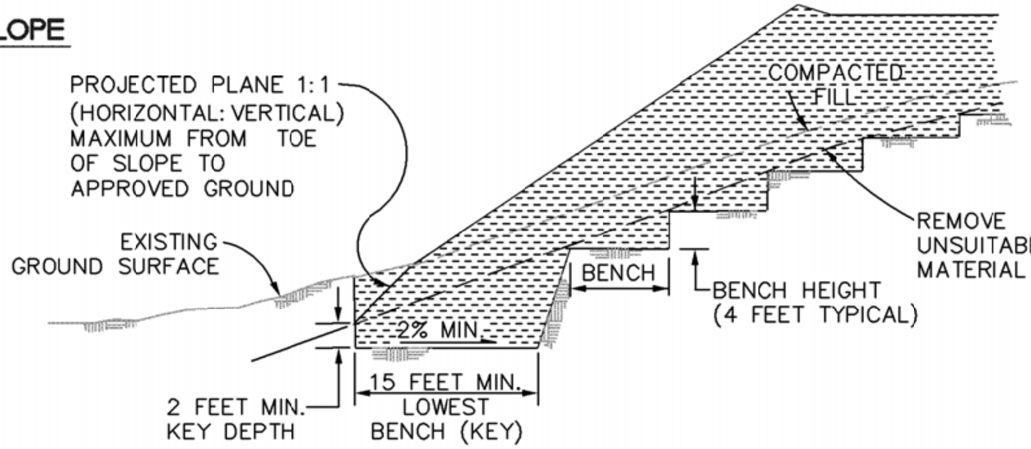
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

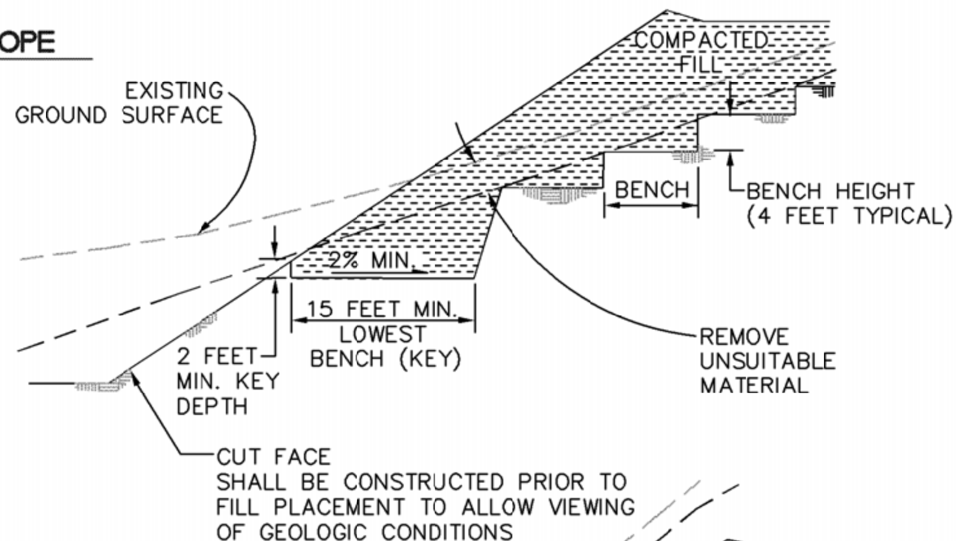
7.4 Observation and Testing

The densification of the bedding around the conduits shall be observed by the Geotechnical Consultant.

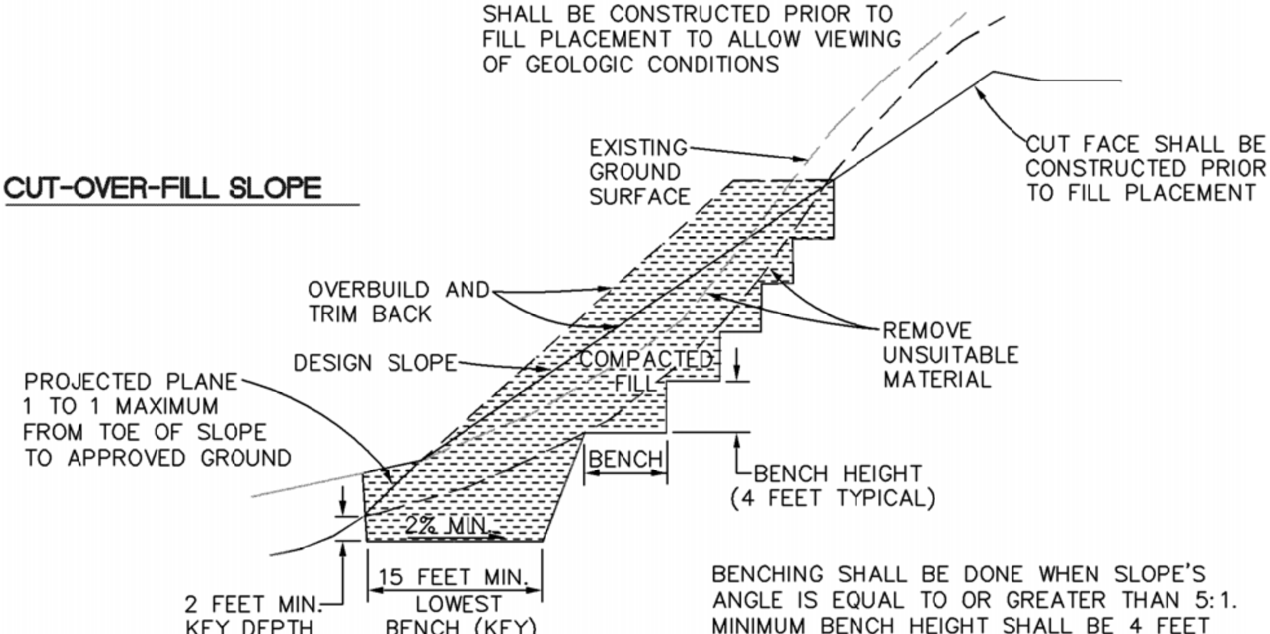
FILL SLOPE



FILL-OVER-CUT SLOPE

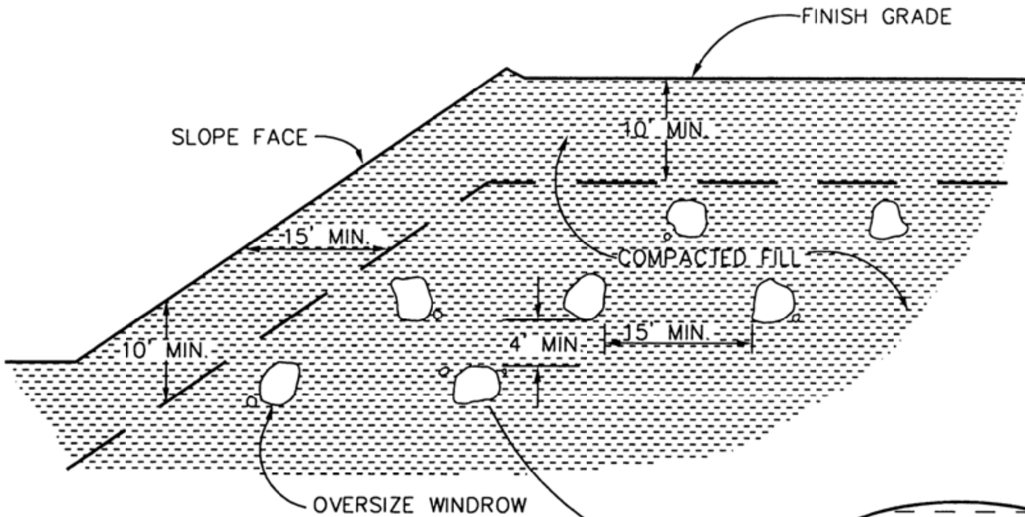


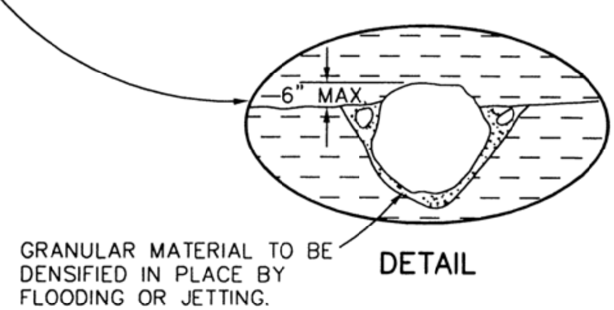
CUT-OVER-FILL SLOPE



BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

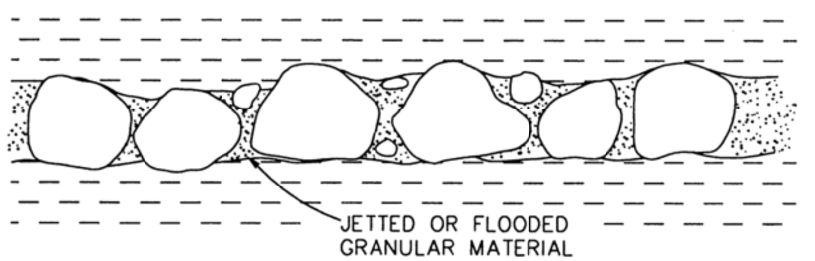
KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL A





DETAIL

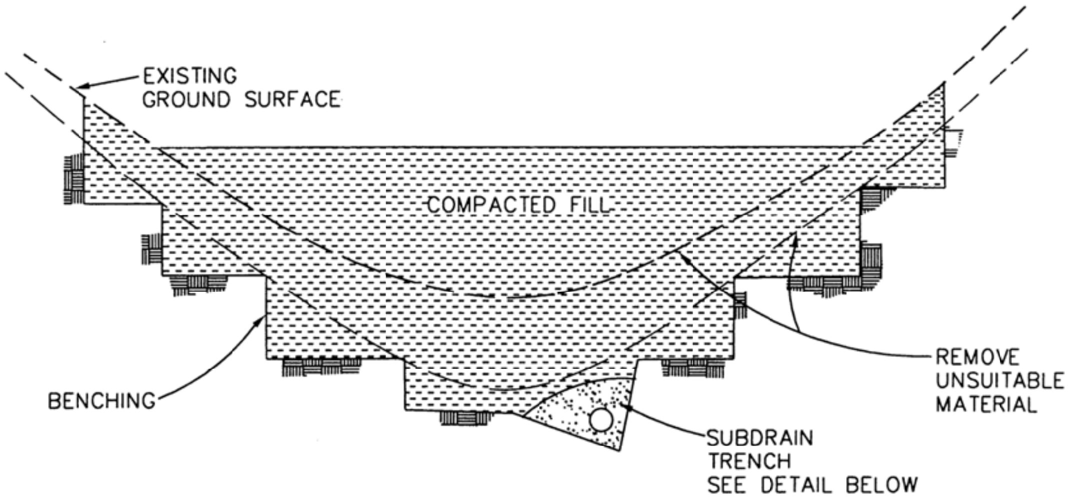
* OVERSIZE ROCK IS LARGER THAN 8 INCHES IN LARGEST DIMENSION.
* EXCAVATE A TRENCH IN THE COMPACTED FILL DEEP ENOUGH TO BURY ALL THE ROCK.
* BACKFILL WITH GRANULAR SOIL JETTED OR FLOODED IN PLACE TO FILL ALL THE VOIDS.
* DO NOT BURY ROCK WITHIN 10 FEET OF FINISH GRADE.
* WINDROW OF BURIED ROCK SHALL BE PARALLEL TO THE FINISHED SLOPE.

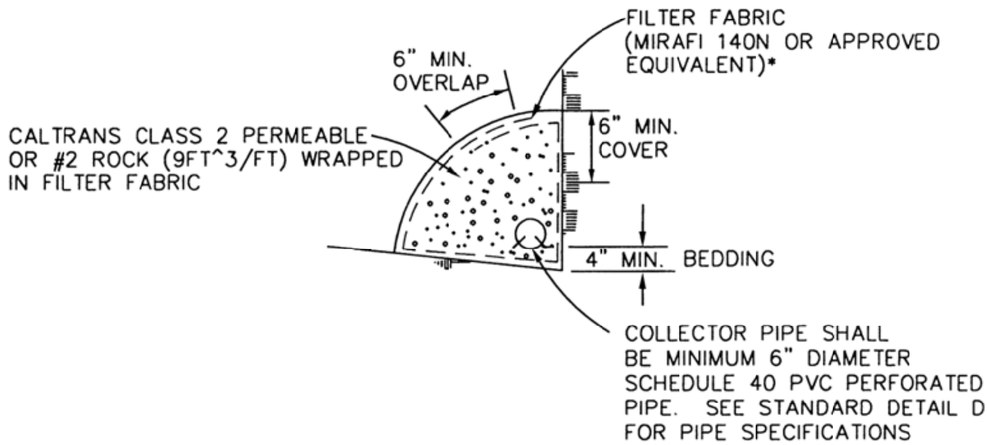


TYPICAL PROFILE ALONG WINDROW

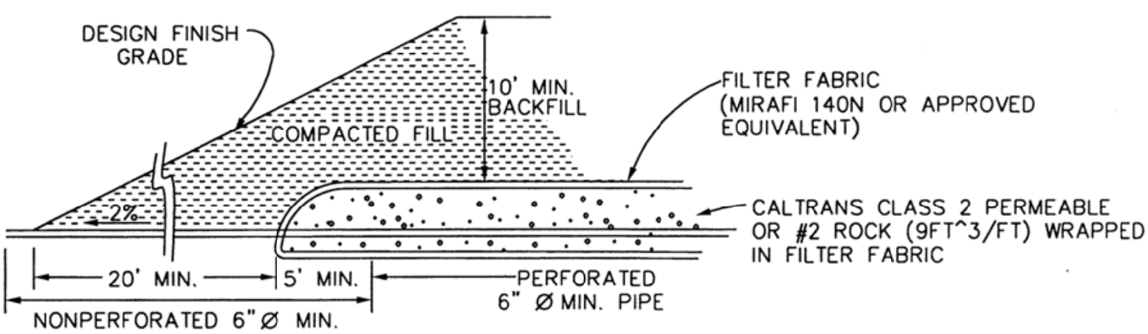
OVERSIZE ROCK DISPOSAL

GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL B





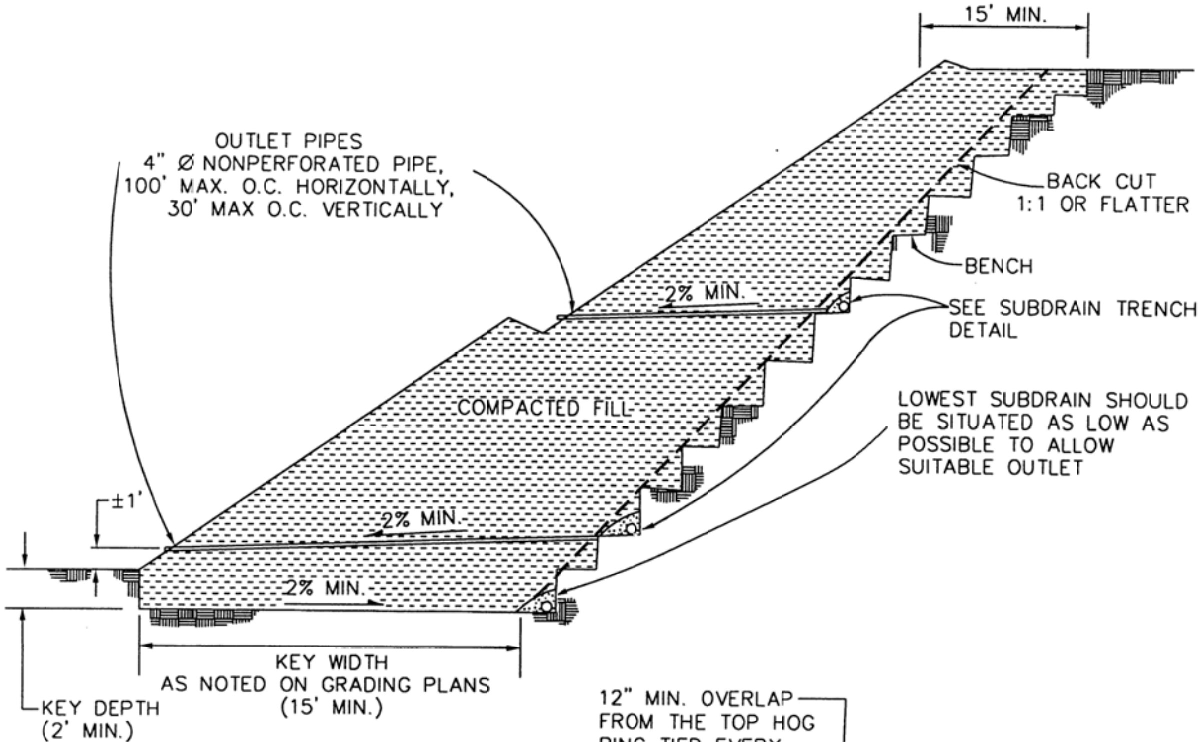
SUBDRAIN DETAIL

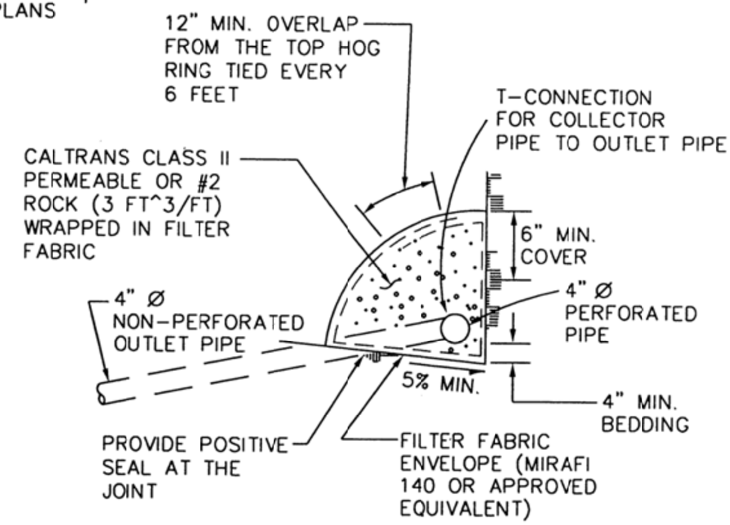


DETAIL OF CANYON SUBDRAIN OUTLET

CANYON SUBDRAINS

GENERAL EARTHWORK AND
GRADING SPECIFICATIONS
STANDARD DETAIL C





SUBDRAIN TRENCH DETAIL

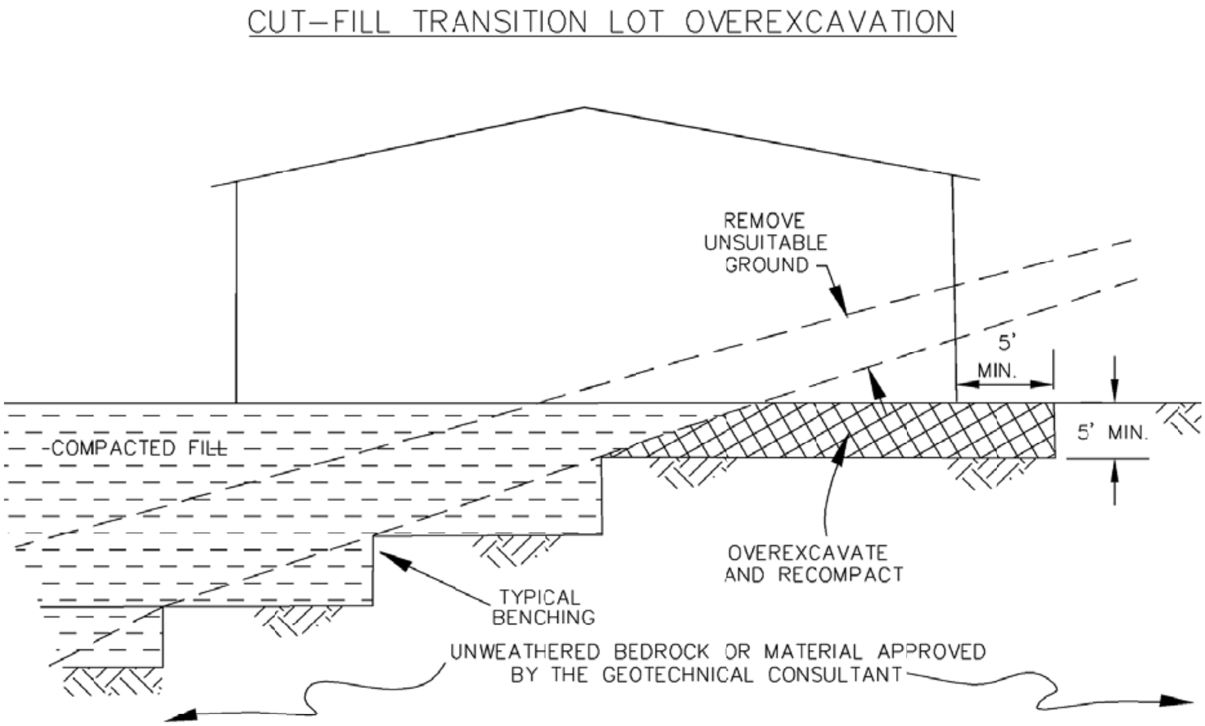
SUBDRAIN INSTALLATION – subdrain collector pipe shall be installed with perforation down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drill holes are used. All subdrain pipes shall have a gradient of at least 2% towards the outlet.

SUBDRAIN PIPE – Subdrain pipe shall be ASTM D2751, SDR 23.5 or ASTM D1527, Schedule 40, or ASTM D3034, SDR 23.5, Schedule 40 Polyvinyl Chloride Plastic (PVC) pipe.

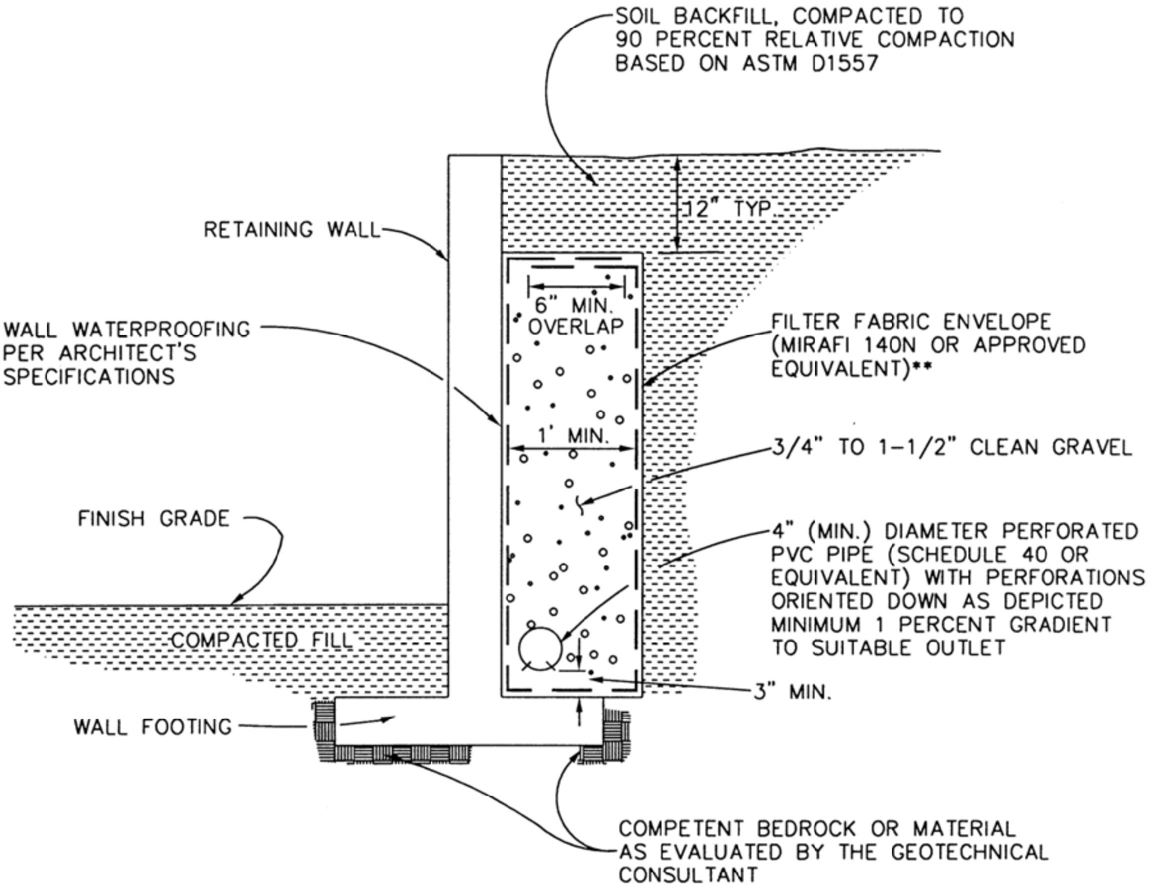
All outlet pipe shall be placed in a trench no wider than twice the subdrain pipe.

BUTTRESS OR REPLACEMENT FILL SUBDRAINS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAIL D

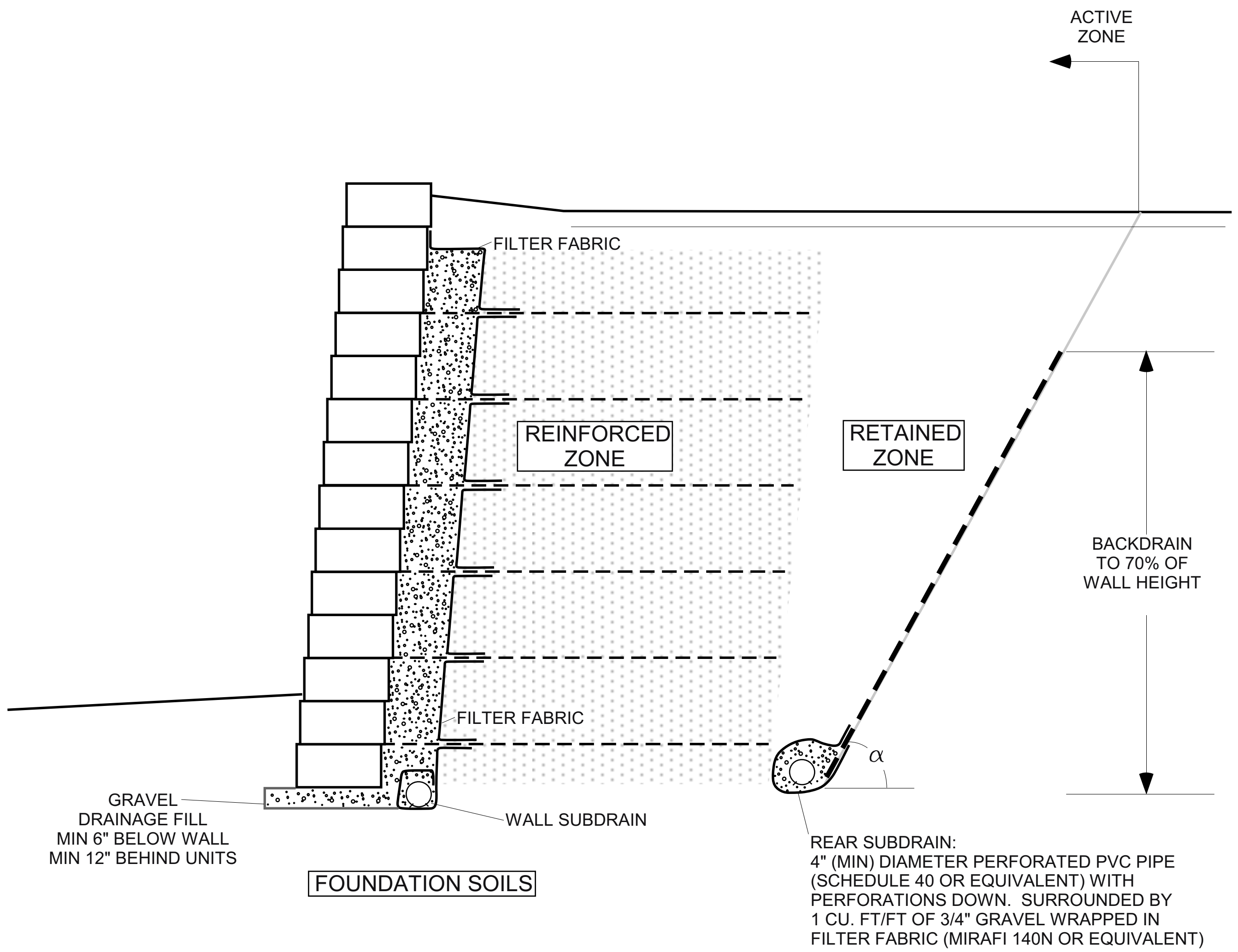


TRANSITION LOT FILLS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL E



NOTE: UPON REVIEW BY THE GEOTECHNICAL CONSULTANT, COMPOSITE DRAINAGE PRODUCTS SUCH AS MIRADRAIN OR J-DRAIN MAY BE USED AS AN ALTERNATIVE TO GRAVEL OR CLASS 2 PERMEABLE MATERIAL. INSTALLATION SHOULD BE PERFORMED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

RETAINING WALL DRAINAGE	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAIL F



OUTLET SUBDRAINS EVERY 100 FEET, OR CLOSER, BY TIGHTLINE TO SUITABLE PROTECTED OUTLET

NOTES:

1) MATERIAL GRADATION AND PLASTICITY

REINFORCED ZONE:

SIEVE SIZE	% PASSING
1 INCH	100
NO. 4	20-100
NO. 40	0-60
NO. 200	0-35

FOR WALL HEIGHT < 10 FEET, PLASTICITY INDEX < 20
FOR WALL HEIGHT 10 TO 20 FEET, PLASTICITY INDEX < 10
FOR TIERED WALLS, USE COMBINED WALL HEIGHTS
WALL DESIGNER TO REQUEST SITE-SPECIFIC CRITERIA FOR WALL HEIGHT > 20 FEET

GRAVEL DRAINAGE FILL:

SIEVE SIZE	% PASSING
1 INCH	100
3/4 INCH	75-100
NO. 4	0-60
NO. 40	0-50
NO. 200	0-5

2) CONTRACTOR TO USE SOILS WITHIN THE RETAINED AND REINFORCED ZONES THAT MEET THE STRENGTH REQUIREMENTS OF WALL DESIGN.

3) GEOGRID REINFORCEMENT TO BE DESIGNED BY WALL DESIGNER CONSIDERING INTERNAL, EXTERNAL, AND COMPOUND STABILITY.

3) GEOGRID TO BE PRETENSIONED DURING INSTALLATION.

4) IMPROVEMENTS WITHIN THE ACTIVE ZONE ARE SUSCEPTIBLE TO POST-CONSTRUCTION SETTLEMENT. ANGLE $\alpha = 45 + \phi/2$, WHERE ϕ IS THE FRICTION ANGLE OF THE MATERIAL IN THE RETAINED ZONE.

5) BACKDRAIN SHOULD CONSIST OF J-DRAIN 302 (OR EQUIVALENT) OR 6-INCH THICK DRAINAGE FILL WRAPPED IN FILTER FABRIC. PERCENT COVERAGE OF BACKDRAIN TO BE PER GEOTECHNICAL REVIEW.

SEGMENTAL RETAINING WALLS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAIL G

Preliminary Drainage Study

635 Robinson

APN 452-10-61

City of San Diego, California

Prepared for:
Greystar

SDE 5709
November 4, 2016

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. WOLFE
44271
Exp. 9.30.17
CIVIL
STATE OF CALIFORNIA

San Dieguito Engineering

Michael D. Wolfe, R.C.E.
Principal

This report summarizes the hydrology and hydraulic calculations for the Preliminary Grading Plan for the property at 635 Robinson, APN 452-10-61. Hydrology calculations have been performed in accordance with the current City of San Diego Hydrology Manual.

EXISTING CONDITIONS

The existing property is currently utilized as a Parking Facility for the ATT Business to the North and is fully paved with landscape and screen walls along the perimeter of Robinson and 7th. All of the property gently slopes toward the east to 7th Avenue. The total lot size is approximately 0.96 acres. The existing parking lot has two points of study that are located in the gutter as shown in the attached exhibits. These existing Basins EX-A and EX–B are 0.61 and 0.36 acres respectively. Both basins drain to the intersect at 7th and Robinson and thence east to a catch basin at 8th and Robinson per existing plan attached 1297-L. This City system thence drains directly to Caltrans 163 Storm Drain and south to the City Exempted conveyance system to San Diego Bay. (An Exempted Water Body for Hydro modification. The existing Q50 of 2.3 cfs and 1.38 cfs respectively were calculated from determination of the Tc and a C factor of 0.88.

PROPOSED CONDITIONS

The proposed development consists of honoring the existing basins A and B and the points of study in the 7th avenue gutter and shown on the attached Exhibit. The developed site has extended the Tc calculation and therefore has a reducing effect on the Q 50. The flows in Basins A and B in the proposed condition are 1.79 cfs and 1.04 cfs respectively which are 20 percent less than the existing Q50 flows. The surface drainage system will honor the current flow patterns and drain to the City's exempted conveyance system to the Bay.

RATIONAL METHOD HYDROLOGY CALCULATIONS

HYDROLOGY STUDY

PRE & POST CONSTRUCTION

PROJECT NAME:	Greystar-7th and Robinson				
PROJECT NUMBER:	5709				
DATE:	10/21/2016				
COMMENT:					
COORD:	N 32d 44' 47"	W 117d 09' 31"			
HYDROLOGIC SOIL GRP.	D	Ur			

Q100	Q100	Q50	Q10	Q2	85th
P6 (in):	2.50	2.20	1.70	1.25	
P24 (in):	4.20	3.70	2.80	1.75	0.63
P6/P24:	0.60	0.59	0.61	0.71	
ADJUSTED P6:	2.50	2.20	1.70	1.14	

PRE CONSTRUCTION

BASIN	HYDROLOGIC SOIL GROUP	AREA (sf)	AREA (Ac)	PRE IMPERV AREA (sf)	IMPERVIOUS %	C	Tc (min)	I100 (iph)	Q100 (cfs)	I50 (iph)	Q50 (cfs)	I10 (iph)	Q10 (cfs)	I2 (iph)	Q2 (cfs)	0.1Q2 (cfs)	85th VOLUME (cf)	Q100 VOLUME (cf)
EX-A	D	26,525	0.61	23,255	88%	0.84	7.4	5.13	2.62	4.51	2.30	3.49	1.78	2.33	1.19	0.12	1393	4631
EX-B	D	15,500	0.36	13,840	89%	0.84	7.2	5.23	1.57	4.60	1.38	3.55	1.07	2.38	0.71	0.07	814	2725
	Total	**42,025**	**0.96**	**37,095**	88%			Total	**4.19**		**3.68**							

TIME OF CONCENTRATION (PRE CONSTRUCTION)

LOCATION	NODE	% IMPERV	ELEMENT	SLOPE		LM	Ti	LENGTH	HI PT	LOW PT	DELTA E	Tt	Tc	Tc Used			
EX-A		88	NC or Com	1.5%		67.5	4.25	293	287	282.6	4.4	3.1	7.4	7.4			
EX-B		89	NC or Com	1.5%		67.5	4.25	269	287	282.9	4.1	2.9	7.2	7.2			

POST CONSTRUCTION

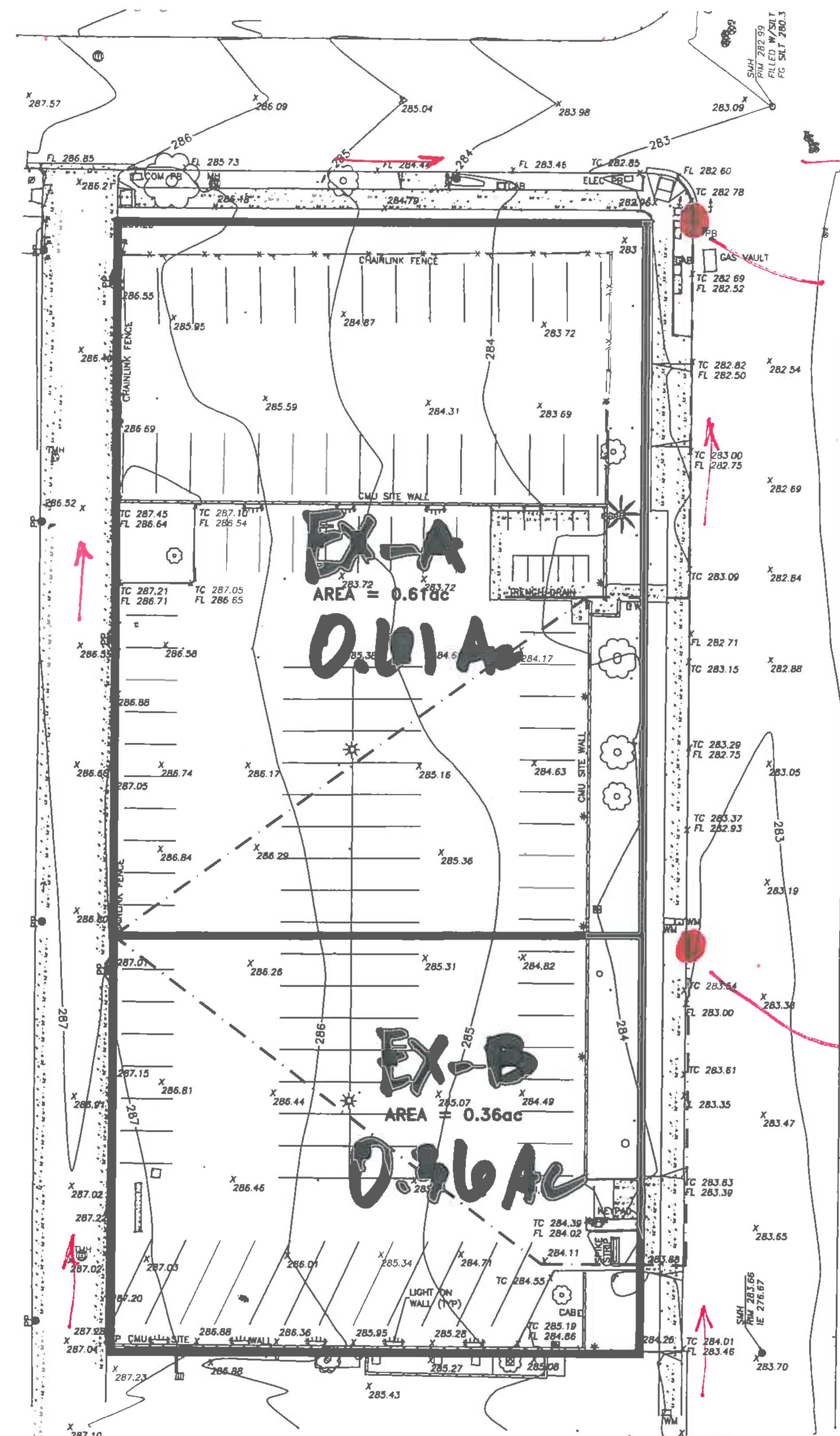
BASIN	HYDROLOGIC SOIL GROUP	AREA (sf)	AREA (Ac)	POST IMPERV AREA (sf)	IMPERVIOUS %	C	Tc (min)	I100 (iph)	Q100 (cfs)	I50 (iph)	Q50 (cfs)	I10 (iph)	Q10 (cfs)	I2 (iph)	Q2 (cfs)	0.1Q2 (cfs)	85th VOLUME (cf)	Q100 VOLUME (cf)
PR-A	D	26,525	0.61	24,450	92%	0.86	11.3	3.90	2.04	3.43	1.79	2.65	1.39	1.78	0.93	0.09	1393	4741
PR-B	D	15,500	0.36	10,700	69%	0.73	8.8	4.56	1.19	4.01	1.04	3.10	0.81	2.07	0.54	0.05	814	2362
	Total	**42,025**	**0.96**	**35,150**	84%			Total	**3.23**		**2.84**							

TIME OF CONCENTRATION (POST CONSTRUCTION)

LOCATION	NODE	% IMPERV	ELEMENT	SLOPE		LM	Ti	LENGTH	HI PT	LOW PT	DELTA E	Tt	Tc	Tc Used			
PR-A		92	OP/Com/LI	0.6%		50	4.2	517	285.5	282.6	2.9	7.1	11.3	11.3			
PR-B		69	HDR 24.0	2.3%		75	5.1	463	293.7	282.9	10.8	3.7	8.8	8.8			

EXISITNG AND PROPOSED DRAINAGE MAPS

HILLCREST 111
HYDROLOGIC BASINS
EXISTING CONDITIONS



Surface gutter flow from Site to EX. CB INLET @ 8th & Robinson per 1297-L attached

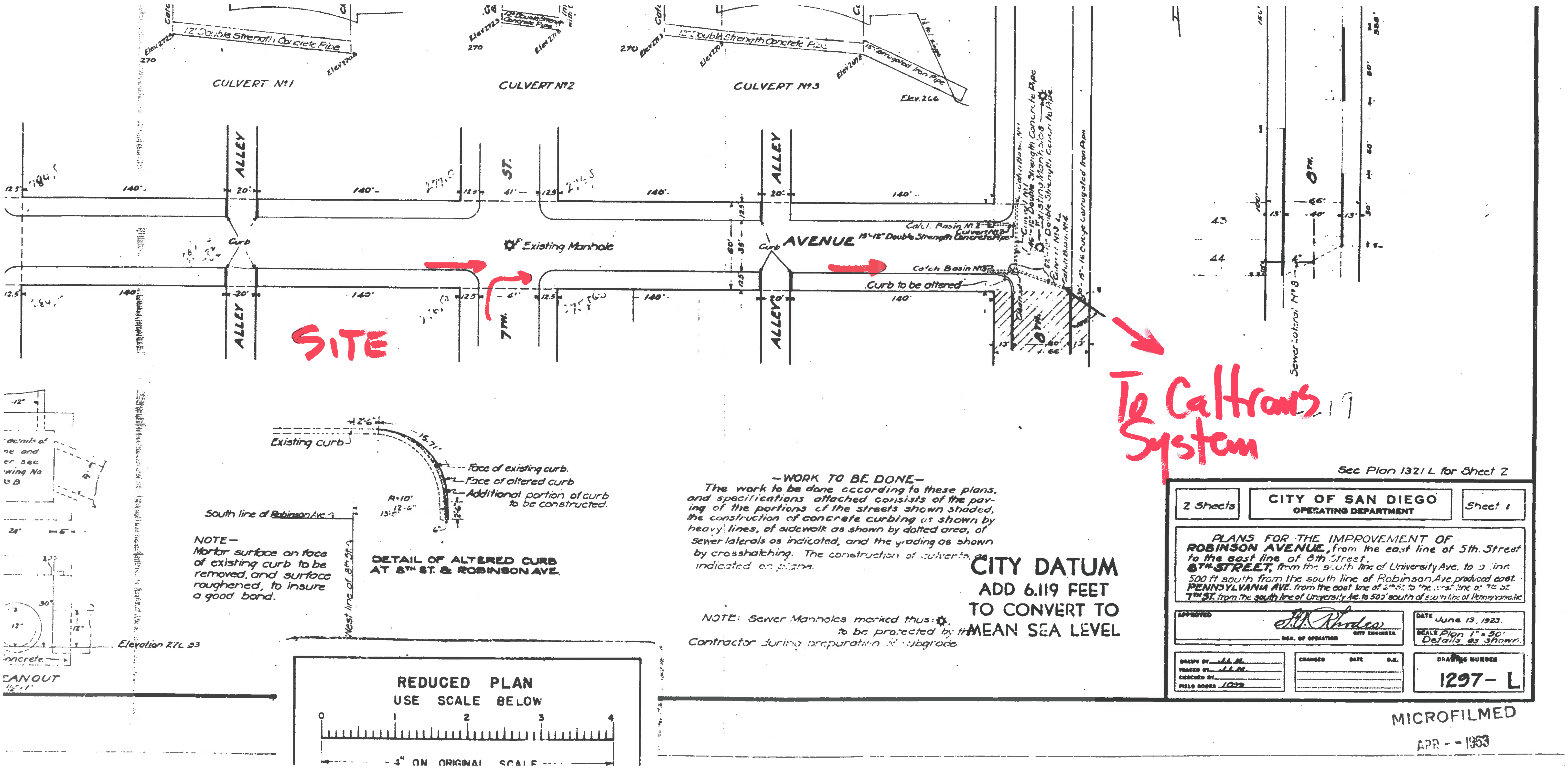
AREA EX-A
Tc=7.4 min
Q50=2.30 cfs

AREA EX-B
Tc=7.2 min
Q50=1.38 cfs

20 10 0 20 40
SCALE: 1" = 20'

SAN DIEGUITO ENGINEERING, INC
462 STEVENS AVE. Ste. 305
SOLANA BEACH, CA
92075-2066
PHONE: (858) 345-1149
www.sdeinc.com
CIVIL ENGINEERING • PLANNING
LAND SURVEYING

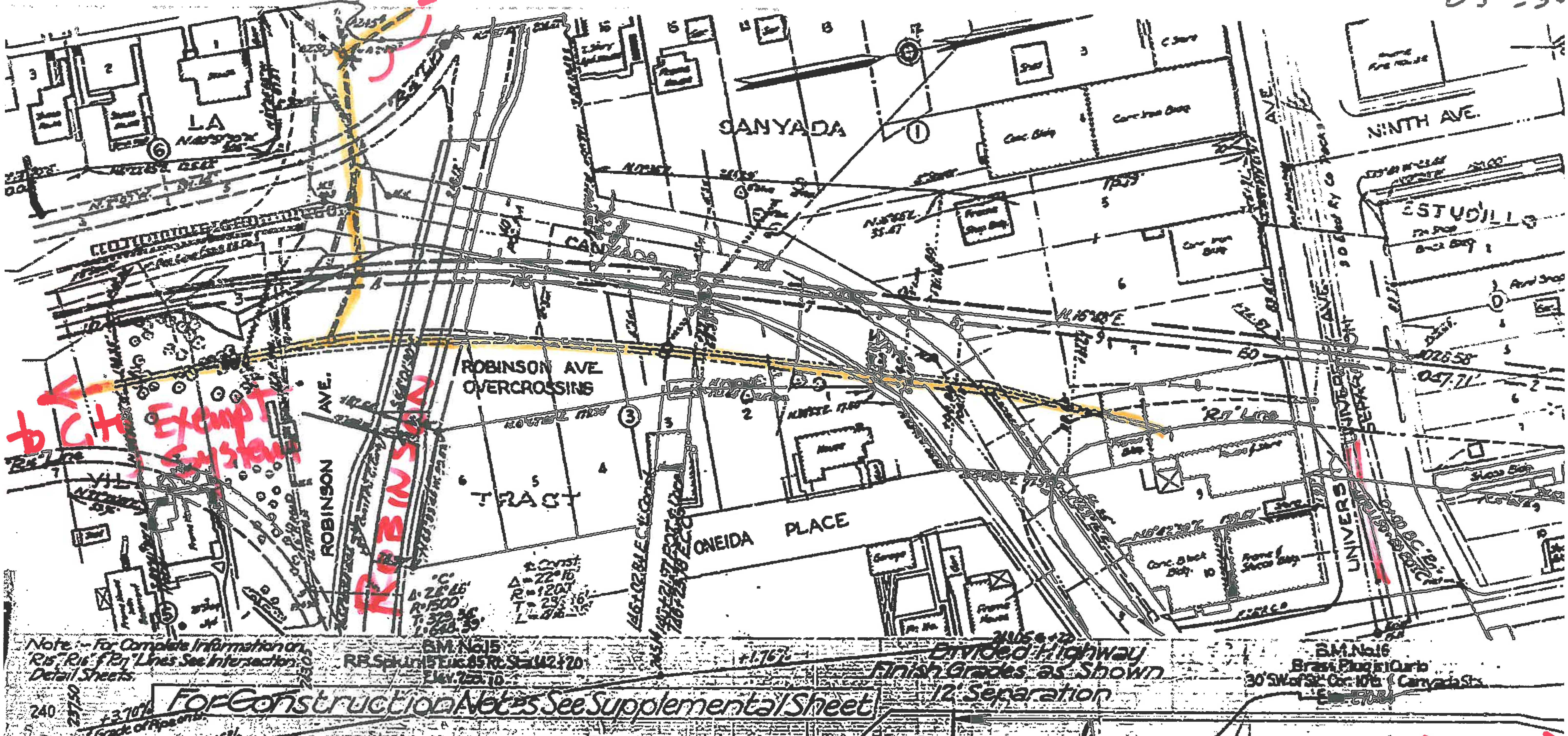
AS BUILT EXHIBIT MAPS



CULVERT No. 1
CULVERT No. 2
CULVERT No. 3
12" Double Strength Concrete Pipe
15" Corrugated Iron Pipe
ALLEY
7TH ST.
AVENUE
8TH
Existing Manhole
Catch Basin No. 3
Curb to be altered
SITE
To Caltrans System
Sewer Lateral No. 8
Existing curb
Face of existing curb
Face of altered curb
Additional portion of curb to be constructed
South line of Robinson Ave.
West line of 8th St.
NOTE— Mortar surface on face of existing curb to be removed, and surface roughened, to insure a good bond.
DETAIL OF ALTERED CURB AT 8TH ST. & ROBINSON AVE.
—WORK TO BE DONE—
The work to be done according to these plans, and specifications attached consists of the paving of the portions of the streets shown shaded, the construction of concrete curbing as shown by heavy lines, of sidewalk as shown by dotted area, of sewer laterals as indicated, and the grading as shown by crosshatching. The construction of culverts as indicated on plans.
NOTE: Sewer Manholes marked thus: to be protected by the Contractor during preparation of subgrade
CITY DATUM
ADD 6.119 FEET
TO CONVERT TO
MEAN SEA LEVEL
REDUCED PLAN
USE SCALE BELOW
4" ON ORIGINAL SCALE
See Plan 1321 L for Sheet 2
2 Sheets
CITY OF SAN DIEGO
OPERATING DEPARTMENT
Sheet 1
PLANS FOR THE IMPROVEMENT OF
ROBINSON AVENUE, from the east line of 5th. Street to the east line of 8th Street.
8TH STREET, from the south line of University Ave. to a line 500 ft south from the south line of Robinson Ave. produced east.
PENNSYLVANIA AVE. from the east line of 6th St. to the west line of 7th St.
7TH ST. from the south line of University Ave. to 500' south of south line of Pennsylvania Ave.
APPROVED
CITY ENGINEER
DIR. OF OPERATION
DATE June 13, 1923.
SCALE Plan 1" = 50' Details as shown.
DRAWN BY J.L.M.
TRACED BY J.L.M.
CHECKED BY
FIELD BOOKS 1099
CHANGES DATE O.K.
DRAWING NUMBER
1297 - L
MICROFILMED
APR - - 1953

from 8th & Robinson 1297-L

UJ 330



CALTRANS 11-SD-77 (395/163)
1945

SAN DIEGUITO ENGINEERING, INC.
Engineering | Surveying | Planning

San Dieguito Engineering, Inc.
462 Stevens Avenue, Suite 305
Solana Beach, CA 92075
858-345-1149

February 15, 2017

To: City of San Diego, Development Services Department (PUD)
Mahmood Keshavarzi

From: San Dieguito Engineering, Inc.
Michael D. Wolfe, PE

Re: 7^{th} Avenue Sewer Replacement
PTS # 522075

This Technical Memorandum is a brief capacity and demand analysis of the existing six (6) inch sewer main in 7^{th} Avenue fronting the project and the existing eight (8) inch sewer main further downstream but immediately adjacent to this development. The existing six (6) inch main flowing south begins at a system high point manhole #1 at the intersection of Robinson Avenue and 7^{th} Avenue. From review of the As-builts the existing six (6) inch sewer main flowing north from this high point manhole was replaced with an eight (8) inch flowing at 0.005 ft/ft. per City As Built 12395-5-D. The south end of this new line shows as being plugged by the City. *See the Attached Exhibit.*

The proposed Mixed Use project at 635 Robinson is made up of 111 residential apartments comprised of studio and 1 and 2 bedroom units, with ground floor Lobby and Retail restaurant services. From a preliminary evaluation of fixture units there are 180 EDU's assigned for the residential and the ground floor retail. We have included the existing five (5) residences on the east side of 7^{th} up to the first manhole south of Robinson at manhole #2. The combined flow to manhole #2 is 185 EDU at 280 GPD/EDU with the 2.5 peaking factor is tabulated at 0.20 cfs.

Based on the attached calculations, the replacement of the existing 6-inch VCP with an (8) inch PVC main at 0.005 ft /ft is required to accommodate the additional demand for this section. The new (8) inch sewer main at 0.005 ft/ft will adequate capacity for this development and will have a cleaning velocity of 2fps.

The next (8) inch diameter sewer section from manhole #2 to manhole #3 was evaluated at the existing slope of 0.005 ft/ft. Additional multi-family units were added to the flow calculated above at manhole #2. It was determined that an additional 63 EDU's were present and a 0.73 multiplier applied to the additional EDU's resulted in the new EDU's for flow evaluation.

Applying the peaking factor to this new flow with the upstream flow results in the total flow being 0.25cfs. The resultant velocity is 2.13 ft/s and peak flow depth is 3 inches. Therefore this existing (8) inch downstream section to manhole #3 at Pennsylvania is adequate.

Michael D. Wolfe, PE

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. WOLFE
44271
Exp. 9.30.17
CIVIL
STATE OF CALIFORNIA

Calculations

Number of EDU's per # of fixtures:

$$3593\ Fixtures\ x\ \frac{1\ EDU}{20\ Fixtures} = 179.65 \approx 180\ EDU$$

Total # EDU:

$$180\ EDU + 5\ existing\ EDU = 185\ EDU$$

$$\text{Downstream Section } 63\ EDU\ x\ 0.73 = 46\ EDU$$

$$\text{Total} = 231\ EDU$$

Flow rate in gallons per day:

$$231\ EDU\ x\ \frac{280\ {}^{gal}/_{day}}{EDU} = 64{,}680\ {}^{gal}/_{day}$$

Flow rate in Cubic feet per second:

$$64{,}680\ {}^{gal}/_{day}\ x\ \frac{ft^3}{7.48\ Gal}\ x\ \frac{day}{24\ hr}\ x\ \frac{hr}{60\ min}\ x\ \frac{min}{60\ sec} = 0.10\ \frac{ft^3}{sec}$$

Peak Flow rate:

$$0.10\ \frac{ft^3}{sec}\ x\ 2.5\ peaking\ factor = 0.25\ \frac{ft^3}{sec}$$

Cross Section for 8" Sewer Pipe

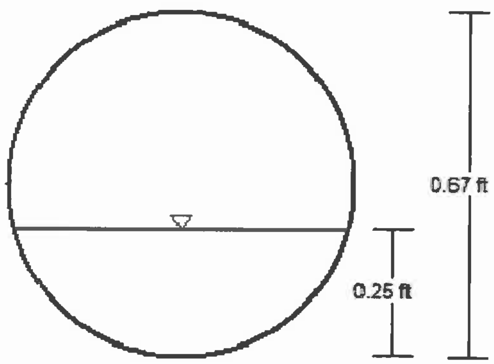
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	0.25	ft
Diameter	0.67	ft
Discharge	0.25	ft³/s

Cross Section Image



V: 1
H: 1

Analysis for 8" Sewer Pipe

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	0.67	ft
Discharge	0.25	ft³/s

Results

Normal Depth	0.25	ft
Flow Area	0.12	ft²
Wetted Perimeter	0.87	ft
Hydraulic Radius	0.13	ft
Top Width	0.65	ft
Critical Depth	0.23	ft
Percent Full	36.8	%
Critical Slope	0.00645	ft/ft
Velocity	2.13	ft/s
Velocity Head	0.07	ft
Specific Energy	0.32	ft
Froude Number	0.88	
Maximum Discharge	0.93	ft³/s
Discharge Full	0.87	ft³/s
Slope Full	0.00042	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

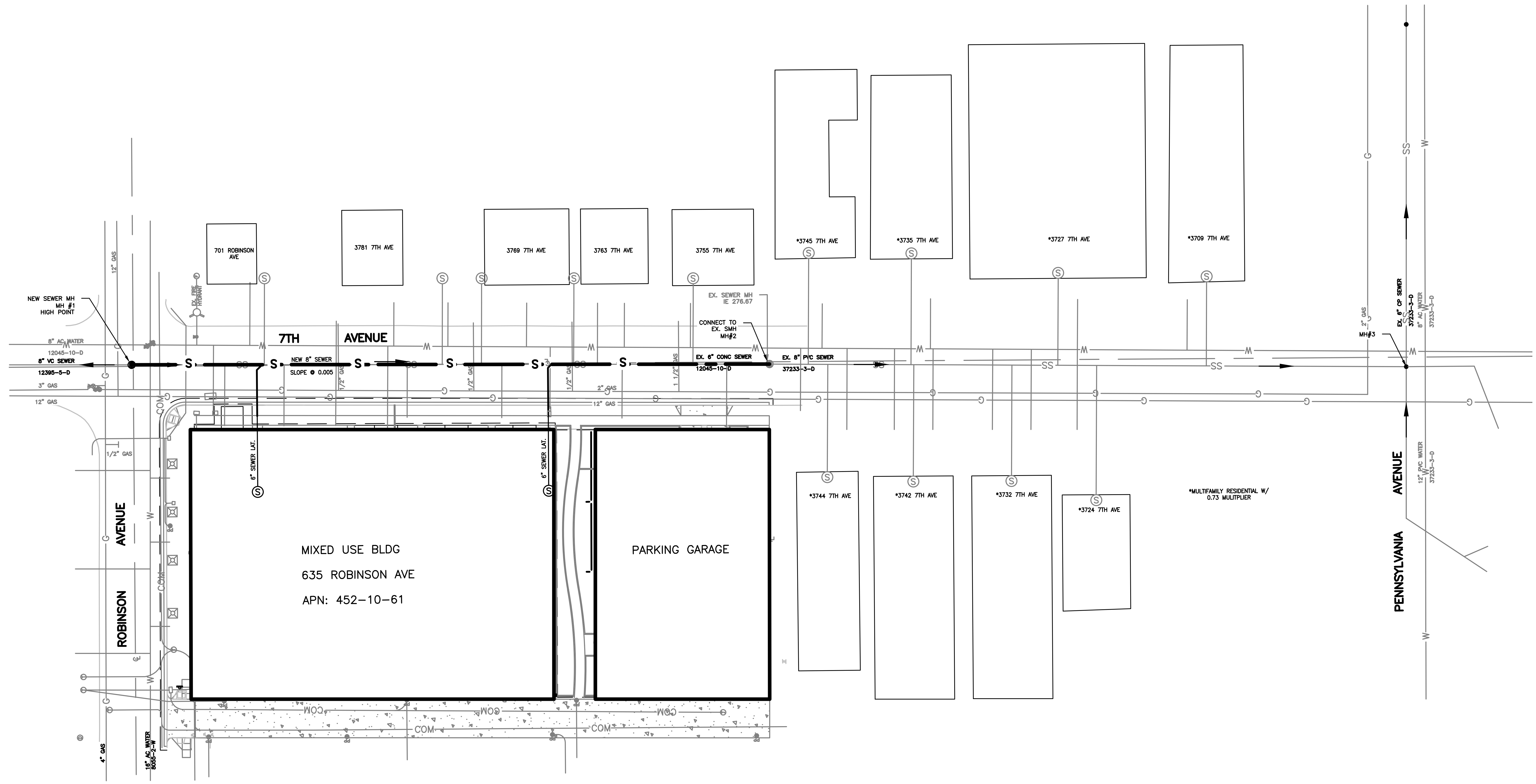
GVF Output Data

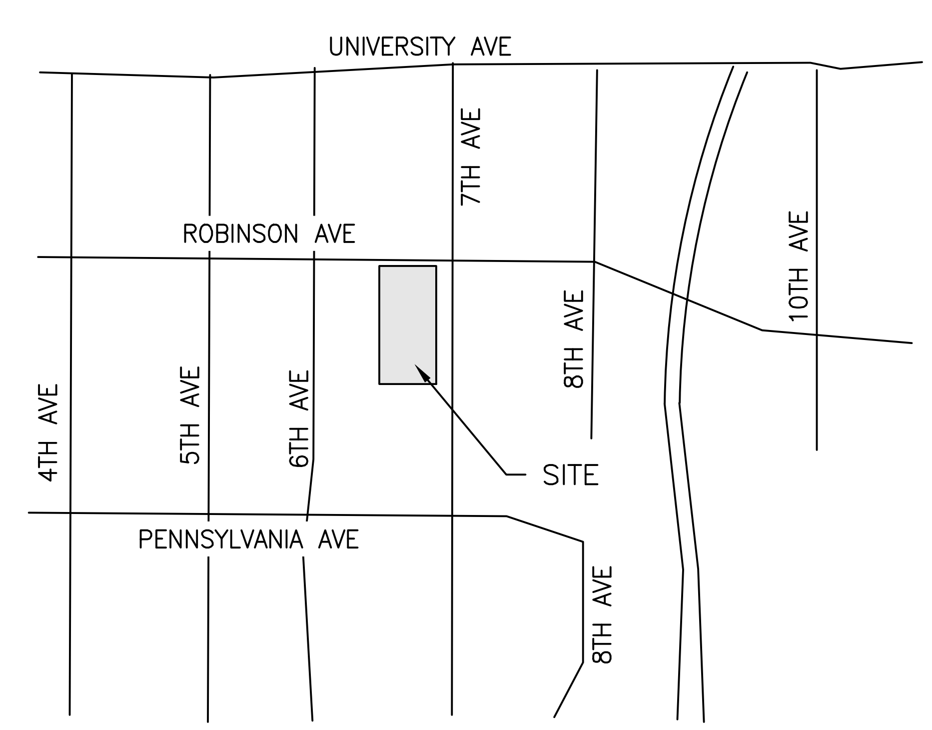
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	36.76	%
Downstream Velocity	Infinity	ft/s

Analysis for 8" Sewer Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.23	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00645	ft/ft





VICINITY MAP

SCALE: 1=500'

GRAPHIC SCALE

0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

111 HILLCREST SAN DIEGO, CA

SEWER TECH MEMO EXHIBIT

SAN DIEGUITO ENGINEERING, INC
462 STEVENS AVE. Ste. 305
SOLANA BEACH, CA
92075-2066
PHONE: (858) 345-1149
www.sdeinc.com
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U:\1DATA_PROJECTS\5709 GREYSTAR\CAD FILES\5709-C-SEWER TECH MEMO EXHIBIT.DWG 2017-02-15

Noise Analysis for Hillcrest 111 City of San Diego, California

Project #579501-0200-D
July 6, 2017

Prepared for:

Greystar
17885 Von Karman Avenue, Suite 450
Irvine, CA 92614

Prepared by:

Theodore C. Lindberg, INCE Bd. Cert.
Keith Turner
Landrum & Brown
19700 Fairchild Road, Suite 230
Irvine, CA 92612
949-349-0671

Noise Analysis for Hillcrest 111 City of San Diego

1.0 Introduction

The purpose of this report is to demonstrate consistency of the project with the noise related 'Conditions of Approval' placed on the project by the City of San Diego. This is a mixed-use project which calls for the development of 111 residential dwelling units, 9 very low income units, 4,800 sq. ft. of commercial retail space within a 138,886 sq. ft., 7-story mixed use building with 3 levels of underground parking and a detached parking structure. The commercial uses proposed for the project include specialty retail, a leasing office, and an art gallery.

The project is located at 635 Robinson Avenue in the City of San Diego, as shown in Exhibit 1. The project will be impacted by traffic noise from Robinson Ave., 7th Ave. and SR-163. The site plan for the project is shown in Exhibit 2. This report specifies any attenuation measures necessary to meet the 70 dB CNEL exterior noise standard (see Table NE-3 in the General Plan, a copy of which can be found in Appendix 2), and addresses the need to meet the 45 dB CNEL interior noise standard.

Site plan and grading information was obtained from the drawings for "7th and Robinson" by Architects Orange, October 31, 2016.

2.0 City of San Diego Noise Standards

2.1 Noise Exposure

The City of San Diego specifies outdoor and indoor noise limits for residential land uses. Both standards are based upon the CNEL index. CNEL (Community Noise Equivalent Level) is a 24-hour time-weighted annual average noise level based on the A-weighted decibel. A weighting is a frequency correction that correlates overall sound pressure levels with the frequency response of the human ear. Time weighting refers to the fact that noise that occurs during certain noise-sensitive time periods is given more significance because it occurs at these times. In the calculation of CNEL, noise occurring in the evening time period (7 p.m. to 10 p.m.) is weighted by 5 dB, while noise occurring in the nighttime period (10 p.m. to 7 a.m.) is weighted by 10 dB. These time periods and weighting factors are used to reflect increased sensitivity to noise while sleeping, eating, and relaxing.

In addition, the City uses an interior noise standard of 45 dB CNEL.

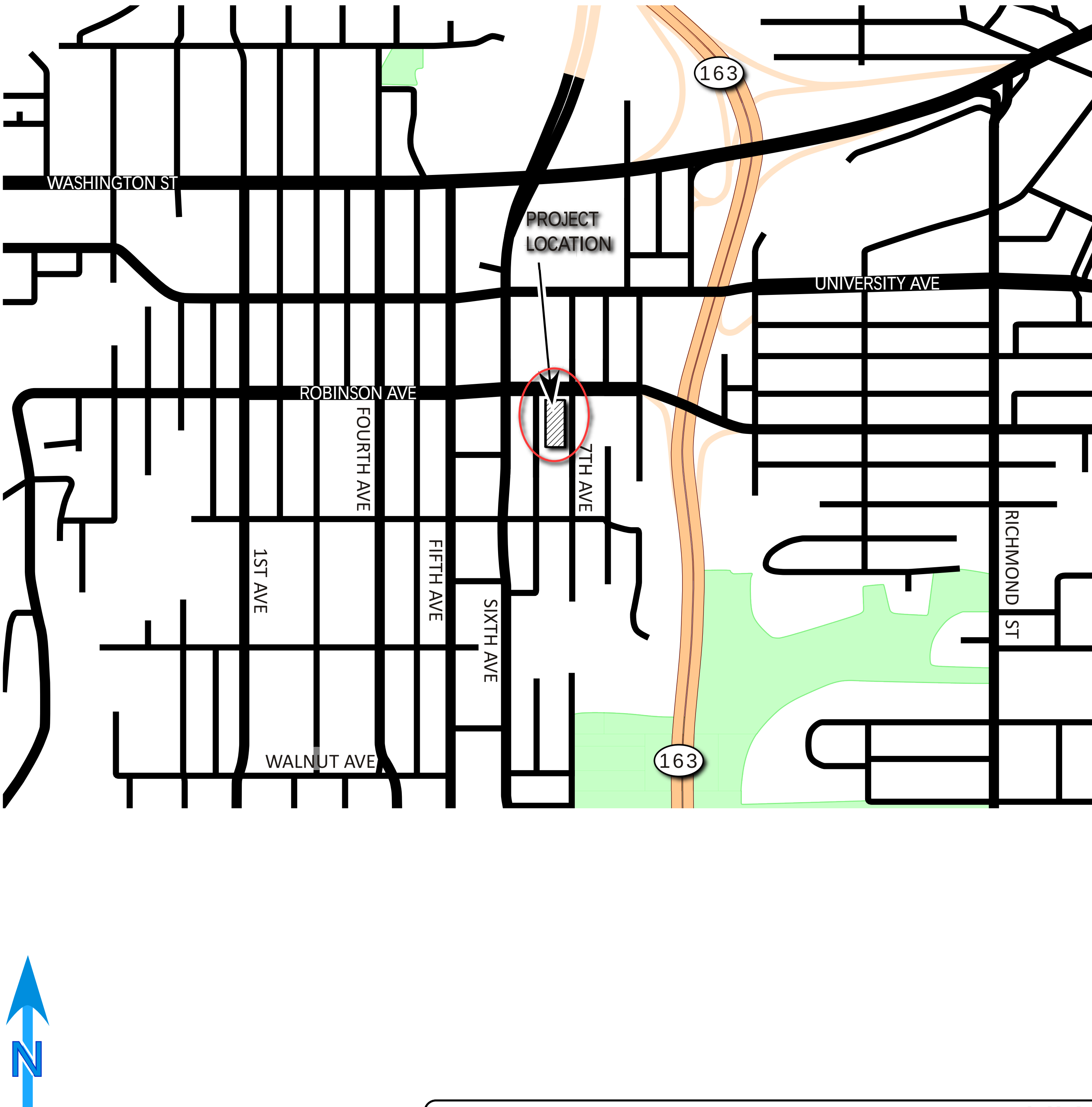


Exhibit 1
Vicinity Map

Landrum & Brown

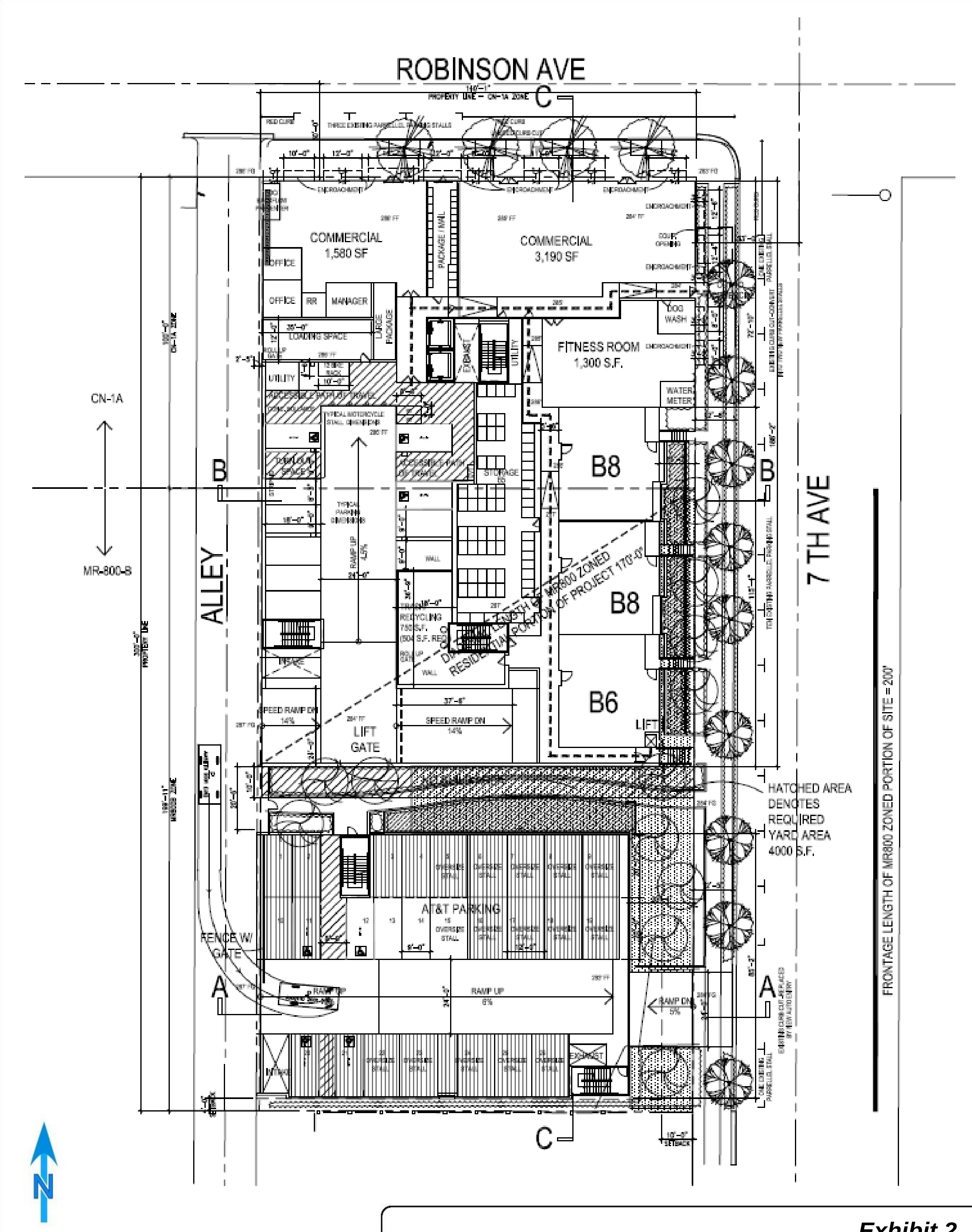


Exhibit 2
Project Site Plan

Landrum & Brown

2.2 Noise Ordinance

The City of San Diego has established a Noise Ordinance which specify the sound level limits. These noise ordinance levels are found within Chapter 5, Article 9.5, Division 4 of the Municipal Code.

Section 59.5.0401, "Sound Level Limits" states the following:

(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 given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.*

TABLE OF APPLICABLE LIMITS

Land Use	Time of Day	One-Hour Average Sound Level (decibels)
1. Single Family Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45 40
2. Multi-Family Residential (Up to a maximum density of 1/2000)	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50 45
3. All other Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 50
4. Commercial	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	65 60 60
5. Industrial or Agricultural	any time	75

(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.*

Section 59.5.0404, "Construction Noise" states the following:

(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 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.*

3.0 Methodology

The traffic noise levels projected in this report were computed using the Highway Noise Model published by the Federal Highway Administration ("FHWA Highway Traffic Noise Prediction Model", FHWA-RD-77-108, December 1978). The FHWA Model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute the "equivalent noise level". A computer code has been written which computes equivalent noise levels for each of the time periods used in dB CNEL. Weighting these noise levels and summing them results in the CNEL for the traffic projections used.

Attenuation through the design and construction of a noise barrier (wall, berm, or combination wall/berm) is the most common way of alleviating traffic noise impacts. The effect of a noise barrier is critically dependent upon the geometry between the noise source, the barrier, and the observer. A noise barrier effect occurs when the "line of sight" between the noise source and the observer is interrupted by the barrier. As the distance that the noise must travel around the noise barrier increases, the amount of noise reduction increases. The FHWA model was also used here in computerized format to determine the required barrier heights.

4.0 Noise Exposure

The future (year-2036) average daily traffic (ADT) volume for 7th Avenue was taken from the Average Daily Vehicle Trips table of the San Diego Roadway Design Manual. The Level of Service C (LOS C) volume for a community collector roadway is listed as 7,100 vehicles per day. The future (year-2036) average daily traffic (ADT) volume for Robinson Avenue was calculated from the existing year-2013 ADT obtained from the City's website (http://data.sandiego.gov/dataset/traffic-volumes). The future (year-2036) average daily traffic (ADT) volume for SR-163 was calculated from the 2014 traffic volume as listed on the Caltrans traffic volume website (http://www.dot.ca.gov/trafficops/census/). A 1% per year growth rate was used to project the future traffic volumes. The traffic volumes, vehicle speeds, and roadway grades used in the CNEL calculations are presented below in Table 1.

Table 1
Future Traffic Volumes, Speeds, and Roadway Grades

Roadway	Traffic Volume (ADT)	Speed	Grade
7^{th} Avenue	7,100	25	<3%
Robinson Avenue	15,589	25	<3%
Highway 163	135,674	55	<3%

The traffic distribution that was used in the CNEL calculations is listed below in Tables 2 and 3, for the arterial roadways and SR-163, respectively. This arterial traffic distribution estimate was compiled by the Orange County Environmental Management Agency, and is based on traffic counts at 31 intersections throughout the Orange County area. Arterial traffic distribution estimates can be considered typical for arterials in Southern California.

Table 2
Traffic Distribution per Time of Day in Percent of ADT – Arterials

VEHICLE TYPE	DAY	EVENING	NIGHT
Automobile	75.51	12.57	9.34
Medium Truck	1.56	0.09	0.19
Heavy Truck	0.64	0.02	0.08

Table 3
Traffic Distribution per Time of Day in Percent of ADT – SR-163

VEHICLE TYPE	DAY	EVENING	NIGHT
Automobile	65.83	17.98	9.49
Medium Truck	2.92	0.20	0.50
Heavy Truck	2.10	0.23	0.75

Using the assumptions presented above, the future noise levels were computed. The results are listed in Table 4 in terms of distances to the 60, 65, and 70 dB CNEL contours. These represent the distance from the centerline of the roadway to the contour value shown. Note that the values given in Table 4 do not take into account the effect of intervening topography, barriers, or buildings that may affect the roadway noise exposure. Topographic effects are included in the noise barrier analysis section (Section 5.0) of this report.

Table 4
Distances to Noise Contours for Future Traffic Conditions

Roadway	Distance to Noise Contour (feet)* 70 dB CNEL	65 dB CNEL	-60 dB CNEL
7th Avenue	9	20	43
Robinson Avenue	16	34	73
SR-163	326	702	1,511

* - Contour distances in this table are based on the centerline of the roadway representing the noise source.

4.1 7th Avenue

7th Avenue borders the east side of the project site. The centerline of the roadway will be located about 34 feet from the yard area to be located on the east side of the building. At this distance, the roadway noise exposure from Robinson Avenue will be about 61.6 dB CNEL. The centerline of the roadway will be located about 36 feet from the eastern building face of the project. At this distance, the roadway noise exposure from Robinson Avenue will be about 61.2 dB CNEL at the east building face.

4.2 Robinson Avenue

Robinson Avenue borders the north side of the project site. The centerline of the roadway will be located about 32 feet from the northern building face of the project. At this distance, the roadway noise exposure from Robinson Avenue will be about 65.4 dB CNEL.

4.3 SR-163

SR-163 borders the east side of the project site. The centerline of the roadway will be located about 600 feet from the east side of the building. The roadway is located below grade at this location, and there are existing residential buildings on the east side of 7th Avenue which will provide attenuation to the traffic noise emanating from SR-163. At this distance, considering the attenuation of the structures between the roadway and the project site, the noise exposure from SR-163 is expected to be about 50.3dB CNEL.

The noise level at the yard area to be located on the east side of the building will be the combination of noise from 7th Avenue and from SR-163. At this location, it is expected that the worst case noise level will be about 61.9 dB CNEL

The worst case noise exposure will be at the corner of 7th Avenue and Robinson Avenue, at the northeast corner of the project site. At this location of the project, the combined noise exposure level is expected to be about 67 dB CNEL due to all of the roadways in the area of the project.

5.0 Exterior Noise Attenuation

The project must comply with the City's 70 dB CNEL exterior noise standard. An effective method of reducing the traffic noise to acceptable levels is with a noise barrier. Representative cross-sections along 7th Avenue and Robinson Avenue were analyzed utilizing the FHWA Model to determine the necessary noise barrier locations and heights. Refer to Appendix 1 for the analysis data.

5.1 East Yard

The total projected noise level at the yard area on the east side of the project site is expected to be 61.9 dB CNEL. This value is less than the exterior noise standard of 70 dB CNEL, therefore noise attenuation will not be required for this area of the project.

5.2 Robinson Ave.

The results of the analysis indicate that the noise level at the exterior of the building facing Robinson Avenue will be exposed to a future noise level as high as 67 dB CNEL. The level is consistent with the noise level guidelines found in Table NE-3, "Land Use – Noise Compatibility Guidelines" in the Noise Element of the General Plan. A copy of this table can be found in Appendix 2. The project would not result in a significant noise impact to the units facing 7th Avenue or Robinson Avenue. Noise attenuation measures would not be required.

6.0 Interior Noise Levels

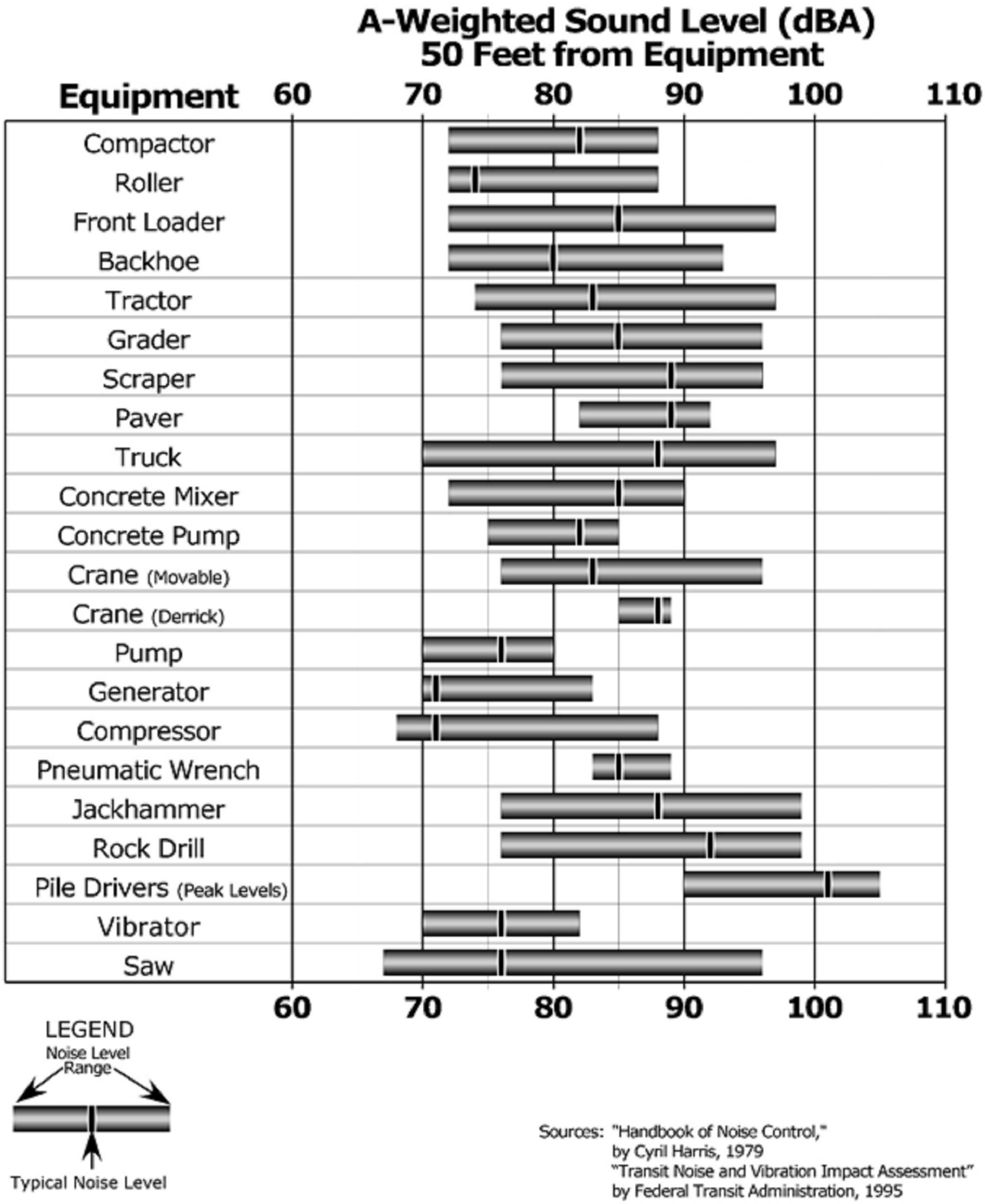
The project must comply with the City of San Diego indoor noise standard of 45 dB CNEL. In order to meet the interior noise standard, the building must provide sufficient outdoor-to-indoor building attenuation to reduce the noise to acceptable levels. The outdoor-to-indoor noise reduction characteristics of a building are determined by combining the transmission loss of each of the building elements that make up the building. Each unique building element has a characteristic transmission loss. For residential units, the critical building elements are the roof, walls, windows, doors, attic configuration and insulation. The total noise reduction achieved is dependent upon the transmission loss of each element, and the surface area of that element in relation to the total surface area of the room. Room absorption is the final factor used in determining the total noise reduction.

Title 24 establishes an interior noise standard of 45 dBA CNEL for multiple unit and hotel/motel structures. Exterior building surfaces in the project will be exposed to a maximum noise level of about 67 dB CNEL, and therefore, the dwelling units will require at least 22 dB of exterior-to-interior noise reduction in order to meet the City's 45 dB CNEL interior noise standard. With residential construction practices typical in California, dwelling units provide at least 20 dB of exterior-to-interior noise reduction. Detailed engineering calculations are necessary for building attenuation requirements greater than 20 dB. <u>A future study will be needed to address the interior noise levels when architectural drawings are finalized, and prior to the issuance of building permits. When that analysis is completed, it will include any noise attenuation measures necessary for the residential dwelling units to meet the 45 dB CNEL interior noise standard. Noise attenuation measures may include upgraded windows, upgraded doors, or upgraded roof or wall assemblies. When those noise attenuation measures are incorporated into the project, then each of the dwelling units will meet the 45 dB CNEL standard. At that time, the project will be consistent with Table NE-3 (Land Use-Noise Compatibility Guidelines) of the City's Noise Element of the General Plan.</u>

7.0 Temporary Impacts – Construction Noise Levels

Construction noise represents a short-term impact on ambient noise levels. Noise generated by construction equipment, including trucks, graders, bulldozers, concrete mixers and portable generators can reach high levels. There will also be removal of the existing parking lot pavement on the project site. Demolition and grading activities will have similar noise levels. Impact devices, such as pile drivers, rock drills, and jackhammers are not expected to be used on the construction site.

Worst-case examples of construction noise at 50 feet are presented in Exhibit 3. Typical equipment that might be employed for this type of project includes trucks, concrete mixers, concrete pumps, cranes, and front loader. The peak noise level for most of the equipment that will be used during the construction is 80 to 95 dBA at a distance of 50 feet. Noise levels at further distances would be less than this.



Sources: "Handbook of Noise Control,"
by Cyril Harris, 1979
"Transit Noise and Vibration Impact Assessment"
by Federal Transit Administration, 1995

Exhibit 3

Typical Construction Equipment Noise Levels

For example, at 200 feet, the peak construction noise levels range from 68 to 83 dBA. The noise levels shown in Exhibit 3 are based upon worst-case (i.e. loudest noise) conditions at the construction site.

7.1 Residences to the East

The nearest sensitive land uses are the existing residences to the east and to the south of the project site. These residences to the east are about 47 feet to the nearest portion of the project site, and about 119 feet to the center of the construction zone. Based on this distance, the unmitigated peak (Lmax) construction noise levels would be in the 72 to 87 dBA range for shorter periods.

The average noise levels are typically 5 to 15 dB lower than the peak noise levels. Average noise levels (Leq) at the residential properties to the east could be in the range of 62 to 77 dBA (approximately 10 dB lower than peak noise levels). This would put the average noise level for construction noise throughout the project site very near the construction noise standard of 75 dBA Leq. These noise levels can be reduced to comply with the construction noise standard by applying best-practice construction noise control measures. With these noise control practices in place, the project would result in no construction noise impact.

7.2 Residences to the South

These residences to the south of the project would be within 10 feet of the nearest portion of the project site. At this distance, the noise levels associated with the construction of the parking structure have the potential to be very high, and the average noise levels could exceed the exterior noise standard of 75 dBA Leq. Therefore, the use of temporary sound walls is also recommended as a attenuation measure during the construction of the parking structure. The parking structure is schedule to be constructed first. This structure will provide noise attenuation to the homes to the south of the project site during the construction of the residential dwellings.

These homes will also be located about 145 feet to the center of the construction zone. Based on this distance, the unmitigated peak (Lmax) construction noise levels would be in the 70 to 85 dBA range for shorter periods. The average noise levels (Leq) at the residential properties to the south could be in the range of 60 to 75 dBA (approximately 10 dB lower than peak noise levels). This would put the average noise level for construction noise throughout the project site within the construction noise standard of 75 dBA Leq, therefore noise impacts are not anticipated.

8.0 Long-Term Impacts – HVAC Noise Levels

The project will include 111 living units on seven levels, along with commercial and leasing spaces on the first floor. As a results, there will be a total of 117 air conditioning condensers associated with the project. According to the plans, there will be 90 HVAC units located on the roof of the structure, and there will be 27 HVAC units located on the 7th floor of the building.

There are two different models of HVAC units expected to be used at the project. The units will be manufactured by Carrier and the unit models will be CH14NB018 and CH14NB024. The A-weighted octave band data and the overall A-weighted noise values for these two units were proved by Carrier. The source level data for these two units is presented in Table 5.

Table 5
HVAC Equipment Octave Band and A-weighted Sound Pressure Levels at 5 Feet

Model	125 Hz	250 Hz	500 Hz	1 KHz	2 KHZ	4 KHz	8 KHz	Total SPL (dBA)
CH14NB018	33.4	36.4	44.4	50.4	43.4	41.4	35.4	**52.6**
CH14NB024	34.4	44.4	47.4	51.4	51.4	48.4	43.4	**56.6**

The source data shows that the CH14NB018 unit will have a noise level of 52.6 at a distance of 5 feet, and the CH14NB024 unit will have a noise level of 56.6 at a distance of 5 feet. According to the plans, for the 111 residential dwellings, 65 of the units will be the model CH14NB018, and the remaining 46 units will be the model CH14NB024. The plans show a total of 117 HVAC units on the roof and on the 7th floor level. For the purposed of this analysis, it was assumed that the six additional units were the louder model CH14NB024 units.

8.1 Homes to the East

Calculations were then made to determine the projected noise level of these HVAC units onto the residential receivers located adjacent to the project site. The nearest homes to the east are located across 7th Street. According to the architectural plans for the project site, the HVAC units located on the roof will be at an elevation of 82 feet above the elevation of the receivers adjacent to the project. The HVAC units located on the 7th floor will be at an elevation of 68 feet above the elevation of the adjacent receivers.

For purposes of calculation of potential impact to the homes to the east of the project, all of the HVAC units on both floors were assumed to be located at the east end of their respective equipment pad areas. It was also assumed as a worst case condition that all of the units would be operating at the same time. Given these conditions, the projected total unmitigated noise level from all of the 90 units on the roof, along with the 27 units on the 7th floor, were calculated to be 31.6 dBA Leq at the nearest residential property to the east. This is significantly below the nighttime residential noise ordinance limit of 40 dBA.

The developer is proposing to put a mechanical enclosure around both sets of the HVAC units to reduce the noise. The HVAC units are about 3 feet in height. If a noise barrier, 4 feet in height were to be constructed around the perimeter of the two groups of HVAC units, then the mitigated noise level at the homes to the east would be reduced to 28.8 dBA Leq. The project would result in no operation impact to the homes to the east of the project site.

8.2 Homes to the South

Calculations were then made to determine the projected noise level of the HVAC units onto the residential receivers located south of the project site. The nearest homes to the south are located adjacent to the existing parking lot on the current project site. According to the architectural plans for the project site, the HVAC units located on the roof will be at an elevation of 81 feet above the elevation of the receivers to the south of the project. The HVAC units located on the 7th floor will be at an elevation of 67 feet above the elevation of the receivers to the south of the project.

For purposes of calculation of potential impact to the homes to the south of the project, all of the HVAC units on both floors were assumed to be located at the south end of their respective equipment pad areas. It was also assumed as a worst case condition that all of the units would be operating at the same time. The projected total unmitigated noise level from all of the 90 units on the roof, along with the 27 units on the 7th floor, were calculated to be 42 dBA Leq at the nearest residential property to the south. This is just above the nighttime residential noise ordinance limit of 40 dBA.

The developer is proposing to put a mechanical enclosure around the HVAC units to reduce the noise. If a noise barrier, 4 feet in height relative to the pad elevation of the HVAC units, were to be constructed around the perimeter of the two groups of HVAC units, then the mitigated noise level at the homes to the south would be reduced to 31.3 dBA Leq. This is significantly below the nighttime residential noise ordinance limit of 40 dBA. The project would result in no operation impact to the homes to the south of the project site.

8.3 Dwelling Units Below the HVAC Units

According to the plans, there will be 90 HVAC units clustered together on the roof of the structure. As a worst case, it was assumed that 44 of the units would be the model CH14NB018, and the remaining 46 units would be the model CH14NB024. The CH14NB018 units generate a noise level of 52.6 at a distance of 5 feet, and the CH14NB024 units have a noise level of 56.6 at a distance of 5 feet. If all 90 of these units were to operate simultaneously, the resulting noise level would be about 75 dBA at a distance of 5 feet. The roof-ceiling assembly is expected to be a flat, built-up assembly with plywood on the top, roof trusses, insulation, and gypsum board on the bottom. An assembly of this construction is expected to achieve a noise rating of about 38 dB. The resulting noise level within the rooms located directly below the HVAC units is expected to be less than 37 dBA.

A noise level of this magnitude would meet the Noise Criteria (NC) curve of 30, which is the noise level guideline recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) for mechanical equipment within a residential development. No operational impact is expected for the dwellings within the project, therefore no attenuation measures are required.

9.0 Attenuation – Construction Noise Levels

Construction noise impacts will occur without some form of attenuation. Limiting construction hours is recommended to be consistent with the Noise Ordinance. Temporary noise barriers are also recommended for construction activities close to residences. The following best-practice construction noise control measures are recommended during construction of the project.

- Limit the hours of construction to between 7:00 a.m. and 7 p.m. Construction is not allowed on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays.
- Use updated equipment which incorporates quiet technology and advanced muffler design.
- Update older equipment with either new equipment, or incorporate new noise control features when possible.
- Maintain older equipment to minimize the level of noise from normal wear and tear that can cause excessive noise from the equipment.
- Use on-site trailers, containers, aggregate as temporary barriers between a fixed construction noise source and the nearby residences.
- Location fixed noise generating equipment (i.e. pumps, compressors) as far from the noise sensitive land uses as is practical.
- Limit the loudest construction activities to the middle of the day when the sensitivity to such noises will be at its lowest.
- Limit the level and use of music generating devices (i.e. radios) on the project site.
- Consider the use of back up alarms which incorporate white noise or flashing lights.
- Provide a phone number people can call should they have noise complaints, especially if construction activities are planned during nighttime hours. If complaints arise, initiate a construction noise monitoring plan to ensure the construction noise levels at the nearest noise sensitive land uses are within the limits of the noise ordinance.

Implementation of the best-practice construction noise control measures would reduce the construction noise levels at the homes to the east to a level that is within the construction noise ordinance limit, and therefore would be less than significant.

Attenuation Measure N-1:

A 12-foot high temporary sound barrier should be used along the south edge of the project site for residences directly adjacent to the project site during the construction of the parking facility. The temporary sound barrier may be constructed of plywood with a total thickness of 1-1/2 inches, or a sound blanket wall may be used. If sound blankets are used the blanket must have a Sound Transmission Class (STC) rating of 27. Examples of acceptable blankets can be found at the following websites; www.enoisecontrol.com/outdoor-sound-blankets.html and www.acousticalsurfaces.com/curtan_stop/curt_absorb.htm?d=12. Other blankets are acceptable as long as they have a STC rating of 27 or higher. Many unrated blankets are available, but their acoustic performance is generally unacceptable.

The attenuation measures described above will mitigate the construction noise impacts to a level that is within the construction noise ordinance limit, and therefore would be less than significant. The project will not result in an unavoidable significant noise impact.

APPENDIX 1

CALCULATION SPREADSHEETS

DATA USED TO DETERMINE EXTERIOR NOISE LEVELS

CNEL Worksheet - Calveno Curve

Customer : Graystar
Project : 7th Ave. & Robinson Ave.
Date : October 28, 2016

Roadway Name:	7th Avenue		Auto %	68.62%
Vehicles per day	7,100	LOS C	MT (%)	8.89%
Speed (mph)	25	estimated	HT (%)	22.49%
Grade (%)	0		Day	77.71%
Grade Adj. (dB)	0.00		Evening	12.68%
Vehicle Noise Red (dB)	0		Night	9.61%

Arterial 1

	Day	Eve	Night	Equiv.	
Auto	75.51%	12.57%	9.34%	208.6%	97.42%
MT	1.56%	0.09%	0.19%	3.7%	1.84%
HT	0.64%	0.02%	0.08%	1.5%	0.74%
	77.71%	12.68%	9.61%		

This is the CNEL at 15 m.

	Soft CNEL (15m)	Hard CNEL (15m)
Auto	56.8	58.0
Medium Trk.	51.3	52.5
Heavy Truck	53.2	54.4
Total	59.2	60.4

To get other noise levels,
Put in other distances (ft).

Dist.	Soft	Hard
34	61.6	62.0
36	61.2	61.7
630	42.6	49.3
2,450	33.7	43.4

To get other distances,
Put in other noise levels.

CNEL	Soft	Hard
57	69	107
60	43	54
65	**20**	17
70	9	5

Building	Road Elevation	Distance To Wall	Base Of Wall	Dist. To Observer	Pad Elevation	Observer Height	Wall Height	Barrier Reduction Auto	Barrier Reduction MT	Barrier Reduction HT	CNEL Soft	CNEL Hard
North End of Project	285.0	34	285	36	285	5	0.0	0.0	0.0	0.0	**61.2**	61.7
1st Floor	285.0	34	285	36	285	5	5.0	5.1	4.9	0.0	**58.1**	58.6
2nd Floor	285.0	34	294	36	294	5	5.0	6.6	6.2	5.2	**55.0**	55.6
3rd Floor	285.0	34	303	36	303	5	5.0	8.1	7.8	6.8	**53.5**	54.0
4th Floor	285.0	34	312	36	312	5	5.0	9.2	8.9	8.2	**52.3**	52.8
5th Floor	285.0	34	321	36	321	5	5.0	9.9	9.8	9.3	**51.5**	52.0
6th Floor	285.0	34	330	36	330	5	5.0	10.5	10.4	10.0	**50.9**	51.4
7th Floor	285.0	34	339	36	339	5	5.0	10.9	10.8	10.5	**50.4**	51.0

Exiting Year	2014
Existing Volume (ADT)	7,100
Annual Growth Rate	0%
Future Year	2036
Future Volume (ADT)	7,100
Noise Level Increase (dB)	0.000

CNEL Worksheet - Calveno Curve

Customer : Graystar
Project : 7th Ave. & Robinson Ave.
Date : October 28, 2016

Roadway Name:	Robinson Ave.		Auto %	68.62%
Vehicles per day	15,589	2036 volume	MT (%)	8.89%
Speed (mph)	25	google-street	HT (%)	22.49%
Grade (%)	0	view	Day	77.71%
Grade Adj. (dB)	0.00		Evening	12.68%
Vehicle Noise Red (dB)	0		Night	9.61%

Arterial 1

	Day	Eve	Night	Equiv.	
Auto	75.51%	12.57%	9.34%	208.6%	97.42%
MT	1.56%	0.09%	0.19%	3.7%	1.84%
HT	0.64%	0.02%	0.08%	1.5%	0.74%
	77.71%	12.68%	9.61%		

This is the CNEL at 15 m.

	Soft CNEL (15m)	**Hard CNEL (15m)**
Auto	60.2	61.4
Medium Trk.	54.7	55.9
Heavy Truck	56.6	57.8
Total	62.6	63.8

To get other noise levels,
Put in other distances (ft).

Dist.	**Soft**	**Hard**
32	65.4	65.7
254	51.9	56.7
630	46.0	52.7
2,450	37.1	46.8

To get other distances,
Put in other noise levels.

CNEL	**Soft**	**Hard**
57	116	235
60	73	118
65	**34**	37
70	16	12

Building	Road Elevation	Distance To Wall	Base Of Wall	Dist. To Observer	Pad Elevation	Observer Height	Wall Height	**Barrier Reduction** Auto	MT	HT	**CNEL** Soft	Hard
North End of Project	285.0	32	285	33	285	5	0.0	0.0	0.0	0.0	**65.2**	65.5
1st Floor	285.0	32	285	33	285	5	5.0	5.0	4.9	0.0	**62.1**	62.4
2nd Floor	285.0	32	294	33	294	5	5.0	6.0	5.7	5.1	**59.5**	59.9
3rd Floor	285.0	32	303	33	303	5	5.0	7.0	6.8	6.1	**58.5**	58.8
4th Floor	285.0	32	312	33	312	5	5.0	7.8	7.6	7.1	**57.6**	57.9
5th Floor	285.0	32	321	33	321	5	5.0	8.4	8.3	7.9	**56.9**	57.3
6th Floor	285.0	32	330	33	330	5	5.0	8.8	8.7	8.5	**56.5**	56.8
7th Floor	285.0	32	339	33	339	5	5.0	9.2	9.1	8.9	**56.1**	56.4

Exiting Year	2013
Existing Volume (ADT)	12,400
Annual Growth Rate	1%
Future Year	2036
Future Volume (ADT)	15,589
Noise Level Increase (dB)	0.994

CNEL Worksheet - Calveno Curve

Customer : Graystar
Project : 7th Ave. & Robinson Ave.
Date : October 28, 2016

Roadway Name:	SR-163		Auto %	68.62%
Vehicles per day	135,674	2036 volume	MT (%)	8.89%
Speed (mph)	55	Google Street	HT (%)	22.49%
Grade (%)	0	View	Day	77.71%
Grade Adj. (dB)	0.00		Evening	12.68%
Vehicle Noise Red (dB)	0		Night	9.61%

Freeway

	Day	Eve	Night	Equiv.	
Auto	65.83%	17.98%	9.49%	217.5%	93.30%
MT	2.92%	0.20%	0.50%	8.6%	3.62%
HT	2.10%	0.23%	0.75%	10.3%	3.08%
	70.85%	18.41%	10.74%		

This is the CNEL at 15 m.

	Soft CNEL (15m)	Hard CNEL (15m)
Auto	79.7	80.9
Medium Trk.	73.1	74.3
Heavy Truck	77.5	78.7
Total	82.3	83.5

To get other noise levels,
Put in other distances (ft).

Dist.	Soft	Hard
92	78.2	80.8
254	71.6	76.4
600	66.0	72.6
2,450	56.9	66.5

To get other distances,
Put in other noise levels.

CNEL	Soft	Hard
57	2,395	22,030
60	1,511	11,041
65	**702**	3,492
70	326	1,104

Building	Road Elevation	Distance To Wall	Base Of Wall	Dist. To Observer	Pad Elevation	Observer Height	Wall Height	Barrier Reduction Auto	MT	HT	CNEL Soft	Hard
East Side of Project	250.0	125	285	600	285	5	0.0	14.5	14.2	13.0	**52.1**	58.7
	250.0	125	285	600	285	5	5.0	15.4	15.1	14.3	**51.1**	57.7
1st Floor	250.0	125	285	600	285	5	10.0	16.0	15.8	15.2	**50.3**	56.9
2nd Floor	250.0	125	285	600	294	5	10.0	15.8	15.6	14.9	**50.6**	57.2
3rd Floor	250.0	125	285	600	303	5	10.0	15.5	15.3	14.5	**50.9**	57.5
4th Floor	250.0	125	285	600	312	5	10.0	15.3	15.0	14.1	**51.2**	57.8
5th Floor	250.0	125	285	600	321	5	10.0	14.9	14.6	13.6	**51.6**	58.2
6th Floor	250.0	125	285	600	330	5	10.0	14.6	14.2	13.1	**52.0**	58.7
7th Floor	250.0	125	285	600	339	5	10.0	14.2	13.8	12.5	**52.5**	59.2

Exiting Year	2014	
Existing Volume (ADT)	109,000	CalTrans 2014 ADT Counts
Annual Growth Rate	1%	
Future Year	2036	
Future Volume (ADT)	135,674	
Noise Level Increase (dB)	0.951	

		Octave Band Spectra (PWL - dBA without tone adjustment)								
Unit Size	**Standard Rating (dBA)**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**PWL Total (dBA)**	
18	69	45	48	56	62	55	53	47	64.2	
24	76	46	56	59	63	63	60	55	68.2	
30	77	52	62	67	68	65	62	55	72.6	
36	77	51	62	66	69	64	61	53	72.5	
42	76	49	61	63	65	62	60	52	69.7	
48	79	53	66	69	71	67	64	57	75.2	
60	73	50	63	62	63	60	58	52	68.7	

Distance (feet)
5

		Octave Band Spectra (SPL - dBA without tone adjustment)								
Unit Size	**Standard Rating (dBA)**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**SPL Total (dBA)**	**Number**
18	57.4	33.4	36.4	44.4	50.4	43.4	41.4	35.4	**52.6**	65
24	64.4	34.4	44.4	47.4	51.4	51.4	48.4	43.4	**56.6**	52
30	65.4	40.4	50.4	55.4	56.4	53.4	50.4	43.4	61.0	
36	65.4	39.4	50.4	54.4	57.4	52.4	49.4	41.4	60.9	
42	64.4	37.4	49.4	51.4	53.4	50.4	48.4	40.4	58.1	
48	67.4	41.4	54.4	57.4	59.4	55.4	52.4	45.4	63.6	
60	61.4	38.4	51.4	50.4	51.4	48.4	46.4	40.4	57.2	
										117

Units on the Roof	90
Units on the 7th Floor	27

Rooftop dBA SPL	**# of Units**	**Total SPL**
52.6	44	69.1
56.6	46	73.2
61.0	0	0.0
	90	**74.6**
		at 5 feet

7th Floor dBA SPL	**# of Units**	**Total SPL**
52.6	0	0.0
56.6	27	70.9
61.0	0	0.0
	27	**70.9**
		at 5 feet

Luis Garcia
2/15/2017

Figure the following preliminary sizes:

Type	Size	Number	Total
Studio	18	26	
1-Bed	18	39	65
2-Bed	24	46	46
	Total	**111**	

Point Source - Single Barrier Calculator - SRD

Source	Rooftop HVAC Units - 90 Total				
Source Level (dBA)	74.6	Speed of Sound (f/s)	1128	Level	63.0
Reference Distance (ft)	5	Wavelength (ft)	2.256	New Distance	19.1
Frequency (Hz)	500				

Single Barrier - Noise Level at Residential Dwelling to the East, Across 7th Ave.

Source Height	Source Elevation	Source to Barrier 1	Barrier Height	Barrier Elevation	Barrier 1 to Receiver	Receiver Height	Receiver Elevation	Distance I Reduction	Breaks LOS 1	A	B	D	Fresnel	Barrier Reduction	**Total (dBA)**	**7th Floor**	**Total**
3	365	13	0	365	54.6	5	283	26.4	1.0	13.3	94.4	104.7	2.7	17.2	**30.9**	**23.2**	**31.6**
3	365	13	0	365	54.6	5	283	26.4	1.0	13.3	94.4	104.7	2.7	17.2	**30.9**	**23.2**	**31.6**
3	365	13	3	365	54.6	5	283	26.4	1.0	13.0	96.9	104.7	4.5	19.6	**28.6**	**21.9**	**29.5**
3	365	13	4	365	54.6	5	283	26.4	1.0	13.0	97.7	104.7	5.3	20.2	**27.9**	**21.5**	**28.8**
3	365	13	5	365	54.6	5	283	26.4	1.0	13.2	98.5	104.7	6.1	20.9	**27.3**	**21.1**	**28.2**

Single Barrier - Noise Level at Residential Dwelling to the South, Across Parking Lot

Source Height	Source Elevation	Source to Barrier 1	Barrier Height	Barrier Elevation	Barrier 1 to Receiver	Receiver Height	Receiver Elevation	Distance I Reduction	Breaks LOS 1	A	B	D	Fresnel	Barrier Reduction	**Total (dBA)**	**7th Floor**	**Total**
3	365	2.6	0	365	201.3	5	284	32.8	0.0	3.9	215.1	218.6	0.4	0.0	**41.8**	**27.7**	**42.0**
3	365	2.6	0	365	201.3	5	284	32.8	0.0	3.9	215.1	218.6	0.4	0.0	**41.8**	**27.7**	**42.0**
3	365	2.6	3	365	201.3	5	284	32.8	1.0	2.6	216.2	218.6	0.2	7.3	**34.5**	**24.8**	**34.9**
3	365	2.6	4	365	201.3	5	284	32.8	1.0	2.7	216.6	218.6	0.6	11.4	**30.4**	**24.0**	**31.3**
3	365	2.6	5	365	201.3	5	284	32.8	1.0	3.2	217.0	218.6	1.4	14.6	**27.2**	**23.3**	**28.7**

Point Source - Single Barrier Calculator - SRD

Source	7th Floor HVAC Units - 27 Total				
Source Level (dBA)	70.9	Speed of Sound (f/s)	1128	Level	63.0
Reference Distance (ft)	5	Wavelength (ft)	2.256	New Distance	12.5
Frequency (Hz)	500				

Single Barrier - Noise Level at Residential Dwelling to the East, Across 7th Ave.

Source Height	Source Elevation	Source to Barrier 1	Barrier Height	Barrier Elevation	Barrier 1 to Receiver	Receiver Height	Receiver Elevation	Distance Reduction	Breaks LOS 1	A	B	D	Fresnel	Barrier Reduction	**Total (dBA)**
3	351	35.3	0	351	65.7	5	283	27.7	1.0	35.4	91.0	120.7	5.1	20.1	**23.2**
3	351	35.3	0	351	65.7	5	283	27.7	1.0	35.4	91.0	120.7	5.1	20.1	**23.2**
3	351	35.3	3	351	65.7	5	283	27.7	1.0	35.3	93.1	120.7	6.9	21.4	**21.9**
3	351	35.3	4	351	65.7	5	283	27.7	1.0	35.3	93.8	120.7	7.5	21.8	**21.5**
3	351	35.3	5	351	65.7	5	283	27.7	1.0	35.4	94.5	120.7	8.2	22.1	**21.1**

Single Barrier - Noise Level at Residential Dwelling to the South, Across Parking Lot

Source Height	Source Elevation	Source to Barrier 1	Barrier Height	Barrier Elevation	Barrier 1 to Receiver	Receiver Height	Receiver Elevation	Distance Reduction	Breaks LOS 1	A	B	D	Fresnel	Barrier Reduction	**Total (dBA)**
3	351	22.1	0	351	111.5	5	284	29.5	1.0	22.3	127.6	148.6	1.2	13.7	**27.7**
3	351	22.1	0	351	111.5	5	284	29.5	1.0	22.3	127.6	148.6	1.2	13.7	**27.7**
3	351	22.1	3	351	111.5	5	284	29.5	1.0	22.1	129.1	148.6	2.3	16.6	**24.8**
3	351	22.1	4	351	111.5	5	284	29.5	1.0	22.2	129.6	148.6	2.8	17.4	**24.0**
3	351	22.1	5	351	111.5	5	284	29.5	1.0	22.2	130.1	148.6	3.3	18.1	**23.3**

APPENDIX 2

Table NE-3
"Land Use – Noise Compatibility Guidelines"

Found Within the Noise Element of
the General Plan of the City of San Diego
June 2015

TABLE NE-3 Land Use - Noise Compatibility Guidelines

Land Use Category	Exterior Noise Exposure (dBA CNEL)				
		60	65	70	75
Parks and Recreational					
Parks, Active and Passive Recreation					
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities					
Agricultural					
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables					
Residential					
Single Dwelling Units; Mobile Homes		45			
Multiple Dwelling Units **For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.*		45	45*		
Institutional					
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12Educational Facilities; Libraries; Museums; Child Care Facilities		45			
Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities		45	45		
Cemeteries					
Retail Sales					
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories			50	50	
Commercial Services					
Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support			50	50	
Visitor Accommodations		45	45	45	
Offices					
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50	
Vehicle and Vehicular Equipment Sales and Services Use					
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking					
Wholesale, Distribution, Storage Use Category					
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution					
Industrial					
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.
45, 50	**Conditionally Compatible**	**Indoor Uses**	Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas. Refer to Section I.
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated t 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.

WASTE MANAGEMENT PLAN

FOR

Hillcrest 111

San Diego, California

Project No. 522075

Prepared for:

City of San Diego Environmental Services Department
9601 Ridgehaven Court, Suite 320
San Diego, California 92123-1636

Prepared by:

KLR Planning
P. O. Box 882676
San Diego, California 92168-2676
Telephone: 619-578-9505
Facsimile: 619-692-4243

May 2017

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this Waste Management Plan (WMP) for the *Hillcrest 111 Project* in the City of San Diego is to provide analysis of the solid waste impacts anticipated for the *Hillcrest 111 Project.* The goal of this WMP is to identify sufficient measures to minimize potential impacts of the *Hillcrest 111 Project* on solid waste services such that significant impacts are avoided. Two acceptable approaches to managing waste are to reduce the tons disposed to 60 tons or less, or to provide diversion of 75 percent or more, thus meeting the goal established by Assembly Bill 341.

The 1.00-acre *Hillcrest 111 Project* site is located along Robinson Avenue between Sixth Avenue and Seventh Avenue, San Diego, California 92101. The project site is situated generally east of Sixth Avenue, west of Fifth Avenue, north of Pennsylvania Avenue, and south of Robinson Avenue and is within the Uptown Community Plan area. (See Figure 1, *Hillcrest 111 Project Location Map and Aerial.*) The project site is currently a developed surface parking lot with 86 parking spaces. Multi-family residential development is located east of the project site. To the south of the project site, on the southern half of that portion of the block, are multi-family residential developments and surface parking. Commercial use in the form of an AT&T facility is located to the north of the project site. Commercial uses in the form of a gas station and retail shops are located to the west of the project site, beyond an alley that divides the block roughly in half. The site is zoned MCCPD-CN-1A and MCCPD-MR-8008 and is designated High Density Residential in the 1988 Uptown Community Plan.

The proposed project involves demolition of existing surface parking (42,000 square feet) and construction of a mixed-use development (approximately 134,086 square feet gross floor area) consisting of residential, commercial retail, underground parking, and a detached parking garage. The project would be a maximum of seven stories in height and would have a total of 111 residential units (including nine very low income units) and 4,800 square feet of commercial retail space. A total of 196 parking spaces would be provided in a three-level underground parking structure and a proposed off-site parking garage with a separate garage dedicated for AT&T uses that will accommodate 86 vehicles. The project is being designed to comply with Cal-Green standards. (See Figure 2, *Hillcrest 111 Project Site Plan.*)

The proposed *Hillcrest 111 Project* involves a Process Two Neighborhood Development Permit. The project would develop under the existing zone and land use designation at the time of the first submittal; therefore, a Rezone and Community Plan Amendment are not required.

Figure 1
Hillcrest 111 - Project Location Map and Aerial

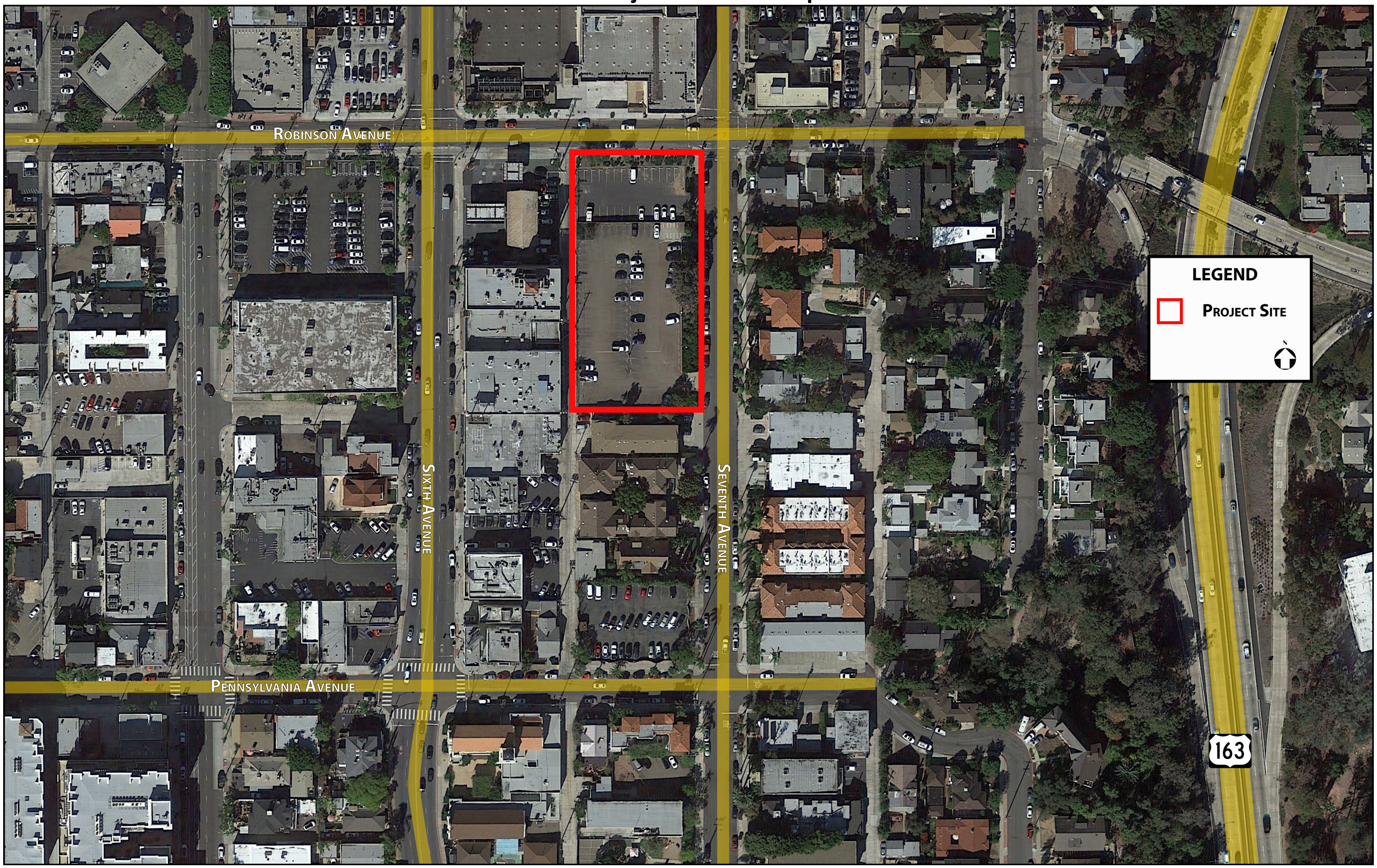
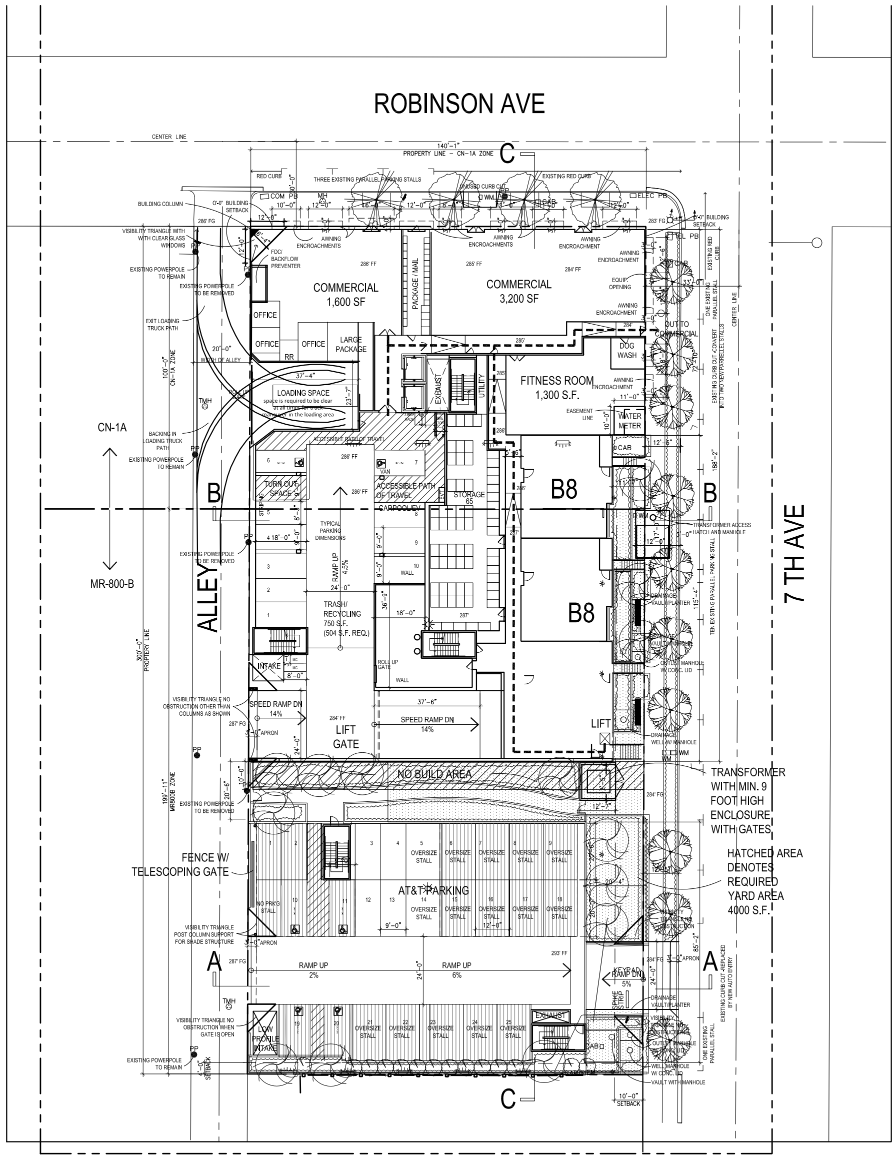


Figure 2
Hillcrest 111 Project Site Plan



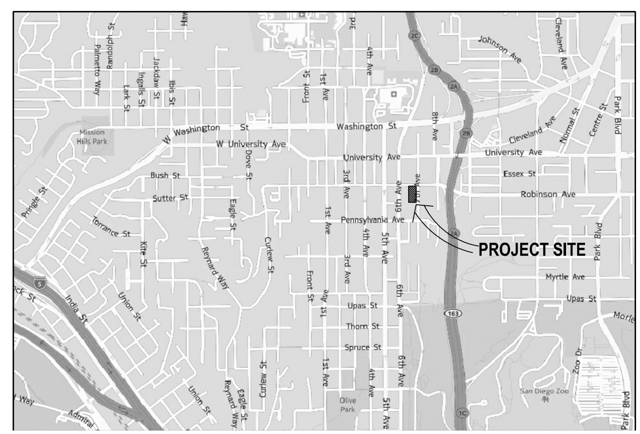
LEGEND

- PROPERTY LINE
- ACCESSIBLE PATH OF TRAVEL
- SETBACK
- NO BUILD AREA
- REQUIRED FRONT YARD AREA
- 50% SHADED PARKING AREA

NOTES:

- BUILDING ADDRESS TO BE DETERMINED
- SEE LANDSCAPE SHEETS FOR PODIUM COURT AND ROOF DECK DESIGNS
- SEE LANDSCAPE PLANS FOR ADDITIONAL CALCULATION REQUIREMENTS
- SEE CIVIL SHEETS FOR DETAILED GRADES AND ADDITIONAL SITE INFORMATION
- NO TRANSIT STOPS ONSITE
- IN THE VISIBILITY TRIANGLE AREAS THERE SHALL BE NO OBSTRUCTION OVER 3 FEET IN HEIGHT.

VICINITY MAP
N.T.S.



This WMP consists of two sections corresponding to the implementation of site development: the *Construction Phase* (to include demolition) and the *Occupancy Phase* (post-construction). The WMP addresses the projected amount of waste that could be generated by the project based on current City generation rates and estimates; waste reduction goals; and recommended techniques to achieve the waste reduction goals, such as recycling. The project includes two months of demolition. Construction of the project (including demolition) is anticipated to take approximately 26 months. Construction would take place as two phases, with the first phase including the development of the parking garage and the second phase including the development of the mixed-use building and is estimated to begin Fall 2017.

Waste disposal sites and recycling methods and opportunities may change from those available today; however, it is not expected that waste diversion and disposal sites listed in Table 3, *Minimum Exterior Refuse and Recyclable Material Storage Areas for Commercial Development,* would change by the time the project is anticipated to begin construction. This WMP includes the following general information known at the time the WMP was prepared:

- Projected waste generation calculations and identification of types of waste materials generated;
- Source separation techniques for waste generated;
- How materials will be re-used on-site;
- Name and location of current recycling, re-use, and landfill facilities where waste will be disposed of if not re-used on-site;
- A "buy recycled" program;
- Measures to be implemented directed at reducing construction debris;
- Method(s) for communicating waste reduction and recycling goals to subcontractors;
- A general time line for construction and development; and
- A list of required progress and inspections by City staff, based on current ordinances.

2.0 BACKGROUND

In 1989, the California Legislature passed Assembly Bill (AB) 939: Integrated Waste Management Act, which mandated that all cities reduce waste disposed in landfills from generators within their borders by 50 percent by the year 2000. AB 939 required all local governments to prepare a Source Reduction and Recycling Element, which incorporates waste management policies and programs to achieve the mandated waste reduction. Since 1990, the City has diverted more than 50 percent of its generated waste stream from disposal. This bill specified that solid waste should be considered by the equation GENERATED = DISPOSED + DIVERTED. "Diverted" materials are put into a *hierarchy* in the law, as follows:

- First *source reduction*, such as using a reusable bag, making double-sided copies, or other measure that stops waste at the source.
- Secondary measures include *recycling* and *composting*. Because these measures often have transportation and processing impacts, they are considered less preferable than source reduction.
- In the Public Resources Code, various methods of *transformation* for energy production are limited to ten percent of the total waste reduction target.

In 2008, SB 1016 was chaptered. Known as the Solid Waste Disposal Measurement Act, SB 1016 maintained the 50 percent diversion requirement, but changed to a disposal-based measurement system, expressed as the 50 percent Equivalent Per Capita Disposal Target. This built upon AB 939 by implementing a simplified and timelier indicator of jurisdiction performance that focuses on reported disposal at Board-permitted disposal facilities. This established a goal of not recycling more, but disposing of less. AB 341: Jobs and Recycling, chaptered in 2011, was intended to create green jobs by expanding recycling to every multi-family dwelling and business. It charged CalRecycle with responsibility for ensuring that the State is diverting at least 75 percent of solid waste that is generated within the State by 2020. SB 1016 establishes that compliance with State law is measured by reducing the amount of waste material requiring disposal, and AB 341 increases the diversion target to 75 percent.

Additional local regulation pertaining to solid waste management includes the City of San Diego's Municipal Code Ch.14 Art. 2 Div. 8: §142.0810, §142.0820, Ch. 6 Art. 6 Div. 7; §66.0706, §66.0709, §66.0710; and Ch. 6 Art. 6 Div. 6; §66.0711, §66.0604, §66.0606. These statues designate refuse and recycling space allocation requirements for:

- on-site refuse and recyclable material storage requirements,
- diversion of construction and demolition debris regulations, and
- diversion of recyclable materials generated from residential facilities, businesses, commercial/institutional facilities, apartments, condominiums, and special events requiring a City permit.

The City of San Diego has established a threshold of 40,000 square feet of development as generating sufficient waste (60 tons) to have a potentially cumulatively significant impact on solid waste services. *Hillcrest 111 Project* as proposed exceeds this threshold. The purpose of this WMP is to identify measures that would be implemented to reduce this potential solid waste impacts such that significant impacts are avoided.

The City Recycling Ordinance is found in Municipal Code section 66.0701 et. seq. It requires the provision of recycling service for all single-family residences; and commercial facilities and multifamily residences with service for four cubic yards or more. In addition, the ordinance also requires development of educational materials to ensure occupants are informed about the City's ordinance and recycling services including information on types of recyclable materials accepted.

Construction and Demolition (C&D) Debris Diversion Deposit Program applies to all applicants for building, demolition, and removal permits. This ordinance requires that the applicant post a deposit (Table 1, *C&D Debris Deposit Table*). The deposit is not returned until the applicant demonstrates that a minimum amount of the material generated has been diverted from disposal in landfills. Mixed construction debris recycling facilities in San Diego are evaluated quarterly to determine how much of the throughput is recycled, and how much is a "residual" material requiring disposal. Facilities that accept mixed debris typically achieve a 68 percent or less diversion rate. Single materials recyclers, such as metal recyclers, often achieve a nearly 100 percent diversion rate. When comingled materials are sent to a mixed facility, the 75 percent diversion goal established by AB 341 will not be met. Depending on the project, to ensure that the overall diversion goal is attained, some materials must often be separated and trucked to facilities with higher diversion rates, such as aggregate and metal recyclers.

Table 1
C&D Debris Deposit Table

Building Category	Sq. Ft. Subject to Ordinance*	Deposit per Sq. Ft.	Range of Deposits
Residential New Construction	500-125,000 detached 500-100,000 attached	$0.40	$200-$50,000 $200-$40,000
Non-residential New Construction	1,000-25,000 commercial 1,000-75,000 industrial	$0.20	$200-$5,000 $200-$15,000
Non-residential Alterations	286 with no maximum	$0.70	$200 and up
Residential Demolition	286 with no maximum	$0.70	$200 and up
Non-residential Demolition	1,000 with no maximum	$0.20	$200 and up
Roof Tear-off	All projects	-	$200
Residential Alterations	500 and above	-	$1,000

* Projects under the minimum square footage subject to the ordinance are exempt from the C&D debris recycling deposit.

2.1 Exterior Refuse and Recyclable Material Storage Area Requirements

The *Hillcrest 111 Project* would develop in two phases over an approximate 26-month period. Development is anticipated to begin Fall 2017. Because the *Hillcrest 111 Project* includes residential and nonresidential development, exterior refuse and recyclable material storage areas will be provided in accordance with City regulations per Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820 and §142.0830.

2.2 Exterior Refuse and Recyclable Material Storage Areas for *Hillcrest 111 Project*

Hillcrest 111 Project would develop a mixed-use project with a total of 111 residential units and 4,800 square feet of commercial retail space. Table 2, *Minimum Exterior and Recyclable Material Storage Areas for Residential Development*, shows the required amount of refuse and recyclable storage areas for the project's residential element. As shown in Table 2, the project would be required to provide 240 square feet each of exterior refuse and recyclable material storage area, for a total of 480 square feet of material storage area. Table 3, *Minimum Exterior and Recyclable Material Storage Areas for Commercial Development*, shows the required amount of refuse and recyclable storage areas for the project's commercial retail element. As shown in Table 3, the project would be required to provide 12 square feet each of exterior refuse and recyclable material storage area, for a total of 24 square feet of material storage area.

Table 2
Minimum Exterior Refuse and Recyclable Material Storage Areas for Residential Development

Number of Dwelling Units per Development	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
2-6	12	12	24
7-15	24	24	48
16-25	48	48	96
26-50	96	96	192
51-75	144	144	288
76-100	192	192	384
101-125	240	240	480
126-150	288	288	576
151-175	336	336	672
176-200	384	384	768
201+	384 plus 48 square feet for every 25 dwelling units above 201	384 plus 48 square feet for every 25 dwelling units above 201	768 plus 96 square feet for every 25 dwelling units above 201

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820, Table 142-08B, effective January 1, 2000.

Table 3
Minimum Exterior Refuse and Recyclable Material Storage Areas for Commercial Development

Gross Floor Area per Development (square feet)	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
0 – 5,000	12	12	24
5,001 – 10,000	24	24	48
10,001 – 25,0000	48	48	96
25,001 – 50,000	96	96	192
50,001 – 75,000	144	144	288
75,001 – 100,000	192	192	384
100, 001+	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	384 plus 96 square feet for every 25,000 square feet of building area above 100,001

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0830, Table 142-08C, effective January 1, 2000.

3.0 EXISTING CONDITIONS

The *Hillcrest 111 Project* site encompasses approximately 1.00 previously graded and developed acres. The project site is bordered by Robinson Avenue to the north, Pennsylvania Avenue to the south, Seventh Avenue to the east, and Sixth Avenue to the east. The project site is currently developed with 42,000 square feet of surface parking.

4.0 PROPOSED CONDITIONS

The proposed project involves demolition of existing surface parking (42,000 square feet) and construction of a mixed-use development (approximately 134,086 square feet gross floor area) consisting of residential, commercial retail, underground parking, and a detached parking garage. The project would be a maximum of seven stories in height and would have a total of 111 residential units (including nine very low income units) and 4,800 square feet of commercial retail space. A total of 276 parking spaces would be provided in a three-level underground parking structure and a proposed off-site parking garage. The project is being designed to comply with Cal-Green standards. (See Figure 2, *Hillcrest 111 Project Site Plan.*)

Construction will be completed in two phases over a 26-month period with construction anticipated to begin in Fall 2017. Construction practices will comply with local, State, and Federal regulations regarding handling of building materials to ensure waste minimization requirements are met.

5.0 CONSTRUCTION WASTE

Construction activities would generate packaging materials and unpainted wood, including wood pallets, and other miscellaneous debris. Construction debris would be separated on-site into material-specific containers to facilitate reuse and recycling and to increase the efficiency of waste reclamation and/or would be collected by a contracted waste hauler and separated at the facility. Source separation of materials at the construction site is essential to (1) ensure appropriate waste diversion rate, (2) minimize costs associated with transportation and disposal, and (3) facilitate compliance with the C&D ordinance. The types of construction waste anticipated to be generated include:

- Asphalt and Concrete
- Brick/Masonry/Tile
- Cardboard
- Carpet, Padding/Foam
- Drywall
- Landscape Debris
- Mixed C&D Debris
- Roofing Materials
- Scrap Metal
- Unpainted Wood and Pallets
- Garbage/Trash

Materials to be recycled would be redirected to appropriate recipients selected from ESD's directory of facilities that recycle construction materials, scrap metal, and yard waste.

5.1 Recycled Construction Materials

The *Hillcrest 111 Project* will implement a target of 20 percent recycled material.

5.2 Managing Construction Material

Demolition would occur over a period of approximately two months and construction would occur over a period of approximately 26 months. ESD staff would be present for an early pre-construction meeting to evaluate waste segregation, signage, and salvage.

The project site is the location of an existing commercial development. The demolition phase will include the deconstruction/demolition and removal of the existing surface parking. Approximately 291 tons of waste is expected to be generated during demolition. Approximately 286 tons of material would be recycled, to include landscaping, concrete, asphalt, and curb and gutter. Approximately five tons of debris would be disposed in a landfill, to include non-useable asphaltic paving that becomes contaminated with the underlying subgrade soils. . Table 4, *Hillcrest 111 Project Waste Generation – Demolition*, summarizes the type and amount of demolition materials, as well as diversion/disposal.

Table 4
Hillcrest 111 Project Waste Generation – Demolition

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
DEMOLITION WASTE				
Asphalt and Concrete, Curb/Gutter	284	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100% diversion)	280	4
Landscape Materials	5	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	5	0
Garbage/Trash	2	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	1	1
TOTAL	291		286	5

In accordance with State diversion targets, a minimum of 75 percent of construction materials will be recycled. Materials to be recycled would be redirected to appropriate recipients selected from ESD's directory of facilities that recycle demolition materials, scrap metal, and yard waste.

To facilitate management of construction materials, the developer shall identify one person or agency connected with the proposed development to act as Solid Waste Management Coordinator, whose responsibility it becomes to work with all contractors and subcontractors to ensure material separation and coordinate proper disposal and diversion of waste generated. The Solid Waste Management Coordinator will help to ensure all diversion practices outlined in this Waste Management Plan are upheld and communicate goals to all contractors involved efficiently.

The responsibilities of the Solid Waste Management Coordinator, include, but are not limited to, the following:

- Review the Solid Waste Management Plan including responsibilities of Solid Waste Management Coordinator.
- Review and update procedures as needed for material separation and verify availability of containers and bins needed to avoid delays.
- Review and update procedures for periodic solid waste collection and transportation to recycling and disposing facilities.
- The authority to issue stop work orders if proper procedures are not being allowed.

The contractors will perform daily inspections of the construction site to ensure compliance with the requirements of the Waste Management Plan and all other applicable laws and ordinances and report directly to Solid Waste Management Coordinator. Daily inspections will include verifying the availability and number of dumpsters based on amount of debris being generated, correct labeling of dumpsters, proper sorting and segregation materials, and salvaging of excess materials. Additionally, the following apply:

- Solid waste management coordinator will be responsible for educating contractors and subcontractors regarding waste management plan requirements and ensuring that contractors and subcontractors carry out the measures described in the WMP.
- Solid waste management coordinator will ensure ESD attendance at a Precon and assure compliance with segregation requirements, and verification of recycled content in base materials.
- Recycling areas will be clearly identified with large signs, approved by ESD, and sufficient amounts of material-specific bins will be provided for necessary segregation.
- Recycling bins will be placed in areas that are readily accessible to contractors/subcontractors and in areas that will minimize misuse or contamination by employees and the public.
- Solid waste management coordinator will be responsible for ensuring that contamination rates in bins remain below 5 percent by weight of the bin.

Table 5, *Hillcrest 111 Project Waste Generation – Construction*, is included below to summarize the types of waste generated, the approximately amount of each waste type diverted, and the approximate overall amount remaining to be disposed of in landfills. Construction waste processing facilities that may be used for any of the construction phases include but are not limited to those facilities listed in Table 5. Because certified diversion rates and authorized facilities are updated quarterly and the decision on which facility will be contracted for waste hauling will be made at the time of construction based on market conditions and the facility's certified rate, the developer reserves the right to select any authorized facility as long as the facility is City-certified to meet minimum diversion requirements.

Table 5
Hillcrest 111 Project Waste Generation – Construction

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
		CONSTRUCTION WASTE		
Asphalt and Concrete	309	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100% diversion)	309	--
Brick/Masonry/ Tile	10	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	8	2
Cardboard	60	**Allan Company** 6733 Consolidated Way San Diego, CA 92121 (100% diversion)	42.7	17.3
Carpet,	2	**DFS Flooring**	2	--

Padding/Foam		10178 Willow Creek Road San Diego, CA 92131 (100% diversion)		
Drywall	28	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	28	--
Landscape Debris	16	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	15.2	0.8
Mixed C&D Debris	30	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	21	9
Roofing Materials	2	**LEED Recycling** 8725 Miramar Place San Diego, CA 92121 (100% diversion)	1	1
Scrap Metal	2	**Allan Company** 6733 Consolidated Way San Diego, CA 92121 (100% diversion)	2	--
Unpainted Wood & Pallets	222	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	222	--
Garbage/Trash	8	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	3	5
TOTAL	**689**		**653.9**	**35.1**

Construction debris will be separated onsite into material-specific containers, corresponding to the materials types in Table 5, to facilitate reuse and recycling and to increase the efficiency of waste reclamation. The *Hillcrest 111 Project* will implement a target of 20 percent recycled material and 75 percent for landfill diversion. As shown in Table 5, the applicant has the goal of 95 percent diversion rate of the construction materials generated by the project are expected to be diverted from landfills.

6.0 OCCUPANCY PHASE

While the construction phase for the *Hillcrest 111 Project* occurs as a one-time waste generation event as construction of the project proceeds, tenant/owner occupancy requires an on-going plan to manage waste disposal to meet the waste reduction goals established by the City and State.

6.1 Solid Waste Recycling

The following table expresses the anticipated refuse and recyclable storage requirements based on Table 142-08B and 142.08C of the City of San Diego Municipal Code.

Table 6
Minimum Exterior and Recyclable Material Storage Areas for the Hillcrest 111 Project

Land Use	Gross Floor Area/Units	Minimum Refuse Storage Area (square feet)	Minimum Recyclable Material Storage Area (square feet)	Total Minimum Storage Area (square feet)
Residential	111 units	240	240	480
Commercial Retail	4,800 sq ft	12	12	24
TOTAL		252	252	504

As shown in Table 7, *Estimated Solid Waste Generation from the Hillcrest 111 Project*, during occupancy, the expected generated waste per year from the *Hillcrest 111 Project* when fully occupied would be approximately 146.64 tons.

Table 7
Estimated Solid Waste Generation from the Hillcrest 111 Project – Occupancy Phase

Use	Intensity	Waste Generation Rate	Estimated Waste Generated (tons/year)
Residential	111 units	1.2 tons/year/unit	133.2
Commercial-Retail	4,800 sq ft	0.0028 tons/year/sq ft	13.44
		TOTAL	146.64

On-site recycling services shall be provided to all tenants/residents within *Hillcrest 111 Project*. Tenants/residents within *Hillcrest 111 Project* that receive solid waste collection service shall participate in a recycling program by separating recyclable materials from other solid waste and depositing the recyclable materials in the recycling container provided for the occupants. Recycling services are required by Section 66.0707 of the City of San Diego Land Development Code. Based on current requirements, these services shall include the following:

- Collection of recyclable materials as frequently as necessary to meet demand;
- Collection of plastic bottles and jars, paper, newspaper, metal containers, cardboard, and glass containers;
- Collection of other recyclable materials for which markets exist, such as scrap metal, wood pallets
- Collection of food waste for recycling by composting, where available (prior to issuance of building and occupancy permits, the project proponent will meet with representatives from ESD to ensure that their educational materials and haulers can comply with the requirements for this service);
- Use of recycling receptacles or containers which comply with the standards in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department;
- Designated recycling collection and storage areas; and

- Signage on all recycling receptacles, containers, chutes, and/or enclosures which complies with the standards described in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department

As required by Section 66.0707 of the City of San Diego Land Development Code, the building management or other designated personnel shall ensure that occupants are educated about the recycling services as follows:

- Information, including the types of recyclable materials accepted, the location of recycling containers, and the occupants responsibility to recycle shall be distributed to all occupants annually;
- All new occupants shall be given information and instructions upon occupancy; and
- All occupants shall be given information and instructions upon any change in recycling service to the commercial facility.

6.2 Landscaping and Green Waste Recycling

Plant material selection will be guided by the macro-and micro-climate characteristics of the project site and surrounding region to encourage long-term sustainability without the excessive use of water pesticides and fertilizers. Irrigation of these areas, where practical, will utilize reclaimed water applied via low precipitation rate spray heads, drip emitters, or other highly efficient systems. Landscape maintenance would include the collection of green waste and disposal of green waste at recycling centers that accept green waste. This will help further reduce the waste generated by developments within *Hillcrest 111Project* during the occupancy phases.

7.0 CONCLUSION

The City of San Diego Development Services Department is requiring that this WMP be prepared and submitted to the City of San Diego's ESD. Since the project is in the design phase, this is only a preliminary plan, which specifies the intent to meet the requirements of PRC 939 and City ordinances. This WMP will be implemented to the fullest degree of accuracy and efficiency. Additionally, the project will be required to adhere to City ordinances, including the *Construction and Demolition Debris Diversion Deposit Program*, the City's *Recycling Ordinance*, and the *Refuse and Recyclable Materials Storages Regulations*. The WMP plan for the *Hillcrest 111 Project* is designed to implement and adhere to all city ordnance and regulations with regards to waste management. The measures in the WMP would ensure that significant impacts relative to solid waste are avoided.

Prior to the issuance of any grading or construction permits, the Solid Waste Coordinator will ensure ESD's attendance at a precon. The Solid Waste Coordinator will ensure that 1) the proposed approach to contractor education is approved, 2) the written specifications for base materials, concrete pavers, decomposed granite, and mulch, is approved, and 3) that the ESD inspector approves the separate waste containers, signage, and hauling contract(s) for the following materials:

- Asphalt/concrete
- Brick/masonry/tile

- Cardboard
- Carpet/padding/foam
- Drywall
- Landscape debris
- Mixed C&D debris
- Scrap metal
- UNTREATED woodwaste
- Refuse

The project would be designed to achieve 75+ percent of construction waste to be source reduced and/or recycled. While diversion activities during occupancy will achieve only 40 percent diversion and will not achieve the State target of 75 percent, the project incorporates several measures above and beyond the requirements of local ordinance.

- First, the project exceeds ordinance requirements and even the State waste reduction target during construction.
- Second, the project includes landscaping that will reduce yardwaste, and will provide transportation to a composting facility for the yard waste that is produced. The project proponent will ensure that ESD reviews the landscaping plans and hauling contract for the facility to verify that waste reduction goals are met.
- Third, the project would include Cal-Green measures to reduce waste, including separate Rubbish and Recycle chutes.

The project would target 20 percent of solid waste to be recycled material and 75 percent for landfill diversion.

These measures ensure that the waste generated by the project will be properly managed and that solid waste services will not be impacted.

The following measures apply to the project to reduce cumulative impacts on solid waste to below a level of significance:

1.0 Prior to Permit Issuance or Bid opening/Bid award

A. LDR Plan check

1. Prior to the issuance of any construction permit, including but is not limited to, demolition, grading, building or any other construction permit, the Assistant Deputy Director (ADD) Environmental Designee shall verify that the all the requirements of the Refuse & Recyclable Materials Storage Regulations and all of the requirements of the waste management plan are shown and noted on the appropriate construction documents. All requirements, notes and graphics shall be in substantial conformance with the conditions and exhibits of the associated discretionary approval.

The construction documents shall include a waste management plan.

Notification shall be sent to:

MMC Environmental Review Specialist
Development Service Department
9601 Ridgehaven Court
Ste. 220, MS 1102 B
San Diego, California 92123 1636
(619) 980 7122

Environmental Services Department (ESD)
9601 Ridgehaven Court
Ste. 210, MS 1102 A
San Diego, California 92123 1636
(858) 573-1236

II. Prior to Start of Construction

A. Grading and Building Permit - Prior to issuance of any grading or building permit, the permittee shall be responsible to arrange a preconstruction meeting to coordinate the implementation of the WMP. The Precon Meeting that shall include: the Construction Manager, Building/Grading Contractor; MMC; and ESD and the Building Inspector and/or the RE (whichever is applicable) to verify that implementation of the waste management plan shall be performed in compliance with the plan approved by LDR and the San Diego ESD, to ensure that impacts to solid waste facilities are below a level of significance.

1. At the Precon Meeting, the Permittee shall submit reduced copies (11" x 17") of the approved waste management plan, the RE, BI, MMC, and ESD.
2. Prior to the start of construction, the Permittee/Construction Manager shall submit a construction schedule to the RE, BI, MMC, and ESD.

III. During Construction

The Permittee/Construction Manager shall call for inspections by the RE/BI and both MMC and ESD, who will periodically visit the demolition/construction site to verify implementation of the waste management plan. The Consultant Site Visit Record (CSVR) shall be used to document the Daily Waste Management Activity/progress.

IV. Post Construction

A. For any demolition or construction permit, a final results report shall be submitted to both MMC and ESD for review and approval to the satisfaction of the City. MMC will coordinate the approval with ESD and issue the approval notification. ESD will review/approve City Recycling Ordinance-required educational materials prior to occupancy.

KOA CORPORATION
PLANNING & ENGINEERING

5095 Murphy Canyon Road, Suite 330
San Diego, CA 92123
t: 619.683.2933 f: 619.683.7982
www.koacorporation.com

December 11, 2017
B72085

Ms. Karen Ruggels
KLR Planning
PO Box 882676
San Diego, CA 92168-2676

Subject: PTS# 522075 (7th & Robinson) Traffic Assessment

Dear Karen:

This traffic impact analysis has been prepared for the mixed use element of the Hillcrest 111 project. The proposed project is located in the Hillcrest area of the City of San Diego. For the purpose of evaluating the potential traffic impacts caused by the project, four scenarios are examined in this report. These scenarios are Existing, Existing with Project, Near Term without Project, and Near Term with Project (opening day, 2019).

Project Description

The project is to develop 4,800 square feet of commercial area and 111 residential units to be located between 6th Avenue and 7th Avenue on the south side of Robinson Avenue. Vehicular access to the proposed project is provided by an alley between 6th Avenue and 7th Avenue. The project site plan is shown in Figure 1.

Study Area

The specific study area consists of one roadway segment and two intersections:

Roadway Segment

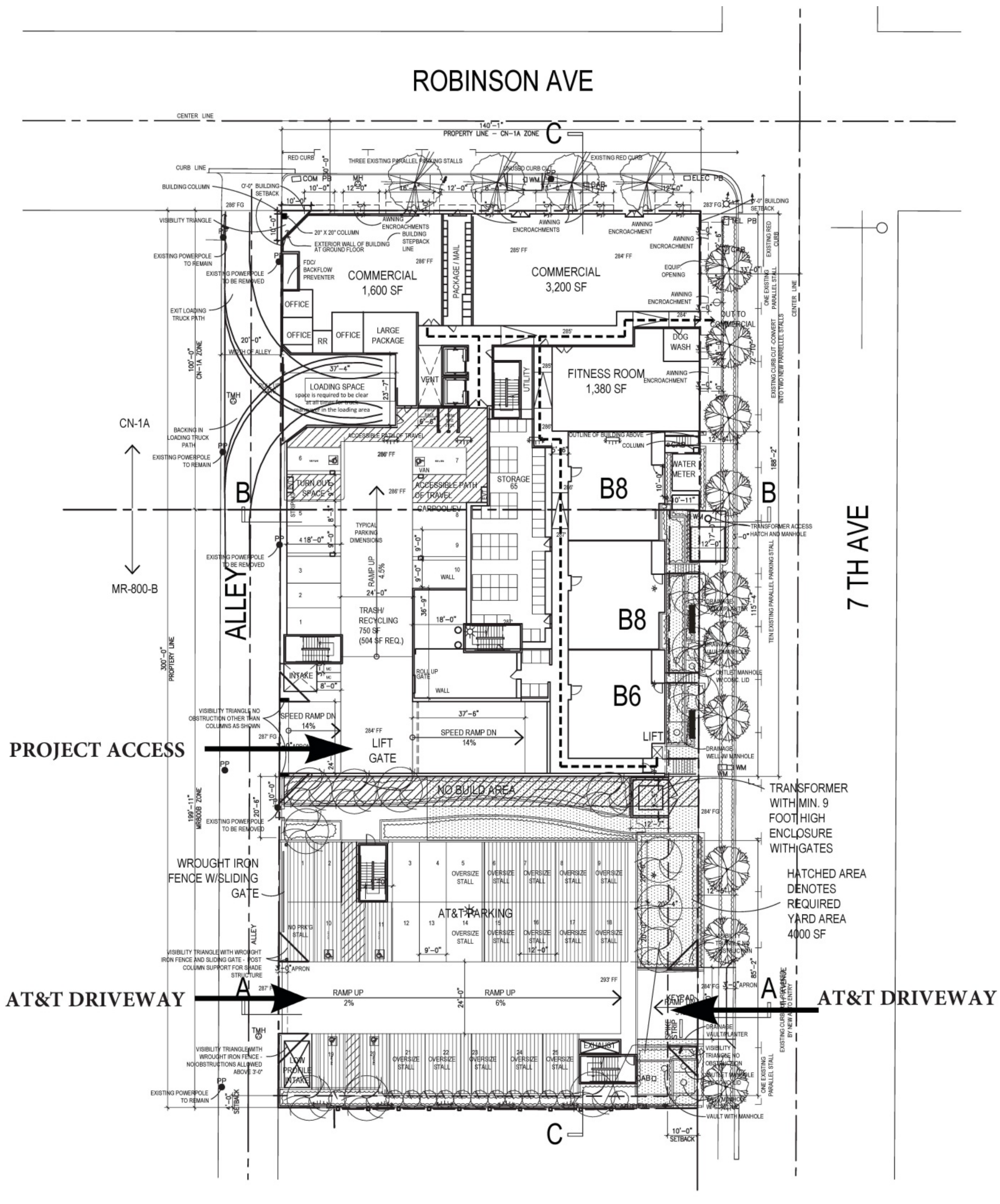
- Robinson Avenue segment from 6th Avenue to 7th Avenue

Intersections:

- 6th Avenue and Robinson Avenue
- 7th Avenue and Robinson Avenue

A daily 24-hour traffic count for the segment was taken on Tuesday November 14, 2017 and peak hour turning movements for the two intersections were taken on Wednesday November 15, 2017. The traffic counts are provided in the appendix.

Figure 1
Project Site Plan



Trip Generation

Trip generation is a measure or forecast of the number of trips that begin or end at the new commercial and residential development of the project site. The existing site use is a parking lot for AT&T. The current parking will be moved from on-site surface parking to a new on-site parking structure. The trip generation from existing AT&T parking is already on the network and is reflected in the existing traffic counts.

The additional traffic generated is a function of the extent and type of development proposed for the site (new mixed use building). These trips will result in traffic increases on the Avenues where they occur. Vehicular traffic generation characteristics for development projects are estimated based on established rates. These rates identify the probable traffic generation of various land uses based on studies of developments in comparable settings. The rates used in this analysis are rates contained in the City of San Diego Trip Generation Manual (2003). The trip generation calculations are shown in Table 1.

Table 1
Site Trip Generation

Use	**Daily Trip Rate**	**Per**	**Mixed Use Reduction daily/AM/PM**	**AM peak**	**AM in/out**	**PM peak**	**PM in/out**
Residential	6	unit	n.a.	8%	20/80	9%	70/30
Specialty Retail	40	1,000 sf	n.a.	3%	60/40	9%	50/50

Use	**Intensity**	**Net Daily Trips**	**AM in**	**AM out**	**AM Peak Hour**	**PM in**	**PM out**	**PM Peak Hour**
Residential	111 units	666	11	43	54	42	18	60
Specialty Retail	4,800 s.f.	192	3	2	5	9	9	18
Total Trips		**858**	**14**	**45**	**59**	**51**	**27**	**78**

Note: Small differences due to rounding to the nearest integer exist.

Trip Distribution / Assignment

Trip distribution and assignment is the process of identifying the probable destinations, directions and traffic routes that project related traffic will affect. Trip distribution and assignment information was estimated from observed traffic patterns. Vehicular access to the site is provided from an alley located west of 7th Street. The trip distribution reflects current peak period turning movement restrictions at 6th Avenue and Robinson Avenue. The trip distribution percentages are shown in Figure 2. The resulting assigned AM and PM peak hour project volumes are shown in Figure 3.

Existing Conditions

This section of the report evaluates existing average daily traffic (ADT) volumes on study area roadway segments and volumes at intersections during AM and PM peak hours. Traffic volumes are based on the November, 2017 daily roadway traffic counts and peak period manual traffic counts at intersections as described previously.

<u>Segment Analysis</u>

The City of San Diego has published daily traffic volume standards for roadways within its jurisdiction. To determine level of service on study area roadway segments the appropriate average daily traffic thresholds for level of service were compared to the daily capacity of the study area roadway segments, and the existing traffic in the study area. The roadway functions as a two-lane collector with commercial-industrial fronting and this type of collector is considered by the City' Traffic Impact Study Manual (TISM)to have a capacity of 8,000 vehicles per day. The results for existing conditions and for existing plus project for the study segment are listed in Table 2.

Table 2
Existing Segment Analysis

Roadway Segment	Lanes/ Class	LOS E Capacity	Without Project			Project Traffic	With Project			Comparison	
			ADT	V/C	LOS		ADT	V/C	LOS	□ V/C	Significant?
Robinson Avenue											
6th Ave. to 7th Ave.	2C	8,000	9,047	1.13	F	365	9,412	1.18	F	0.05	Yes

2C = 2 lane collector

<u>Intersection Analysis</u>

The traffic analysis followed the guidelines of the TISM. The intersection level of service results for the existing scenario and existing plus project scenario are shown in Table 3. The analysis is based on the current City signal timing plans for these intersections. The intersections are shown to operate at LOS C or better. The intersection analysis sheets are included in the appendix.

Table 3
Existing Intersection Level of Service

Intersection	Without Project		With Project		Change in Delay(sec.)	Significant
	Delay(sec.)	LOS	Delay(sec.)	LOS		
AM Peak Hour						
1. 6th Avenue and Robinson Avenue	25.6	C	25.8	C	0.2	No
2. 7th Avenue and Robinson Avenue	14.8	B	14.8	B	0.0	No
PM Peak Hour						
1. 6th Avenue and Robinson Avenue	29.5	C	29.9	C	0.4	No
2. 7th Avenue and Robinson Avenue	20.4	C	20.6	C	0.2	No

Near Term Conditions

Near-term conditions represent opening day of the proposed project (Year 2019) traffic. The Near Term volumes are based on a growth factor of traffic using City traffic counts. Based upon the historical trend, a traffic growth percentage of 1% per year was used to reflect traffic growth. The historical traffic counts are provided in the appendix. The network is unchanged from existing conditions.

Segment Analysis

The segment analysis for Near Term and Near Term with Project is shown in Table 4.

Table 4
Near Term Segment Analysis

Roadway Segment	Lanes/ Class	LOS E Capacity	Without Project			Project Traffic	With Project			Comparison	
			ADT	V/C	LOS		ADT	V/C	LOS	☐ V/C	Significant?
Robinson Avenue											
6th Ave. to 7th Ave.	2C	8,000	9,228	1.15	F	365	9,593	1.20	F	0.05	Yes

2C = 2 lane collector

Intersection Analysis

The intersection analysis for Near Term and Near Term with Project is shown in Table 5.

Table 5
Near Term Intersection Level of Service

Intersection	Without Project		With Project		Change in Delay(sec.)	Significant
	Delay(sec.)	LOS	Delay(sec.)	LOS		
AM Peak Hour						
1. 6th Avenue and Robinson Avenue	26.0	C	26.1	C	0.1	No
2. 7th Avenue and Robinson Avenue	14.8	B	14.8	B	0.0	No
PM Peak Hour						
1. 6th Avenue and Robinson Avenue	29.9	C	30.3	C	0.4	No
2. 7th Avenue and Robinson Avenue	20.5	C	20.7	C	0.2	No

Mitigation

The mitigation measure for the segment of Robinson between 6th and 7th Street is to re-stripe the roadway to include a center left turn lane. A turn lane will also be provided for the westbound left turn movement at the intersection of Robinson Avenue/7th Avenue. The project mitigation is shown in Figure 4. The applicant will be responsible for implementing the mitigation and consequent signal modification(s) as stated in this report.

As per the TISM, with this continuous left turn lane mitigation, the collector would have a LOS E capacity of 15,000 vehicles per day. When mitigated, the segment of Robinson Avenue between 6th Avenue and 7th Avenue would have a Near Term Plus Project volume-to-capacity ratio of 0.64 (LOS C). The segment analysis with mitigation is shown in Table 6.

Table 6
Near-term With Project Mitigated Roadway Segment Conditions

Roadway Segment	Lanes / Class*	LOS E Capacity*	With Project Without Mitigation			With Project With Mitigation		Mitigated?
			ADT	V/C	LOS	V/C	LOS	
Robinson Avenue								
From 6th Avenue to 7th Avenue	2Cc	15,000	9,571	1.20	F	0.64	C	Yes

* Applies to the mitigated condition
Abbreviations: 2Cc is a 2 lane Collector with continuous left turn lane

Parking

As shown in the mitigation drawing in the appendix, the mitigation measure will have an impact on two on-street parking spaces and one loading zone space located on the north side of Robinson Avenue. The existing loading zone space would be re-located to 7th Avenue by moving one parking space as shown on the mitigation drawing in Figure 4 in order to maintain the loading zone. Three parking spaces are required to be removed on the south side of Robinson Avenue in order to permit fire department access to the proposed project.

Conclusion

This memo describes project trip generation and reports the intersection and segment level of service with and without the project for existing and near term conditions. The street segment analysis showed a significant direct project impact. The results indicate that after project mitigation, the trips generated by the project will be adequately mitigated by the proposed improvements.

Sincerely,

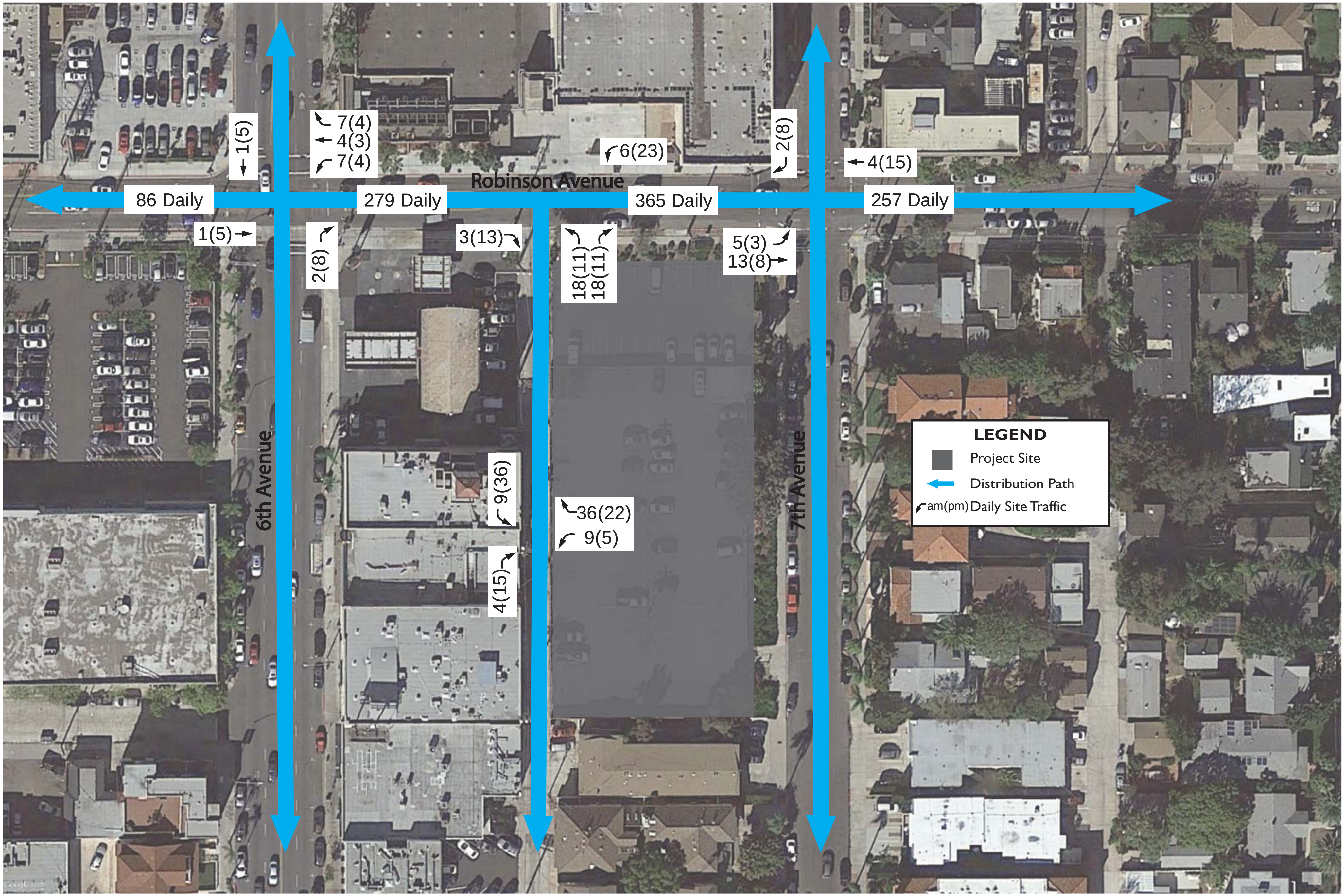
KOA CORPORATION

Arnold Torma, T.E.
Senior Traffic Engineer
California RTE # 1143

FIGURE 2

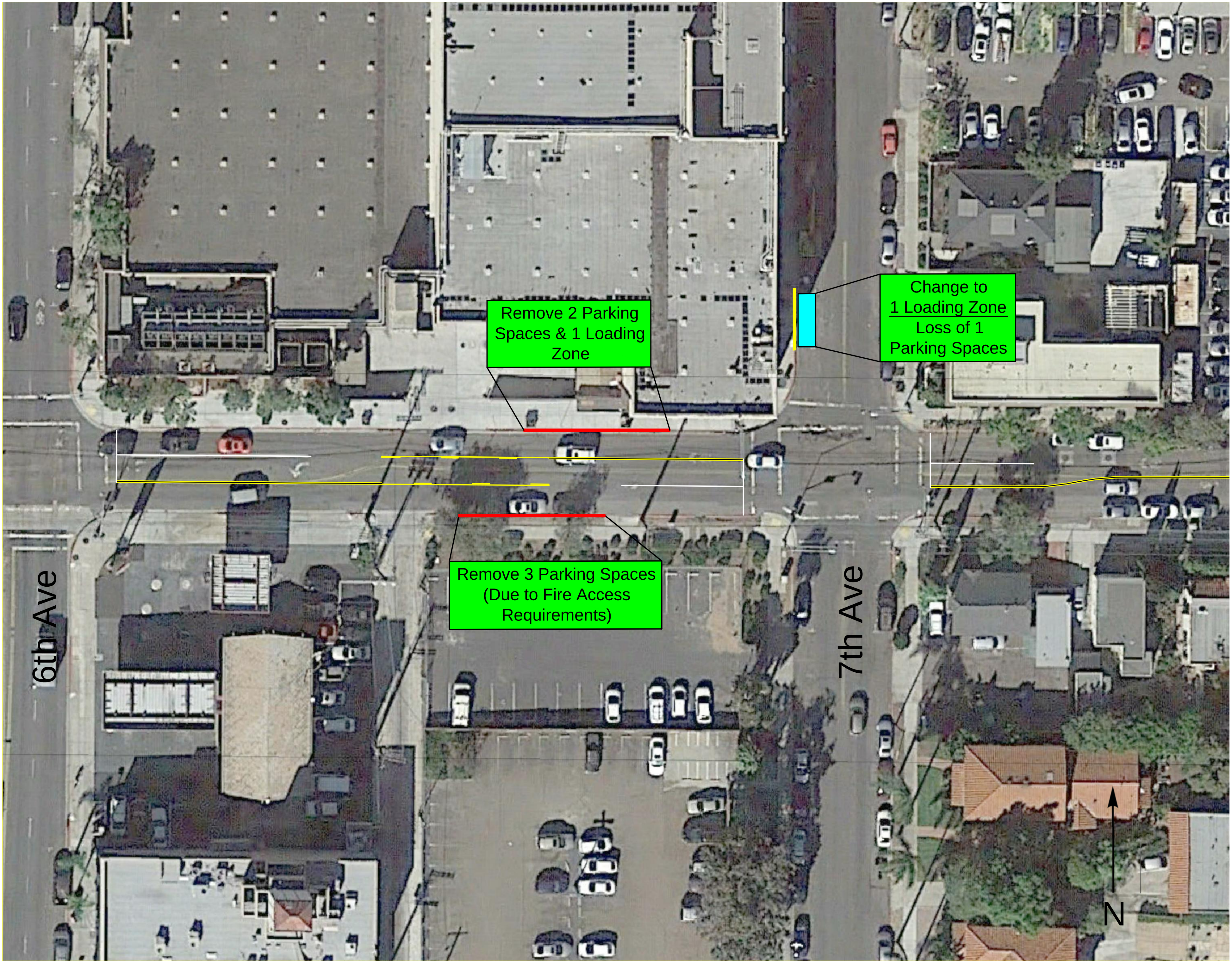
Robinson Avenue
6th Avenue
7th Avenue
10%
10%
10%
10%
15%
10%
15%
15%
40%
25%
25%
45%
40%
40%
45%
40%
15%
10%
30%
30%
30%
30%
70%
30%
80%
20%
AT&T
AT&T
20%
LEGEND
Project Site
Distribution Path
5 % Distribution Amount

FIGURE 3



* Numbers have been rounded

FIGURE 4


Remove 2 Parking Spaces & 1 Loading Zone
Change to 1 Loading Zone Loss of 1 Parking Spaces
Remove 3 Parking Spaces (Due to Fire Access Requirements)
6th Ave
7th Ave
N

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APPENDIX

TUESDAY - NOVEMBER 14, 2017 CITY: SAN DIEGO - HILLCREST PROJECT: PTD17-1117-02

ROBINSON - 6TH TO 7TH

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			13		5			12:00			93		68		
00:15			11		8			12:15			103		55		
00:30			8		2			12:30			97		72		
00:45			5	37	2	17	54	12:45			90	383	73	268	651
01:00			10		1			13:00			84		83		
01:15			6		0			13:15			88		69		
01:30			4		3			13:30			92		79		
01:45			6	26	3	7	33	13:45			86	350	68	299	649
02:00			2		0			14:00			89		57		
02:15			5		1			14:15			110		59		
02:30			2		0			14:30			114		56		
02:45			4	13	1	2	15	14:45			97	410	74	246	656
03:00			4		3			15:00			84		66		
03:15			3		0			15:15			110		59		
03:30			4		2			15:30			102		58		
03:45			2	13	8	13	26	15:45			102	398	58	241	639
04:00			2		2			16:00			126		58		
04:15			3		2			16:15			89		79		
04:30			5		7			16:30			116		66		
04:45			3	13	9	20	33	16:45			108	439	70	273	712
05:00			7		10			17:00			112		61		
05:15			13		10			17:15			123		74		
05:30			15		13			17:30			109		61		
05:45			18	53	26	59	112	17:45			121	465	75	271	736
06:00			17		15			18:00			123		66		
06:15			15		21			18:15			98		57		
06:30			20		18			18:30			108		60		
06:45			31	83	34	88	171	18:45			94	423	46	229	652
07:00			37		37			19:00			106		45		
07:15			38		50			19:15			81		45		
07:30			47		55			19:30			74		38		
07:45			57	179	68	210	389	19:45			81	342	38	166	508
08:00			59		49			20:00			58		21		
08:15			58		55			20:15			66		31		
08:30			63		75			20:30			37		35		
08:45			64	244	63	242	486	20:45			70	231	16	103	334
09:00			71		60			21:00			50		18		
09:15			75		53			21:15			54		24		
09:30			72		40			21:30			47		16		
09:45			66	284	49	202	486	21:45			38	189	23	81	270
10:00			73		48			22:00			43		19		
10:15			79		46			22:15			25		7		
10:30			65		54			22:30			36		3		
10:45			75	292	63	211	503	22:45			30	134	14	43	177
11:00			99		56			23:00			21		8		
11:15			82		65			23:15			29		14		
11:30			93		55			23:30			24		7		
11:45			118	392	73	249	641	23:45			8	82	3	32	114
Total Vol.				1629		1320	**2949**					3846		2252	**6098**

Daily Totals

NB	SB	EB	WB	Combined
		5475	3572	**9047**

	AM			PM		
Split %	55.2%	44.8%	**32.6%**	63.1%	36.9%	**67.4%**
Peak Hour	11:45	11:45	**11:45**	17:15	12:45	**17:15**
Volume	411	268	**679**	476	304	**752**
P.H.F.	0.87	0.92	**0.89**	0.97	0.92	**0.95**

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	HILLCREST	PROJECT #:	PTD17-1117-01
11/15/17	NORTH & SOUTH:	6TH	LOCATION #:	1
WEDNESDAY	EAST & WEST:	ROBINSON	CONTROL:	SIGNAL

NOTES:

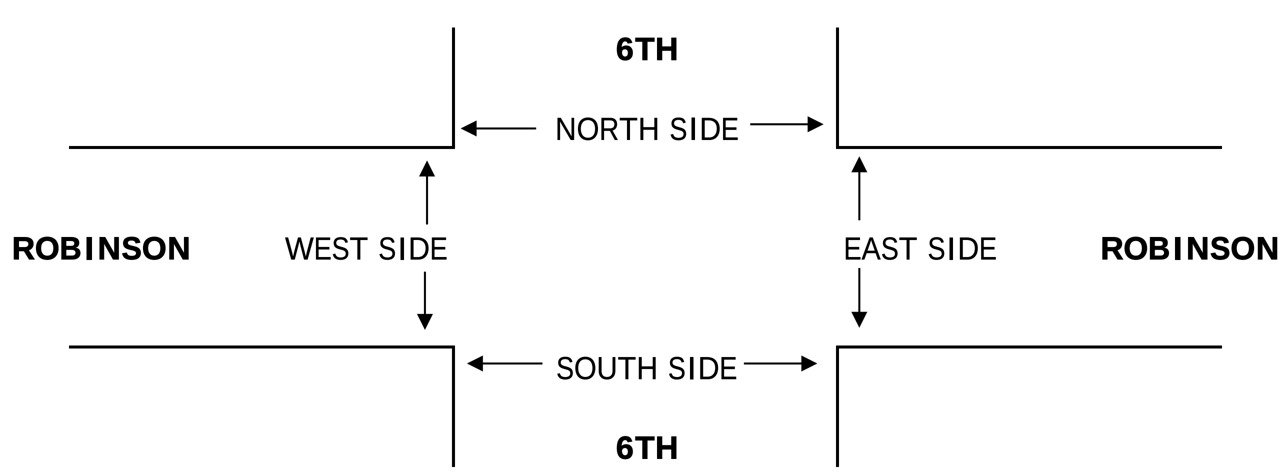
AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

	NORTHBOUND 6TH			SOUTHBOUND 6TH			EASTBOUND ROBINSON			WESTBOUND ROBINSON			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	0	1	1	0	1	1	0	
AM 7:00 AM	0	120	5	1	154	17	19	27	1	8	26	5	383
7:15 AM	0	124	9	0	178	15	21	31	4	6	36	3	427
7:30 AM	1	159	5	0	226	16	43	35	1	9	34	4	533
7:45 AM	0	162	16	0	244	17	33	34	5	22	39	2	574
8:00 AM	0	151	18	2	228	22	31	37	2	16	26	2	535
8:15 AM	0	124	16	1	215	14	40	38	4	13	33	7	505
8:30 AM	0	126	14	0	217	18	39	42	3	23	38	8	528
8:45 AM	0	140	16	0	258	30	25	43	2	19	41	8	582
VOLUMES	1	1,106	99	4	1,720	149	251	287	22	116	273	39	4,067
APPROACH %	0%	92%	8%	0%	92%	8%	45%	51%	4%	27%	64%	9%	
APP/DEPART	1,206	/	1,396	1,873	/	1,858	560	/	390	428	/	423	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	0	541	64	3	918	84	135	160	11	71	138	25	2,150
APPROACH %	0%	89%	11%	0%	91%	8%	44%	52%	4%	30%	59%	11%	
PEAK HR FACTOR		0.895			0.872			0.911			0.848		0.924
APP/DEPART	605	/	701	1,005	/	1,000	306	/	227	234	/	222	0
PM 4:00 PM	0	192	26	0	164	31	42	71	3	19	33	9	590
4:15 PM	1	153	25	0	177	22	34	53	8	31	30	18	552
4:30 PM	0	191	24	0	177	24	39	66	4	23	41	3	592
4:45 PM	0	178	33	1	172	28	45	72	6	23	32	6	596
5:00 PM	0	178	18	0	170	34	54	70	2	16	34	8	584
5:15 PM	0	178	5	0	167	27	56	80	5	23	34	11	586
5:30 PM	0	166	12	2	156	24	59	62	1	23	31	11	547
5:45 PM	0	160	7	1	169	31	30	66	4	22	46	15	551
VOLUMES	1	1,396	150	4	1,352	221	359	540	33	180	281	81	4,598
APPROACH %	0%	90%	10%	0%	86%	14%	39%	58%	4%	33%	52%	15%	
APP/DEPART	1,547	/	1,836	1,577	/	1,565	932	/	694	542	/	503	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	0	725	80	1	686	113	194	288	17	85	141	28	2,358
APPROACH %	0%	90%	10%	0%	86%	14%	39%	58%	3%	33%	56%	11%	
PEAK HR FACTOR		0.936			0.980			0.885			0.934		0.989
APP/DEPART	805	/	947	800	/	788	499	/	369	254	/	254	0

U-TURNS

	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM					0
7:15 AM					0
7:30 AM					0
7:45 AM					0
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
VOLUMES	0	0	0	0	0
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM					0
5:00 PM					0
5:15 PM					0
5:30 PM					0
5:45 PM					0
VOLUMES	0	0	0	0	0



	PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM					0					0					0
7:15 AM					0					0					0
7:30 AM					0					0					0
7:45 AM					0					0					0
8:00 AM					0					0					0
8:15 AM					0					0					0
8:30 AM					0					0					0
8:45 AM					0					0					0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 4:00 PM					0					0					0
4:15 PM					0					0					0
4:30 PM					0					0					0
4:45 PM					0					0					0
5:00 PM					0					0					0
5:15 PM					0					0					0
5:30 PM					0					0					0
5:45 PM					0					0					0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	HILLCREST	PROJECT #:	PTD17-1117-01
11/15/17	NORTH & SOUTH:	7TH	LOCATION #:	2
WEDNESDAY	EAST & WEST:	ROBINSON	CONTROL:	SIGNAL

NOTES:

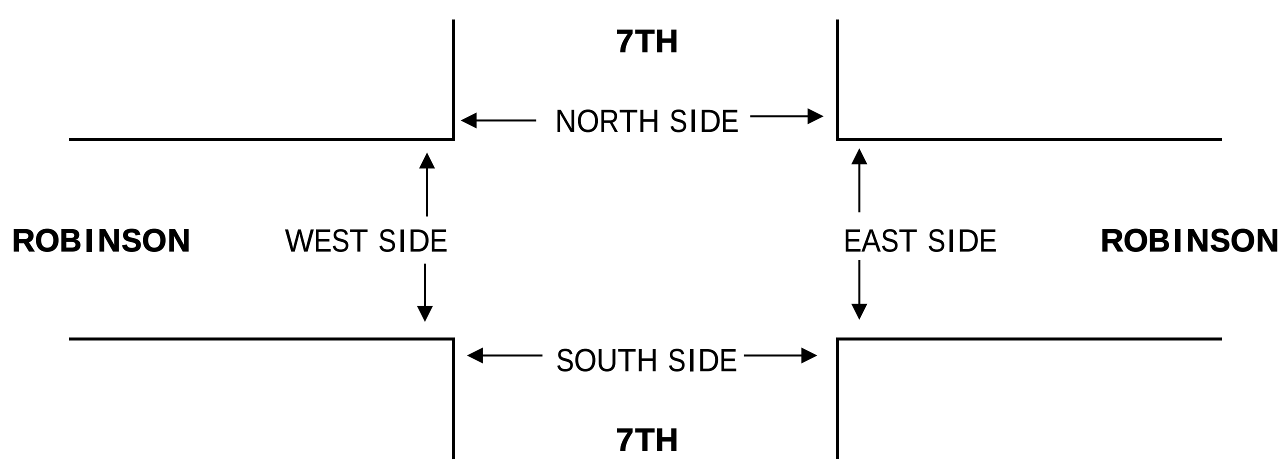
AM PM MD OTHER OTHER

▲ N ◀ W E ▶ S ▼

	NORTHBOUND 7TH			SOUTHBOUND 7TH			EASTBOUND ROBINSON			WESTBOUND ROBINSON			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	1	0	0	1	0	
AM 7:00 AM	2	4	10	5	8	3	1	30	3	7	31	4	108
7:15 AM	2	2	24	4	6	2	5	34	1	21	45	3	149
7:30 AM	2	5	19	5	12	4	5	36	4	16	46	3	157
7:45 AM	1	8	21	5	6	2	7	46	1	19	60	8	184
8:00 AM	0	5	19	8	12	8	7	48	2	11	40	6	166
8:15 AM	1	5	25	9	5	1	7	49	0	17	56	2	177
8:30 AM	2	6	28	4	6	8	9	48	2	18	65	3	199
8:45 AM	0	2	16	4	9	10	7	51	1	15	54	0	169
VOLUMES	10	37	162	44	64	38	48	342	14	124	397	29	1,309
APPROACH %	5%	18%	78%	30%	44%	26%	12%	85%	3%	23%	72%	5%	
APP/DEPART	209	/	114	146	/	202	404	/	548	550	/	445	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	4	24	93	26	29	19	30	191	5	65	221	19	726
APPROACH %	3%	20%	77%	35%	39%	26%	13%	85%	2%	21%	72%	6%	
PEAK HR FACTOR		0.840			0.661			0.958			0.876		0.912
APP/DEPART	121	/	73	74	/	99	226	/	310	305	/	244	0
PM 4:00 PM	2	12	52	16	10	16	8	90	1	8	47	6	268
4:15 PM	0	10	46	9	5	9	7	70	2	18	72	7	255
4:30 PM	1	10	58	11	6	8	11	83	1	14	56	6	265
4:45 PM	1	25	65	16	3	7	6	87	5	21	51	9	296
5:00 PM	4	22	74	13	7	7	10	73	3	17	51	6	287
5:15 PM	4	23	78	19	8	9	11	85	4	11	56	7	315
5:30 PM	3	23	83	9	5	8	16	75	3	12	57	8	302
5:45 PM	5	13	55	25	8	9	16	81	3	22	67	6	310
VOLUMES	20	138	511	118	52	73	85	644	22	123	457	55	2,298
APPROACH %	3%	21%	76%	49%	21%	30%	11%	86%	3%	19%	72%	9%	
APP/DEPART	669	/	278	243	/	197	751	/	1,273	635	/	550	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	16	81	290	66	28	33	53	314	13	62	231	27	1,214
APPROACH %	4%	21%	75%	52%	22%	26%	14%	83%	3%	19%	72%	8%	
PEAK HR FACTOR		0.888			0.756			0.950			0.842		0.963
APP/DEPART	387	/	161	127	/	103	380	/	670	320	/	280	0

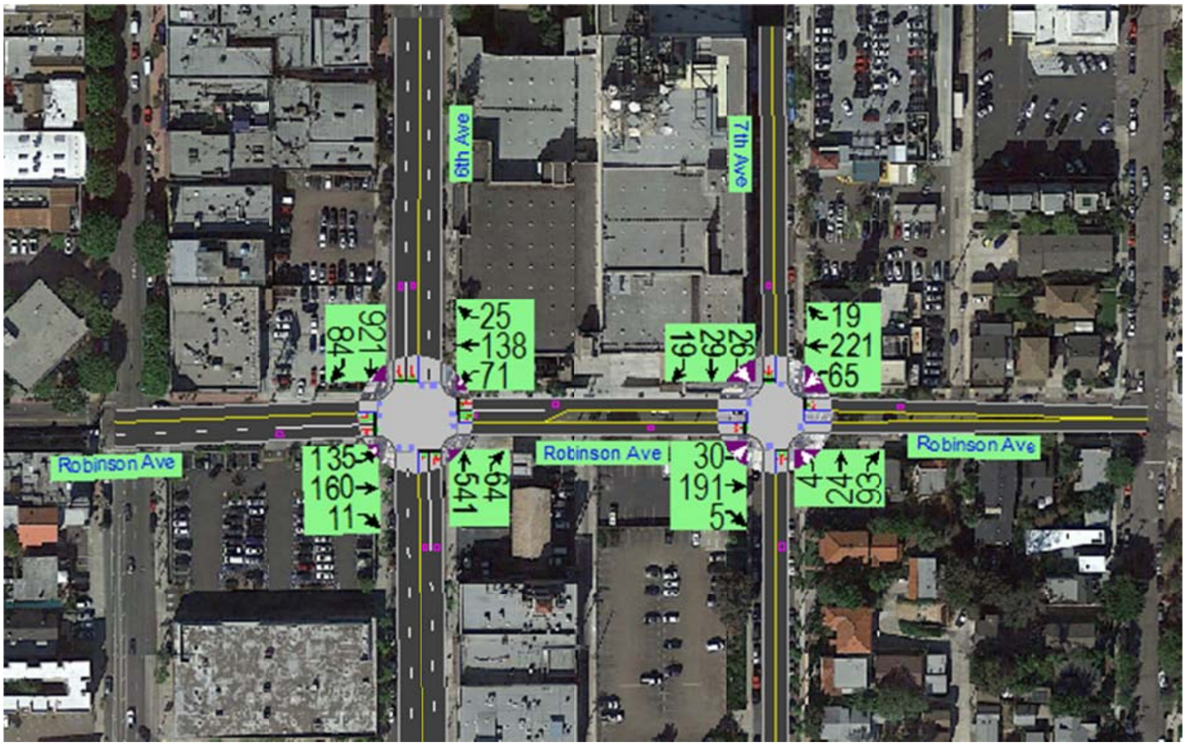
U-TURNS

	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM					0
7:15 AM					0
7:30 AM					0
7:45 AM					0
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
VOLUMES	0	0	0	0	0
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM					0
5:00 PM					0
5:15 PM					0
5:30 PM					0
5:45 PM					0
VOLUMES	0	0	0	0	0



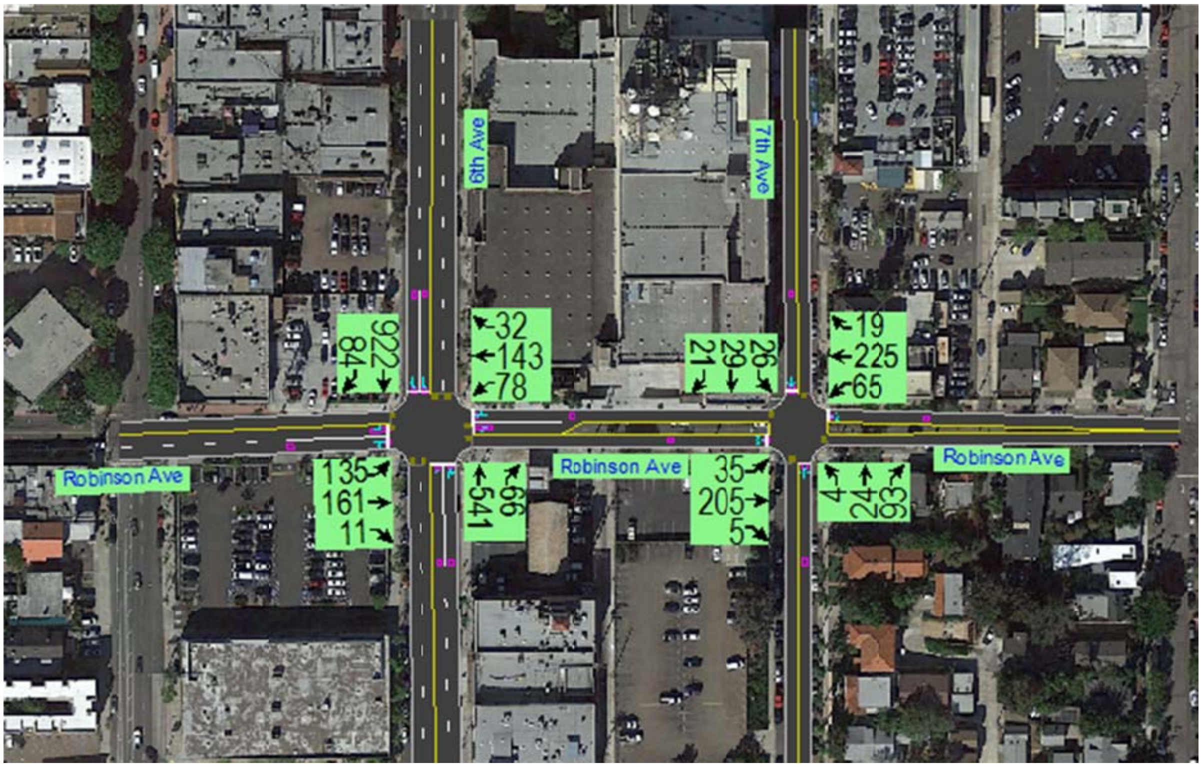
	PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM 7:00 AM					0					0					0
7:15 AM					0					0					0
7:30 AM					0					0					0
7:45 AM					0					0					0
8:00 AM					0					0					0
8:15 AM					0					0					0
8:30 AM					0					0					0
8:45 AM					0					0					0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM 4:00 PM					0					0					0
4:15 PM					0					0					0
4:30 PM					0					0					0
4:45 PM					0					0					0
5:00 PM					0					0					0
5:15 PM					0					0					0
5:30 PM					0					0					0
5:45 PM					0					0					0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Existing AM Volumes

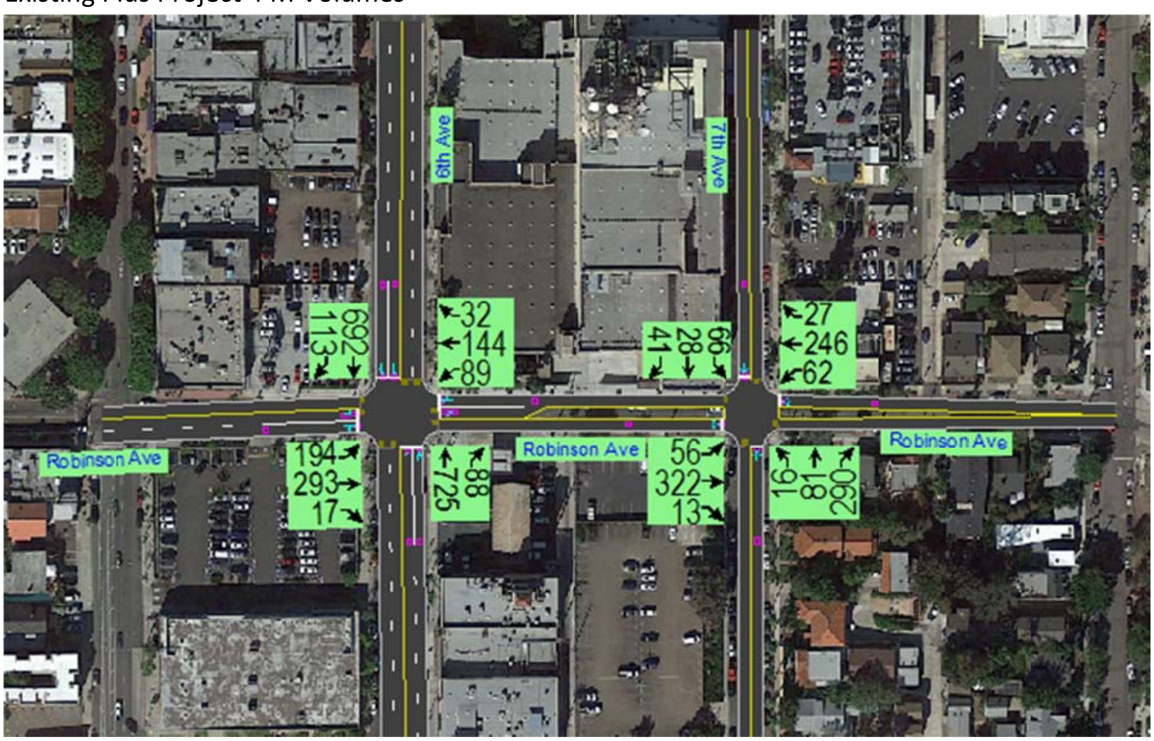


Existing PM Volumes

Existing Plus Project AM Volumes

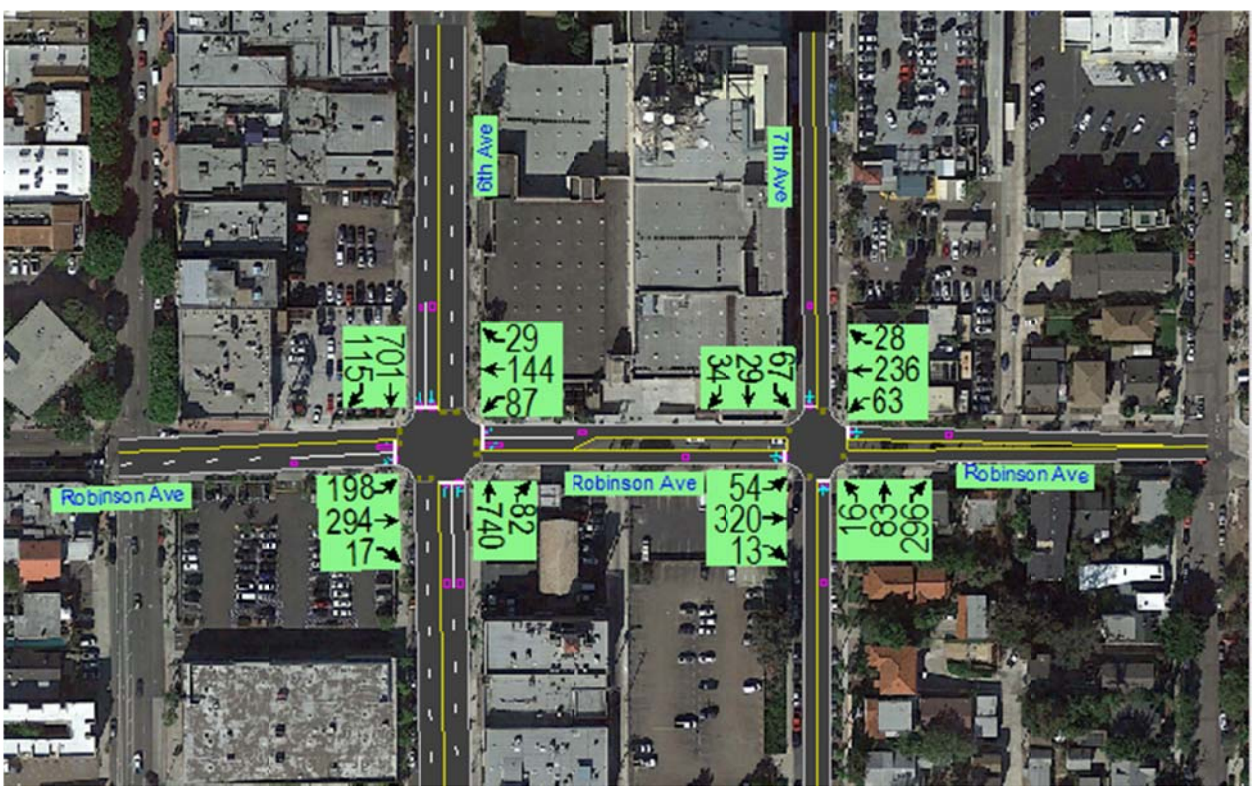


Existing Plus Project PM Volumes



Near Term AM Volumes

Near Term PM Volumes



Near Term Plus Project AM Volumes

Near Term Plus Project PM Volumes

Historical Traffic Counts

ROBINSON AV	05 AV - 06	10370	4/5/2005 0:00
ROBINSON AV	05 AV - 06	10920	3/25/2008 0:00
ROBINSON AV	05 AV - 06	11710	5/26/2011 0:00
ROBINSON AV	05 AV - 06	11467	10/2/2014 0:00
ROBINSON AV	05 AV - 06	11686	11/13/2014 0:00
ROBINSON AV	07 AV - 08	0	3/17/2004 0:00
ROBINSON AV	07 AV - 08	12070	3/7/2007 0:00
ROBINSON AV	07 AV - 08	12635	3/10/2010 0:00
ROBINSON AV	07 AV - 08	12399	2/7/2013 0:00

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	160	11	71	138	25	0	541	64	0	921	84
Future Volume (vph)	135	160	11	71	138	25	0	541	64	0	921	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1660		1593	1638			3135			3145	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1660		1593	1638			3135			3145	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	148	176	12	84	162	29	0	601	71	0	1059	97
RTOR Reduction (vph)	0	2	0	0	6	0	0	6	0	0	5	0
Lane Group Flow (vph)	148	186	0	84	185	0	0	666	0	0	1151	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	15.1	27.5		9.2	21.6			65.1			65.1	
Effective Green, g (s)	15.1	27.5		9.2	21.6			65.1			65.1	
Actuated g/C Ratio	0.13	0.24		0.08	0.19			0.56			0.56	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	207	393		126	305			1759			1764	
v/s Ratio Prot	c0.09	0.11		0.05	c0.11			0.21			c0.37	
v/s Ratio Perm												
v/c Ratio	0.71	0.47		0.67	0.61			0.38			0.65	
Uniform Delay, d1	48.4	38.0		51.9	43.3			14.2			17.6	
Progression Factor	1.00	1.00		0.95	1.07			1.00			1.00	
Incremental Delay, d2	9.4	0.3		8.9	2.1			0.6			1.9	
Delay (s)	57.7	38.3		57.9	48.3			14.8			19.5	
Level of Service	E	D		E	D			B			B	
Approach Delay (s)		46.9			51.3			14.8			19.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	191	5	65	221	19	4	24	93	26	29	19
Future Volume (vph)	30	191	5	65	221	19	4	24	93	26	29	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.97	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1495			1480			1351			1431	
Flt Permitted		0.93			0.89			0.99			0.89	
Satd. Flow (perm)		1392			1327			1344			1290	
Peak-hour factor, PHF	0.96	0.96	0.96	0.88	0.88	0.88	0.84	0.84	0.84	0.66	0.66	0.66
Adj. Flow (vph)	31	199	5	74	251	22	5	29	111	39	44	29
RTOR Reduction (vph)	0	2	0	0	5	0	0	59	0	0	15	0
Lane Group Flow (vph)	0	233	0	0	342	0	0	86	0	0	97	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.1			21.1			27.1			27.1	
Effective Green, g (s)		21.1			21.1			27.1			27.1	
Actuated g/C Ratio		0.36			0.36			0.47			0.47	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		506			482			627			602	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.26			0.06			c0.07	
v/c Ratio		0.46			0.71			0.14			0.16	
Uniform Delay, d1		14.1			15.8			8.8			8.9	
Progression Factor		0.81			1.00			1.00			1.00	
Incremental Delay, d2		0.8			5.1			0.5			0.0	
Delay (s)		12.2			20.9			9.2			8.9	
Level of Service		B			C			A			A	
Approach Delay (s)		12.2			20.9			9.2			8.9	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	161	11	78	143	32	0	541	66	0	922	84
Future Volume (vph)	135	161	11	78	143	32	0	541	66	0	922	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.97			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1661		1593	1630			3134			3145	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1661		1593	1630			3134			3145	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	148	177	12	92	168	38	0	601	73	0	1060	97
RTOR Reduction (vph)	0	2	0	0	7	0	0	6	0	0	5	0
Lane Group Flow (vph)	148	187	0	92	199	0	0	668	0	0	1152	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	14.9	25.3		10.7	21.1			65.8			65.8	
Effective Green, g (s)	14.9	25.3		10.7	21.1			65.8			65.8	
Actuated g/C Ratio	0.13	0.22		0.09	0.18			0.57			0.57	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	204	362		146	296			1777			1783	
v/s Ratio Prot	c0.09	c0.11		0.06	c0.12			0.21			c0.37	
v/s Ratio Perm												
v/c Ratio	0.73	0.52		0.63	0.67			0.38			0.65	
Uniform Delay, d1	48.6	40.0		50.7	44.2			13.8			17.1	
Progression Factor	1.00	1.00		0.95	1.06			1.00			1.00	
Incremental Delay, d2	10.3	0.5		5.7	4.1			0.6			1.8	
Delay (s)	58.9	40.5		54.0	51.1			14.4			19.0	
Level of Service	E	D		D	D			B			B	
Approach Delay (s)		48.6			52.0			14.4			19.0	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	205	5	65	225	19	4	24	93	26	29	21
Future Volume (vph)	35	205	5	65	225	19	4	24	93	26	29	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.96	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1494			1481			1351			1428	
Flt Permitted		0.92			0.89			0.99			0.89	
Satd. Flow (perm)		1379			1330			1344			1290	
Peak-hour factor, PHF	0.96	0.96	0.96	0.88	0.88	0.88	0.84	0.84	0.84	0.66	0.66	0.66
Adj. Flow (vph)	36	214	5	74	256	22	5	29	111	39	44	32
RTOR Reduction (vph)	0	1	0	0	5	0	0	59	0	0	17	0
Lane Group Flow (vph)	0	254	0	0	347	0	0	86	0	0	98	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.2			21.2			27.0			27.0	
Effective Green, g (s)		21.2			21.2			27.0			27.0	
Actuated g/C Ratio		0.37			0.37			0.47			0.47	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		504			486			625			600	
v/s Ratio Prot												
v/s Ratio Perm		0.18			c0.26			0.06			c0.08	
v/c Ratio		0.50			0.71			0.14			0.16	
Uniform Delay, d1		14.3			15.8			8.8			9.0	
Progression Factor		0.77			1.00			1.00			1.00	
Incremental Delay, d2		1.0			5.2			0.5			0.0	
Delay (s)		12.0			21.0			9.3			9.0	
Level of Service		B			C			A			A	
Approach Delay (s)		12.0			21.0			9.3			9.0	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	288	17	85	141	28	0	725	80	0	687	113
Future Volume (vph)	194	288	17	85	141	28	0	725	80	0	687	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1662		1593	1635			3138			3118	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1662		1593	1635			3138			3118	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	213	316	19	100	166	33	0	806	89	0	790	130
RTOR Reduction (vph)	0	2	0	0	7	0	0	6	0	0	9	0
Lane Group Flow (vph)	213	333	0	100	192	0	0	889	0	0	911	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	19.3	29.0		11.4	21.1			57.4			57.4	
Effective Green, g (s)	19.3	29.0		11.4	21.1			57.4			57.4	
Actuated g/C Ratio	0.17	0.26		0.10	0.19			0.51			0.51	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	274	430		162	308			1608			1597	
v/s Ratio Prot	c0.13	c0.20		0.06	0.12			0.28			c0.29	
v/s Ratio Perm												
v/c Ratio	0.78	0.77		0.62	0.62			0.55			0.57	
Uniform Delay, d1	44.3	38.5		48.2	41.8			18.6			18.8	
Progression Factor	1.00	1.00		0.83	1.18			1.00			1.00	
Incremental Delay, d2	11.9	7.7		3.9	2.2			1.4			1.5	
Delay (s)	56.2	46.2		43.7	51.7			19.9			20.3	
Level of Service	E	D		D	D			B			C	
Approach Delay (s)		50.1			49.0			19.9			20.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	314	13	62	231	27	16	81	290	66	28	33
Future Volume (vph)	53	314	13	62	231	27	16	81	290	66	28	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.97	
Flt Protected		0.99			0.99			1.00			0.97	
Satd. Flow (prot)		1491			1477			1353			1419	
Flt Permitted		0.91			0.86			0.99			0.71	
Satd. Flow (perm)		1371			1284			1338			1035	
Peak-hour factor, PHF	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89	0.89	0.76	0.76	0.76
Adj. Flow (vph)	56	331	14	74	275	32	18	91	326	87	37	43
RTOR Reduction (vph)	0	2	0	0	7	0	0	171	0	0	20	0
Lane Group Flow (vph)	0	399	0	0	374	0	0	264	0	0	147	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.1			21.1			25.1			25.1	
Effective Green, g (s)		21.1			21.1			25.1			25.1	
Actuated g/C Ratio		0.38			0.38			0.45			0.45	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		516			483			599			463	
v/s Ratio Prot												
v/s Ratio Perm		0.29			c0.29			c0.20			0.14	
v/c Ratio		0.77			0.77			0.44			0.32	
Uniform Delay, d1		15.3			15.4			10.6			9.9	
Progression Factor		1.55			1.00			1.00			1.00	
Incremental Delay, d2		6.2			8.0			2.4			0.1	
Delay (s)		30.0			23.4			13.0			10.1	
Level of Service		C			C			B			B	
Approach Delay (s)		30.0			23.4			13.0			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	293	17	89	144	32	0	725	88	0	692	113
Future Volume (vph)	194	293	17	89	144	32	0	725	88	0	692	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.97			0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1662		1593	1630			3133			3118	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1662		1593	1630			3133			3118	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	213	322	19	105	169	38	0	806	98	0	795	130
RTOR Reduction (vph)	0	2	0	0	8	0	0	7	0	0	9	0
Lane Group Flow (vph)	213	339	0	105	199	0	0	897	0	0	916	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	19.3	29.1		11.6	21.4			57.1			57.1	
Effective Green, g (s)	19.3	29.1		11.6	21.4			57.1			57.1	
Actuated g/C Ratio	0.17	0.26		0.10	0.19			0.51			0.51	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	274	431		164	311			1597			1589	
v/s Ratio Prot	c0.13	c0.20		0.07	0.12			0.29			c0.29	
v/s Ratio Perm												
v/c Ratio	0.78	0.79		0.64	0.64			0.56			0.58	
Uniform Delay, d1	44.3	38.6		48.2	41.7			18.9			19.1	
Progression Factor	1.00	1.00		0.84	1.16			1.00			1.00	
Incremental Delay, d2	11.9	8.5		4.9	2.5			1.4			1.5	
Delay (s)	56.2	47.0		45.1	51.0			20.3			20.6	
Level of Service	E	D		D	D			C			C	
Approach Delay (s)		50.5			49.1			20.3			20.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	322	13	62	246	27	16	81	290	66	28	41
Future Volume (vph)	56	322	13	62	246	27	16	81	290	66	28	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.96	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1491			1479			1353			1413	
Flt Permitted		0.91			0.87			0.99			0.72	
Satd. Flow (perm)		1363			1293			1337			1039	
Peak-hour factor, PHF	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89	0.89	0.76	0.76	0.76
Adj. Flow (vph)	59	339	14	74	293	32	18	91	326	87	37	54
RTOR Reduction (vph)	0	2	0	0	6	0	0	173	0	0	25	0
Lane Group Flow (vph)	0	410	0	0	393	0	0	262	0	0	153	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.6			21.6			24.6			24.6	
Effective Green, g (s)		21.6			21.6			24.6			24.6	
Actuated g/C Ratio		0.39			0.39			0.44			0.44	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		525			498			587			456	
v/s Ratio Prot												
v/s Ratio Perm		0.30			c0.30			c0.20			0.15	
v/c Ratio		0.78			0.79			0.45			0.34	
Uniform Delay, d1		15.1			15.2			10.9			10.3	
Progression Factor		1.53			1.00			1.00			1.00	
Incremental Delay, d2		6.4			8.5			2.4			0.2	
Delay (s)		29.6			23.7			13.4			10.5	
Level of Service		C			C			B			B	
Approach Delay (s)		29.6			23.7			13.4			10.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	163	11	72	141	26	0	552	65	0	939	86
Future Volume (vph)	138	163	11	72	141	26	0	552	65	0	939	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1661		1593	1637			3135			3145	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1661		1593	1637			3135			3145	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	152	179	12	85	166	31	0	613	72	0	1079	99
RTOR Reduction (vph)	0	2	0	0	7	0	0	7	0	0	5	0
Lane Group Flow (vph)	152	189	0	85	190	0	0	678	0	0	1173	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	15.0	27.6		9.1	21.7			65.1			65.1	
Effective Green, g (s)	15.0	27.6		9.1	21.7			65.1			65.1	
Actuated g/C Ratio	0.13	0.24		0.08	0.19			0.56			0.56	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	205	395		124	306			1759			1764	
v/s Ratio Prot	c0.10	0.11		0.05	c0.12			0.22			c0.37	
v/s Ratio Perm												
v/c Ratio	0.74	0.48		0.69	0.62			0.39			0.67	
Uniform Delay, d1	48.6	38.0		52.1	43.4			14.3			17.8	
Progression Factor	1.00	1.00		0.96	1.05			1.00			1.00	
Incremental Delay, d2	11.9	0.3		10.5	2.5			0.6			2.0	
Delay (s)	60.5	38.3		60.5	47.9			14.9			19.8	
Level of Service	E	D		E	D			B			B	
Approach Delay (s)		48.2			51.7			14.9			19.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	195	5	66	225	19	4	24	95	27	30	19
Future Volume (vph)	31	195	5	66	225	19	4	24	95	27	30	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.97	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1495			1480			1350			1432	
Flt Permitted		0.92			0.89			0.99			0.88	
Satd. Flow (perm)		1389			1327			1344			1284	
Peak-hour factor, PHF	0.96	0.96	0.96	0.88	0.88	0.88	0.84	0.84	0.84	0.66	0.66	0.66
Adj. Flow (vph)	32	203	5	75	256	22	5	29	113	41	45	29
RTOR Reduction (vph)	0	2	0	0	5	0	0	61	0	0	16	0
Lane Group Flow (vph)	0	238	0	0	348	0	0	86	0	0	99	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.4			21.4			26.8			26.8	
Effective Green, g (s)		21.4			21.4			26.8			26.8	
Actuated g/C Ratio		0.37			0.37			0.46			0.46	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		512			489			621			593	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.26			0.06			c0.08	
v/c Ratio		0.47			0.71			0.14			0.17	
Uniform Delay, d1		13.9			15.7			9.0			9.1	
Progression Factor		0.79			1.00			1.00			1.00	
Incremental Delay, d2		0.8			5.2			0.5			0.0	
Delay (s)		11.8			20.8			9.4			9.1	
Level of Service		B			C			A			A	
Approach Delay (s)		11.8			20.8			9.4			9.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	165	11	79	145	32	0	552	67	0	941	86
Future Volume (vph)	138	165	11	79	145	32	0	552	67	0	941	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.97			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1661		1593	1631			3134			3145	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1661		1593	1631			3134			3145	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	152	181	12	93	171	38	0	613	74	0	1082	99
RTOR Reduction (vph)	0	2	0	0	7	0	0	7	0	0	5	0
Lane Group Flow (vph)	152	191	0	93	202	0	0	680	0	0	1176	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	15.0	25.5		10.7	21.2			65.6			65.6	
Effective Green, g (s)	15.0	25.5		10.7	21.2			65.6			65.6	
Actuated g/C Ratio	0.13	0.22		0.09	0.18			0.57			0.57	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	205	365		146	298			1772			1778	
v/s Ratio Prot	c0.10	c0.11		0.06	c0.12			0.22			c0.37	
v/s Ratio Perm												
v/c Ratio	0.74	0.52		0.64	0.68			0.38			0.66	
Uniform Delay, d1	48.6	39.9		50.8	44.2			14.0			17.5	
Progression Factor	1.00	1.00		0.97	1.04			1.00			1.00	
Incremental Delay, d2	11.9	0.6		5.8	4.2			0.6			2.0	
Delay (s)	60.5	40.5		54.9	50.2			14.6			19.4	
Level of Service	E	D		D	D			B			B	
Approach Delay (s)		49.3			51.6			14.6			19.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	208	5	66	230	19	4	24	95	27	30	21
Future Volume (vph)	35	208	5	66	230	19	4	24	95	27	30	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.96	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1494			1481			1350			1429	
Flt Permitted		0.92			0.89			0.99			0.88	
Satd. Flow (perm)		1379			1330			1344			1285	
Peak-hour factor, PHF	0.96	0.96	0.96	0.88	0.88	0.88	0.84	0.84	0.84	0.66	0.66	0.66
Adj. Flow (vph)	36	217	5	75	261	22	5	29	113	41	45	32
RTOR Reduction (vph)	0	1	0	0	5	0	0	61	0	0	17	0
Lane Group Flow (vph)	0	257	0	0	353	0	0	86	0	0	101	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.4			21.4			26.8			26.8	
Effective Green, g (s)		21.4			21.4			26.8			26.8	
Actuated g/C Ratio		0.37			0.37			0.46			0.46	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		508			490			621			593	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.27			0.06			c0.08	
v/c Ratio		0.51			0.72			0.14			0.17	
Uniform Delay, d1		14.2			15.7			9.0			9.1	
Progression Factor		0.74			1.00			1.00			1.00	
Incremental Delay, d2		1.0			5.5			0.5			0.0	
Delay (s)		11.5			21.2			9.4			9.2	
Level of Service		B			C			A			A	
Approach Delay (s)		11.5			21.2			9.4			9.2	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	294	17	87	144	29	0	740	82	0	701	115
Future Volume (vph)	198	294	17	87	144	29	0	740	82	0	701	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.97			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1662		1593	1634			3138			3118	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1662		1593	1634			3138			3118	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	218	323	19	102	169	34	0	822	91	0	806	132
RTOR Reduction (vph)	0	2	0	0	7	0	0	6	0	0	9	0
Lane Group Flow (vph)	218	340	0	102	196	0	0	907	0	0	929	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	19.7	29.4		11.3	21.0			57.1			57.1	
Effective Green, g (s)	19.7	29.4		11.3	21.0			57.1			57.1	
Actuated g/C Ratio	0.18	0.26		0.10	0.19			0.51			0.51	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	280	436		160	306			1599			1589	
v/s Ratio Prot	c0.14	c0.20		0.06	0.12			0.29			c0.30	
v/s Ratio Perm												
v/c Ratio	0.78	0.78		0.64	0.64			0.57			0.58	
Uniform Delay, d1	44.1	38.3		48.4	42.0			18.9			19.2	
Progression Factor	1.00	1.00		0.83	1.17			1.00			1.00	
Incremental Delay, d2	11.7	7.8		4.7	2.5			1.5			1.6	
Delay (s)	55.8	46.1		45.0	51.8			20.4			20.7	
Level of Service	E	D		D	D			C			C	
Approach Delay (s)		49.9			49.5			20.4			20.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	54	320	13	63	236	28	16	83	296	67	29	34
Future Volume (vph)	54	320	13	63	236	28	16	83	296	67	29	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.96	
Flt Protected		0.99			0.99			1.00			0.97	
Satd. Flow (prot)		1491			1477			1353			1419	
Flt Permitted		0.91			0.86			0.99			0.70	
Satd. Flow (perm)		1369			1284			1338			1024	
Peak-hour factor, PHF	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89	0.89	0.76	0.76	0.76
Adj. Flow (vph)	57	337	14	75	281	33	18	93	333	88	38	45
RTOR Reduction (vph)	0	2	0	0	7	0	0	172	0	0	21	0
Lane Group Flow (vph)	0	406	0	0	382	0	0	272	0	0	150	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.4			21.4			24.8			24.8	
Effective Green, g (s)		21.4			21.4			24.8			24.8	
Actuated g/C Ratio		0.38			0.38			0.44			0.44	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		523			490			592			453	
v/s Ratio Prot												
v/s Ratio Perm		0.30			c0.30			c0.20			0.15	
v/c Ratio		0.78			0.78			0.46			0.33	
Uniform Delay, d1		15.2			15.2			10.9			10.2	
Progression Factor		1.53			1.00			1.00			1.00	
Incremental Delay, d2		6.2			8.3			2.6			0.2	
Delay (s)		29.4			23.5			13.5			10.3	
Level of Service		C			C			B			B	
Approach Delay (s)		29.4			23.5			13.5			10.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	299	17	91	147	33	0	740	89	0	706	115
Future Volume (vph)	198	299	17	91	147	33	0	740	89	0	706	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frt	1.00	0.99		1.00	0.97			0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1593	1663		1593	1630			3134			3118	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (perm)	1593	1663		1593	1630			3134			3118	
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.90	0.90	0.90	0.87	0.87	0.87
Adj. Flow (vph)	218	329	19	107	173	39	0	822	99	0	811	132
RTOR Reduction (vph)	0	2	0	0	8	0	0	7	0	0	9	0
Lane Group Flow (vph)	218	346	0	107	204	0	0	914	0	0	934	0
Parking (#/hr)												
Turn Type	Prot	NA		Prot	NA			NA			NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases												
Actuated Green, G (s)	19.5	29.5		11.4	21.4			56.9			56.9	
Effective Green, g (s)	19.5	29.5		11.4	21.4			56.9			56.9	
Actuated g/C Ratio	0.17	0.26		0.10	0.19			0.51			0.51	
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9			4.9	
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0			1.0	
Lane Grp Cap (vph)	277	438		162	311			1592			1584	
v/s Ratio Prot	c0.14	c0.21		0.07	0.13			0.29			c0.30	
v/s Ratio Perm												
v/c Ratio	0.79	0.79		0.66	0.66			0.57			0.59	
Uniform Delay, d1	44.3	38.4		48.4	41.9			19.1			19.3	
Progression Factor	1.00	1.00		0.84	1.16			1.00			1.00	
Incremental Delay, d2	12.7	8.5		5.9	2.9			1.5			1.6	
Delay (s)	57.0	46.8		46.4	51.4			20.6			21.0	
Level of Service	E	D		D	D			C			C	
Approach Delay (s)		50.8			49.7			20.6			21.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	14.2
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	328	13	63	251	28	16	83	296	67	29	41
Future Volume (vph)	57	328	13	63	251	28	16	83	296	67	29	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9			4.9			4.9	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.90			0.96	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1491			1479			1353			1413	
Flt Permitted		0.91			0.87			0.99			0.71	
Satd. Flow (perm)		1361			1292			1338			1025	
Peak-hour factor, PHF	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89	0.89	0.76	0.76	0.76
Adj. Flow (vph)	60	345	14	75	299	33	18	93	333	88	38	54
RTOR Reduction (vph)	0	2	0	0	6	0	0	175	0	0	25	0
Lane Group Flow (vph)	0	417	0	0	401	0	0	269	0	0	155	0
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.9			21.9			24.3			24.3	
Effective Green, g (s)		21.9			21.9			24.3			24.3	
Actuated g/C Ratio		0.39			0.39			0.43			0.43	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		3.9			3.9			2.0			2.0	
Lane Grp Cap (vph)		532			505			580			444	
v/s Ratio Prot												
v/s Ratio Perm		0.31			c0.31			c0.20			0.15	
v/c Ratio		0.78			0.79			0.46			0.35	
Uniform Delay, d1		15.0			15.1			11.2			10.6	
Progression Factor		1.53			1.00			1.00			1.00	
Incremental Delay, d2		6.4			8.8			2.7			0.2	
Delay (s)		29.3			23.9			13.9			10.7	
Level of Service		C			C			B			B	
Approach Delay (s)		29.3			23.9			13.9			10.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	9.8
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Scientific Resources Associated

September 20, 2017

Ms. Karen Ruggles
KLR Planning, Inc.
P.O. Box 882676
San Diego, CA 92186-2676

RE: Hillcrest 111 Mixed-Use Project
Air Quality Analysis

Dear Ms. Ruggles:

As you requested, Scientific Resources Associated (SRA) has prepared an evaluation of the potential for adverse impacts to air quality from construction and operation of the Hillcrest 111 Mixed-Use Project located at 635 Robinson Avenue in the Uptown community of the City of San Diego (Project). This letter report presents the results of the analysis.

To address whether or not the Project would result in a significant air quality impact, the CalEEMod Model, Version 2016.3.1, was run for both the construction and operational phases of the Project. The CalEEMod Model provides estimates of maximum daily emissions. The emissions predicted by the CalEEMod Model were then compared with the City of San Diego's Significance Determination Thresholds[1] for air quality.

Project Description

The Project site is approximately one acre in size and is currently developed as a surface parking lot for an AT&T facility located at 650 Robinson Avenue. The existing surface parking lot functions under an approved Conditional Use Permit (CUP No. 11086), approved in 1972, and a shared parking agreement between AT&T and the owner of the property at 635 Robinson Avenue. The Project includes the demolition of the existing surface parking and redevelopment of the site as a mixed-use project with commercial retail and residential uses and a new subterranean parking structure for the AT&T facility.

The Project would involve the construction of a six- to seven-story, 136,213-square-foot, mixed-use structure, which would include residential units and commercial retail space. The project would develop 111 residential dwelling units, including 102 market rate units and nine affordable units restricted to very-low income households. Additionally, 4,800 square feet of commercial retail space would be provided on the ground floor of the

[1] City of San Diego. 2016. Significance Determination Thresholds.

building. A total of 190 parking spaces would be provided for the mixed-use project on the ground level and in a subterranean parking structure with access via an alley along the Project site's western border.

The Project would also include the construction of a detached subterranean parking structure, which would provide the required parking to serve AT&T employees in compliance with CUP No. 11086. The CUP requires 16.5 parking spaces for AT&T facility use, with the remainder of the 86 spaces being supplemental parking. The separate parking structure would include an at-grade ramp with parking and three levels of subterranean parking. Maximum parking structure height would be 13 feet; the baja canopy above the parking garage would bring the total height 21 feet, six inches. Materials for the parking structure include brick veneer, wood slats, metal shade structure, and perforated metal.

Construction Impacts

SRA evaluated potential impacts to air quality from the construction phase of the Project using the CalEEMod Model, Version 2016.3.1, which is the latest version of the California air quality model for land use projects. The CalEEMod Model provides a conservative means of estimating emissions from construction, and is based on the following assumptions:

- Construction heavy equipment is based on the average construction fleet for the San Diego region.
- Construction vehicle emissions are calculated using the EMFAC2014 model, which assumes the average vehicle fleet for the San Diego region is representative of construction vehicles.
- Construction activities occur 5 days per week, 22 days per month.
- Architectural coatings meet San Diego Air Pollution Control District Rule 67.0.1, which requires flat coatings to meet a VOC content of 50 grams per liter, and non-flat coatings to meet a VOC content of 100 grams per liter.

Project construction activities could potentially generate combustion emissions from on-site heavy-duty construction vehicles and motor vehicles transporting the construction crew and necessary construction materials. Exhaust emissions generated by construction activities would generally result from the use of typical construction equipment that may include excavation equipment, forklifts, skip loaders, and/or dump trucks. Variables that factor into the total construction emissions potentially generated include the level of activity, length of construction period, number of pieces and types of equipment in use, site characteristics, weather conditions, number of construction personnel, and the amount of materials to be transport on- or off-site. It is anticipated that construction equipment would be used on-site for four to eight hours per day; however, construction would be short-term (approximately 26 months, including demolition), and impacts to neighboring uses would be minimal and temporary.

The Project includes two months of demolition. Construction of the Project (including demolition) is anticipated to take approximately 26 months. Construction would take place in two phases, with the first phase including the development of the parking garage and the second phase including the development of the mixed-use building.

The inputs to the CalEEMod model are summarized in Table 1.

Construction Phase	Duration	Heavy Equipment	Personnel	Haul Truck Trips
Demolition	2 months	1 Concrete/Industrial Saws 1 Rubber Tired Dozers 2 Tractors/Loaders/Backhoes	10	156
Parking Garage Construction				
Grading/ Excavation	3 months	1 Concrete/Industrial Saws 1 Excavators 1 Rubber Tired Dozers 2 Tractors/Loaders/Backhoes	13	1,750
Garage Construction	7 months	1 Cranes 2 Forklifts 2 Tractors/Loaders/Backhoes	17	7
Paving	4 months	4 Cement and Mortar Mixers 1 Pavers 1 Roller 1 Tractors/Loaders/Backhoes	18	
Architectural Coatings	1 month	1 Air Compressor	3	
Mixed Use Building Construction				
Grading/ Excavation	3 months	1 Excavators 1 Graders 1 Rubber Tired Dozers 3 Tractors/Loaders/Backhoes	15	3,125
Building Construction	24 months	1 Cranes 3 Forklifts 1 Generator Sets 3 Tractors/Loaders/Backhoes 1 Welders	115	26
Paving	6 months	2 Cement and Mortar Mixers 1 Pavers 2 Paving Equipment 2 Rollers 1 Tractors/Loaders/Backhoes	20	
Architectural Coatings	5 months	1 Air Compressor	23	

Demolition, excavation, and grading can cause fugitive dust emissions. Construction of the project would be subject to standard measures required by a City of San Diego grading permit to reduce potential air quality impacts to less than significant. These measures include, but are not limited to, compliance with SDMC 142.0170, which prohibits airborne contaminants from emanating beyond the boundaries of the premises upon which the use emitting the contaminants is located. Some example measures are watering three times daily, reducing vehicle speeds to 15 miles per hour on unpaved surfaces, or use of architectural coatings that comply with San Diego Air Pollution Control District Rule 67.0.1 (i.e., architectural coatings that meet a volatile organic compound [VOC] content of 50 grams per liter for flat coatings and 100 grams per liter for non-flat coatings) would be used during construction.

Table 2 presents the results of the emissions evaluation for the construction of the project.

Table 2
Estimated Maximum Daily Construction Emissions
Hillcrest 111 Mixed Use Project
Emissions, Pounds per day

Emission Source	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Phase 1 – Parking Structure Construction						
Demolition						
Fugitive Dust	-	-	-	-	0.31	0.05
Offroad Equipment	1.06	9.43	7.78	0.01	0.62	0.59
Onroad Emissions	0.03	1.15	0.24	0.003	0.07	0.02
Worker Trips	0.04	0.03	0.34	0.001	0.08	0.02
Subtotal	**1.13**	**10.61**	**8.36**	**0.01**	**1.08**	**0.68**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Grading						
Fugitive Dust	-	-	-	-	0.31	0.16
Offroad Equipment	1.35	12.54	11.07	0.02	0.77	0.73
Onroad Emissions	0.24	8.43	1.74	0.02	0.50	0.16
Worker Trips	0.05	0.04	0.45	0.001	0.11	0.03
Subtotal	**1.64**	**21.01**	**13.26**	**0.04**	**1.69**	**1.08**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Building Construction						
Offroad Equipment	1.08	11.03	7.75	0.01	0.71	0.65
Vendor Trips	0.04	0.92	0.24	0.002	0.05	0.02
Worker Trips	0.07	0.05	0.58	0.002	0.14	0.04
Subtotal	**1.19**	**12.00**	**8.57**	**0.01**	**0.90**	**0.71**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Paving						
Offroad Equipment	0.92	8.74	7.22	0.01	0.51	0.47
Worker Trips	0.08	0.06	0.62	0.002	0.15	0.04
Subtotal	**1.00**	**8.80**	**7.84**	**0.01**	**0.66**	**0.51**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Architectural Coatings Application						
Architectural Coatings	1.36	-	-	-	-	-
Offroad Equipment	0.30	2.01	1.85	0.003	0.15	0.15
Worker Trips	0.01	0.01	0.10	0.00	0.02	0.01
Subtotal	**1.67**	**2.02**	**1.95**	**0.00**	**0.17**	**0.16**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

Table 2
Estimated Maximum Daily Construction Emissions
Hillcrest 111 Mixed Use Project
Emissions, Pounds per day

Emission Source	**ROG**	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions, Phase 1[a]	**3.87**	**22.82**	**18.37**	**0.04**	**1.74**	**1.38**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Phase 2 – Mixed-Use Building Construction						
Grading						
Fugitive Dust	-	-	-	-	2.39	1.30
Offroad Equipment	2.58	28.35	16.29	0.03	1.40	1.29
Onroad Emissions	0.63	21.83	4.71	0.06	1.35	0.43
Worker Trips	0.06	0.04	0.46	0.001	0.12	0.03
Subtotal	**3.27**	**50.22**	**21.46**	**0.09**	**5.26**	**3.05**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Building Construction						
Offroad Equipment	2.36	21.08	17.16	0.03	1.29	1.21
Vendor Trips	0.12	3.22	0.83	0.01	0.20	0.07
Worker Trips	0.45	0.32	3.56	0.01	0.95	0.26
Subtotal	**2.93**	**24.62**	**21.55**	**0.05**	**2.44**	**1.54**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Paving						
Offroad Equipment	1.27	12.76	12.31	0.02	0.72	0.66
Worker Trips	0.08	0.05	0.62	0.002	0.17	0.04
Subtotal	**1.35**	**12.81**	**12.93**	**0.02**	**0.89**	**0.70**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Architectural Coatings Application						
Architectural Coatings	8.87	-	-	-	-	-
Offroad Equipment	0.27	1.84	1.84	0.003	0.13	0.13
Worker Trips	0.09	0.06	0.71	0.002	0.19	0.05
Subtotal	**9.23**	**1.90**	**2.55**	**0.01**	**0.32**	**0.18**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Maximum Daily Emissions, Phase 2[a]	**13.51**	**50.22**	**37.04**	**0.09**	**5.26**	**3.04**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

As shown in Table 2, criteria pollutant emissions from construction are below the City of San Diego's Significance Determination Thresholds for air quality. Therefore, construction would result in a less than significant impact on air quality.

Operational Emissions

SRA evaluated potential impacts to air quality from the operational phase of the project using the CalEEMod Model, Version 2016.3.1, which is the latest version of the California air quality model for land use projects. Operational emissions were based on CalEEMod default assumptions, which provide a conservative means of estimating emissions. The CalEEMod Model uses the following assumptions to calculate emissions:

- Area Sources:
    - 10% of the Project buildings would undergo maintenance of architectural coatings on an annual basis
    - Residents would use consumer products with a VOC content based on statewide average usage
    - Landscaping equipment would be used based on statewide average usage
- Energy Use:
    - Residential units would use electricity and natural gas based on Title 24 as of 2013 for multi-family units, as follows:
        - 246.93 kWh/unit annually for electricity usage governed by Title 24
        - 3,277.06 kWh/unit annually for electricity usage not governed by Title 24 (i.e., electronics and appliance uses)
        - 741.44 kWh/unit annually for lighting electricity use
        - 4,687.93 kBTU/unit annually for natural gas usage governed by Title 24
        - 4,180 kBTU/unit annually for natural gas usage not governed by Title 24 (i.e., cooking, appliances)
    - Retail uses would use electricity and natural gas based on Title 24 as of 2013 for retail, as follows:
        - 3.34 kWh/square foot annually for electricity usage governed by Title 24
        - 3.16 kWh/square foot annually for electricity usage not governed by Title 24 (i.e., electronics and appliance uses)
        - 6.39 kWh/square foot annually for lighting electricity use
        - 1.15 kBTU/square foot annually for natural gas usage governed by Title 24
        - 1.09 kBTU/square foot annually for natural gas usage not governed by Title 24 (i.e., cooking, appliances)
    - Amenities (workout room, common areas) would use electricity and natural gas based on Title 24 as of 2013, as follows:
        - 1.27 kWh/square foot annually for electricity usage governed by Title 24
        - 4.27 kWh/square foot annually for electricity usage not governed by Title 24 (i.e., electronics and appliance uses)
        - 2.91 kWh/square foot annually for lighting electricity use
        - 4.34 kBTU/square foot annually for natural gas usage governed by Title 24

    - 7.25 kBTU/square foot annually for natural gas usage not governed by Title 24 (i.e., water heaters)
  - Parking garage would use electricity based on Title 24 as of 2013, as follows:
    - 3.92 kWh/square foot annually for electricity usage governed by Title 24
    - 0.19 kWh/square foot annually for electricity usage not governed by Title 24 (i.e., electronics use)
    - 2.63 kWh/square foot annually for lighting electricity use
- Vehicle Use:
  - 6 trips per multi-family residential unit, allocated as follows:
    - 41.6% of trips are home to work trips, 10.8 mile trip distance
    - 18.8% of trips are home to shopping trips, 7.3 mile trip distance
    - 39.6% of trips are home to other destination trips, 7.5 mile trip distance
  - 44.32 trips per square foot for retail uses, allocated as follows:
    - 64.4% of trips are commercial customer trips, 7.3 mile trip distance
    - 16.6% of trips are commercial employee trips, 9.5 mile trip distance
    - 19% of trips are other commercial trips, 7.3 mile trip distance
  - Vehicle distribution among vehicle types (auto, truck, heavy-duty vehicle) is based on the average for the San Diego region per the California Air Resources Board's EMFAC2014 model
  - Emission factors from the California Air Resources Board's EMFAC2014 model representing the San Diego region

Table 3 presents the results of the emissions evaluation for the operation of the Project.

Table 3
Operational Emissions
Hillcrest 111 Mixed Use Project

	ROG	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions						
Summer Day, Lbs/day						
Area Sources	3.12	0.11	9.20	0.00	0.05	0.05
Energy Use	0.03	0.26	0.12	0.002	0.02	0.02
Vehicular Emissions	1.26	4.68	11.66	0.04	2.95	0.81
TOTAL	**4.41**	**5.05**	**20.97**	**0.04**	**3.03**	**0.88**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Winter Day, Lbs/day						
Area Sources	3.12	0.11	9.20	0.00	0.05	0.05
Energy Use	0.03	0.26	0.12	0.002	0.02	0.02
Vehicular Emissions	1.23	4.76	11.90	0.04	2.95	0.81
TOTAL	**4.37**	**5.13**	**21.22**	**0.04**	**3.03**	**0.88**
Significance Criteria	137	250	550	250	100	55
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

As shown in Table 3, emissions from construction are below the City of San Diego's Significance Determination Thresholds for air quality. Therefore, operations of the project would result in a less than significant impact on air quality.

Conclusions

SRA analyzed potential air quality impacts associated with construction and operation of the Project. The analysis was based on CalEEMod default assumptions, which provide a conservative estimate of emissions from the Project. Both construction and operational emissions are below the City of San Diego Significance Determination Thresholds for air quality. The Project's impact on air quality is less than significant.

We appreciate the opportunity to work with you on this project.

Sincerely,

Valorie L. Thompson

Valorie L. Thompson, Ph.D.
Principal

Attachment

CalEEMod Model Outputs

Hillcrest 111 Mixed-Use Project Parking Garage

San Diego Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	103.00	Space	0.93	41,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	556.22	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Parking Lot Construction

Land Use - Parking Structure

Construction Phase - Construction of parking structure assumed to require 12 months - Phase 1

Off-road Equipment - Including an excavator for subterranean work

Grading - Based on site description

Demolition - Based on 86 spaces in current garage

Off-road Equipment -

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use - Project description

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	100.00	152.00
tblConstructionPhase	NumDays	10.00	43.00
tblConstructionPhase	NumDays	2.00	66.00
tblConstructionPhase	NumDays	5.00	86.00
tblConstructionPhase	PhaseEndDate	12/31/2017	12/31/2018
tblConstructionPhase	PhaseEndDate	12/31/2017	12/31/2018
tblConstructionPhase	PhaseEndDate	12/31/2017	2/28/2018
tblConstructionPhase	PhaseEndDate	12/31/2017	5/31/2018
tblConstructionPhase	PhaseEndDate	12/31/2017	12/31/2018
tblConstructionPhase	PhaseStartDate	1/1/2018	12/1/2018
tblConstructionPhase	PhaseStartDate	1/1/2018	6/1/2018
tblConstructionPhase	PhaseStartDate	1/1/2018	3/1/2018
tblConstructionPhase	PhaseStartDate	1/1/2018	9/1/2018
tblGrading	AcresOfGrading	0.00	1.00
tblGrading	MaterialExported	0.00	14,000.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	720.49	556.22
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblProjectCharacteristics	OperationalYear	2018	2020

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

Year	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
2018	3.8655	22.8208	18.3745	0.0397	1.3688	1.3796	2.1764	0.5753	1.2850	1.3815	0.0000	4,127.5973	4,127.5973	0.7136	0.0000	4,142.5081
Maximum	**3.8655**	**22.8208**	**18.3745**	**0.0397**	**1.3688**	**1.3796**	**2.1764**	**0.5753**	**1.2850**	**1.3815**	**0.0000**	**4,127.5973**	**4,127.5973**	**0.7136**	**0.0000**	**4,142.5081**

Mitigated Construction

Year	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
2018	3.8655	22.8208	18.3745	0.0397	0.8816	1.3796	1.7392	0.3191	1.2850	1.3815	0.0000	4,127.5973	4,127.5973	0.7136	0.0000	4,142.5081
Maximum	**3.8655**	**22.8208**	**18.3745**	**0.0397**	**0.8816**	**1.3796**	**1.7392**	**0.3191**	**1.2850**	**1.3815**	**0.0000**	**4,127.5973**	**4,127.5973**	**0.7136**	**0.0000**	**4,142.5081**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**35.59**	**0.00**	**20.09**	**44.53**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0234	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0234**	**1.0000e-004**	**0.0106**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0225**	**0.0225**	**6.0000e-005**	**0.0000**	**0.0241**

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	0.0234	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0234**	**1.0000e-004**	**0.0106**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0225**	**0.0225**	**6.0000e-005**	**0.0000**	**0.0241**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description

1	Demolition	Demolition	1/1/2018	2/28/2018	5	43	
2	Grading	Grading	3/1/2018	5/31/2018	5	66	
3	Building Construction	Building Construction	6/1/2018	12/31/2018	5	152	
4	Paving	Paving	9/1/2018	12/31/2018	5	86	
5	Architectural Coating	Architectural Coating	12/1/2018	12/31/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1

Acres of Paving: 0.93

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,472

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Grading	Excavators	1	8.00	158	0.38
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
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
Architectural Coating	1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	17.00	7.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	4	10.00	0.00	156.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	1,750.00	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

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7973	0.0000	0.7973	0.1207	0.0000	0.1207			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943		1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.7973**	**0.6228**	**1.4201**	**0.1207**	**0.5943**	**0.7150**		**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

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	0.0332	1.1539	0.2380	2.9200e-003	0.0634	4.5400e-003	0.0679	0.0174	4.3400e-003	0.0217		317.3528	317.3528	0.0280		318.0522
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	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**0.0758**	**1.1846**	**0.5803**	**3.8200e-003**	**0.1455**	**5.1300e-003**	**0.1507**	**0.0392**	**4.8900e-003**	**0.0441**		**407.0753**	**407.0753**	**0.0310**		**407.8514**

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					0.3110	0.0000	0.3110	0.0471	0.0000	0.0471			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943	0.0000	1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.3110**	**0.6228**	**0.9337**	**0.0471**	**0.5943**	**0.6414**	**0.0000**	**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

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	0.0332	1.1539	0.2380	2.9200e-003	0.0634	4.5400e-003	0.0679	0.0174	4.3400e-003	0.0217		317.3528	317.3528	0.0280		318.0522
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	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992

Total	0.0758	1.1846	0.5803	3.8200e-003	0.1455	5.1300e-003	0.1507	0.0392	4.8900e-003	0.0441		407.0753	407.0753	0.0310		407.8514

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7986	0.0000	0.7986	0.4200	0.0000	0.4200			0.0000			0.0000
Off-Road	1.3549	12.5409	11.0683	0.0172		0.7736	0.7736		0.7331	0.7331		1,691.5332	1,691.5332	0.3880		1,701.2327
Total	**1.3549**	**12.5409**	**11.0683**	**0.0172**	**0.7986**	**0.7736**	**1.5723**	**0.4200**	**0.7331**	**1.1531**		**1,691.5332**	**1,691.5332**	**0.3880**		**1,701.2327**

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	0.2427	8.4338	1.7394	0.0213	0.4633	0.0332	0.4965	0.1270	0.0317	0.1587		2,319.4249	2,319.4249	0.2045		2,324.5364
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	0.0553	0.0399	0.4450	1.1700e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		116.6392	116.6392	3.9900e-003		116.7390
Total	**0.2981**	**8.4736**	**2.1844**	**0.0225**	**0.5701**	**0.0339**	**0.6041**	**0.1553**	**0.0325**	**0.1878**		**2,436.0641**	**2,436.0641**	**0.2085**		**2,441.2754**

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					0.3115	0.0000	0.3115	0.1638	0.0000	0.1638			0.0000			0.0000
Off-Road	1.3549	12.5409	11.0683	0.0172		0.7736	0.7736		0.7331	0.7331	0.0000	1,691.5332	1,691.5332	0.3880		1,701.2327
Total	**1.3549**	**12.5409**	**11.0683**	**0.0172**	**0.3115**	**0.7736**	**1.0851**	**0.1638**	**0.7331**	**0.8969**	**0.0000**	**1,691.5332**	**1,691.5332**	**0.3880**		**1,701.2327**

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	0.2427	8.4338	1.7394	0.0213	0.4633	0.0332	0.4965	0.1270	0.0317	0.1587		2,319.4249	2,319.4249	0.2045		2,324.5364
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	0.0553	0.0399	0.4450	1.1700e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		116.6392	116.6392	3.9900e-003		116.7390
Total	**0.2981**	**8.4736**	**2.1844**	**0.0225**	**0.5701**	**0.0339**	**0.6041**	**0.1553**	**0.0325**	**0.1878**		**2,436.0641**	**2,436.0641**	**0.2085**		**2,441.2754**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

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

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520		1,146.5323	1,146.5323	0.3569		1,155.4555
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**		**1,146.5323**	**1,146.5323**	**0.3569**		**1,155.4555**

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	0.0361	0.9223	0.2442	1.9500e-003	0.0474	7.2100e-003	0.0546	0.0136	6.9000e-003	0.0205		208.7329	208.7329	0.0165		209.1465
Worker	0.0724	0.0521	0.5820	1.5300e-003	0.1397	1.0100e-003	0.1407	0.0370	9.3000e-004	0.0380		152.5282	152.5282	5.2200e-003		152.6587
Total	**0.1085**	**0.9744**	**0.8262**	**3.4800e-003**	**0.1870**	**8.2200e-003**	**0.1953**	**0.0507**	**7.8300e-003**	**0.0585**		**361.2611**	**361.2611**	**0.0218**		**361.8052**

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	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520	0.0000	1,146.5323	1,146.5323	0.3569		1,155.4555
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**	**0.0000**	**1,146.5323**	**1,146.5323**	**0.3569**		**1,155.4555**

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	0.0361	0.9223	0.2442	1.9500e-003	0.0474	7.2100e-003	0.0546	0.0136	6.9000e-003	0.0205		208.7329	208.7329	0.0165		209.1465
Worker	0.0724	0.0521	0.5820	1.5300e-003	0.1397	1.0100e-003	0.1407	0.0370	9.3000e-004	0.0380		152.5282	152.5282	5.2200e-003		152.6587
Total	**0.1085**	**0.9744**	**0.8262**	**3.4800e-003**	**0.1870**	**8.2200e-003**	**0.1953**	**0.0507**	**7.8300e-003**	**0.0585**		**361.2611**	**361.2611**	**0.0218**		**361.8052**

3.5 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735		1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**		**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

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	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386
Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

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	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735	0.0000	1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**	**0.0000**	**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

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	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386

Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

3.6 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Archit. Coating	1.3640					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**1.6626**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0128	9.2000e-003	0.1027	2.7000e-004	0.0246	1.8000e-004	0.0248	6.5400e-003	1.6000e-004	6.7000e-003		26.9167	26.9167	9.2000e-004		26.9398
Total	**0.0128**	**9.2000e-003**	**0.1027**	**2.7000e-004**	**0.0246**	**1.8000e-004**	**0.0248**	**6.5400e-003**	**1.6000e-004**	**6.7000e-003**		**26.9167**	**26.9167**	**9.2000e-004**		**26.9398**

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	1.3640					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**1.6626**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

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	0.0128	9.2000e-003	0.1027	2.7000e-004	0.0246	1.8000e-004	0.0248	6.5400e-003	1.6000e-004	6.7000e-003		26.9167	26.9167	9.2000e-004		26.9398
Total	**0.0128**	**9.2000e-003**	**0.1027**	**2.7000e-004**	**0.0246**	**1.8000e-004**	**0.0248**	**6.5400e-003**	**1.6000e-004**	**6.7000e-003**		**26.9167**	**26.9167**	**9.2000e-004**		**26.9398**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

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					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	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					

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0234	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241
Unmitigated	0.0234	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241

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	7.8500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0146					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Landscaping	1.0000e-003	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241
Total	**0.0234**	**1.0000e-004**	**0.0106**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0225**	**0.0225**	**6.0000e-005**		**0.0241**

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	7.8500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0146					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-003	1.0000e-004	0.0106	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0225	0.0225	6.0000e-005		0.0241
Total	**0.0234**	**1.0000e-004**	**0.0106**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0225**	**0.0225**	**6.0000e-005**		**0.0241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 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

Hillcrest 111 Mixed Use Project

San Diego Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	111.00	Dwelling Unit	2.92	111,000.00	317
Strip Mall	4.80	1000sqft	0.11	4,800.00	0
Health Club	3.15	1000sqft	0.07	3,150.00	0
Enclosed Parking with Elevator	190.00	Space	1.71	76,000.00	0

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)	556.22	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Hillcrest 111 Mixed Use Portion

Land Use - Based on project description

Construction Phase - Assuming 14-month construction for Phase II

Grading - Based on project description

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Assuming 6 trips per unit; no additional trips for on-site amenities

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Woodstoves - Assuming no fireplaces in units

Area Coating - Rule 67.0.1 coatings

Energy Use - Site energy use

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	18.00	109.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	8.00	43.00
tblConstructionPhase	NumDays	18.00	132.00
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2020
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2020
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2019
tblConstructionPhase	PhaseEndDate	12/31/2018	12/31/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	10/1/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	3/1/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	7/1/2019
tblFireplaces	NumberGas	61.05	0.00
tblFireplaces	NumberNoFireplace	11.10	111.00
tblFireplaces	NumberWood	38.85	0.00

tblGrading	AcresOfGrading	21.50	1.00
tblGrading	MaterialExported	0.00	25,000.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	720.49	556.22
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblProjectCharacteristics	OperationalYear	2018	2021
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	32.93	0.00
tblWoodstoves	NumberCatalytic	5.55	0.00
tblWoodstoves	NumberNoncatalytic	5.55	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year						lb/day							lb/day			
2019	13.5080	50.2185	37.0391	0.0886	7.5216	2.1699	9.0022	3.7060	2.0352	5.0712	0.0000	9,357.1094	9,357.1094	1.4900	0.0000	9,394.3583
2020	11.8380	24.1428	23.3386	0.0487	1.3097	1.2503	2.5599	0.3514	1.1823	1.5337	0.0000	4,762.0062	4,762.0062	0.7358	0.0000	4,780.4006
Maximum	**13.5080**	**50.2185**	**37.0391**	**0.0886**	**7.5216**	**2.1699**	**9.0022**	**3.7060**	**2.0352**	**5.0712**	**0.0000**	**9,357.1094**	**9,357.1094**	**1.4900**	**0.0000**	**9,394.3583**

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	13.5080	50.2185	37.0391	0.0886	3.7832	2.1699	5.2638	1.6776	2.0352	3.0428	0.0000	9,357.1094	9,357.1094	1.4900	0.0000	9,394.3583
2020	11.8380	24.1428	23.3386	0.0487	1.3097	1.2503	2.5599	0.3514	1.1823	1.5337	0.0000	4,762.0062	4,762.0062	0.7358	0.0000	4,780.4005
Maximum	**13.5080**	**50.2185**	**37.0391**	**0.0886**	**3.7832**	**2.1699**	**5.2638**	**1.6776**	**2.0352**	**3.0428**	**0.0000**	**9,357.1094**	**9,357.1094**	**1.4900**	**0.0000**	**9,394.3583**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.33**	**0.00**	**32.33**	**49.99**	**0.00**	**30.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Energy	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
Mobile	1.4832	5.9421	16.7305	0.0566	4.7270	0.0463	4.7733	1.2634	0.0433	1.3067		5,751.9747	5,751.9747	0.2989		5,759.4473
Total	**4.6311**	**6.3095**	**26.0447**	**0.0588**	**4.7270**	**0.1180**	**4.8450**	**1.2634**	**0.1150**	**1.3784**	**0.0000**	**6,101.0137**	**6,101.0137**	**0.3214**	**6.1000e-003**	**6,110.8645**

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	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Energy	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
Mobile	1.2647	4.6780	11.6579	0.0364	2.9234	0.0306	2.9540	0.7813	0.0286	0.8100		3,696.5643	3,696.5643	0.2076		3,701.7542
Total	**4.4125**	**5.0454**	**20.9721**	**0.0385**	**2.9234**	**0.1024**	**3.0257**	**0.7813**	**0.1003**	**0.8817**	**0.0000**	**4,045.6032**	**4,045.6032**	**0.2301**	**6.1000e-003**	**4,053.1714**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.72**	**20.04**	**19.48**	**34.48**	**38.16**	**13.26**	**37.55**	**38.16**	**12.73**	**36.04**	**0.00**	**33.69**	**33.69**	**28.41**	**0.00**	**33.67**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	10/1/2019	2/28/2020	5	109	
2	Building Construction	Building Construction	3/1/2019	2/28/2020	5	261	
3	Grading	Grading	1/1/2019	2/28/2019	5	43	
4	Paving	Paving	7/1/2019	12/31/2019	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1

Acres of Paving: 1.71

Residential Indoor: 224,775; Residential Outdoor: 74,925; Non-Residential Indoor: 11,925; Non-Residential Outdoor: 3,975; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Grading	Excavators	1	8.00	158	0.38
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	2	6.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	2	6.00	132	0.36
Building Construction	Welders	1	8.00	46	0.45

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
Architectural Coating	1	23.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	115.00	26.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	3,125.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Architectural Coating - 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					
Archit. Coating	8.8724					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**9.1389**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

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**

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	8.8724					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**9.1389**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

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**

3.2 Architectural Coating - 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	8.8724					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	**9.1146**	**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	0.0844	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**

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	8.8724					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	**9.1146**	**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	0.0844	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**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.1197	3.2237	0.8323	7.1800e-003	0.1760	0.0224	0.1984	0.0507	0.0215	0.0721		769.6433	769.6433	0.0594		771.1288
Worker	0.4516	0.3151	3.5582	0.0101	0.9447	6.7300e-003	0.9514	0.2506	6.2000e-003	0.2568		1,000.7296	1,000.7296	0.0320		1,001.5285
Total	**0.5712**	**3.5388**	**4.3905**	**0.0172**	**1.1207**	**0.0292**	**1.1499**	**0.3013**	**0.0277**	**0.3289**		**1,770.3728**	**1,770.3728**	**0.0914**		**1,772.6572**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.1197	3.2237	0.8323	7.1800e-003	0.1760	0.0224	0.1984	0.0507	0.0215	0.0721		769.6433	769.6433	0.0594		771.1288
Worker	0.4516	0.3151	3.5582	0.0101	0.9447	6.7300e-003	0.9514	0.2506	6.2000e-003	0.2568		1,000.7296	1,000.7296	0.0320		1,001.5285
Total	**0.5712**	**3.5388**	**4.3905**	**0.0172**	**1.1207**	**0.0292**	**1.1499**	**0.3013**	**0.0277**	**0.3289**		**1,770.3728**	**1,770.3728**	**0.0914**		**1,772.6572**

3.3 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

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	0.0972	2.9317	0.7469	7.1200e-003	0.1760	0.0143	0.1904	0.0507	0.0137	0.0644		764.5042	764.5042	0.0564		765.9142
Worker	0.4220	0.2843	3.2598	9.7300e-003	0.9447	6.6300e-003	0.9513	0.2506	6.1100e-003	0.2567		969.1591	969.1591	0.0289		969.8826
Total	**0.5192**	**3.2160**	**4.0067**	**0.0169**	**1.1207**	**0.0210**	**1.1417**	**0.3013**	**0.0198**	**0.3211**		**1,733.6633**	**1,733.6633**	**0.0853**		**1,735.7967**

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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

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	0.0972	2.9317	0.7469	7.1200e-003	0.1760	0.0143	0.1904	0.0507	0.0137	0.0644		764.5042	764.5042	0.0564		765.9142
Worker	0.4220	0.2843	3.2598	9.7300e-003	0.9447	6.6300e-003	0.9513	0.2506	6.1100e-003	0.2567		969.1591	969.1591	0.0289		969.8826
Total	**0.5192**	**3.2160**	**4.0067**	**0.0169**	**1.1207**	**0.0210**	**1.1417**	**0.3013**	**0.0198**	**0.3211**		**1,733.6633**	**1,733.6633**	**0.0853**		**1,735.7967**

3.4 Grading - 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					6.1285	0.0000	6.1285	3.3253	0.0000	3.3253			0.0000			0.0000

Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856		2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**6.1285**	**1.3974**	**7.5258**	**3.3253**	**1.2856**	**4.6108**		**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

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	0.6308	21.8294	4.7122	0.0577	1.2699	0.0824	1.3523	0.3480	0.0788	0.4268		6,289.7726	6,289.7726	0.5566		6,303.6880
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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.6897**	**21.8705**	**5.1763**	**0.0590**	**1.3931**	**0.0833**	**1.4764**	**0.3807**	**0.0796**	**0.4603**		**6,420.3026**	**6,420.3026**	**0.5608**		**6,434.3222**

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					2.3901	0.0000	2.3901	1.2969	0.0000	1.2969			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856	0.0000	2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**2.3901**	**1.3974**	**3.7875**	**1.2969**	**1.2856**	**2.5824**	**0.0000**	**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

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	0.6308	21.8294	4.7122	0.0577	1.2699	0.0824	1.3523	0.3480	0.0788	0.4268		6,289.7726	6,289.7726	0.5566		6,303.6880
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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.6897**	**21.8705**	**5.1763**	**0.0590**	**1.3931**	**0.0833**	**1.4764**	**0.3807**	**0.0796**	**0.4603**		**6,420.3026**	**6,420.3026**	**0.5608**		**6,434.3222**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2679	12.7604	12.3130	0.0189		0.7196	0.7196		0.6637	0.6637		1,843.3191	1,843.3191	0.5671		1,857.4966
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2679**	**12.7604**	**12.3130**	**0.0189**		**0.7196**	**0.7196**		**0.6637**	**0.6637**		**1,843.3191**	**1,843.3191**	**0.5671**		**1,857.4966**

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	0.0785	0.0548	0.6188	1.7500e-003	0.1643	1.1700e-003	0.1655	0.0436	1.0800e-003	0.0447		174.0399	174.0399	5.5600e-003		174.1789
Total	**0.0785**	**0.0548**	**0.6188**	**1.7500e-003**	**0.1643**	**1.1700e-003**	**0.1655**	**0.0436**	**1.0800e-003**	**0.0447**		**174.0399**	**174.0399**	**5.5600e-003**		**174.1789**

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	1.2679	12.7604	12.3130	0.0189		0.7196	0.7196		0.6637	0.6637	0.0000	1,843.3191	1,843.3191	0.5671		1,857.4966
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2679**	**12.7604**	**12.3130**	**0.0189**		**0.7196**	**0.7196**		**0.6637**	**0.6637**	**0.0000**	**1,843.3191**	**1,843.3191**	**0.5671**		**1,857.4966**

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	0.0785	0.0548	0.6188	1.7500e-003	0.1643	1.1700e-003	0.1655	0.0436	1.0800e-003	0.0447		174.0399	174.0399	5.5600e-003		174.1789
Total	**0.0785**	**0.0548**	**0.6188**	**1.7500e-003**	**0.1643**	**1.1700e-003**	**0.1655**	**0.0436**	**1.0800e-003**	**0.0447**		**174.0399**	**174.0399**	**5.5600e-003**		**174.1789**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	1.2647	4.6780	11.6579	0.0364	2.9234	0.0306	2.9540	0.7813	0.0286	0.8100		3,696.5643	3,696.5643	0.2076		3,701.7542
Unmitigated	1.4832	5.9421	16.7305	0.0566	4.7270	0.0463	4.7733	1.2634	0.0433	1.3067		5,751.9747	5,751.9747	0.2989		5,759.4473

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	666.00	666.00	666.00	1,901,632	1,176,051
Enclosed Parking with Elevator	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
Strip Mall	212.74	201.79	98.06	299,984	185,523
Total	878.74	867.79	764.06	2,201,616	1,361,574

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Strip Mall	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Health Club	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Enclosed Parking with Elevator	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

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	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
NaturalGas Unmitigated	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2696.82	0.0291	0.2485	0.1058	1.5900e-003		0.0201	0.0201		0.0201	0.0201		317.2732	317.2732	6.0800e-003	5.8200e-003	319.1586
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	100.023	1.0800e-003	9.8100e-003	8.2400e-003	6.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004		11.7675	11.7675	2.3000e-004	2.2000e-004	11.8374
Strip Mall	29.4575	3.2000e-004	2.8900e-003	2.4300e-003	2.0000e-005		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		3.4656	3.4656	7.0000e-005	6.0000e-005	3.4862
Total		**0.0305**	**0.2612**	**0.1164**	**1.6700e-003**		**0.0211**	**0.0211**		**0.0211**	**0.0211**		**332.5063**	**332.5063**	**6.3800e-003**	**6.1000e-003**	**334.4822**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2.69682	0.0291	0.2485	0.1058	1.5900e-003		0.0201	0.0201		0.0201	0.0201		317.2732	317.2732	6.0800e-003	5.8200e-003	319.1586
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0.100023	1.0800e-003	9.8100e-003	8.2400e-003	6.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004		11.7675	11.7675	2.3000e-004	2.2000e-004	11.8374
Strip Mall	0.0294575	3.2000e-004	2.8900e-003	2.4300e-003	2.0000e-005		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		3.4656	3.4656	7.0000e-005	6.0000e-005	3.4862
Total		**0.0305**	**0.2612**	**0.1164**	**1.6700e-003**		**0.0211**	**0.0211**		**0.0211**	**0.0211**		**332.5063**	**332.5063**	**6.3800e-003**	**6.1000e-003**	**334.4822**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Unmitigated	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350

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	0.2650					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5725					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	0.2800	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507		16.5326	16.5326	0.0161		16.9350
Total	**3.1174**	**0.1061**	**9.1978**	**4.9000e-004**		**0.0507**	**0.0507**		**0.0507**	**0.0507**	**0.0000**	**16.5326**	**16.5326**	**0.0161**	**0.0000**	**16.9350**

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	0.2650					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5725					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	0.2800	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507		16.5326	16.5326	0.0161		16.9350
Total	**3.1174**	**0.1061**	**9.1978**	**4.9000e-004**		**0.0507**	**0.0507**		**0.0507**	**0.0507**	**0.0000**	**16.5326**	**16.5326**	**0.0161**	**0.0000**	**16.9350**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 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

Hillcrest 111 Mixed Use Project

San Diego Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	111.00	Dwelling Unit	2.92	111,000.00	317
Strip Mall	4.80	1000sqft	0.11	4,800.00	0
Health Club	3.15	1000sqft	0.07	3,150.00	0
Enclosed Parking with Elevator	190.00	Space	1.71	76,000.00	0

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)	556.22	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Hillcrest 111 Mixed Use Portion

Land Use - Based on project description

Construction Phase - Assuming 14-month construction for Phase II

Grading - Based on project description

Architectural Coating - Rule 67.0.1 coatings

Vehicle Trips - Assuming 6 trips per unit; no additional trips for on-site amenities

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Woodstoves - Assuming no fireplaces in units

Area Coating - Rule 67.0.1 coatings

Energy Use - Site energy use

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	18.00	109.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	8.00	43.00
tblConstructionPhase	NumDays	18.00	132.00
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2020
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2020
tblConstructionPhase	PhaseEndDate	12/31/2018	2/28/2019
tblConstructionPhase	PhaseEndDate	12/31/2018	12/31/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	10/1/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	3/1/2019
tblConstructionPhase	PhaseStartDate	1/1/2019	7/1/2019
tblFireplaces	NumberGas	61.05	0.00
tblFireplaces	NumberNoFireplace	11.10	111.00
tblFireplaces	NumberWood	38.85	0.00

tblGrading	AcresOfGrading	21.50	1.00
tblGrading	MaterialExported	0.00	25,000.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	720.49	556.22
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblProjectCharacteristics	OperationalYear	2018	2021
tblVehicleTrips	ST_TR	6.39	6.00
tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	SU_TR	5.86	6.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	WD_TR	6.65	6.00
tblVehicleTrips	WD_TR	32.93	0.00
tblWoodstoves	NumberCatalytic	5.55	0.00
tblWoodstoves	NumberNoncatalytic	5.55	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	13.5944	50.4473	36.8607	0.0876	7.5216	2.1703	9.0041	3.7060	2.0356	5.0730	0.0000	9,243.2744	9,243.2744	1.5099	0.0000	9,281.0218
2020	11.9097	24.1823	23.1968	0.0478	1.3097	1.2506	2.5602	0.3514	1.1826	1.5340	0.0000	4,671.0750	4,671.0750	0.7375	0.0000	4,689.5112
Maximum	**13.5944**	**50.4473**	**36.8607**	**0.0876**	**7.5216**	**2.1703**	**9.0041**	**3.7060**	**2.0356**	**5.0730**	**0.0000**	**9,243.2744**	**9,243.2744**	**1.5099**	**0.0000**	**9,281.0218**

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	13.5944	50.4473	36.8607	0.0876	3.7832	2.1703	5.2658	1.6776	2.0356	3.0446	0.0000	9,243.2744	9,243.2744	1.5099	0.0000	9,281.0218
2020	11.9097	24.1823	23.1968	0.0478	1.3097	1.2506	2.5602	0.3514	1.1826	1.5340	0.0000	4,671.0750	4,671.0750	0.7375	0.0000	4,689.5112
Maximum	**13.5944**	**50.4473**	**36.8607**	**0.0876**	**3.7832**	**2.1703**	**5.2658**	**1.6776**	**2.0356**	**3.0446**	**0.0000**	**9,243.2744**	**9,243.2744**	**1.5099**	**0.0000**	**9,281.0218**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.33**	**0.00**	**32.33**	**49.99**	**0.00**	**30.70**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Energy	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
Mobile	1.4398	6.1031	16.5321	0.0537	4.7270	0.0467	4.7737	1.2634	0.0436	1.3070		5,454.0063	5,454.0063	0.3007		5,461.5248
Total	**4.5876**	**6.4704**	**25.8464**	**0.0558**	**4.7270**	**0.1184**	**4.8454**	**1.2634**	**0.1153**	**1.3787**	**0.0000**	**5,803.0452**	**5,803.0452**	**0.3232**	**6.1000e-003**	**5,812.9420**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Energy	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
Mobile	1.2255	4.7607	11.9016	0.0344	2.9234	0.0310	2.9544	0.7813	0.0290	0.8103		3,500.4223	3,500.4223	0.2122		3,505.7269
Total	**4.3734**	**5.1281**	**21.2159**	**0.0366**	**2.9234**	**0.1027**	**3.0261**	**0.7813**	**0.1007**	**0.8820**	**0.0000**	**3,849.4613**	**3,849.4613**	**0.2346**	**6.1000e-003**	**3,857.1441**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.67**	**20.75**	**17.92**	**34.46**	**38.16**	**13.22**	**37.55**	**38.16**	**12.69**	**36.03**	**0.00**	**33.66**	**33.66**	**27.40**	**0.00**	**33.65**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	10/1/2019	2/28/2020	5	109	
2	Building Construction	Building Construction	3/1/2019	2/28/2020	5	261	
3	Grading	Grading	1/1/2019	2/28/2019	5	43	
4	Paving	Paving	7/1/2019	12/31/2019	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1

Acres of Paving: 1.71

Residential Indoor: 224,775; Residential Outdoor: 74,925; Non-Residential Indoor: 11,925; Non-Residential Outdoor: 3,975; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Grading	Excavators	1	8.00	158	0.38
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	2	6.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	2	6.00	132	0.36
Building Construction	Welders	1	8.00	46	0.45

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
Architectural Coating	1	23.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	115.00	26.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	3,125.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Architectural Coating - 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					
Archit. Coating	8.8724					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**9.1389**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

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**

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	8.8724					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**9.1389**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

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**

3.2 Architectural Coating - 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	8.8724					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	**9.1146**	**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	0.0956	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**

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	8.8724					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	**9.1146**	**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	0.0956	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**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.1248	3.2263	0.9227	7.0000e-003	0.1760	0.0228	0.1988	0.0507	0.0218	0.0725		750.1007	750.1007	0.0632		751.6810
Worker	0.5107	0.3539	3.3625	9.4300e-003	0.9447	6.7300e-003	0.9514	0.2506	6.2000e-003	0.2568		939.4508	939.4508	0.0303		940.2086
Total	**0.6355**	**3.5802**	**4.2853**	**0.0164**	**1.1207**	**0.0296**	**1.1503**	**0.3013**	**0.0280**	**0.3293**		**1,689.5515**	**1,689.5515**	**0.0935**		**1,691.8896**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

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	0.1248	3.2263	0.9227	7.0000e-003	0.1760	0.0228	0.1988	0.0507	0.0218	0.0725		750.1007	750.1007	0.0632		751.6810
Worker	0.5107	0.3539	3.3625	9.4300e-003	0.9447	6.7300e-003	0.9514	0.2506	6.2000e-003	0.2568		939.4508	939.4508	0.0303		940.2086
Total	**0.6355**	**3.5802**	**4.2853**	**0.0164**	**1.1207**	**0.0296**	**1.1503**	**0.3013**	**0.0280**	**0.3293**		**1,689.5515**	**1,689.5515**	**0.0935**		**1,691.8896**

3.3 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

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	0.1018	2.9294	0.8289	6.9400e-003	0.1760	0.0146	0.1906	0.0507	0.0140	0.0647		744.8018	744.8018	0.0599		746.3001
Worker	0.4779	0.3192	3.0733	9.1300e-003	0.9447	6.6300e-003	0.9513	0.2506	6.1100e-003	0.2567		909.8018	909.8018	0.0274		910.4865
Total	**0.5797**	**3.2486**	**3.9022**	**0.0161**	**1.1207**	**0.0213**	**1.1420**	**0.3013**	**0.0201**	**0.3213**		**1,654.6035**	**1,654.6035**	**0.0873**		**1,656.7866**

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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

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	0.1018	2.9294	0.8289	6.9400e-003	0.1760	0.0146	0.1906	0.0507	0.0140	0.0647		744.8018	744.8018	0.0599		746.3001
Worker	0.4779	0.3192	3.0733	9.1300e-003	0.9447	6.6300e-003	0.9513	0.2506	6.1100e-003	0.2567		909.8018	909.8018	0.0274		910.4865
Total	**0.5797**	**3.2486**	**3.9022**	**0.0161**	**1.1207**	**0.0213**	**1.1420**	**0.3013**	**0.0201**	**0.3213**		**1,654.6035**	**1,654.6035**	**0.0873**		**1,656.7866**

3.4 Grading - 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					6.1285	0.0000	6.1285	3.3253	0.0000	3.3253			0.0000			0.0000

Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856		2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**6.1285**	**1.3974**	**7.5258**	**3.3253**	**1.2856**	**4.6108**		**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

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	0.6486	22.0531	5.0499	0.0567	1.2699	0.0843	1.3542	0.3480	0.0807	0.4287		6,183.9305	6,183.9305	0.5768		6,198.3497
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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.7152**	**22.0993**	**5.4885**	**0.0579**	**1.3931**	**0.0852**	**1.4783**	**0.3807**	**0.0815**	**0.4622**		**6,306.4676**	**6,306.4676**	**0.5807**		**6,320.9856**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3901	0.0000	2.3901	1.2969	0.0000	1.2969			0.0000			0.0000
Off-Road	2.5805	28.3480	16.2934	0.0297		1.3974	1.3974		1.2856	1.2856	0.0000	2,936.8068	2,936.8068	0.9292		2,960.0361
Total	**2.5805**	**28.3480**	**16.2934**	**0.0297**	**2.3901**	**1.3974**	**3.7875**	**1.2969**	**1.2856**	**2.5824**	**0.0000**	**2,936.8068**	**2,936.8068**	**0.9292**		**2,960.0361**

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	0.6486	22.0531	5.0499	0.0567	1.2699	0.0843	1.3542	0.3480	0.0807	0.4287		6,183.9305	6,183.9305	0.5768		6,198.3497
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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.7152**	**22.0993**	**5.4885**	**0.0579**	**1.3931**	**0.0852**	**1.4783**	**0.3807**	**0.0815**	**0.4622**		**6,306.4676**	**6,306.4676**	**0.5807**		**6,320.9856**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2679	12.7604	12.3130	0.0189		0.7196	0.7196		0.6637	0.6637		1,843.3191	1,843.3191	0.5671		1,857.4966
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2679**	**12.7604**	**12.3130**	**0.0189**		**0.7196**	**0.7196**		**0.6637**	**0.6637**		**1,843.3191**	**1,843.3191**	**0.5671**		**1,857.4966**

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					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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	0.0888	0.0616	0.5848	1.6400e-003	0.1643	1.1700e-003	0.1655	0.0436	1.0800e-003	0.0447		163.3828	163.3828	5.2700e-003		163.5146
Total	**0.0888**	**0.0616**	**0.5848**	**1.6400e-003**	**0.1643**	**1.1700e-003**	**0.1655**	**0.0436**	**1.0800e-003**	**0.0447**		**163.3828**	**163.3828**	**5.2700e-003**		**163.5146**

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	1.2679	12.7604	12.3130	0.0189		0.7196	0.7196		0.6637	0.6637	0.0000	1,843.3191	1,843.3191	0.5671		1,857.4966
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2679**	**12.7604**	**12.3130**	**0.0189**		**0.7196**	**0.7196**		**0.6637**	**0.6637**	**0.0000**	**1,843.3191**	**1,843.3191**	**0.5671**		**1,857.4966**

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	0.0888	0.0616	0.5848	1.6400e-003	0.1643	1.1700e-003	0.1655	0.0436	1.0800e-003	0.0447		163.3828	163.3828	5.2700e-003		163.5146
Total	**0.0888**	**0.0616**	**0.5848**	**1.6400e-003**	**0.1643**	**1.1700e-003**	**0.1655**	**0.0436**	**1.0800e-003**	**0.0447**		**163.3828**	**163.3828**	**5.2700e-003**		**163.5146**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

	ROG	NOx	CO	SO2	Fugitive 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	1.2255	4.7607	11.9016	0.0344	2.9234	0.0310	2.9544	0.7813	0.0290	0.8103		3,500.4223	3,500.4223	0.2122		3,505.7269
Unmitigated	1.4398	6.1031	16.5321	0.0537	4.7270	0.0467	4.7737	1.2634	0.0436	1.3070		5,454.0063	5,454.0063	0.3007		5,461.5248

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	666.00	666.00	666.00	1,901,632	1,176,051
Enclosed Parking with Elevator	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
Strip Mall	212.74	201.79	98.06	299,984	185,523
Total	878.74	867.79	764.06	2,201,616	1,361,574

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Strip Mall	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Health Club	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Enclosed Parking with Elevator	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

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	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822
NaturalGas Unmitigated	0.0305	0.2612	0.1164	1.6600e-003		0.0211	0.0211		0.0211	0.0211		332.5063	332.5063	6.3700e-003	6.1000e-003	334.4822

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2696.82	0.0291	0.2485	0.1058	1.5900e-003		0.0201	0.0201		0.0201	0.0201		317.2732	317.2732	6.0800e-003	5.8200e-003	319.1586
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	100.023	1.0800e-003	9.8100e-003	8.2400e-003	6.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004		11.7675	11.7675	2.3000e-004	2.2000e-004	11.8374
Strip Mall	29.4575	3.2000e-004	2.8900e-003	2.4300e-003	2.0000e-005		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		3.4656	3.4656	7.0000e-005	6.0000e-005	3.4862
Total		**0.0305**	**0.2612**	**0.1164**	**1.6700e-003**		**0.0211**	**0.0211**		**0.0211**	**0.0211**		**332.5063**	**332.5063**	**6.3800e-003**	**6.1000e-003**	**334.4822**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2.69682	0.0291	0.2485	0.1058	1.5900e-003		0.0201	0.0201		0.0201	0.0201		317.2732	317.2732	6.0800e-003	5.8200e-003	319.1586
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0.100023	1.0800e-003	9.8100e-003	8.2400e-003	6.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004		11.7675	11.7675	2.3000e-004	2.2000e-004	11.8374
Strip Mall	0.0294575	3.2000e-004	2.8900e-003	2.4300e-003	2.0000e-005		2.2000e-004	2.2000e-004		2.2000e-004	2.2000e-004		3.4656	3.4656	7.0000e-005	6.0000e-005	3.4862
Total		**0.0305**	**0.2612**	**0.1164**	**1.6700e-003**		**0.0211**	**0.0211**		**0.0211**	**0.0211**		**332.5063**	**332.5063**	**6.3800e-003**	**6.1000e-003**	**334.4822**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350
Unmitigated	3.1174	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507	0.0000	16.5326	16.5326	0.0161	0.0000	16.9350

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	0.2650					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5725					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	0.2800	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507		16.5326	16.5326	0.0161		16.9350
Total	**3.1174**	**0.1061**	**9.1978**	**4.9000e-004**		**0.0507**	**0.0507**		**0.0507**	**0.0507**	**0.0000**	**16.5326**	**16.5326**	**0.0161**	**0.0000**	**16.9350**

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	0.2650					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5725					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	0.2800	0.1061	9.1978	4.9000e-004		0.0507	0.0507		0.0507	0.0507		16.5326	16.5326	0.0161		16.9350
Total	**3.1174**	**0.1061**	**9.1978**	**4.9000e-004**		**0.0507**	**0.0507**		**0.0507**	**0.0507**	**0.0000**	**16.5326**	**16.5326**	**0.0161**	**0.0000**	**16.9350**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 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