



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: _____

Property Address: _____

Applicant Name/Co.: _____

Contact Phone: _____ Contact Email: _____

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

Consultant Name: _____ Contact Phone: _____

Company Name: _____ Contact Email: _____

Project Information

1. What is the size of the project (acres)? _____

2. Identify all applicable proposed land uses:

☐ Residential (indicate # of single-family units): _____

☐ Residential (indicate # of multi-family units): _____

☐ Commercial (total square footage): _____

☐ Industrial (total square footage): _____

☐ Other (describe): _____

3. Is the project or a portion of the project located in a Transit Priority Area? ☐ Yes ☐ No

4. Provide a brief description of the project proposed: _____

² Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.



CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
A. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations? ³ <u>OR</u>		
B. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment, would the proposed amendment result in an increased density within a Transit Priority Area (TPA) ⁴ and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department? <u>OR</u> ,	☐	☐
C. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?		

If **"Yes,"** proceed to Step 2 of the Checklist. For question B above, complete Step 3. For question C above, provide estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation.

If **"No,"** in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

³ This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

⁴ This category applies to all projects that answered in the affirmative to question 3 on the previous page: Is the project or a portion of the project located in a transit priority area.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.⁵ All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the [Greenbook](#) (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
1. <i>Cool/Green Roofs.</i> • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; <u>OR</u> • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; <u>OR</u> • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component.	☐	☐	☐

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.

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Strategy 3: Bicycling, Walking, Transit & Land Use

3. Electric Vehicle Charging

- Multiple-family projects of 17 dwelling units or less: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents?
- Multiple-family projects of more than 17 dwelling units: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents?
- Non-residential projects: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use?

Check "N/A" only if the project is a single-family project or would not require the provision of listed cabinets, boxes, or enclosures connected to a conduit linking the parking spaces with electrical service, e.g., projects requiring fewer than 10 parking spaces.



Strategy 3: Bicycling, Walking, Transit & Land Use

(Complete this section if project includes non-residential or mixed uses)

4. Bicycle Parking Spaces

Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code ([Chapter 14, Article 2, Division 5](#))?⁶

Check "N/A" only if the project is a residential project.



⁶ Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

5. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the [California Green Building Standards Code](#) as shown in the table below?

Number of Tenant Occupants (Employees)	Shower/Changing Facilities Required	Two-Tier (12" X 15" X 72") Personal Effects Lockers Required
0-10	0	0
11-50	1 shower stall	2
51-100	1 shower stall	3
101-200	1 shower stall	4
Over 200	1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants	1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

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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.

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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).

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Step 3: Project CAP Conformance Evaluation (if applicable)

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option B. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. In general, a project that would result in a reduction in density inside a TPA would not be consistent with Strategy 3. The following questions must each be answered in the affirmative and fully explained.

1. Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?

Considerations for this question:

- Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
- Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
- Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?

Considerations for this question:

- Does the proposed project support/incorporate identified transit routes and stops/stations?
- Does the project include transit priority measures?

3. Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?

Considerations for this question:

- Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
- Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?

Considerations for this question:

- Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
- Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?

Considerations for this question:

- Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
- Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
- Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?

Considerations for this question:

- Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
- Does the proposed project include policies or strategies for preserving existing trees?
- Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?



CLIMATE ACTION PLAN CONSISTENCY CHECKLIST ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Plan (CAP) Consistency Checklist measures.

Table 1 Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan				
Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
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 <i>California Code of Regulations</i> .	
Conveyor-type Dishwashers	0.70 maximum gallons per rack (2.6 L) (High-Temperature)	0.62 maximum gallons per rack (4.4 L) (Chemical)
Door-type Dishwashers	0.95 maximum gallons per rack (3.6 L) (High-Temperature)	1.16 maximum gallons per rack (2.6 L) (Chemical)
Undercounter-type Dishwashers	0.90 maximum gallons per rack (3.4 L) (High-Temperature)	0.98 maximum gallons per rack (3.7 L) (Chemical)
Combination Ovens	Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.	
Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)	Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and • 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)



Toyon Road Private Residence Project

General Biological Survey Report Project no. 599273

prepared for

Dan Munch

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November 2018

A handwritten signature in cursive script that reads "Amber Bruno".

Amber Bruno
Senior Biologist

Toyon Road Private Residence Project

General Biological Survey Report

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November 2018

This report prepared on 50 percent recycled paper with 50 percent post-consumer content.

Rincon Consultants, Inc.

2018 *General Biological Survey Report Toyon Road Private Residence Project, San Diego, California.* Rincon Consultants Project No. 17-04935.

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Executive Summary

This General Biological Survey Report documents the findings of a biological survey conducted by Rincon Consultants, Inc. (Rincon) for the Toyon Road Private Residence Project located in San Diego, California. The purpose of this report is to document the existing conditions of the project site and to evaluate the potential for impacts to biological resources for compliance with the California Environmental Quality Act (CEQA) review process, as well as consistency with the City of San Diego's (City) Multiple Species Conservation Program (MSCP) Subarea Plan.

The project is in the College Area Community Plan area in the MSCP Subarea Plan, and occurs partially in a Multi-Habitat Planning Area (MHPA). The project consists of the construction of a two-story single-family residence in the northwest corner of the property, and a Boundary Line Adjustment (BLA) to the MHPA.

The site is within the RS-1-1 Zone which allows single family developments with minimum 40,000-square-foot lots. However, OR-1-2 Zone development regulations apply to all property within the MHPA. In this case the parcels is not zoned OR-1-2, but is still subject to the OR-1-2 development area regulations pursuant to the Environmentally Sensitive Lands regulations (ESL) (Sec. 143.0141(d)). The site is subject to ESL which apply additional regulations for lands that contain Sensitive Biological Resources, including lands within the MHPA. The allowable development area within this zone includes all portions of the site, both developed and undeveloped, that occur outside of the MHPA. However, the site does not include enough area outside of the MHPA to achieve a contiguous development footprint within the least sensitive portion of the site. This is because the current configuration of the MHPA bisects the site and includes much of the buildable area of the property. Therefore, a BLA is proposed to allow reconfiguration of the MHPA to allow a reasonable development footprint within the least sensitive portion of the site. The development footprint, including Brush Management Zone 1, is proposed to be limited to 25 percent of the lot area.

The proposed project would directly impact two special status vegetation communities (Diegan Coastal Sage Scrub and Coastal Sage Scrub/Chaparral Transition) within the least sensitive portion of a site partially bisected by the MHPA. The project is required to mitigate for the 0.27 acre of Tier II habitats at a ratio of 1:1 per the City's upland mitigation ratio requirements. Habitat will be mitigated on-site within the adjacent MHPA. As part of the conditions of approval for the project, 0.61 acres of native vegetation within the property boundary will be added to the MHPA through a BLA and placed in a 1.03 acre COE in perpetuity. The BLA will exchange habitat of lower quality (disturbed) for Diegan Coastal Sage Scrub and Coastal Sage Scrub/Chaparral Transition habitat of higher quality. The project as proposed addresses the City's MHPA Land Use Adjacency Guidelines through environmentally sensitive drainage and lighting design, toxic chemical and noise minimization, barriers to access, and adherence to invasive plant, brush management and grading requirements.

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1 Introduction

This report provides information pertaining to the existing biological resources Rincon observed for the Toyon Road Private Residence Project (project) located in San Diego. The purpose of this report is to document the existing conditions of the project site and to evaluate the potential for impacts to biological resources, facilitating the City's environmental review of the project during the CEQA process. This report is prepared in accordance with the City's Land Development Manual Biological Guidelines (hereafter, City Guidelines), and includes an analysis of the project's consistency with the City's MSCP Subarea Plan.

1.1 Project Location

The project site is a vacant 1.52-acre vegetated lot located in the northern portion of the Alvarado Estates gated community in San Diego, California (Figure 1). It is bordered by Toyon Road on the west, Yerba Anita Drive 150 feet to the east, Interstate Highway 8 approximately 700 feet to the north, and single-family residences to the north and south. Specifically, development would occur on Assessor's Parcel Number (APN) 461-430-0900. The project site is depicted on the U.S. Geological Survey (USGS) La Mesa, California 7.5-minute topographic quadrangle, San Bernardino Meridian Township 16 South, Range 2 West, Section 16 (Figure 2). The project is within the College Area Community Plan, the City's adopted land use plan for this area. The site is within the City's MSCP Subarea Plan, and occurs partially in an MHPA. The development around the project includes single-family residential homes and roads sited on ridgetops, described as an urban canyon system. The site is not in the Coastal Zone. Of the 1.52 acres, 0.69 acre (45 percent) is in the MHPA. The property is surrounded by single-family residential properties, directly between Toyon Road to the west and Yerba Anita Drive to the east.

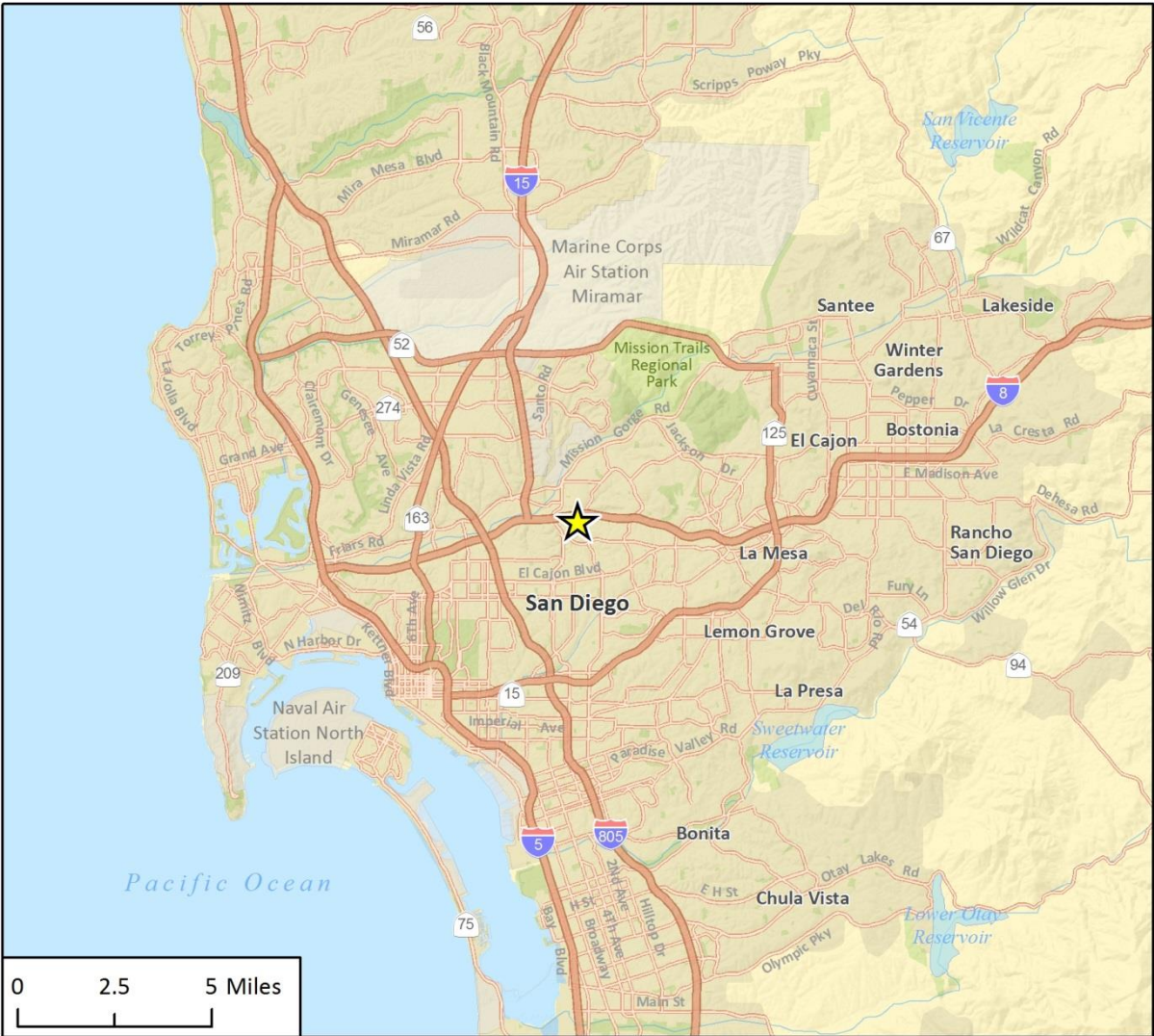
1.2 Project Description

The proposed project would construct a two-story single-family residence in the northwest corner of the property. The northwest corner was selected because it was the most disturbed / least biologically sensitive and least impactful portion of the parcel.

The development will include a 3,170 square-foot single-family residence with a 499-square foot attached junior unit, 554-square foot garage and a 710-square foot pool with hot tub. It will also include a 750-square foot patio with non-combustible paving, a 540-square foot concrete driveway and 11,085 square feet of landscaping (Figure 3). All development will be confined to the development footprint/limits of work or the road right-of-way (ROW). All runoff from BMZ -1, including pervious and impervious surfaces, will drain or be pumped into a landscaped filtration area on the northwest corner of the property before infiltrating into landscaping outside the MHPA. Any overflow from the filtration basin will discharge directly to the public conveyance system (street drainage) on Toyon Road via gravity.

The limits of construction (limits of grading) would include the structure and associated features (e.g., driveway, walkway, pool, ornamental landscape, etc.). A standard 35-foot-wide Brush Management Zone (BMZ) 1 setback extends from the edge of the proposed structure. The limits of

Figure 1 Regional Location



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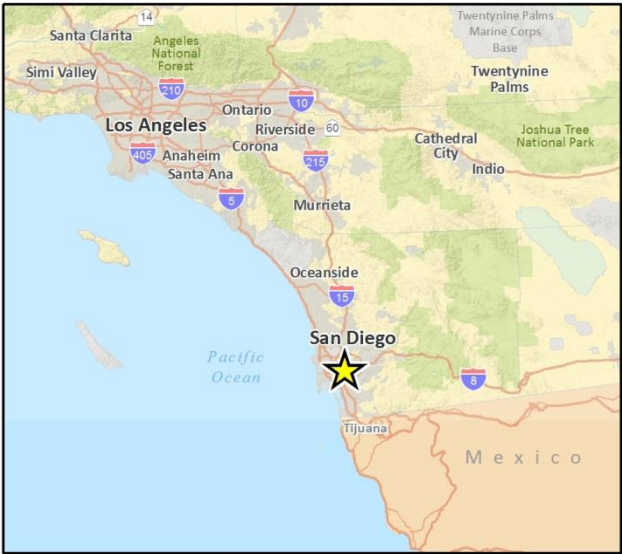
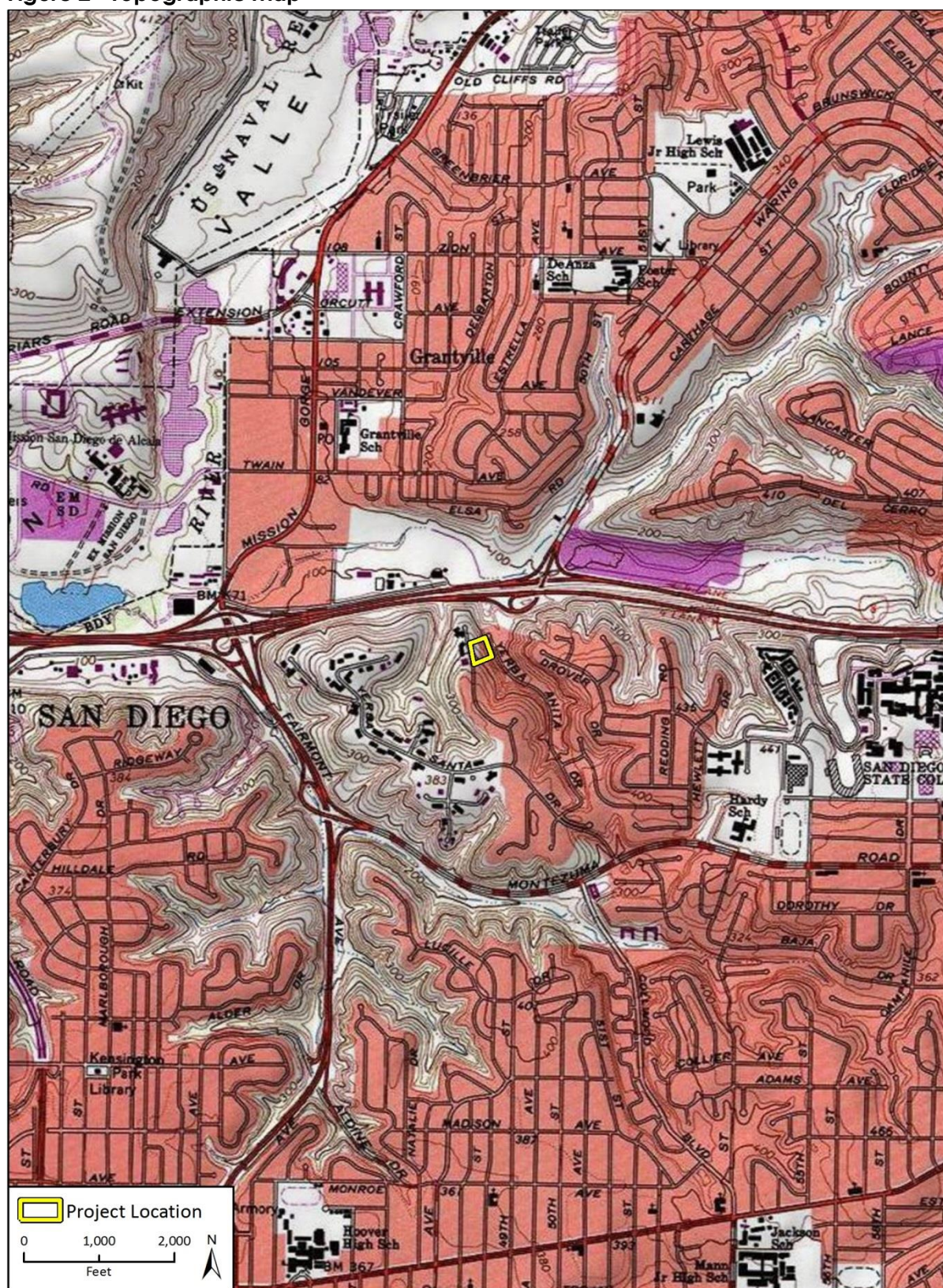


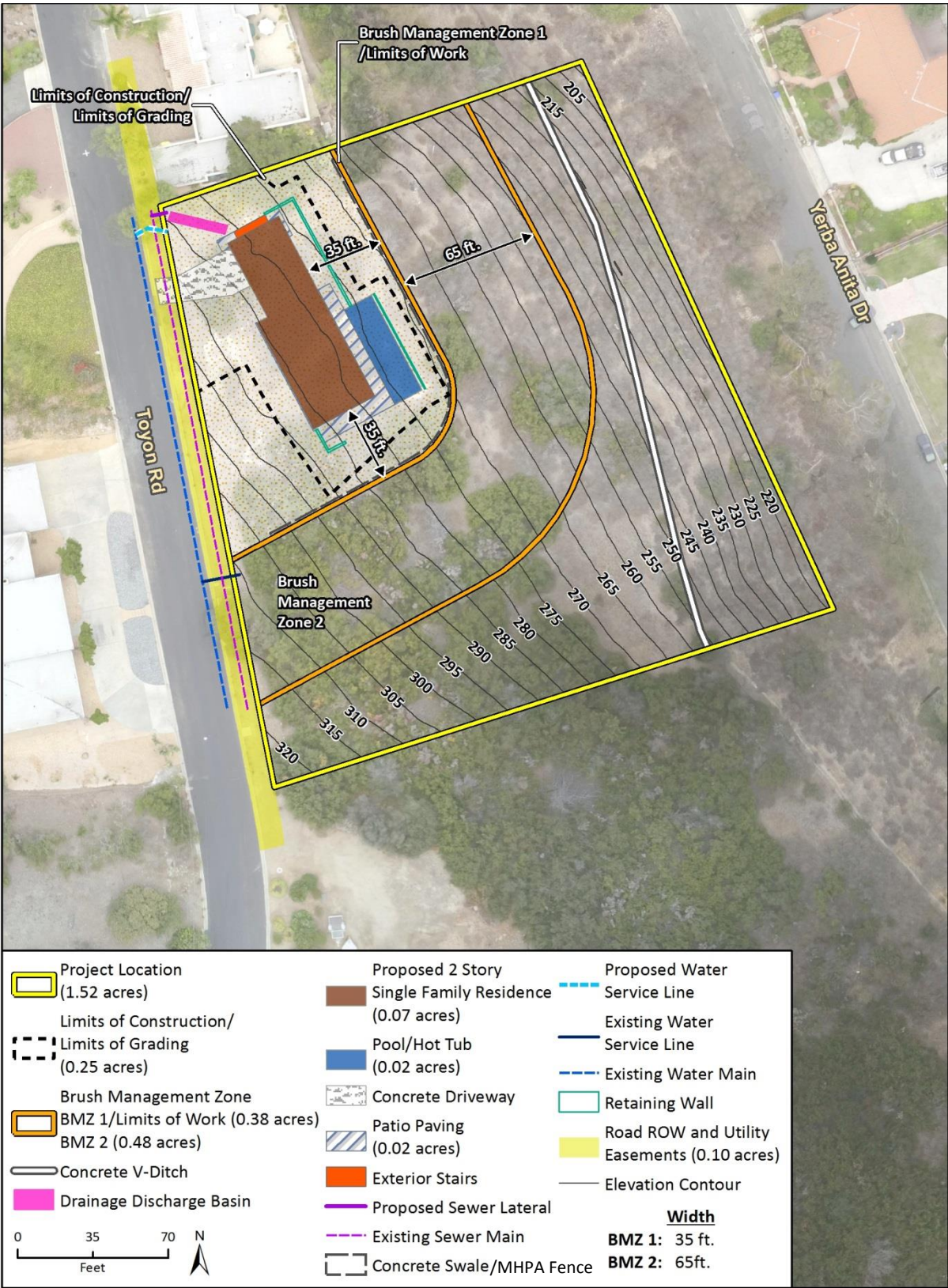
Fig 1 Regional Location

Figure 2 Topographic Map



Imagery provided by National Geographic Society, Esri and its licensors © 2018. La Mesa Quadrangle. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

Figure 3 Project Site and Description



construction and BMZ-1 setback comprise the project development footprint (limits of work); a boundary fence is proposed along BMZ-1. A standard BMZ-2 setback extends another 65 feet beyond BMZ-1 for additional wildland fire safety. BMZ-2 is not considered part of the project development footprint because it is considered impact neutral (City of San Diego 2012).

It is estimated that the proposed project would begin construction in spring of 2019 and be completed by summer of 2020.

The project proposes a MHPA Boundary Line Adjustment (BLA) that would remove areas of encroachment into the MHPA and add habitat not currently in the MHPA into the MHPA. The MHPA will be placed within a Covenant of Easement (COE) for conservation in perpetuity.

2 Methodology

Biological conditions at the project site were evaluated by confirming applicable biological regulations, policies, and standards; reviewing biological literature pertinent to the site and vicinity; and conducting a reconnaissance-level biological survey of the site. The methods employed are described in detail below and are consistent with City Guidelines.

2.1 Literature Review

Prior to the field survey, Rincon conducted a literature review to characterize the nature and extent of biological resources on and adjacent to the site. The literature review included an evaluation of current and historical aerial photographs of the site, regional and site-specific topographic maps including the USGS La Mesa, California 7.5-minute topographic quadrangle, soil and vegetation maps, and other available background information.

The City's SanBIOS data was reviewed to determine areas designated as MHPA for the MSCP Subarea Plan. The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) wetlands mapper (USFWS 2017) and USGS National Hydrography Dataset (USGS 2018) were reviewed to determine if any wetland and/or non-wetland waters had been previously documented and mapped on or in the vicinity of the proposed study area.

The California Natural Diversity Data Base (CNDDDB), Biogeographic Information and Observation System (BIOS), the USFWS Critical Habitat Portal, and San Diego Association of Governments (SANDAG) Data Basin vegetation community layers (SANDAG/Data Basin 2013) were also reviewed to determine if any special status wildlife, plant, or vegetation communities were recorded previously on-site.

Other resources included the California Native Plant Society (CNPS) online Inventory of Rare and Endangered Plants of California, California Department of Fish and Wildlife (CDFW) Special Animals List, and CDFW Special Vascular Plants, Bryophytes, and Lichens List, Calflora, Habitat Classification Rules California Wildlife Habitat Relationships System (CWHRR), the City Guidelines, and Environmentally Sensitive Land regulations, and amendments.

2.2 Field Reconnaissance Survey and Biological Resource Mapping

On January 17, 2018, Rincon Senior Biologist Richard Stolpe conducted a general biological survey. The survey area included the 1.52 acre property and a 100-foot buffer where feasible (excluding private property). The purpose of the survey was to document the existing biological conditions within the project site, including plant and wildlife species, general vegetation communities, and presence/absence of jurisdictional waters and wetlands. Additionally, the survey documented the potential for presence of sensitive (locally important) or special status (e.g., threatened and endangered [T&E]) species and/or habitats, and vegetation communities. The biologist conducted the survey on foot between the hours of 0800 and 1200. Where portions of the site were inaccessible (e.g., steep slopes), the biologist visually inspected those areas with binoculars (10 x

40). Weather conditions at the time of the survey included a temperature of 75 degrees Fahrenheit (°F), with sustained winds of approximately 5 miles per hour (mph), and 0 percent cloud cover. Refer to Appendix B for photographs of the project site.

Biological resources observed on-site were mapped on a site-specific aerial photograph, at a scale of 1.0-inch-equals-50-feet. All accessible portions of the study area were covered on foot. Inaccessible areas were mapped using binoculars and aerial photography interpretation. Vegetation classification was based on the systems provided in the *Draft Vegetation Communities of San Diego County* (Oberbauer et al. 2008), and modified as appropriate to reflect the existing site conditions.

2.2.1 Flora

All plant species observed on the property were noted, and plants that could not be identified in the field were photographed and identified later using taxonomic keys. The reconnaissance survey included a directed search for special status plants that would have been apparent at the time of the survey. Rincon made modifications to the community classifications, as appropriate, based on the field conditions. Appendix A provides a complete list of plant species observed on-site.

2.2.2 Fauna

Animal species were documented as observed directly or detected from calls, tracks, scat, nests, or other sign. Zoological nomenclature for birds is in accordance with the American Ornithological Society Checklist (2018), and for mammals, Wilson and Reeder (2005). The detection of wildlife species was limited by seasonal and temporal factors as the survey was conducted during winter. Potentially occurring spring, summer, or fall migrants may not have been observed. As the survey was performed during the day, identification of nocturnal animals was limited to on-site sign, if present. Appendix A provides a complete list of wildlife species observed on-site.

2.2.3 Jurisdictional Waters, Wetlands, and Drainages

The field survey also included a survey for potential jurisdictional features (including wetlands), streambeds, and drainages. Any water features encountered on the parcel were recorded.

2.2.4 Survey Limitations

The reconnaissance-level survey was conducted during the winter season. Many residual annual plants were withered and dead; some perennial species were dormant.

The potential presence of special status species is based on a literature review, existing site conditions, and a general biological field survey to assess habitat suitability. The southern extent of the property could not be accessed due to extreme slope. Therefore, findings for this area are based on visual observations from above, below, and from satellite imagery. Definitive surveys to confirm the presence or absence of special status species were not performed due to low probability of occurrence, as described in Appendix C.

3 Regulatory Overview

Biological resources studied and analyzed herein include sensitive or special status species and/or habitats, vegetation communities, nesting birds and raptors, jurisdictional waters and wetlands, wildlife movement, and locally protected resources such as MSCP-protected species and habitat.

3.1 Federal, State, and Local Environmental Statutes

For the purpose of this report, potential impacts to biological resources were analyzed based on the following statutes:

3.1.1 Federal

- **Federal Endangered Species Act (ESA):** These laws prohibit the unauthorized take of federally and state-listed threatened and endangered species. The project will adhere to ESA provisions and ensure no unauthorized take of protected species.
- **Federal Clean Water Act (CWA):** These laws prohibit unauthorized discharges of pollutants, including fill material for construction, into jurisdictional waters of the United States. The project will comply with the provisions of the CWA.
- **Migratory Bird Treaty Act:** Under the provisions of the Migratory Bird Treaty Act of 1918 (MBTA), it is unlawful “by any means or manner to pursue, hunt, take, capture (or) kill” any migratory birds except as permitted by regulations issued by the USFWS. The project will comply with the provisions of the MBTA.

3.1.2 State

- **California Environmental Quality Act (CEQA):** Requires environmental review prior to approval of discretionary projects, and requires significant impacts to be mitigated if feasible. The project will adhere to CEQA review and mitigation guidelines.
- **California Endangered Species Act (CESA):** These laws prohibit the unauthorized take of state-listed threatened and endangered species. The project will adhere to CESA provisions and ensure no unauthorized take of protected species.
- **California Fish and Game Code (CFGC):** The CFGC regulates activities that would divert, obstruct, or alter streambeds (Sections 1600 and 3503 et seq.) or impact any birds in the orders Falconiformes and Strigiformes (raptors or birds-of-prey) (CFGC Section 3503.5). The project will comply with the provisions of the CFGC.
- **Porter-Cologne Water Quality Control Act:** These laws prohibit unauthorized discharges of pollutants, including fill material for construction, into jurisdictional waters of the State. The project will comply with the provisions of this legislation.

3.1.3 City of San Diego

- **City of San Diego Multiple Species Conservation Subarea Plan:** The MSCP is a comprehensive habitat conservation planning program within San Diego County pursuant to

ESA §10(a), the Natural Community Conservation Program (NCCP), and the California NCCP Act of 1991, and CESA. The MSCP consists of numerous planning subareas.

The project site is located in the boundaries of the City's MSCP Subarea Plan. The Subarea Plan was adopted by City Council in March of 1997 and approved by the USFWS and California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game [CDFG]) in July of the same year. The Subarea Plan demonstrates how consistency with the MSCP Plan and its conservation targets is achieved (City of San Diego 1997). The purpose of the MSCP Subarea Plan is preservation of a network of habitat and open space to protect biodiversity and conservation of viable populations of sensitive species covered by the MSCP. The City implements the MSCP Subarea Plan through various mechanisms including conservation of lands within the MHPA through the development process.

- **City of San Diego Municipal Code Environmentally Sensitive Lands Regulations (Chapter 14, Division 1, Section 143.0141):** Regulations intended to ensure that development in the city of San Diego occurs in such a way that the overall quality of biological resources is protected, and the natural and topographic character of the area and retains biodiversity and interconnected habitats. The project falls within City boundaries and will adhere to these regulations.

4 Environmental Setting and Survey Results

4.1 Topography and Soils

At an elevation range of approximately 200 to 325 feet above mean sea level, the topography of the parcel can be described as a sloped hillside on the west side of an unnamed canyon (of the Mission Valley Canyon system), with Yerba Anita Drive and single-family residences occupying the canyon floor. The parcel has no structures currently and contains a dense mixture of non-native and native vegetation. A concrete runoff conveyance channel is situated near the eastern terminus of the parcel, extending the length of the western side of the unnamed canyon through APNs 461-430-0700, 461-430-0800, 461-430-0900, 461-430-1000, and 461-430-1100. The eastern third of the site (0.58 acres) is steep (greater than 25 percent slope).

Two soil series occur within the parcel. Table 1 shows their respective phase(s) (USDA 2018a). Olivenhain Urban land complex makes up approximately 88 percent of the parcel, whereas Terrace escarpments composes the remaining (and eastern) portion of the parcel. No hydric soils are present on the site.

Table 1 Soils Occurring within the Survey Area

Soil Series	Phase	Setting
Olivenhain Urban land complex	Very cobbly loam, 2 to 9 % slopes (OkC)	Olivenhain soils occur on gently sloping to strongly sloping, dissected marine terraces at elevations of 100 to 600 feet, and typically support flattop buckwheat, wildoats, chamise, morning glory, filaree, soft chess, and cactus. Olivenhain soils are well-drained, exhibit slow or medium runoff, and are of slow permeability.
Terrace Escarpments	Steep to very steep landscapes (TeF)	Terrace escarpments occur on the steep sides of drainageways of foothills, plains, and deserts. Frequently there are 4 to 10 inches of loamy or gravelly soil over gravelly sediments. Typical vegetation cover is dense in shaded areas and sparse in exposed areas.

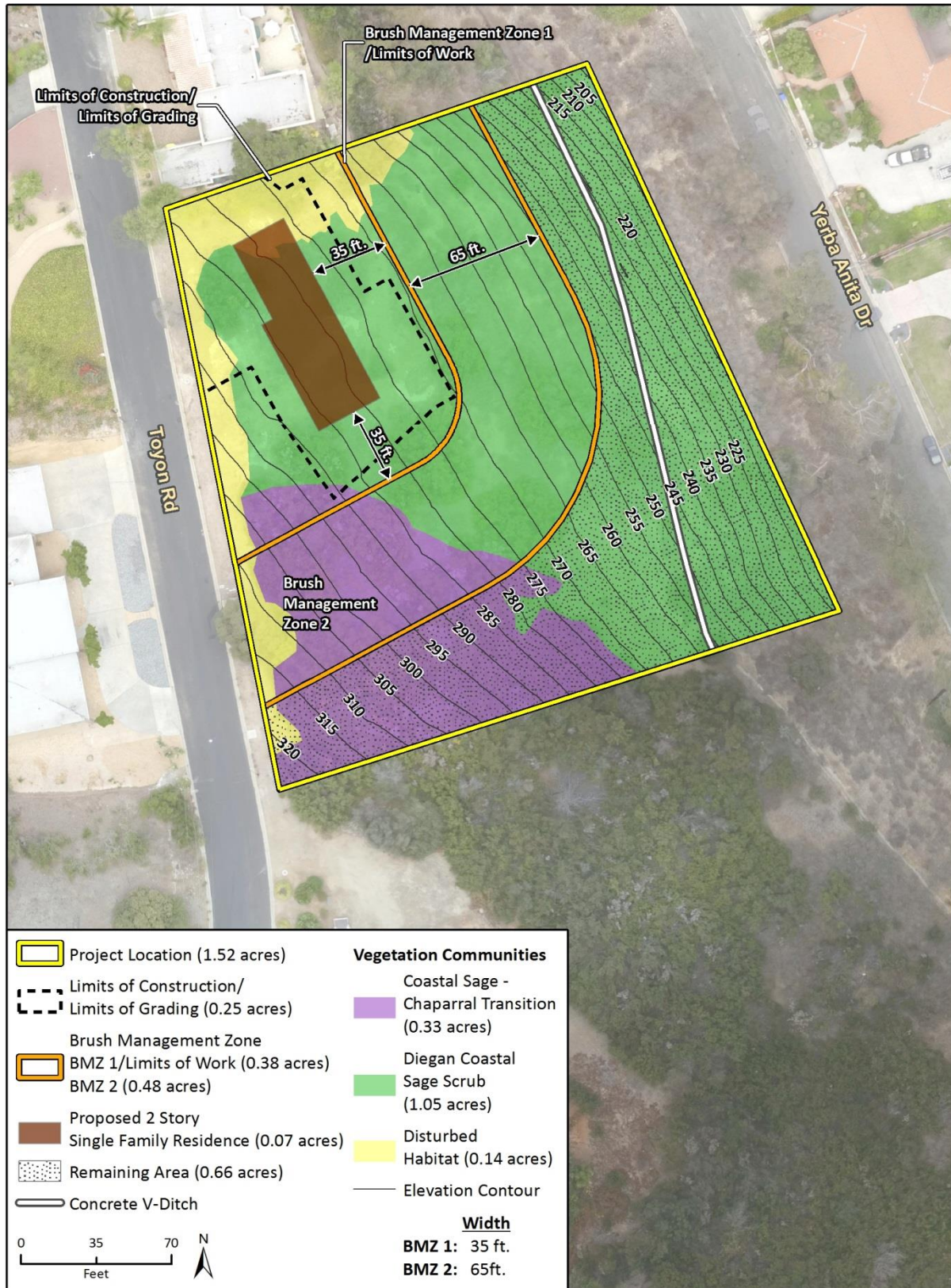
Soil series information: USDA 1973, 2018b

4.2 Vegetation Communities

SANDAG mapped the project site as non-native vegetation, developed areas, or unvegetated habitat (SANDAG/ Data Basin 2013). Two vegetation communities are mapped in the San Diego County SANBIOS GIS Map Layer (San Bios, 2018). One data layer maps the property as grasslands, vernal pools, meadows, and other herb communities. The other data layer shows the property as Diegan Coastal Sage Scrub (DCSS), but based on the survey conducted at the site, these remote data are inaccurate.

Three vegetation communities or land cover types were mapped during the field survey and are presented in this report; DCSS (Tier II), Coastal Sage-Chaparral Transition (CSS/Chaparral, Tier II), and disturbed habitat (Tier IV) (Figure 4). Table 2 lists total acreage of each vegetation community/land cover types on-site.

Figure 4 Vegetation Communities



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Additional data provided by County of San Diego 2018.

Fig. 4 Vegetation Communities

Table 2 Vegetation Community/Land Cover Type On-site

Tier	Vegetation Community/Land Cover Type by Oberbauer (Holland Code)	Acres
II	Diegan Coastal Sage Scrub (32500)	1.05
II	Coastal Sage-Chaparral Transition (37G00)	0.33
IV	Disturbed Habitat (11300)	0.14
Total		1.52

4.2.1 Diegan Coastal Sage Scrub (32500)

DCSS makes up approximately 70 percent of the site. DCSS is a plant community composed of low, soft-woody subshrubs up to three feet tall that most actively grow in winter and early spring. Many taxa are drought-deciduous. This community typically occurs on low moisture-availability sites: steep xeric slopes, or clay-rich soils that are slow to release stored water.

The 1.05 acres of DCSS occurs throughout the parcel, with the exception of the western and northwestern parcel margins that are occupied by disturbed habitat. The DCSS on-site is dominated by a mix of sages (white [*Salvia apiana*], black [*Salvia mellifera*],), baccharis (desertbroom [*B. sarathroides*], and coyote brush [*B. pilularis*]).

DCSS is considered a Tier II “uncommon” vegetation according to the City Guidelines. The DCSS on the northwestern corner of the property is considered disturbed DCSS by the City Guidelines, due to evidence of graded areas and a higher amount of invasive species than areas of DCSS on the property to the east.

4.2.2 Coastal Sage-Chaparral Transition (37G00)

A mix of woody chaparral and sage scrub species that are drought-deciduous characterize the CSS/Chaparral Transition habitat. The 0.33 acres on-site is composed of toyon (*Heteromeles arbutifolia*) and lemonade berry (*Rhus integrifolia*) intermixed with black sage and coyote brush. CSS/Chaparral is considered a Tier II “uncommon” vegetation by the City Guidelines.

4.2.3 Disturbed Habitat (11300)

Disturbed Habitat consists of areas that have been disturbed physically (by previous legal human activity) and are no longer recognizable as a native or naturalized vegetation association, but continue to retain a soil substrate. Typically, vegetation, if present, is nearly exclusively composed of non-native plant species such as ornamental plantings or ruderal exotic species that take advantage of disturbance, or shows signs of past or present animal usage that removes any capability of providing viable natural habitat for uses other than dispersal. Approximately 0.14 acre of Disturbed Habitat occurs on the parcel. These areas are dominated mostly by white horehound (*Marrubium vulgare*) and bare ground. Disturbed Habitat is considered a Tier IV “other” vegetation type by the City Guidelines.

4.3 Waterways, Wetlands, and Drainages

There are no waterways, wetlands, or natural drainages on the project site. There is a concrete runoff conveyance channel at the eastern terminus of the parcel that extends the length of the

property through APNs 461-430-0700, 461-430-0800, 461-430-0900, 461-430-1000, and 461-430-1100. This feature is a stormwater control measure installed in approximately 1965, above the steepest parts of the hillside to manage runoff (and ostensibly eroded material) from Yerba Anita Drive. To estimate its installation date and to ensure that the feature was not a natural waterway or drainage subject to federal, state, or local regulations, Rincon reviewed historical aerial photos of the site (National Environmental Title Research 2018) and confirmed that the constructed channel does not appear until 1966.

4.4 Common Wildlife

Parcels adjacent to the project site make up part of a developed and disturbed residential community, or “urban canyon system” characterized by mesa/ridge-top and canyon-bottom development. The steep slopes between the areas of development provide some pockets of dense habitat, but not extensive high-quality habitat for wildlife species. Wildlife activity observed during the survey was low and the wildlife species observed were typical of those commonly occurring in southern California urban-canyon shared use areas (see Appendix A for full list of wildlife species observed on-site).

5 Multiple Species Conservation Plan Subarea Plan Consistency Analysis

The project area is within a largely developed / urbanized community within the City of San Diego's MSCP Subarea Plan. The project area is located within an area described by the MSCP Subarea Plan as "Other Urban Habitat Areas". The Subarea Plan describes the relationship of Urban Habitat Areas to the MHPA as: "Urban habitat areas within the City of San Diego included in the MHPA are primarily concentrated in existing urbanized locations, and include areas not incorporated in the major planned areas of the MHPA. The majority of these lands consist of canyons with native habitats in relative proximity to other MHPA areas providing habitat. These areas contribute in some form to the MHPA, either by providing habitat for native species to continue to reproduce and find new territories, or by providing necessary shelter and forage for migrating species (mostly birds)."

5.1 Environmentally Sensitive Lands Regulations

The Environmentally Sensitive Lands regulations (ESL) provide a compliance and implementation mechanism for the MSCP Subarea Plan and its Implementing Agreement. According to the City Municipal Code §143.0101, the purpose of the ESL regulations are to "protect, preserve, and, where damaged restore, the ESL of San Diego and the viability of the species supported by those lands" (City of San Diego 2018a). Specific development regulations pertaining to sensitive biological resources exist in the City's Municipal Code in both the ESL Regulations (City of San Diego 2018b) and the OR-1-2 Zone (City of San Diego 2018c).

The ESL regulations defines sensitive biological resources as lands included within the MHPA as identified in the City's MSCP Subarea Plan and other lands outside of the MHPA that contain wetlands; vegetation communities classifiable as Tier I, II, IIIA or IIIB; habitat for rare, endangered or threatened species; or narrow endemic species (City of San Diego 2012).

Sites within the MHPA are subject to the allowable development area of the OR-1-2 zone and include all portions of the site, both developed and undeveloped, that occur outside of the MHPA. Encroachment into the MHPA may be permitted if necessary to achieve a minimum 25 percent development area on the least sensitive portion of a site. The project would develop the least sensitive area on the northwest corner of the property.

The development footprint is placed closest to the road on the flatter, western portion of the property in an area that can accommodate reasonable development. Some of this area was previously graded and is identified as disturbed habitat (closest to the road). The areas of DCSS within the development footprint are also of somewhat lower quality than those areas outside the development footprint because they are affected by previous disturbance. Placement of the development would avoid steep hillsides, DCSS and CSS/Chaparral located on the eastern and southern portions of the property.

The BLA has been proposed to accommodate the proposed development in the least sensitive portion of the site by reconfiguring the MHPA on the property. Because more than 25 percent of the site exists outside the MHPA, strict application of the regulations and the current configuration of the MHPA would require the development footprint to be located entirely outside the MHPA, within a narrow strip near the road or in an area constrained by steep slopes.

5.1.1 Development Inside the MHPA (Outside of Coastal Overlay Zone).

According to City Guidelines, for parcels outside of the Coastal Overlay Zone and wholly or partially in the MHPA, development is limited to the development area allowed by the OR-1-2 Zone, as described in Section II.B, including BMZ-1. Development is allowed within the MHPA only if necessary to achieve a minimum developable area of 25 percent of the total site. Development is further restricted to the least sensitive portion of the site. This property is outside of the Coastal Overlay Zone and is bisected by the MHPA. Because more than 25 percent of the site is outside the MHPA, development inside the MHPA is restricted. As previously described, a BLA is proposed to reconfigure the preserve to avoid development inside the MHPA.

The proposed project would be designed to avoid impacts to covered species where feasible and is sited on the least sensitive area of the property, based on the following rationale: The property is primarily vegetated on a hillside that slopes steeply to the east. The development area is placed closest to the road where the property is most disturbed but can still accommodate development. Some of this area is previously graded and considered disturbed. Placement of the development also avoids impacts to steep hillsides and mixed chaparral, considered more sensitive than the DCSS in the development area. The areas of DCSS in the development area are of lower quality than those in BMZ-2 and habitats within BMZ-2 and to the east would be placed in a COE.

5.1.2 Development Outside of the MHPA.

The allowable development area of a site in the OR-1-2 zone (or within the MHPA) includes all areas outside of the MHPA, however, as previously described the project site does not include enough contiguous area to achieve the allowable 25 percent of the site. This is because the current configuration of the MHPA bisects the site into two portions, one of which contains steep slopes. The proposed BLA would reconfigure the preserve so that a 25 percent developable area would be located in the least sensitive portion of the site and development would be outside the MHPA. Development of the project would result in the direct removal of 0.05 acre of DCSS habitat outside the MHPA. The City Guidelines clearly state required mitigation ratios for impacts outside the MHPA based on the habitat type impacted. The proposed project would mitigate in the MHPA at the ratio required by the City Guidelines.

5.2 MHPA BLA Equivalency Analysis

The City's permit to 'take' Covered Species under the MSCP is based on the estimates at the time the Subarea Plan was adopted that at least 90 percent of lands in the MHPA will be preserved. Any encroachment into the MHPA (in excess of the encroachment allowable by the OR-1-2) is considered significant and requires a BLA that would include a habitat equivalency assessment to ensure what will be added to the MHPA is at least equivalent to what would be removed.

The existing MHPA bisects the property but does not encompass all of the DCSS/CSS/Chaparral on-site (Figures 5 and 6). Development of the project would affect 0.21 acre of MSCP-protected vegetation communities (Tier II DCSS and CSS/Chaparral). However, as proposed the project would place the remaining undeveloped areas in the MHPA through a BLA. The new MHPA would be protected in perpetuity through a COE. The discussions regarding the components of the project that make it eligible for a BLA follow, including an equivalency analysis. The existing MHPA on-site is 0.69 acres composed of 0.06 acre of disturbed areas, 0.24 acre of CSS/Chaparral and 0.39 acre of DCSS (Table 3).

Table 3 BLA Vegetation Community Configuration

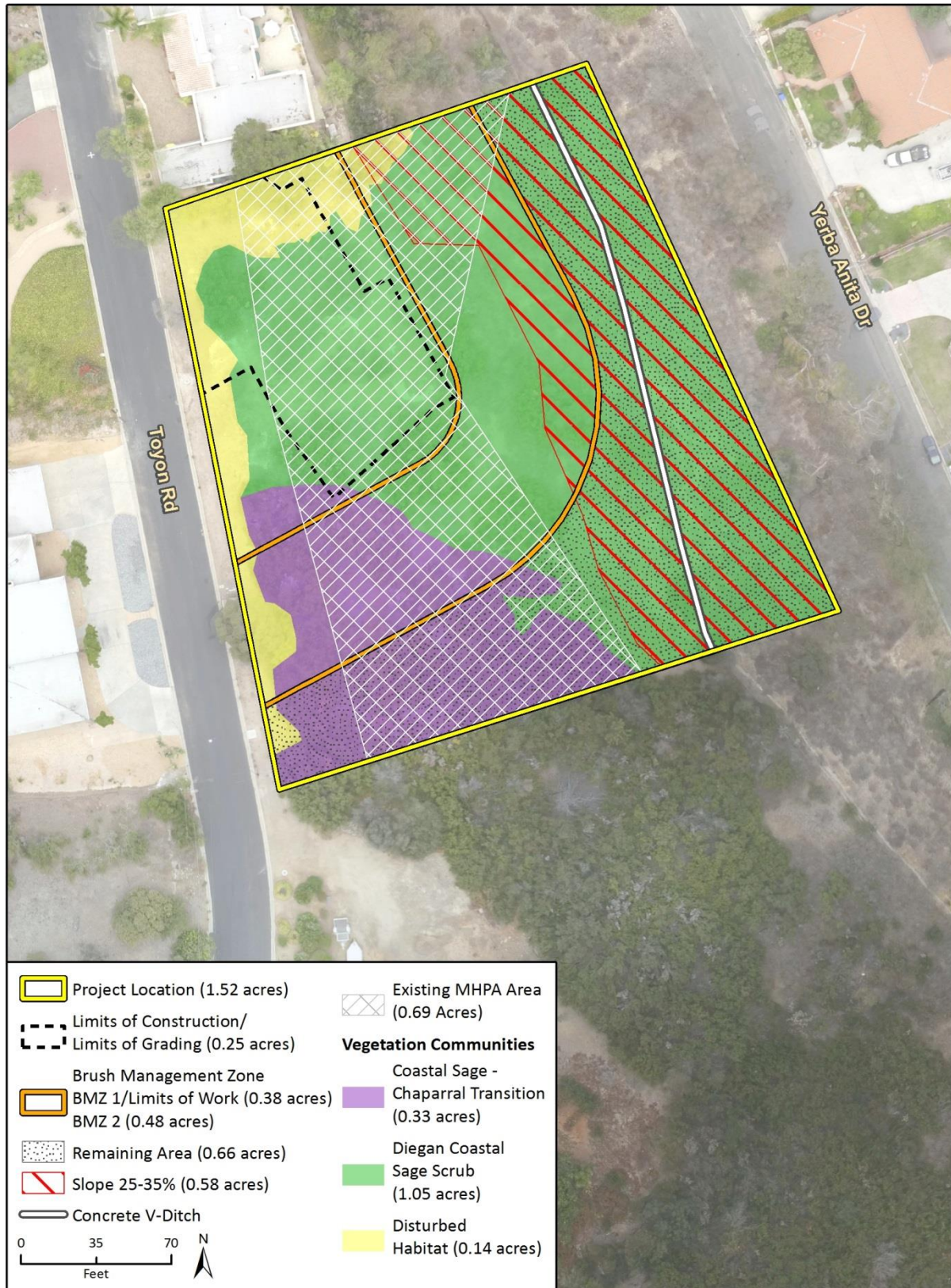
	Existing MHPA (acre)	MHPA Deletion Area (acre)	MHPA BLA Adjacent Habitat Additions (acre)	Proposed MHPA with BLA (acre)
Disturbed Habitat (11300)	0.06	0.04	0.01*	0.01
Coastal Sage- Chaparral Transition (37G00)	0.24	0.01	0.00	0.23
Diegan Coastal Sage Scrub (32500)	0.39	0.20	0.61	0.79
Total	0.69	0.25	0.61	1.03

*Due to cumulative rounding, habitat acreages results in up +/-0.004 acre discrepancy for each habitat type

As described above, development of the proposed project is not possible without some encroachment into the existing MHPA. Therefore, a BLA is proposed to reconfigure the MHPA preserve on-site to obtain a reasonable, contiguous development area. The property includes both native vegetation communities within and adjacent to existing MHPA lands. Overall, the proposed BLA would delete 0.20 acre of DCSS and 0.01 acre of CSS/Chaparral from the MHPA and add 0.61 acre of DCSS (Figures 7 and 8).

The habitats that would be added to the MHPA through the BLA have the same species composition, but the DCSS in this area is less disturbed and contains steep slopes (0.58 acre); this habitat is considered more sensitive and of higher biological value for covered species. The BLA will delete 0.20 acre of lower quality DCSS and add 0.61 acre of steeper and less disturbed DCSS, which would improve the quality and quantity of conserved habitats on-site. Therefore the BLA will exchange habitat of lower quality (disturbed) for habitat of higher quality.

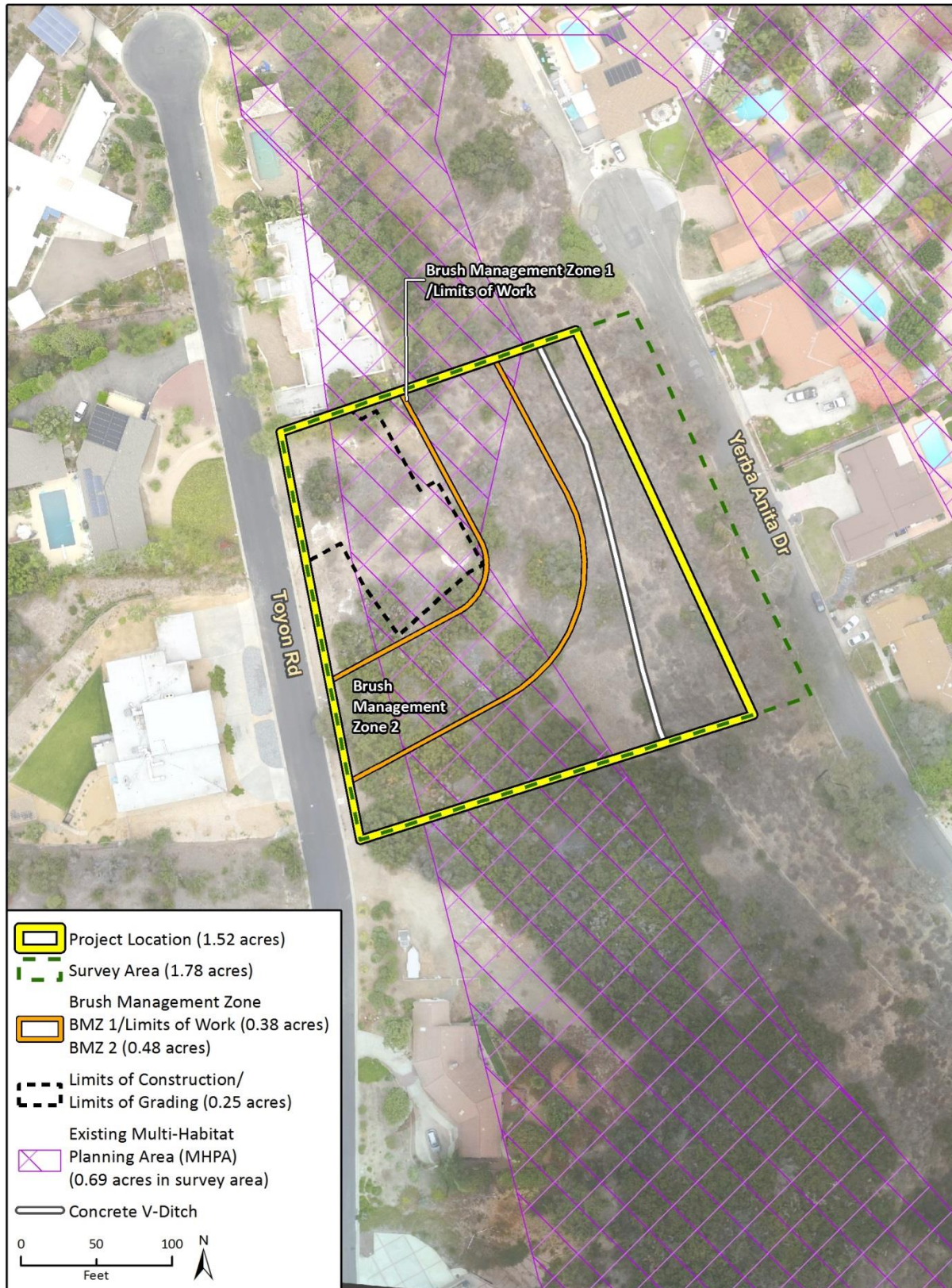
Figure 5 Vegetation Communities and Environmentally Sensitive Lands



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Additional data provided by County of San Diego 2018.

Fig 5 Vegetation Communities w/MHPA

Figure 6 Existing MHPA Configuration



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 Additional data provided by County of San Diego 2018.

Fig 6 MHPA

Figure 7 MHPA BLA Addition and Deletion



Figure 8 MHPA BLA Overview



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Additional data provided by County of San Diego 2018.

Fig 7.5 New MHPA with Proposed BLA

The property includes both native vegetation communities in and adjacent to MHPA lands. The project proposes contribution of adjacent lands through the BLA and no additional focused surveys will be required. Since the BLA would increase the amount of similar habitat, it would result in an increase in the MHPA function to protect biological resources. Adjustments to the MHPA boundaries may be made without the need to amend either the Subarea Plan or the MSCP plan in cases where the new MHPA boundary results in an area of equivalent or higher biological value. The comparison of biological value is based upon the following factors:

5.2.1 Effects on Significantly and Sufficiently Conserved Habitats

The existing MHPA on-site includes 0.39 acre of DCSS, and 0.24 acre of CSS/Chaparral. The current shape of the MHPA bisects the property and does not include all habitat or steep slopes on-site. The current configuration also includes some DCSS of lower quality (previous disturbance from grading) than the DCSS habitat adjacent to the MHPA.

The habitats that would be added to the MHPA through the BLA are made up of the same species composition, but the DCSS added contains steep slopes (0.58 acre). Equivalent habitat within steep slopes is considered more sensitive and of higher biological value for covered species.

The BLA will delete 0.20 acre of lower quality DCSS and add 0.61 acre of higher quality DCSS, which would increase the total acreage of conserved habitats within the preserve system. Though the benefit related to configuration of the MHPA is limited to the property, it is also known that DCSS has not been sufficiently conserved within the MHPA, therefore the BLA also contributes to the preservation of DCSS within the configuration of the MHPA system.

5.2.2 Effects to Covered Species

The BLA will result in an increase of 0.61 acre of higher quality DCSS into the preserve system. Overall, this addition to the MHPA would increase the amount of preserved DCSS in the MHPA which increases the amount of potential habitat available in perpetuity for covered species that utilize this habitat type.

5.2.3 Effects on Habitat Linkages and Preserve Function

The MHPA within the Urban Habitat Areas identified by the Subarea Plan is typically isolated from larger, core habitat areas and is more affected by edge effects from surrounding development. The MHPA within the project site is within a relatively isolated urban canyon system that is surrounded by single family residential development sited on ridgetops and in a few locations, canyon bottoms. The Interstate 8 Freeway is also approximately 700 feet to the north of the property which limits any regional connectivity of the native habitats within these canyons. Therefore, the project site and existing MHPA preserve configuration is not expected to function as a regional wildlife movement corridor.

However, the MHPA preserve in this location is expected to provide habitat connectivity for local common wildlife and avian species. The BLA would result in an increase in the area and overall width of the MHPA preserve in this location which should improve the function of the MHPA as a habitat linkage for local wildlife and migrating avian species.

5.2.4 Effects of Preserve Configuration and Management

The width of the existing MHPA would expand from approximately 135 linear feet to 235 feet at the southern end of the parcel and maintain the 135-foot linear distance at the northern end of the parcel. The existing MHPA has a narrow pinch point of approximately 83 feet in the middle of the parcel. The BLA will expand the linear distance at this pinch point to approximately 125 linear feet. The BLA will also shift the MHPA to the middle and east side of the parcel which is higher quality habitat (less disturbed, steep slopes). Though the benefit related to configuration of the MHPA is limited to the property, it is also known that DCSS has not been sufficiently conserved within the MHPA, therefore the BLA also contributes to the preservation of DCSS within the configuration of the MHPA system.

5.2.5 Effects on Ecotones or Species Diversity

The development would occur within a single-family home residential community also described as an urban canyon system. The proposed project is sited on the least sensitive area of the property, in the disturbed areas on the northwest corner adjacent to a road. The BLA would delete DCSS habitat of lesser quality and add DCSS habitat of higher quality. The BLA addition includes DCSS on steep slopes (0.58 acre) which is considered more sensitive and which is not currently in the existing MHPA. Therefore, this addition of DCSS would increase structural diversity within the MHPA on-site as well as potential species diversity. Overall the project avoids impacting habitats on steep slopes and would preserve higher quality ecotones on-site than what is currently within the MHPA.

5.2.6 Effects on Species of Concern

While no species of concern were observed on-site, because the BLA will add approximately 0.61 acres of higher quality habitat to the MHPA system, it would contribute to the quantity of potential habitat available for species of special concern. The addition of habitat to the MHPA is expected to decrease the likelihood that species would become listed through the addition in viable habitat (for common species) to the MHPA to be protected in perpetuity.

Therefore, the BLA is not expected to have any negative effects to species, including species of concern. In total, the BLA does not have the potential to significantly increase the likelihood that an uncovered species would or could become listed under either the federal or state Endangered Species Acts.

6 Special Status Biological Resources

This section discusses the special status biological resources observed on the project site, and evaluates the potential for the project site to support other sensitive resources.

Federal, state, and local agencies regulate special status resources and require an assessment of their presence or potential presence to be conducted on-site prior to the approval of any proposed development on a property. Assessments for the potential occurrence of special status species are based upon known ranges, habitat preferences for the species, species occurrence records from the CNDDDB and CNPS, species occurrence records from other sites in the vicinity of the study area, and previous reports for the study area. The potential for each special status species to occur in the study area was evaluated according to the following criteria:

- **Not Expected.** Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- **Low Potential.** Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- **Moderate Potential.** Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- **High Potential.** All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- **Present.** Species is observed on the site or has been recorded (e.g., CNDDDB, CNPS, other reports) on the site recently (within the last five years).

For the purpose of this report, special status species are those plants and animals listed, proposed for listing, or candidates for listing as Threatened or Endangered by the USFWS and National Marine Fisheries Service (NMFS) under the ESA; those listed as Threatened, or Endangered by the CDFW under the California Endangered Species Act (CESA) or Native Plant Protection Act; those recognized as Species of Special Concern (SSC) by the CDFW; are covered species under the City of San Diego MSCP subarea plan; and/or narrow endemic (plant) species identified in the City of San Diego MSCP Subarea Plan and regulations and plants occurring on lists 1 and 2 of the CNPS California Rare Plant Rank (CRPR) system per the following definitions:

- **List 1A** = Plants presumed extinct in California
- **List 1B.1** = Rare or endangered in California and elsewhere; seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)
- **List 1B.2** = Rare or endangered in California and elsewhere; fairly endangered in California (20-80 percent occurrences threatened)
- **List 1B.3** = Rare or endangered in California and elsewhere, not very endangered in California (<20 percent of occurrences threatened or no current threats known)
- **List 2** = Rare, threatened or endangered in California, but more common elsewhere

Sensitive biological resources are defined by the City Municipal Code as:

- Lands that have been included in the MHPA as identified in the City of San Diego MSCP Subarea Plan (City of San Diego 1997)
- Wetlands (as defined by the Municipal Code, Section 113.0103) (City of San Diego 2017a)
- Lands outside the MHPA that contain Tier I Habitats, Tier II Habitats, Tier IIIA Habitats, or Tier IIIB Habitats as identified in the City Guidelines (City of San Diego 2012)
- Lands supporting species or subspecies listed as rare, endangered, or threatened
- Lands containing habitats with narrow endemic species as listed in the City (City of San Diego 2012)
- Lands containing habitats of covered species as listed in the City Guidelines (City of San Diego 2012)

Before a determination of the significance of an impact can be made, the presence and nature of the biological resources must be established.

Appendix C provides a complete list of all special status resources tracked in the CNDDDB, CNPS, and SANDAG/Data Basin for a 2.0-mile radius of the project site.

6.1 Sensitive Vegetation Communities

The City Guidelines list habitat communities considered locally sensitive. Vegetation communities in the MSCP study area have been divided into four tiers of biological sensitivity based on rarity and ecological importance. Tier I represents the most sensitive vegetation communities while Tier IV represents the least sensitive vegetation communities. For upland habitat types, Tier 1 is classified as “rare,” Tier II is “uncommon,” Tier III is “common” and further divides into “common native” (Tier IIIA) and “common non-native” (Tier IIIB), and Tier IV is “other” (City of San Diego 2012). For the purposes of this report, vegetation communities considered to be locally sensitive under the City Guidelines are considered here as special status vegetation communities.

Two special status vegetation communities exist on-site: Diegan coastal sage scrub and Coastal Sage-Chaparral transition. Both vegetation communities would be considered Tier II Uncommon Upland.

6.2 Special Status Plant Species

The CNDDDB, CNPS, and SANDAG/Data Basin document 41 special status plant species as potentially occurring in a 2.0-mile radius of the project site. No special status plant species were observed at the project site during the field survey. Of the 41 special status plant species documented within a 2.0-mile radius of the project site, only 17 species have a low potential to occur. The habitat needs and likelihood of occurrence for each of these species are evaluated in Appendix C.

Though rare plant surveys were not conducted for the project area, the site is fragmented, dominated by common CSS/Chaparral species, and does not contain any soils known to support rare plants.

6.3 Special Status Wildlife Species

No special status wildlife species were observed during the field survey. The CNDDDB documents 10 special status wildlife species with the potential to occur within a 2.0-mile radius of the project site. Of the 10 special status wildlife species documented within a 2.0-mile radius of the project site, four species have a low potential to occur. The remaining special status wildlife species are not expected to occur due to the existing conditions of the project site (Appendix C).

6.4 Jurisdictional Waters and Wetlands

There are no jurisdictional nor City regulated waters or wetlands on the project site. The nearest jurisdictional or City regulated waters or wetlands is the San Diego River, located north of Interstate Highway 8.

6.5 Wildlife Corridors

Wildlife movement corridors are pseudo-linear or constricted features that connect larger patches of natural open space and provide habitat conditions for the movement of small and large animals. They can serve as routes for dispersal and migration of animals, as well as the distribution of plants via wildlife vectors. In San Diego County, important corridors and linkages have been identified to provide connections between undeveloped lands, especially to significant public lands. Although the project is located within the City, no San Diego County designated wildlife corridors are located on-site.

Despite the MHPA on-site, the proposed project is within a densely vegetated lot that is situated between a major highway to the north, residential development to the south, and a series of narrow ridge/mesa tops separated by steep and relatively narrow canyons. In addition, it is further surrounded by nearby major roads and commercial development, and does not directly connect to larger patches of open space or core habitat areas within the MHPA. While the project site may provide limited habitat and shelter for common local wildlife species and foraging habitat for transient and migratory species like birds, it does not serve as a regional wildlife movement corridor.

According to CDFW Habitat Connectivity Viewer (CDFW 2018), the project site is not located in any known regional wildlife movement corridors or any other special status biological areas. Through the BLA, this project will contribute to local habitat connectivity by increasing the area within the MHPA on-site.

7 MHPA Management Requirements

7.1 MHPA Land Use Adjacency Guidelines

For properties that straddle the MHPA, land uses adjacent to the MHPA will be managed to ensure minimal impacts to the MHPA as outlined in Section 1.4.3 Land Use Adjacency Guidelines in the City Subarea Plan. The project would address the land use adjacency guidelines to minimize impacts and maintain the function of the MHPA adjacent to the proposed limits of development. Compliance with these measures will be implemented as follows:

Drainage

The release of toxins, chemicals, petroleum products, exotic plant materials and other elements that might degrade or harm the natural environment or ecosystem processes within the MHPA must be prevented from development areas. Drainage should be directed away from the MHPA, or if not possible, must not drain directly into the MHPA. Instead, runoff should flow into sedimentation basins, grassy swales or mechanical trapping devices prior to draining into the MHPA.

- The project as proposed incorporates environmentally sensitive drainage design such that all on-site surface runoff will be controlled and prevented from draining into the MHPA. All runoff from the paved driveway, patio paving, roof and walkways will be controlled and directed into a landscaped filtration area at the northwest corner of the property within the limits of construction and outside of the MHPA. The roof, driveway, walkway and patio paving on the west and northern ends of the proposed structure will drain via gravity to trench drains or downspouts that will control flow into the landscaped filtration area. Runoff from the proposed southern and eastern patio paving (including any drainage from the swimming pool) will flow through drains to a drain line under the patio which leads to a sump pump at the northeastern corner of BMZ-1 (the limits of work); this pump in conjunction with a concrete swale that lines the edge of BMZ-1 will collect runoff from all impervious and pervious surfaces within BMZ-1 and discharge it into the landscaped filtration area. In the event of heavy rains, the filtration area will be designed to overflow and discharge directly to the public conveyance system on Toyon Road via gravity. These design features will prevent drainage of stormwater and runoff into the MHPA (upon BLA approval) . The filtration area and sump pump will be maintained to ensure proper functionality.
- All irrigation systems will be placed outside of the MHPA (upon BLA approval) and low water-use landscaping will be incorporated within BMZ-1 to reduce any potential for irrigation runoff at the edges of the MHPA. The concrete swale lining BMZ-1 in conjunction with the sump pump mentioned above will eliminate the threat of any runoff from irrigation or the development into the MHPA.
- The project will implement a Water Pollution Control Plan during construction and comply with all post-construction requirements and BMPs preventing long- and short-term effects of urban runoff.

Toxics

Land uses that use chemicals, petroleum products or generate potentially toxic by-products impactive of wildlife, sensitive species, habitat, or water quality within the MHPA need to incorporate measures to reduce impacts caused by the application and/or drainage of such materials into the MHPA.

- Land use for the project as proposed is a single-family residence which is unlikely to produce or utilize chemicals, petroleum products or toxic substances that could impact the MHPA.
- Landscaping of the property will not include the use of large-scale fertilizers or pesticides.
- The project will incorporate drainage design such that any runoff with potential to mix with sediments, nutrients, trash/debris, oil/grease, or pesticides would not flow into the MHPA. A landscaped filtration area will capture and filter all stormwater and runoff from impervious and pervious surfaces in BMZ-1. The system will utilize the principles of biofiltration to filter runoff by directing it through a pretreatment grass filter strip, surface plantings of woody and herbaceous plant species, and layers of mulch, sand and gravel. The system will be maintained to ensure proper functionality. In the event of heavy rains and overflow of the filtration area, gravity will feed water into a curb outlet that will drain excess water into the public conveyance system on Toyon Road. These drainage features will ensure that no potentially degrading runoff would enter or impact the MHPA.

Lighting

Lighting of all developed areas should be directed away from the MHPA and shielded if necessary (also refer to Municipal Code Section 142.0740).

- The project as proposed does not incorporate site or landscape lighting. All outdoor lighting will be attached to the structure; lighting on the southern and eastern portion of the structure will be recessed in overhead can-style housing and on the western portion of the structure, a wall-mounted garage light will direct away from the MHPA toward Toyon Road. Given the location of the proposed residence above the steep slopes of the MHPA, any light reflected off of the structure or development area from the overhead recessed lights would reflect up and away from the MHPA.
- Temporary lighting will not be used during the construction phase of the proposed development and work will not be conducted at night.

Noise

Uses in or adjacent to the MHPA should be designed to minimize noise impacts. Berms or walls should be constructed adjacent to commercial areas, recreational areas, and any other use that may introduce noises that could impact or interfere with wildlife utilization of the MHPA. Uses or activities that generate excessive noise within wildlife breeding areas must be avoided during the breeding season, or, if not possible, incorporate adequate noise reduction measures.

- Land use for the project as proposed is a single-family residence which presents minimal potential for excessive noise (defined as greater than 60 dBA continuous hourly sound level) at or extending into the boundary of the MHPA. Given the slope of the project site and the design of the project, the completed residence will sit above the MHPA and noise originating on the site has little potential to pollute the steep slopes of the MHPA below.

- Construction associated with the project will take precautions to ensure that excessive noise levels are not exceeded. If construction noise is found to be excessive, the activity producing the noise will be avoided during the breeding season of any covered species impacted by the noise; typically, this includes the California gnatcatcher (*Poliophtila californica*) (CAGN) (3/1-8/15), least Bell's vireo (*Vireo bellii pusillus*) (3/15-9/15) and the southwestern willow flycatcher (*Empidonax traillii extimus*) (5/1-8/30). If construction is proposed during the breeding season for these species, USFWS protocol surveys will be conducted to determine presence/absence. If the species is/are not identified within the MHPA, no additional measures will be required. If present, however, measures to minimize noise impacts, including erecting temporary noise walls/berms, will be implemented. If a survey is not conducted and construction is proposed during the species' breeding season, presence of the species will be assumed, and a temporary wall/berm will be erected.
- CAGN is the only covered avian species of the three listed above known to exclusively utilize the habitat found on-site (DCSS/CSS/Chaparral). Although the species has been reported within 1.0 mile of the project site, these occurrences are located primarily in the open space north of Interstate Highway 8 (2002 occurrence 0.6 miles north of the project site). The DCSS on-site is surrounded by residential developments and streets to the east and west. Given the small area of available habitat limited by surrounding development and the relatively large contiguous areas of coastal sage scrub to the east of the property, it is unlikely that CAGN would nest, occur, or occupy the site during the breeding season or construction. If it is determined to be present through surveys or monitoring, however, the above measures will be taken to ensure minimal impacts and noise avoidance.

Barriers

Access to the MHPA, if any, should be directed to appropriate locations and be designed to reduce domestic animal predation through use of barriers (e.g. non-invasive vegetation, rocks/boulders, fences, walls and/or signage).

- The project as proposed plans to construct a boundary fence along the MHPA (at the BMZ-1 boundary) to reduce the potential for any domestic animal predation or human access.
- Given the fact that the project is a proposed private single-family residence and the surrounding land use does not facilitate recreation or access into open space areas and the MHPA, the potential for access to the MHPA is low. Additionally, a planned retaining wall connected to the structure and landscaping/vegetation across the front of the property will further diminish ability to access the MHPA below. Lastly, the likelihood of unauthorized access from either Toyon Road or Yerba Anita Drive is low given the residential land-use along both of those streets and the presence of thick vegetation and steep slopes at the border of the MHPA.

Invasive Plants

No invasive plant species shall be planted in or adjacent to the MHPA.

- No invasive non-native plant species will be introduced into areas adjacent to the MHPA as a result of the project. Landscape construction for the planting and hydro seeding of all disturbed land adjacent to the MHPA will be done in accordance with the LDM Landscape Standards and the Development Services Department. The project will remove invasive plants from the development area prior to construction and conduct extensive planting of disturbed land adjacent to the MHPA with native, non-invasive plants. In addition, the property owner will

ensure that all proposed landscaping, especially that adjacent to native habitat and/or the MHPA would not include exotic plant species that may be invasive.

Brush Management

All Zone 1 brush management areas must be incorporated within the development footprint and located outside the MHPA. Brush management Zone 2 may be permitted within the MHPA except where narrow wildlife corridors require it to be located outside of the MHPA. The total brush management zone width shall not exceed the maximum allowed by the Landscape Regulations.

- The development will be set back from slope edges and will incorporate a 35-foot-wide Zone 1 brush management area on the development pad and outside of the MHPA. Zone 2 will increase by 30 feet and will be 65 feet wide. Brush management zones will not be greater in size than currently required by City regulations. The amount of woody vegetation clearing will not exceed 50 percent of the vegetation existing when the initial clearing is complete. Vegetation clearing will be done consistent with City standards and will avoid/minimize impacts to covered species to the maximum extent possible. Brush management in the Zone 2 area will be the responsibility of the home owner.

Grading/Land Development

Manufactured slopes associated with site development shall be included within the limits of development and outside the MHPA.

- Manufactured slopes associated with site development of the project will be included within the development footprint and limits of work and will not extend into the MHPA.

8 Impact Analysis

8.1 Guidelines for Determining CEQA Impact Significance to Biological Resources

For projects in the city of San Diego or carried out by the City that may affect sensitive biological resources, potential impacts to such sensitive biological resources must be assessed. Impacts to biological resources are assessed by City staff through the CEQA review process, and through review of the project's consistency with the ESL regulations, the City Guidelines, and with the City of San Diego MSCP Subarea Plan (City of San Diego 2012, 1997 respectively).

The following is a list of criteria from the City's Initial Study Checklist and provides guidance to determine potential significance to biological resources. Based on these criteria, the project would have a significant effect on biological resources if it would result in:

- 1) A substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in the MSCP or other local or regional plans, policies or regulations, or by the CDFG or USFWS?
- 2) A substantial adverse impact on any Tier I Habitats, Tier II Habitats, Tier IIIA Habitats, or Tier IIIB Habitats as identified in the Biology Guidelines of the Land Development manual or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS?
- 3) A substantial adverse impact on wetlands (including, but not limited to, marsh, vernal pool, riparian, etc.) through direct removal, filling, hydrological interruption, or other means?
- 4) Interfering substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, including linkages identified in the MSCP Plan, or impede the use of native wildlife nursery sites?
- 5) A conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan, either within the MSCP Plan area or in the surrounding region?
- 6) Introducing land use within an area adjacent to the MHPA that would result in adverse edge effects?
- 7) A conflict with any local policies or ordinances protecting biological resources?
- 8) An introduction of invasive species of plants into a natural open space area?

The area of impact for the development area of this project is defined as the structure and associated features (e.g., driveway, walkway, buildings) and BMZ-1. The City requires two BMZs around the project footprint. BMZ-1 will surround the structure and associated features, and BMZ-2 will surround BMZ-1. Unlike BMZ-1, BMZ-2 is considered by the City to be impact-neutral (City of San Diego 2012). Fuel management requirements in BMZ-2 are not considered an impact, but these areas cannot be considered as mitigation.

8.1.1 Special Status Vegetation Communities

The proposed project would directly impact 0.25 acre of DCSS (Tier II) and 0.02 acre of contiguous CSS/Chaparral (Tier II). Per the City Guidelines, direct impacts to greater than 0.1 acre of Tier II habitat would be considered significant.

An additional 0.12 acre of disturbed habitat would be impacted by the development but is not considered sensitive (Tier IV) and would not require mitigation. Table 4 lists the project impacts to vegetation communities by acreage, and Figure 9 depicts the impacts to vegetation communities. Mitigation proposed for these impacts is presented in Section 9.1.1.

Impacts to special status vegetation communities are a result of project design which places the development at the northwestern corner of the site. The area was subject to past grading and is closest to the road and neighboring residences. It is also the only buildable portion of the property due to surrounding steep slopes. As such, the project was designed according to City Guidelines to avoid areas of highest sensitivity by placing development on the least sensitive area of the site. The direct vegetation removal in BMZ-1 will account for all on-site impacts to Tier II vegetation communities. Vegetation clearing for fuel management in BMZ-2 is considered impact neutral per the City Guidelines.

Table 4 Impacts to Vegetation Communities

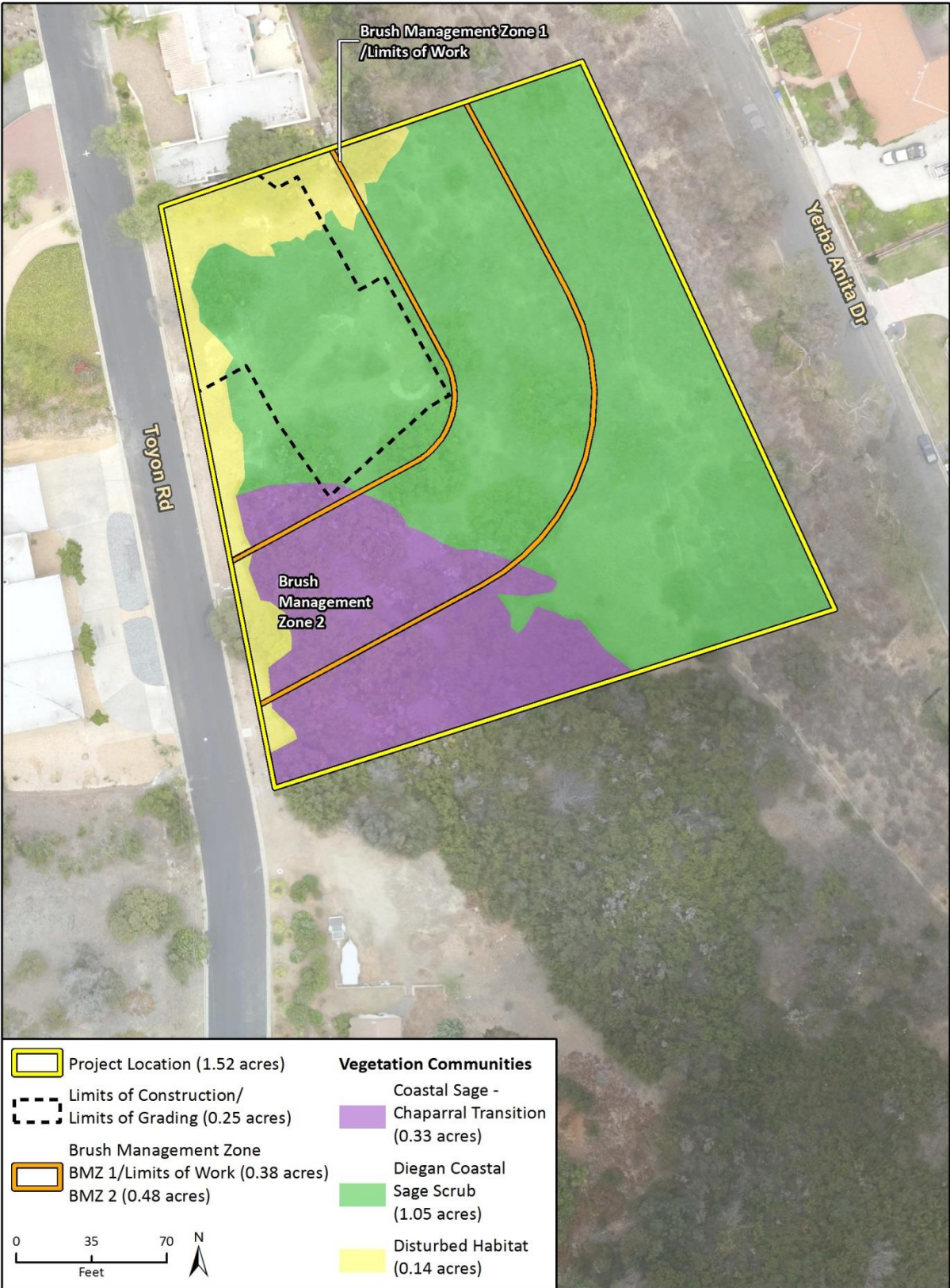
Tier	Vegetation Community/ Land Cover Type by Oberbauer (Holland Code)	Development (Including BMZ-1)	Brush Management Zone 2	Remaining	Existing
IV	Disturbed Habitat (11300)	0.11	0.03	<0.01	0.14*
II	Coastal Sage-Chaparral Transition (37G00)	0.02	0.13	0.18	0.33
II	Diegan Coastal Sage Scrub (32500)	0.25	0.31	0.48	1.05
Total (acres)		0.38	0.48*	0.66	1.52

*Cumulative rounding of habitat acreages results in 0.01 of table not shown in total calculations

8.1.2 Special Status Plant Species

No special status plants occur or are expected to occur on the property. Thus no impacts to special status plant species are anticipated.

Figure 9 Impacts to Vegetation Communities



8.1.3 Special Status Wildlife Species

No special status wildlife species were observed during the field survey. Thus no impacts to special status wildlife species are anticipated.

8.1.4 Wetlands

There are no jurisdictional or City of San Diego MSCP-designated waters or wetlands on or adjacent to the project site. Therefore, the project would not impact jurisdictional waters and wetlands.

8.1.5 Wildlife Corridors

The project site does not function as a wildlife corridor and is not indicated as part of any wildlife corridor identified by CDFW or the City (CDFW 2018). Although common wildlife species may move locally through the site, the proposed project would not significantly impact a wildlife corridor on a regional or local basis. Therefore, no impacts to wildlife movement are anticipated.

8.2 Indirect Impacts

8.2.1 Special Status Vegetation Communities

Indirect impacts to DCSS or adjacent habitat could include dust from construction activities and degradation of habitat areas from human disturbance. Since this project is in a residential area, it is already subject to some human disturbance. No significant indirect impacts to special status vegetation communities or adjacent habitat would result from the project; rather, the project would contribute to the preservation of additional sensitive habitats.

8.2.2 Special Status Species

Indirect impacts to special status species are unlikely but could include noise, nighttime lighting, and degradation of habitat areas from human disturbance. Noise and lighting could result in temporary but not significant impacts to special status species. Because the project is in a residential area, noise and nighttime lighting associated with the occupancy of the property are expected to be similar to existing conditions and therefore would not result in a significant impact. No significant indirect impacts to special status species would result from the project and the project would contribute to the preservation of additional DCSS and CSS/Chaparral habitat for a variety of species.

8.2.3 Introduction of Invasive Species into a Natural Open Space Area

The project footprint is located in the most disturbed part of the parcel to minimize impacts to undisturbed or less disturbed habitat. The portion of the parcel underlying the project footprint is composed of disturbed habitat and DCSS, with some invasive plants and runaway ornamentals from the adjacent property. The property owner proposes to submit landscape construction documents for the planting and hydro seeding of all disturbed land in accordance with the LDM Landscape Standards and the Development Services Department guidance. All plans would be in substantial conformance to the environmental conditions of the issued permit. Therefore, the project is not expected to result in introduction of invasive species and potential impacts would be less than significant.

8.3 Cumulative Impacts Analysis

Pursuant to CEQA Guidelines §15130(a), cumulative impacts must be discussed when project impacts are cumulatively considerable, even when they are limited individually. Cumulatively considerable means the incremental effects of an individual project are considerable when viewed in connection with the effects of past, other current, and probable future projects.

The proposed project would occur in a residential area zoned for residential development. Single-family homes occur immediately adjacent to this property. The proposed project would impact the least sensitive habitat area and would contribute to the City MHPA system. The proposed project is not expected to contribute significantly to cumulative impacts to the area because it is consistent with the existing land use and most residential areas in the vicinity have already been developed. Additionally, the project conforms with the MSCP as specified by the Subarea Plan, City Guidelines and ESL regulations and is not expected to result in significant cumulative impact to any biological resources covered by the MSCP.

9 Mitigation, Monitoring, and Reporting

The following mitigation measures are proposed to reduce potential project impacts to below a level of significance.

9.1 Mitigation for Protected Resources

9.1.1 Sensitive Vegetation Communities

The proposed project would directly impact DCSS and CSS/Chaparral, Tier II special status vegetation communities. Direct impacts to greater than 0.1 acre of Tier II habitat are considered significant and require mitigation per the City Guidelines. Impacts would be mitigated in the MHPA through the addition of higher quality habitat (Figure 10).

As required by the City, the ratio to mitigate for impacts to Tier II is 1:1 (Table 5). The project is required to mitigate for 0.27 acre of contiguous DCSS and CSS/Chaparral. Table 6 summarizes mitigation for the project.

No other impacts to special status vegetation communities will occur because of this project, and no additional mitigation is required.

9.1.2 Covenant of Easement

As a condition of project approval, a COE for protection of environmentally sensitive lands within the MHPA will be granted to the City of San Diego and recorded against the title of the property. The purpose of the COE is to ensure that sensitive biological resources, including MHPA lands, will be retained forever in a natural condition and to prevent any development within the portion of the property identified for conservation. The MHPA within the project site will be placed within the COE and the USFWS and the CDFW named as third-party beneficiaries. The COE will allow the grantee (City) to preserve and protect sensitive biological resources, entry to monitor compliance, to prohibit uses and activities inconsistent with the purposes of the COE, and to require restoration of any damaged areas because of non-compliance. Specific uses and activities detrimental to resource protection and management of the conserved property will be prohibited. The COE will also ensure that the sensitive biological resources identified as project mitigation will be adequately protected and that potential impacts are less than significant.

Figure 10 Covenant of Easement



Table 5 City of San Diego Upland Mitigation Ratios

Tier	Habitat Type	Location of Impact	Mitigation Ratios	
			Inside MHPA*	Outside MHPA*
Tier II (uncommon uplands)	Diegan Coastal Sage Scrub	Inside MHPA	1:1	2:1
		Outside MHPA	1:1	1.5:1
Tier II (uncommon uplands)	Coastal Sage-Chaparral Transition	Inside MHPA	1:1	2:1
		Outside MHPA	1:1	1.5:1

*Mitigation is only required for impacts greater than 0.1 acre

Table 6 Mitigation of Impacts to Vegetation Communities

Tier	Vegetation Community/ Land Cover Type by Oberbauer (Holland Code)	Impact Area (acre)	Mitigation Ratio of impacts	Minimum Acres to be Mitigated	Actual Acres Preserved as Mitigation (COE)
IV	Disturbed Habitat (11300)	0.11	0:1	0.00	0.01
II	Coastal Sage-Chaparral Transition (37G00)	0.02	1:1*	0.02	0.23
II	Diegan Coastal Sage Scrub (32500)	0.25	1:1	0.25	0.79
Total		0.38		0.27	1.03

*CSS/Chaparral is contiguous with DCSS and will thus be considered a greater than 0.1 acre impact

9.1.3 Special Status Species

Impacts to covered species are covered by the MSCP such that the conditions of coverage outlined in the Subarea Plan are met. Conditions of coverage as outlined in the Subarea Plan must include measures to reduce edge effects and minimize disturbance during the nesting period, fire protection measures to reduce the potential for habitat degradation due to unplanned fire, and management measures to maintain or improve habitat quality including vegetation structure. No clearing of occupied habitat within the City's MHPAs and within the City's Biological Resource Core Areas may occur between March 1 and August 15. The project is consistent with City brush management requirements, and the project is not expected to degrade habitat related to unplanned fire.

9.1.4 General Mitigation and Management Measures

To ensure appropriate long-term management inside the MHPA, the site will be fenced to minimize access to MHPA. Only native species will be planted adjacent to the preserve such that non-native species are not inadvertently introduced into the preserve area. The property owner will ensure that trash and debris associated with construction or use of the site does not encroach into the preserve area.

10 Conclusion

The proposed project would directly impact two special status vegetation communities (DCSS and CSS/Chaparral, Tier II) within the least sensitive portion of a site partially bisected by an existing MHPA. The project is required to mitigate for the 0.27 acre of Tier II habitats at a ratio of 1:1 per the City's upland mitigation ratio requirements. Habitat will be mitigated on-site within the adjacent MHPA. As part of the conditions of approval for the project, 0.61 acres of native vegetation within the property boundary will be added to the MHPA through a BLA and placed in a 1.03 acre COE in perpetuity. The BLA will exchange habitat of lower quality (disturbed) for DCSS and CSS/Chaparral habitat of higher quality. The project as proposed addresses the City's MHPA Land Use Adjacency Guidelines through environmentally sensitive drainage and lighting design, toxic chemical and noise minimization, barriers to access, and adherence to invasive plant, brush management and grading requirements.

11 Limitations, Assumptions, and Use Reliance

This General Biological Survey has been performed in accordance with professionally accepted biological resources investigation practices applicable at this time and in this geographic area. The General Biological Survey is limited by the scope of work performed and the environmental conditions present at the time of the survey. Field studies were based on current industry practices that change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance and specified historical and literature sources. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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12.1 List of Preparers

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Development Services Department –MSCP
Development Services Department –Environmental Analysis Section
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Appendix A

List of Species Observed On-site

Plant Species Observed Within the Study Area

Scientific Name	Common Name	Vegetation Community	Native or Introduced
<i>Salvia mellifera</i>	Black sage	Diegan Coastal Sage Scrub	Native
<i>Peritoma arborea</i>	Bladder pod	Diegan Coastal Sage Scrub	Native
<i>Artemisia californica</i>	California sage	Diegan Coastal Sage Scrub	Native
<i>Dudleya pulverulenta</i>	Chalk dudleya	Diegan Coastal Sage Scrub	Native
<i>Baccharis pilularis</i>	Coyote bush	Diegan Coastal Sage Scrub	Native
<i>Rhus integrifolia</i>	Lemonade berry	Diegan Coastal Sage Scrub	Native
<i>Heteromeles arbutifolia</i>	Toyon	Diegan Coastal Sage Scrub	Native
<i>Salvia apiana</i>	White sage	Diegan Coastal Sage Scrub	Native
<i>Baccharis sarathroides</i>	Desertbroom	Diegan Coastal Sage Scrub	Native
<i>Marah macrocarpa</i>	Wild cucumber	Diegan Coastal Sage Scrub	Native
<i>Adenostoma fasciculatum</i>	Chamise	Diegan Coastal Sage Scrub	Native
<i>Mimulus aurantiacus</i>	Bush monkey-flower	Diegan Coastal Sage Scrub	Native
<i>Stipa sp</i>	Needle grass	Diegan Coastal Sage Scrub	Native
<i>Dudleya sp.</i>	Dudleya	Diegan Coastal Sage Scrub	Native
<i>Hazardia squarrosa</i>	Saw toothed goldenbush	Diegan Coastal Sage Scrub	Native
<i>Ambrosia sp</i>	Burrobrush	Diegan Coastal Sage Scrub	Native
<i>Eucalyptus sp.</i>	Eucalyptus	Disturbed	Introduced
<i>Washingtonia filifera</i>	Fan palm	Disturbed	Introduced
<i>Brassica sp.</i>	Mustard	Disturbed	Introduced
<i>Foeniculum vulgare</i>	Sweet fennel	Disturbed	Introduced
<i>Centaurea melitensis</i>	Tocolote	Disturbed	Introduced
<i>Nicotiana glauca</i>	Tree tobacco	Disturbed	Introduced
<i>Avena barbata</i>	Slender oat	Disturbed	Introduced
<i>Brachypodium distachyon</i>	False brome	Disturbed	Introduced
<i>Bromus diandrus</i>	Ripgut brome	Disturbed	Introduced
<i>Medicago polymorpha</i>	Bur clover	Disturbed	Introduced
<i>Schismus arabica</i>	Mediterranean Grass	Disturbed	Introduced
<i>Marrubium vulgare</i>	White horehound	Disturbed	Introduced
<i>Rosmarinus officinalis</i>	Rosemary	Disturbed	Introduced

Animal Species Observed Within the Study Area

Scientific Name	Common Name	Native or Introduced
<i>Corvus brachyrhynchos</i>	American crow	Native
<i>Melospiza crissalis</i>	California towhee	Native
<i>Carpodacus mexicanus</i>	House finch	Native
<i>Zenaidura macroura</i>	Mourning dove	Native
<i>Mimus polyglottos</i>	Northern mockingbird	Native
<i>Tyrannus verticalis</i>	Western kingbird	Native

Appendix B

Site Photographs



Photo 1. View N from SW corner of parcel. Toyon Rd on left. Disturbed (bare ground) and DCSS (right) habitats.



Photo 2. Close-up of lemonadeberry that dominates much of the SW quadrat and DCSS on the parcel.



Photo 3. View north from just south of subject parcel. Toyon bush in foreground and I-8 in background.



Photo 4. View north of NW quadrat of parcel (the development area). Ground appears recently tilled.



Photo 5. View east of northern boundary of parcel. Ornamentals/disturbed habitat on left. Ground appears recently tilled.



Photo 6. View south along southern boundary of parcel. Fence post (orange) and grasses (very light patch) visible.



Photo 7. View NE and down from NE corner of parcel. Yerba Anita Drive cul-de-sac and I-8 visible.



Photo 8. View west/up near N parcel boundary. Sage, grasses, lemonadeberry (front); ornamental trees (back).



Photo 9. View east and down over east fenceline. Concrete runoff conveyance visible behind vegetation.



Photo 10. View south near SE corner of development area. Ground appears recently tilled

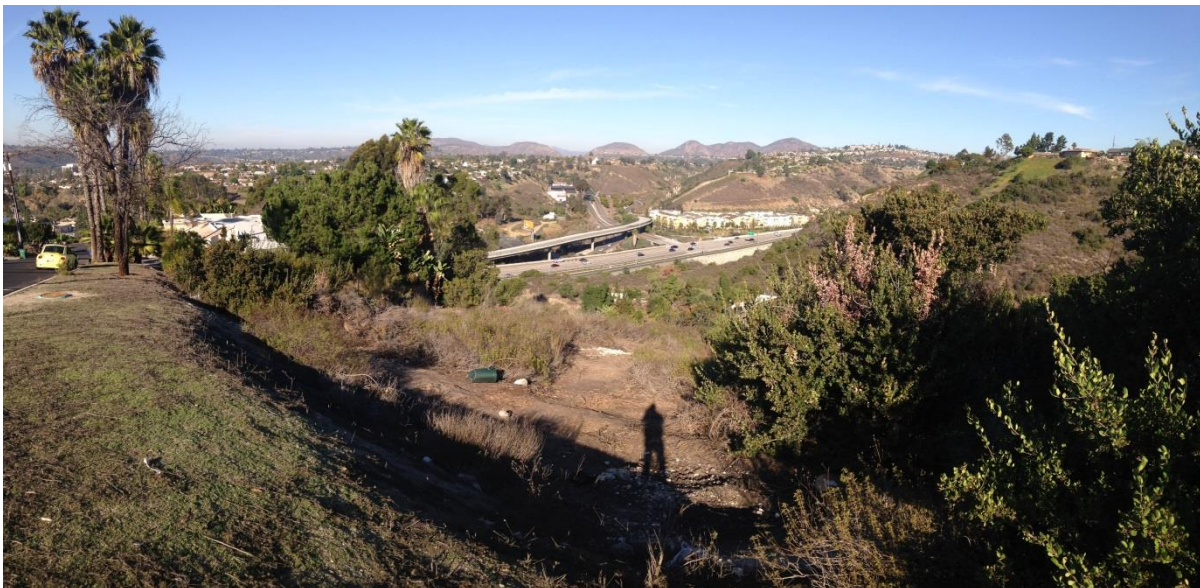


Photo 11. View northeast across the development area. Ground disturbance and refuse visible. This photo is on the report cover but with photographer's shadow muted.



Photo 12. View north of north parcel boundary with refuse and non-natives (e.g. black mustard, eucalyptus) visible.



Photo 13. View east from just south of mid-northern parcel boundary. Refuse and non-natives (e.g. black mustard) visible.

Appendix C

California Natural Diversity Database and California Native Plant Society Species List for 5595 Toyon Road

California Natural Diversity Database List for 5595 Toyon Road, San Diego, California				
Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Plants				
<i>Acanthomintha ilicifolia</i> San Diego thorn-mint	Threatened/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Chaparral, coastal scrub, valley and foothill grassland, vernal pools. Endemic to active vertisol clay soils of mesas & valleys. Usually on clay lenses within grassland or chaparral communities. 25-945 m.	Low potential to occur.	There are CNDDDB accounts of this species occurring in the vicinity of the project site. However, this area has been extensively developed since these records (1890s, 1940s, 1950s), and those occurrences are considered extirpated. The nearest extant occurrence is 2.75 miles to the north. This species was not observed during the site survey.
<i>Adolphia californica</i> California adolphia	None/None G3 / S2 2B.1	Chaparral, coastal sage scrub, valley and foothill grassland. From sandy/gravelly to clay soils within grassland, coastal sage scrub, or chaparral; various exposures. 10-400 m.	Low potential to occur.	The habitat to support this species is present onsite and there are multiple extant CNDDDB accounts of this species occurring within one mile of the project site. This species was not observed during the site survey.
<i>Agave shawii</i> shaw's agave	None/None G2G3 2B.1 City of San Diego Narrow Endemic	Maritime succulent scrub, coastal bluff scrub, coastal scrub. 3-120 m.	No potential to occur.	The habitat to support this species is generally not present onsite and there are no CNDDDB accounts of this species occurring within six miles of the project site. This species was not observed during the site survey.
<i>Ambrosia monogyra</i> singlewhorl burrobrush	None/None G5 / S2 2B.2	Chaparral, Sonoran desert scrub. Sandy soils. 5-475 m.	Low potential to occur.	The habitat to support this species is present onsite and there are multiple extant CNDDDB accounts of this species occurring within one mile of the project site. This

				species was not observed during the site survey.
<i>Ambrosia pumila</i> San Diego ambrosia	Endangered/ None G1 / S1 1B.1 City of San Diego Narrow Endemic	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil; sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m.	Low potential to occur.	There is one CNDDDB account of this species occurring within one mile of the project site. However, this area has been extensively developed since this record (1935), and that occurrence is considered extirpated. The nearest extant occurrence is 5 miles to the northeast.
<i>Aphanisma blitoides</i> aphanisma	None/None G3G4 / S2 1B.2 City of San Diego Narrow Endemic	Coastal bluff scrub, coastal dunes, and coastal scrub. Sandy or gravelly soils. 1-305 m.	No potential to occur.	The habitat to support this species is not present onsite and there are no CNDDDB accounts of this species occurring within six miles of the project site. This species was not observed during the site survey.
<i>Arctostaphylos glandulosa</i> <i>ssp. crassifolia</i> Del Mar manzanita	Endangered/ None G5T2 / S2 1B.1	Chaparral. Sandy coastal mesas and ocean bluffs; in chaparral or Torrey pine forest. 30-365 m.	No potential to occur.	The habitat to support this species is generally not present onsite and there are no CNDDDB accounts of this species occurring within four miles of the project site. This species was not observed during the site survey.
<i>Artemisia palmeri</i> San Diego sagewort	None/None G3G4 / S3? 4.2	Coastal scrub, chaparral, riparian forest, riparian woodland, riparian scrub. In drainages and riparian areas in sandy soil within chaparral and other habitats. 15-915 m.	No potential to occur.	There is marginal habitat to support this species onsite; however, there are no CNDDDB accounts of this species occurring within five miles of the project site. This species was not observed during the site survey.

<i>Asplenium vespertinum</i> western spleenwort	None/None G4 / S4 4.2	Chaparral, cismontane woodland, coastal scrub. Rocky sites. 180-1000 m.	No potential to occur.	The habitat to support this species is generally not present onsite and there are no recent accounts of this species occurring within the vicinity of the project site. The nearest "recent" observation was in 1986 near Mission Trails Regional Park, 3.5 miles to the northeast. This species was not observed during the site survey.
<i>Astragalus tener var. titi</i> Coastal dunes milk vetch	Endangered/ Endangered G2 / S1 1B.1 City of San Diego Narrow Endemic	Coastal bluff scrub (sandy), coastal dunes and coastal prairie (mesic); often in vernal mesic areas. 1-50 m.	No potential to occur.	The habitat to support this species is not present onsite and there are no CNDDDB accounts of this species occurring within seven miles of the project site. This species was not observed during the site survey.
<i>Baccharis vanessae</i> Encinitas baccharis	Threatened/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Chaparral and cismontane woodland; sandstone. 60-720 m.	No potential to occur.	The habitat and soil type to support this species is generally not present onsite and there are no CNDDDB accounts of this species occurring within ten miles of the project site. This species was not observed during the site survey.
<i>Bloomeria clevelandii</i> San Diego goldenstar	None/None G2 / S2 1B.1	Chaparral, coastal scrub, valley and foothill grassland, vernal pools. Mesa grasslands, scrub edges; clay soils. Often on mounds between vernal pools in fine, sandy loam. 60-465 m.	Low potential to occur.	There are CNDDDB accounts of this species occurring in the vicinity of the project site. However, those occurrences are considered extirpated. The nearest extant occurrence is 1.5 miles to the northwest. This species was not observed during the site survey.

<i>Brodiaea orcuttii</i> Orcutt's brodiaea	None/None G2 / S2 1B.1	Vernal pools, valley and foothill grassland, closed-cone coniferous forest, cismontane woodland, chaparral, meadows and seeps. Mesic, clay habitats; usually in vernal pools and small drainages. 30-1615 m.	Low potential to occur.	There are CNDDDB accounts of this species occurring in the vicinity of the project site. However, those occurrences are considered extirpated. The nearest extant occurrence is 1.6 miles to the northwest. This species was not observed during the site survey.
<i>Ceanothus otayensis</i> Otay Mountain ceanothus	None/None G1G2 / S1 1B.2	Chaparral. Metavolcanic or gabbroic soils. 75-1160 m.	No potential to occur.	The habitat to support this species is not present onsite and there are no CNDDDB accounts of this species occurring within five miles of the project site. This species was not observed during the site survey.
<i>Ceanothus verrucosus</i> wart-stemmed ceanothus	None/None G2 / S2? 2B.2	Chaparral. 30-350 m.	Low potential to occur.	There is marginal habitat to support this species present onsite and there are multiple extant CNDDDB accounts of this species occurring within one mile of the project site. This species was not observed during the site survey.
<i>Chorizanthe polygonoides</i> var. <i>longispina</i> long-spined spineflower	None/None G5T3 / S3 1B.2	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools. Gabbroic clay. 30-1540 m.	No potential to occur.	There is only marginal habitat to support this species present onsite and there are no CNDDDB accounts of this species occurring within three miles of the project site. This species was not observed during the site survey.
<i>Clarkia delicata</i> delicate clarkia	None/None G3 / S3 1B.2	Cismontane woodland, chaparral. Often on gabbro soils. 50-1360 m.	No potential to occur.	The habitat to support this species is generally not present onsite and there are no CNDDDB accounts of this species occurring within three miles of the project site. This species was not

				observed during the site survey.
<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i> summer holly	None/None G3T2 / S2 1B.2	Chaparral, cismontane woodland. Often in mixed chaparral in California, sometimes post-burn. 30-945 m.	Low potential to occur.	There are two CNDDDB accounts of this species occurring in the vicinity of the project site (0.6 and 1.1 mile). Although there is marginal habitat present to support this species, it generally prefers chaparral to coastal sage scrub. This species was not observed onsite during the field survey.
<i>Convolvulus simulans</i> small-flowered morning-glory	None/None G4 / S4 4.2	Chaparral, coastal scrub, valley and foothill grassland. Wet clay, serpentine ridges. 30-700 m.	No potential to occur.	There is only marginal habitat to support this species present onsite and there are no CNDDDB accounts of this species occurring within 3.8 miles of the project site. This species was not observed during the site survey.
<i>Dichondra occidentalis</i> western dichondra	None/None G3G4 / S3S4 4.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. On sandy loam, clay, and rocky soils. 50-500 m.	No potential to occur.	There is only marginal habitat to support this species present onsite and there are no CNDDDB accounts of this species occurring within 3.5 miles of the project site. This species was not observed during the site survey.
<i>Dudleya blochmaniae</i> ssp. <i>Brevifolia</i> short-leaf live-forever	None/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Chaparral (maritime, openings) and coastal scrub; torrey sandstone. 30-250 m.	No potential to occur.	The soil type to support this species is not present onsite and there are no CNDDDB accounts of this species occurring within seven miles of the project site. This species was not observed during the site survey.

<i>Dudleya variegata</i> variegated dudleya	None/None G2 / S2 1B.2 City of San Diego Narrow Endemic	Chaparral, coastal scrub, cismontane woodland, valley and foothill grassland. In rocky or clay soils; sometimes associated with vernal pool margins. 3-550 m.	Low potential to occur.	There is a CNDDDB account of this species occurring in the vicinity of the project site. However, this area has been extensively developed since this record (1935), and that occurrence is considered extirpated. There are extant occurrences approximately 2.5 miles to the east and west of the project site. This species was not observed during the site survey.
<i>Ericameria palmeri</i> var. <i>palmeri</i> Palmer's goldenbush	None/None G4T2? / S2 1B.1	Coastal scrub, chaparral. On granitic soils, on steep hillsides. Mesic sites. 5-625 m.	Low potential to occur.	There is a CNDDDB account of this species occurring in the vicinity of the project site. This area has been extensively developed since this record (1938); however, this occurrence is still considered extant. The nearest recent extant occurrence is 3.5 miles south of the project site. This species was not observed during the site survey.
<i>Eryngium aristulatum</i> var. <i>parishii</i> San Diego button-celery	Endangered/ Endangered G5T1 / S1 1B.1 City of San Diego Narrow Endemic	Vernal pools, coastal scrub, valley and foothill grassland. San Diego mesa hardpan & claypan vernal pools & southern interior basalt flow vernal pools; usually surrounded by scrub. 15-880 m.	No potential to occur.	The habitat onsite is too steep and partially shaded to support this species. There are no extant CNDDDB accounts of this species occurring within three miles of the project site. This species was not observed during the site survey.
<i>Ferocactus viridescens</i> San Diego barrel cactus	None/None G3? / S2S3 2B.1	Chaparral, coastal scrub, valley and foothill grassland. Often on exposed, level or south-sloping areas; often in coastal scrub near crest of slopes. 3-490 m.	Low potential to occur.	There is marginal habitat to support this species onsite and there are two extant occurrences within 0.4 mile of the project site. Much of the project site is partially shaded for parts of the day which would discourage growth

				of this species. This species was not observed during the site survey.
<i>Githopsis diffusa</i> ssp. <i>filicaulis</i> Mission Canyon bluecup	None/None G5T1Q / S1 3.1	Chaparral. Probably in open, grassy places and mesic, disturbed areas; much overlooked. 450-700 m.	No potential to occur.	There is no habitat to support this species present onsite and there are no CNDDDB accounts of this species occurring within 5 miles of the project site. This species was not observed during the site survey.
<i>Grindelia hallii</i> San Diego gumplant	None/None G2 / S2 1B.2	Meadows and seeps, valley and foothill grassland, chaparral, lower montane coniferous forest. Frequently occurs in low moist areas in meadows. Associated species commonly include Wyethia, Ranunculus, Sidalcea. 180-1810 m.	No potential to occur.	The habitat needed to support this species is generally not present onsite and there are no extent CNDDDB accounts of this species occurring within 5 miles of the project site. This species was not observed during the site survey.
<i>Harpagonella palmeri</i> Palmer's grapplinghook	None/None G4 / S3 4.2	Chaparral, coastal scrub, valley and foothill grassland. Clay soils; open grassy areas within shrubland. 20-955 m.	No potential to occur.	There is marginal habitat to support this species onsite; however, and there are no extant CNDDDB accounts of this species occurring within 5 miles of the project site. This species was not observed during the site survey.
<i>Hemizonia conjugens</i> Otay tarplant	Threatened/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Coastal scrub and valley and foothill grassland. Clay soils. 25-300 m.	Low potential to occur.	There is marginal habitat to support this species onsite but the nearest CNDDDB accounts of this species occur over six miles southeast of the project site. This species was not observed during the site survey.

<i>Hordeum intercedens</i> vernal barley	None/None G3G4 / S3S4 3.2	Valley and foothill grassland, vernal pools, coastal dunes, coastal scrub. Vernal pools, dry, saline streambeds, alkaline flats. 5-1000 m.	No potential to occur.	The habitat needed to support this species is generally not present onsite and there are no extent CNDDDB accounts of this species occurring within 5 miles of the project site. This species was not observed during the site survey.
<i>Isocoma menziesii</i> var. <i>decumbens</i> decumbent goldenbush	None/None G3G5T2T3 / S2 1B.2	Coastal scrub, chaparral. Sandy soils; often in disturbed sites. 1-915 m.	Low potential to occur.	There is marginal habitat to support this species onsite; however, there are no extant occurrences within 5 miles of the project site. This species was not observed during the site survey.
<i>Iva hayesiana</i> San Diego marsh-elder	None/None G3 / S2 2B.2	Marshes and swamps, playas. Riverwashes. 1-430 m.	No potential to occur.	The habitat needed to support this species is not present onsite. There are extent CNDDDB accounts of this species occurring 1.4 to 2.0 miles east of the project site in supporting habitat. This species was not observed during the site survey.
<i>Juncus acutus</i> ssp. <i>leopoldii</i> southwestern spiny rush	None/None G5T5 / S4 4.2	Salt marshes, alkaline seeps, coastal dunes (mesic sites). Moist saline places. 3-900 m.	No potential to occur.	The habitat needed to support this species is not present onsite. The nearest account of this species occurs approximately 1.4 mile east-northeast of the project site in supporting riparian habitat. This species was not observed during the site survey.
<i>Lepechinia cardiophylla</i> heart-leaved pitcher sage	None/None G3 / S2S3 1B.2	Closed-cone coniferous forest, chaparral, cismontane woodland. 520-1370 m.	No potential to occur.	The habitat needed to support this species is not present onsite and there are no extant occurrences within 5 miles of the project site. This species was not observed during the site survey.

<i>Lepidium virginicum</i> var. <i>robinsonii</i> Robinson's pepper-grass	None/None G5T3 / S3 4.3	Chaparral, coastal scrub. Dry soils, shrubland. 4-1435 m.	Low potential to occur.	There is marginal habitat to support this species onsite; however, the nearest extant CNDDDB occurrence is 2.5 miles east-northeast of the project site. This species was not observed during the site survey.
<i>Monardella viminea</i> willow monardella	Endangered/ Endangered G1 / S1 1B.1	Coastal scrub, chaparral, riparian forest, riparian scrub, riparian woodland. In canyons, in rocky and sandy places, sometimes in washes or floodplains; with <i>Baccharis</i> , <i>Iva</i> , etc. Alluvial, ephemeral washes with adjacent coastal scrub. 45-230 m.	No potential to occur.	While there is marginal habitat to support this species present onsite, this species range is extremely limited. There is one extirpated CNDDDB occurrence 3.3 miles southwest (from 1878), and there are no extant CNDDDB occurrences within 4.1 miles of the project site. This species was not observed during the site survey.
<i>Myosurus minimus</i> ssp. <i>apus</i> little mouseltail	None/None G5T2Q / S2 3.1	Vernal pools, valley and foothill grassland. This subspecies has taxonomic problems; distinguishing between this and <i>M. sessilis</i> is difficult. Hybrid? Alkaline soils. 20-640 m.	No potential to occur.	The habitat needed to support this species is generally not present onsite. The nearest extant CNDDDB account of this species is a 1986 occurrence approximately 1.6 mile northwest of the project site in supporting riparian habitat. This species was not observed during the site survey.
<i>Navarretia fossalis</i> Spreading navaretia	Threatened/ None G2 / S2 1B.1 City of San Diego Narrow Endemic	Chenopod scrub, marshes and swamps (assorted shallow freshwater), playas, vernal pools. 30-655 m.	No potential to occur.	The habitat to support this species does not occur onsite and there are no CNDDDB accounts of this species within three miles of the project site. This species was not observed during the site survey.

<i>Opuntia parryi</i> var. <i>serpentina</i> snake cholla	None/None G3 / S1 1B.1 City of San Diego Narrow Endemic	Chaparral and coastal scrub. 30-150 m.	Low potential to occur.	There is marginal habitat to support this species but there are no CNDDDB accounts of this species within three miles of the project site. This species was not observed during the site survey.
<i>Orcuttia californica</i> orcutt grass	Endangered/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Vernal pools. 15-660 m.	No potential to occur.	The habitat needed to support this species is not present onsite. There are no accounts of this species within four miles of the project site. This species was not observed during the site survey.
<i>Pentachaeta aurea ssp. aurea</i> golden-rayed pentachaeta	None/None G4T3 / S3 4.2	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland, riparian woodland. 80-1850 m.	No potential to occur.	The habitat needed to support this species is generally not present onsite. There are no accounts of this species within 5 miles of the project site. This species was not observed during the site survey.
<i>Pogogyne abramsii</i> San Diego mesa mint	Endangered/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Vernal pools. Vernal pools within grasslands, chamise chaparral, or coastal sage scrub communities. 70-195 m.	No potential to occur.	The habitat needed to support this species is not present onsite. There are CNDDDB extant occurrences 1.5 mile northwest of the project site in supporting habitat. This species was not observed during the site survey.
<i>Pogogyne nadiuscula</i> Otay Mesa mint	Endangered/ Endangered G1 / S1 1B.1 City of San Diego Narrow Endemic	Vernal pools. Dry beds of vernal pools and moist swales with <i>Eryngium</i> <i>aristulatum</i> var. <i>parishii</i> and <i>Orcuttia californica</i> . 135-165 m.	No potential to occur.	The habitat needed to support this species is not present onsite. There are no accounts of this species within 5 miles of the project site. This species was not observed during the site survey.

<i>Quercus dumosa</i> Nuttall's scrub oak	None/None G3 / S3 1B.1	Closed-cone coniferous forest, chaparral, coastal scrub. Generally on sandy soils near the coast; sometimes on clay loam. 15-640 m.	Low potential to occur.	Habitat to support this species occurs onsite, and the nearest extant CNDDDB occurrence is approximately 0.4 mile west of the project site. This species was not observed during the site survey.
<i>Selaginella cinerascens</i> ashy spike-moss	None/None G3G4 / S3 4.1	Chaparral, coastal scrub. 20-640 m.	Low potential to occur.	Habitat to support this species occurs onsite. An older occurrence (1936) and a more recent occurrence (2005) are located 1.3 mile south and 2.6 miles northeast, respectively. This species was not observed during the site survey.
<i>Senecio aphanactis</i> chaparral ragwort	None/None G3 / S2 2B.2	Chaparral, cismontane woodland, coastal scrub. Drying alkaline flats. 20-855 m.	No potential to occur.	There is marginal habitat to support this species present onsite. However, there are no accounts of this species within 5 miles of the project site. This species was not observed during the site survey.
<i>Stemodia durantifolia</i> purple stemodia	None/None G5 / S2 2B.1	Sonoran desert scrub. Sandy soils; mesic sites. 35-385 m.	No potential to occur.	The habitat needed to support this species (sandy soil, riparian) is not present onsite. This species was not observed during the site survey.
<i>Stylocline citroleum</i> oil neststraw	None/None G3 / S3 1B.1	Chenopod scrub, coastal scrub, valley and foothill grassland. Flats, clay soils in oil-producing areas. 50-400 m.	No potential to occur.	The habitat needed to support this species is not present onsite. Only occurrence in San Diego County is from 1883 and its location is unknown. This species was not observed during the site survey.
<i>Texosporium sancti-jacobi</i> woven-spored lichen	None/None G3 / S1 3	Chaparral. Open sites; in California with <i>Adenostoma fasciculatum</i> , <i>Eriogonum</i> , <i>Selaginella</i> . At Pinnacles,	Low potential to occur.	Habitat to support this species occurs onsite. Nearest extant CNDDDB occurrence is located 3.9 miles north of the project

		on small mammal pellets. 290-660 m.		site. This species was not observed during the site survey.
<i>Viguiera laciniata</i> San Diego County viguiera	None/None G4 / S4 4.3	Chaparral, coastal scrub. Slopes and ridges. 60-750 m.	Low potential to occur.	Habitat to support this species occurs onsite. Nearest documented occurrence is 2.5 miles east of the project site; however, this species is far more common than the occurrences indicate. This species was not observed during the site survey.
Reptiles				
<i>Arizona elegans occidentalis</i> California glossy snake	None/None G5T2 / S2 SSC	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Low potential to occur.	Marginal habitat to support this species occurs onsite. Project site is within the estimated location range of Occurrence 176 (1934 and 1937), and there are two other occurrences within 4 miles from the 1920s and 1940s. In spite of the age of the records, the occurrences are still considered extant. Therefore, the potential to exist onsite is considered low and chance of encountering this species is unlikely. This species was not observed during the site survey.
<i>Aspidoscelis hyperythra</i> orange-throated whiptail	None/None G5 / S2S3 WL	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major	Low potential to occur.	Marginal habitat to support this species occurs onsite. The nearest CNDDDB extant occurrence is 1.4 miles northwest of the project site, but from 1965. The nearest recent extant occurrence (2002) is 2.8 miles west-

		food: termites.		northwest of the project site. This species was not observed during the site survey.
<i>Phrynosoma blainvillii</i> coast horned lizard	None/None G3G4 / S3S4 SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	No potential to occur.	The habitat needed to support this species is generally not present onsite. There is only one extant CNDDDB account of this species (from 1980) within 4 miles of the project site in supporting riparian habitat. This species was not observed during the site survey.
Crustaceans				
<i>Branchinecta sandiegonensis</i> San Diego fairy shrimp	Endangered/ None G2 / S2	Endemic to San Diego and Orange County mesas. Vernal pools.	No potential to occur.	The habitat needed to support this species (vernal basins) is not present onsite.
Insects				
<i>Cicindela gabbii</i> western tidal-flat tiger beetle	None/None G2G4 / S1	Inhabits estuaries and mudflats along the coast of Southern California. Generally found on dark-colored mud in the lower zone; occasionally found on dry saline flats of estuaries.	No potential to occur.	The habitat needed to support this species (estuary or mud flats) is not present onsite.
<i>Cicindela latesignata</i> <i>latesignata</i> western beach tiger beetle	None/None G2G4T1T2 / S1	Mudflats and beaches in coastal Southern California.	No potential to occur.	The habitat needed to support this species (beaches or mud flats) is not present onsite.
Mammals				
<i>Eumops perotis californicus</i> western mastiff bat	None/None G5T4 / S3S4 SSC	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Low potential to occur.	Marginal habitat to support this species occurs onsite. The nearest recent (1999) CNDDDB extant occurrence is 1.9

		Roosts in crevices in cliff faces, high buildings, trees and tunnels.		miles west of the project site. This species was not observed during the site survey.
Birds				
<i>Falco mexicanus</i> prairie falcon	None/None G5 / S4 WL	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	No potential to occur.	The habitat needed to support this species (open terrain) is present in insufficient quantities onsite. The only CNDDDB occurrence for this species within 5 miles of the project area was in 1980. This species was not observed during the site survey.
<i>Polioptila californica californica</i> coastal California gnatcatcher	Threatened/ None G4G5T2Q / S2 SSC	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	Low potential to occur. Not likely to nest onsite.	There are multiple CNDDDB occurrences of this species north of the project site across Interstate 8. The closest is 0.6 mile northeast of the site in Alvarado Canyon. Nevertheless, the habitat present onsite would strongly support and suggest the presence of coastal California gnatcatchers. This species was not observed during the site survey. A nesting bird survey would help verify presence or absence of this species.
<i>Vireo bellii pusillus</i> least Bell's vireo	Endangered/ Endangered G5T2 / S2	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	No potential to occur.	The habitat needed to support this species (riparian areas) is not present onsite.
Sensitive Natural Communities				

<i>San Diego Mesa Hardpan Vernal Pool</i> San Diego Mesa Hardpan Vernal Pool	None/None G2 / S2.1		No potential to occur.	The habitat is not present onsite and will not be present onsite due to the slope of the project area.
<i>Southern Cottonwood Willow Riparian Forest</i> Southern Cottonwood Willow Riparian Forest	None/None G3 / S3.2		No potential to occur.	The habitat is not present onsite and will not be present onsite because there are no riparian areas on the subject parcel.

GEOTECHNICAL INVESTIGATION

Munch Residence
5605 Toyon Road
San Diego, California

prepared for:

Mr. Dan Munch
2909 First Avenue #4B
San Diego, CA 92103

by:

TerraPacific Consultants, Inc.
4010 Morena Boulevard, Suite 108
San Diego, CA 92117

January 22, 2018
File No. 17188

Mr. Dan Munch
2909 First Avenue #4B
San Diego, CA 92103

January 22, 2018
File No. 17188

Subject: **Geotechnical Investigation**
Munch Residence
5605 Toyon Road
San Diego, California

Dear Mr. Munch:

In accordance with our proposal dated December 8, 2017, TerraPacific Consultants, Inc. (TCI) has prepared the following report presenting our findings and recommendations from a geotechnical investigation performed at the subject property. The purpose of the investigation was to evaluate the subsurface conditions at the site and provide recommendations and design parameters for the proposed construction. The following report contains a summary of our findings and recommendations.

We greatly appreciate the opportunity to be of service. If you should have any questions or comments regarding this report or our findings, please do not hesitate to call.

Sincerely,
TerraPacific Consultants, Inc.



Cristopher C. O'Hern, CEG 2397
Senior Engineering Geologist



Octavio Brambila, PE 70633
Project Engineer



CCO/OB:sm

Distribution: (3) – Mr. Dan Munch



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APPENDICES

- Appendix A: Figures and Sheets
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- Appendix D: Laboratory Test Results
- Appendix E: Slope Stability Analysis
- Appendix F: Summary of Active Faults
- Appendix G: Storm Water Standards
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1.0 INTRODUCTION

1.1 General

The following report presents the findings of a geotechnical investigation performed at 5605 Toyon Road in San Diego, California. The location of the property is presented on the Site Location Plan, Figure 1 in Appendix A. The purpose of the investigation was to evaluate the subsurface conditions at the site in order to provide recommendations and soil design parameters for the proposed construction, which will consist of a new residential structure, swimming pool, and associated appurtenances.

1.2 Scope of Services

The scope of the investigation consisted of field reconnaissance, subsurface exploration, laboratory testing, and engineering and geologic analysis of the obtained data. The following tasks were performed during the investigation and production of this report:

- Site reconnaissance and review of published geologic, seismologic, and geotechnical reports, maps, and aerial photos pertinent to the project. A list of references is provided in Appendix B;
- Logging/sampling of eight test pit excavations in the area of the proposed work. The Geotechnical Plan, Sheet 1 in Appendix A, presents the approximate subsurface exploration locations. The excavation logs are presented in Appendix C;
- Conducting percolation testing within two of the test pits;
- Collection of representative soil samples from selected depths within the excavations, which were transported to our laboratory for testing and analysis;
- Laboratory testing of samples collected from the test excavations. The testing included sulfate and chloride level analysis, expansion index, maximum density and optimum moisture, and direct shear. The laboratory data is presented in Appendix D;
- Engineering and geologic analysis of data acquired from the investigation, which provided the basis for our conclusions and recommendations; and
- Preparation of this report presenting our findings and recommendations.



2.0 PROJECT BACKGROUND

2.1 Site Description and Development History

The subject property is located on the east side of Toyon Road in San Diego, California. The legal description of the property is APN 461-430-09-00, Lot 25 Map No. 2823, City of San Diego. The trapezoidal shaped lot is bordered by Toyon Road to the west, developed residential properties to the north and south, and descending sloping canyon terrain to the east.

The lot consists of moderately sloping terrain which descends in an easterly direction. Lot elevations range from approximately 325 feet above mean sea level (MSL) at the southwest lot corner, to approximately 200 feet MSL at the northeast property corner. The area of proposed work is limited to the northwest corner of the lot. Elevations in this area range from 295 feet MSL to 270 feet MSL. The lot is currently unimproved.

2.2 Proposed Development

Based on our review of the preliminary design drawing from the project architect, it is our understanding that the project will involve the construction of a new single-family residential structure, retaining walls, a swimming pool, and other associated appurtenances. Construction will include a partial or daylight style basement.

3.0 SITE INVESTIGATION

The site investigation was conducted on December 20, 2017 and consisted of visual reconnaissance and subsurface exploration. The purpose of the investigation was to gain an understanding of the site configuration and expose the subsurface conditions in the vicinity of the proposed construction.

3.1 Site Reconnaissance

Our site reconnaissance consisted of walking the site and surrounding areas (i.e. accessible exterior areas) to determine if any indications of adverse geologic conditions were present. No outward signs of significant distress indicating adverse geologic conditions were noted.

3.2 Subsurface Exploration

The subsurface exploration consisted of eight test pit excavations. The excavations were conducted across the lot in the approximate areas of proposed work. Final excavation depths extended up to 9.0 feet below ground surface (bgs). The approximate excavation locations are presented on the Geotechnical Plan, Sheet 1 in Appendix A.



In general, the subsurface exploration revealed that the area of proposed development is mantled by relatively shallow fill material or slopewash deposits that are underlain by native formational soils identified as the Tertiary-aged Mission Valley Formation.

Groundwater was not encountered in any of the excavations during our exploration. Descriptions of each of the materials encountered are detailed in Section 4.2, Site Stratigraphy, and subsurface excavation logs are presented in Appendix C.

3.3 Laboratory Testing

Soil samples collected during the field exploration were transported to our laboratory for testing. The purpose of the testing was to characterize the soil types and evaluate the engineering properties of the soil. The laboratory testing included sulfate and chloride level analysis, expansion index, maximum density and optimum moisture and direct shear. Each of the laboratory tests were performed in accordance with ASTM specifications or other accepted testing procedures. The results of the laboratory tests are presented in Appendix D.

4.0 SITE GEOLOGY

4.1 Geologic Setting

The site is located within the coastal portion of the Peninsular Ranges Geomorphic Province of California. This province, which extends 900 miles from Southern California to the southern tip of Baja California, is characterized by northwest-trending structural blocks. The coastal portion of the province in San Diego County is typically comprised of Tertiary to late Cretaceous-aged (1.8 million to 65 million years) marine and non-marine sedimentary bedrock units that have been deposited within a northwest trending basin known as the San Diego Embayment (Norris & Webb, 1976). Recent geologic uplift along the San Diego coastal margin, combined with sea level changes, have created marine terraces and associated deposits consisting of near-shore marine, beach estuarine, and lagoonal facies. These deposits range from early to mid Quaternary-aged (45,000 to 1.5 million years) and are designated in geologic literature as Paralic Deposits.

According to the geologic literature, the site is underlain by sedimentary deposits of Tertiary-aged Mission Valley Formation (Kennedy and Tan, 2008). Geologic literature describes the Mission Valley Formation, as a light gray, soft and friable, fine to medium grained sandstone (Kennedy and Tan, 2008).



The site is further located on the City of San Diego Seismic Safety Study Map within a Zone 53 – “level or sloping terrain, unfavorable geologic structure, low to moderate risk.” The site is located on the Geologic Map on Figure 2, and the Seismic Safety Study Map on Figure 3, within Appendix A.

4.2 Site Stratigraphy

The subsurface descriptions presented below are interpreted from the conditions exposed during the field investigation. In addition to the following descriptions, detailed exploration logs are presented in Appendix C. Also, Cross-Sections A-A' and B-B' Sheet 2 in Appendix A, depict the general configuration of the subsurface conditions.

Fill – Fill soil is earth material that has been placed using mechanical means such as bulldozers or other large earthmovers. Typically, the fill soil has been removed from topographically high locations and placed in low-lying areas to create level building pads. When properly compacted, fill soil can be used to support structures. However, it is typically more compressible than natural formational soils.

Fill soil was encountered in each of the test pits from the ground surface to depths of up to 3.0 feet bgs. The fill soil was relatively consistent, comprised of a medium gray brown, medium stiff, moist, sandy clay with sub-rounded gravel to cobble sized rock.

Native – Slopewash Deposits (Qsw) – Quaternary-aged slopewash deposits are unconsolidated native sediments that are deposited onto terrain by gravity and water. Slopewash deposits were encountered in each excavation underlying the fill material to depths of up to 5.0 feet bgs. The material encountered was generally described as a dark brown sandy clay that was slightly moist and soft to medium stiff in consistency. Gravel and cobble sized rock were encountered within the slopewash deposits.

Bedrock – Mission Valley Formation (Tmv) – Tertiary-aged Mission Valley Formation was encountered underlying either the fill and slopewash deposits in each of the test pits to the final excavation depths. The material was generally described as a light olive gray, fine to medium grained sandstone that was dry and dense to moderately hard to hard in consistency.

4.3 Groundwater

Static groundwater was not encountered within the depths of our excavations. It should be mentioned that transient perched groundwater conditions can develop at different levels within the soil profile due to future irrigation patterns, periods of prolonged rainfall, and/or other conditions related to on or off-site development.



5.0 SEISMICITY

5.1 Regional Seismicity

Generally, the seismicity within California can be attributed to the regional tectonic movement taking place along the San Andreas Fault Zone, which includes the San Andreas Fault and most parallel and sub-parallel faulting within the state. A majority of Southern California, which includes the subject site, is considered seismically active. Seismic hazards can be attributed to potential ground shaking from earthquake events along nearby faults or more distant faulting.

According to the regional geologic literature, the closest known active faults are located within the Rose Canyon Fault Zone located approximately 5.3 miles southwest of the site. The Rose Canyon Fault Zone consists of a complex zone of several en echelon strike slip, oblique, reverse, and normal faults, which extend onshore in this area from La Jolla Bay south to San Diego Bay. Several other potentially active and pre-Quaternary faults also occur within the regional vicinity. Currently, the geologic literature presents varying opinions regarding the seismicity of these faults. As such, the following seismic analysis only considers the effects of nearby faults currently considered active.

5.2 Probabilistic Ground Acceleration

A deterministic seismic hazard analysis was performed for the site using the computer program EQFault (Blake, 2000). The analysis considers the maximum moment magnitude earthquake for active faults within the specified search radius to provide a maximum expected earthquake event for the known tectonic structure. For this site, we specified a search radius of 62.4 miles (100 km) and the attenuation equation of Campbell & Bozorgnia (1997 Rev.) for soft rock. The results of the analysis for the faults most likely to affect the site are presented in Appendix F, Summary of Active Faults.

In addition to the deterministic analysis, a simplified probabilistic seismic hazard analysis was performed for the site. The California Geological Survey has a webpage that allows a user to calculate the ground motion at a site with both a 2 and 10 percent probability of exceedance in a 50-year period. The results of the output indicate the site has respective peak ground accelerations of 0.44g and 0.24g.

The values provided above are for comparing the potential for seismic shaking due to fault activity most likely to affect the site. Other factors should be considered when completing seismic design, such as duration of shaking, period of the structure, design category, etc. The design and/or structural engineer should consider the information provided herein and



evaluate the structure(s) in accordance with the California Building Code (CBC) and guidelines of the City of San Diego. The earthquake design parameters based on the 2016 CBC applicable to the site are provided in Section 7.6.

5.3 Hazard Assessment

Faulting/Fault Rupture Hazard – An “active” fault as defined by the Alquist-Priolo Earthquake Fault Zoning Act is a fault that has had surface rupture within Holocene time (the past 11,000 years). A “potentially active” fault is defined as any fault that showed evidence of surface displacement during Quaternary time (last approximate 1.6 million years), but not since Holocene time.

According to the City of San Diego Seismic Safety Study 2008 and the Quaternary Fault Map from the USGS Earthquake Hazards Program, the subject parcel is located approximately 5.3 miles northeast of an “active” portion of the Rose Canyon Fault Zone (Silver Strand Section) and Alquist Priolo Zone. Several other unnamed faults are mapped nearby. These faults are considered to be older than Quaternary-aged and are classified on the Seismic Safety Study map as Zone 12 - “potentially active, inactive, presumed inactive or activity unknown.” The site is not located within an Alquist-Priolo “active” fault zone, and according to geologic literature, is not intersected by any faults.

Seismically Induced Settlement – Within the depths of our exploration, the soils encountered consisted predominately of shallow fill soil and slopewash over competent formation or bedrock. Based on the anticipated earthquake effect and the stratigraphy of the site, seismically induced settlement is expected to be minor and within tolerable limits. Structures that are designed and constructed in accordance with applicable building codes are expected to perform well with respect to settlement associated with predictable seismic events.

Liquefaction – Liquefaction involves the substantial loss of shear strength in saturated soil, usually taking place within a saturated medium exhibiting a uniform fine grained characteristic, loose consistency, and low confining pressure when subjected to impact by seismic or dynamic loading. Based on the relatively shallow depth to bedrock and absence of shallow groundwater, the site is considered to have a negligible risk for liquefaction.

Lurching and Shallow Ground Rupture – Rupturing of the ground is not likely due to the absence of known active fault traces within the project limits. However, due to the generally active seismicity of Southern California, the possibility for ground lurching or rupture cannot be completely ruled out. In this light, “flexible” design for on-site utility lines and connections should be considered.



Landsliding – At the time of our investigation, there was no evidence of landsliding observed at the site. Based on our subsurface investigation, the site is underlain by bedrock of the Mission Valley Formation, which is not typically associated with landslide potential. Furthermore, the San Diego Seismic Safety Study Map does not depict any known landslides in the immediate vicinity of the site.

Seiches and Flooding – At the time of our investigation, there were no nearby contained bodies of water that could produce seiches (“tidal” waves in confined bodies of water) that may affect the site. No seiche or flooding potential was identified.

5.4 Slope Stability Analysis

An analysis of the gross stability of the existing slope on-site was conducted with the Slope/W computer program. The cross section utilized in the analysis of the stability of the slope is included as Cross-Section A-A’, Sheet 2 in Appendix A.

Soil strength parameters were adapted from our laboratory test results and our previous experience with similar soil environments in the area.

<i>Soil Description</i>	<i>Strength Parameters Utilized in Analysis: Friction Angle / Apparent Cohesion</i>
Fill Material	30 degrees / 200 psf
Slopewash Material	28 degrees / 150 psf
Mission Valley Formation	35 degrees / 500 psf

A search analysis was performed through the fill and bedrock for Cross Section A-A’. The analysis was performed in an auto search mode to determine the most critical failure surfaces. These analyses resulted in a critical factor of safety for deep seated stability of 3.6. The same search analysis with an added seismic load was performed for the section, with a resulting factor of safety of 2.3. The results of the slope stability analysis are included in Appendix E of this report. The analysis and calculated factors of safety indicate adequate deep seated slope stability for the project.

Surficial Slope Stability

Pursuant to the City of San Diego Guidelines for Geotechnical Reports (2011), a surficial slope stability analysis was performed assuming fully saturated conditions for the upper 5 feet of the slope face. This analysis revealed a factor of safety of 1.8. However, as with most slopes in this area, the factor of safety against surficial instability could be reduced with concentrated runoff from irrigation or rainfall. The potential for surficial slope failure



can be mitigated with proper drainage of top of slope improvements and close monitoring of irrigation on and at the top of the slope. If periods of prolonged heavy rainfall, excessive irrigation, pipe breaks, or drainage directed over the top of slope are experienced, instability of the near surface soils could result. The results of the surficial slope stability analysis are included in Appendix E of this report.

6.0 CONCLUSIONS

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

The following sections provide recommendations for the proposed site development. The civil and/or structural engineer should use this information during the planning and design of the proposed construction. Once the plans and details have been prepared, they should be forwarded to this office for review and comment.

A key aspect of the site, which will need to be considered during the design, is the presence of undocumented fill and native slope wash deposits with the upper approximate 3 to 5 feet of the site and the transition that will be created with the flat building pad across the sloping terrain. It is recommended that all areas to receive structures undergo removal of all fill and slopewash deposits, or to a depth of 24-inches below proposed foundation bottom, whichever is deeper. This will provide a uniform fill mat for the structures.

7.0 RECOMMENDATIONS

The following sections provide our recommendations for site preparation, design, and construction of the proposed foundation systems. Once the plans and details have been prepared, they should be forwarded to this office for review and comment.

7.1 Site Preparation and Grading

In order to prepare the site for the new construction, it is assumed that all of the existing improvements will be demolished and removed from the site. However, if unsuitable materials (i.e. construction debris, plant material, etc.) are encountered during the grading phase, they should be removed and properly disposed off-site.

As previously mentioned, grading will be conducted to provide a uniform fill mat for all structures. This will require removal and recompaction of the fill and native slopewash



deposits, or to a depth of 24-inches below proposed foundation bottom, whichever is deeper. The removals should extend a minimum of 5 feet beyond the structural footprint.

In areas where less critical structures, such as site walls, driveways, and walkway slabs are proposed, it is recommended that the upper approximate 18 inches of existing soil be moisture conditioned and recompact. This will help provide a more uniform bearing support for these types of appurtenant structures.

Once the removal bottoms have been established, the bottoms should be scarified a minimum of 6 inches, moisture conditioned, and compacted 90 percent relative compaction.

The on-site soil, less any organic debris, may be used for fill provided that it is placed in thin lifts (not exceeding 8 inches in loose thickness). All soil should be properly moisture conditioned and mechanically compacted to a minimum of 90 percent of the laboratory maximum dry density per ASTM D-1557 and at or slightly above optimum moisture condition. The removal bottoms, fill placement, and compaction should be observed and tested by the geotechnical consultant. Standard guidelines for grading are provided in Appendix H.

7.2 Foundation Recommendations

The following sections provide the soil parameters and general guidelines for foundation design and construction. It is anticipated that all new construction will be supported by conventional continuous and spread footings. As mentioned previously, the new foundations should be supported on competent engineered fill in accordance with Section 7.1. Consideration can be given to construct the pool on a deepened foundation extending a minimum of 24-inches into competent bedrock with a minimum 10-foot distance to daylight. The pool shell should be designed as a structural slab to span between the deepened foundations. If additional parameters are desired, they can be provided on request.

The foundation design parameters and guidelines that are provided below are considered to be “minimums” in keeping with the current standard-of-practice. They do not preclude more restrictive criteria that may be required by the governing agency or structural engineer. The architect or structural engineer should evaluate the foundation configurations and reinforcement requirements for structural loading, concrete shrinkage, and temperature stress.



7.3 Soil Design Criteria

The following separate soil design criteria are provided for design and construction of the conventional foundations for light building structures. The parameters that are provided assume foundation embedment in competent engineered fill material with an expansion index classification as “medium” or lower.

Conventional Foundations

Allowable bearing capacity for square or continuous footings..... 2,500 psf
Minimum embedment in competent engineered fill..... 24 inches
Minimum width for continuous footings 15 inches
Minimum width for square footings 3.0 feet

Note: The bearing capacity value may be increased by one-third for transient loads such as wind and seismic. In addition, the value provided may be increased by 500 psf for each additional foot of width or depth beyond the minimums provided. The increased bearing capacity should not exceed 5,000 psf.

Coefficient of friction against sliding 0.35
Passive resistance 300 psf/ft up to a maximum of 2,500 psf

7.4 Retaining Walls

Lateral Loading and Resistance Parameters

For retaining walls not located within the slope areas, the bearing capacity and foundation dimensions provided for Sections 7.3 and 7.6 may be followed. Additional design parameters for lateral loading and resistance are provided below:

Active earth pressure for level backfill (non-restrained walls).....40 psf/ft.
At rest earth pressure for level backfill (restrained walls)60 psf/ft.

Note: The active and at rest pressures are provided assuming free draining granular soil is used for backfill behind the wall for a minimum distance equal to the wall height. Backfill and subdrain recommendations are provided in the following sections.

Passive resistance in competent native soil300 psf/ft.
Coefficient of friction against sliding 0.33



Note: If the two values are used in combination, the passive resistance value should be reduced by one-third.

Earthquake Loads

Seismic loading for retaining walls with level backfill should be approximated by applying a 14 psf/ft in an inverse triangle shape where the lateral force at the bottom of the wall is equal to zero and the lateral force at the top of the retaining wall is equal to 14 psf times the height of the wall. The resultant seismic load should be applied from the bottom of the wall a distance of 0.6 times the overall height of the wall.

The seismic loads would be in addition to the normal earth pressure loads applied on the retaining walls, which are provided above. The structural engineer should evaluate the overall height of the wall and apply the appropriate retaining wall loading parameters to be used for analysis and design.

7.5 Earthquake Design Parameters

Earthquake-resistant design parameters may be determined from the California Building Code (2016 Edition). Based on our investigation and characterization of the site the following design parameters may be adopted:

Site coordinates	Latitude: 32.7786, Longitude: -117.0907
Site classification	D
Site coefficient F_a	1.008
Site coefficient F_v	1.525
Spectral response acceleration at short periods S_s	0.950
Spectral response acceleration at 1-second period S_1	0.346
Maximum spectral response accelerations at short periods S_{ms}	1.064
Maximum spectral response accelerations at 1-second period S_{m1}	0.609
Design spectral response accelerations at short periods S_{ds}	0.709
Design spectral response accelerations at 1-second period S_{d1}	0.406



7.6 Foundation and Retaining Wall Design Guidelines

The following guidelines are provided for assistance in the design of the various foundation elements, and are based on the anticipated medium expansion potential of the bearing soils. As is always the case, where more restrictive, the structural and/or architectural design criteria should take precedent.

Foundations – Conventional footings for the buildings should be a minimum of 24 inches deep. Reinforcement should consist of a minimum of four No. 5 rebar, two placed at the top and two at the bottom of the footing. All footing embedments should be verified by the soil engineer. Footings should be provided with a minimum horizontal slope setback distance of 10 feet measured from the lower leading footing edge to the face of an adjacent descending slope.

Slabs-on-Grade – Interior and exterior slabs-on-grade should be a minimum 5 inches thick and reinforced with No. 4 rebar placed at a maximum spacing of 18 inches on center, each way. The steel reinforcement should be placed at the midpoint or slightly above the midpoint in the slab section. Prior to construction of slabs, the subgrade should be moistened to approximately 12 inches in depth at least 24 hours before placing the concrete. Slabs for the pier and grade beam supported structures should be designed by the structural engineer to span between the structural elements.

All interior floor slabs should be underlain by 2 inches of clean sand followed by a minimum 15-mil PVC vapor retarder (Stego Wrap or similar). The vapor retarder should be further underlain by a 4-inch thick layer of gravel or crushed rock. Also, the vapor retarder should be properly lapped and sealed around all plumbing penetrations. Exterior driveway slabs should be a minimum 5 inches thick and underlain by 4 inches of Class II Base compacted to 95 percent relative compaction. For exterior slabs, control joints should be installed at a maximum spacing of 10 feet in each direction.

Retaining Walls – Retaining walls should be provided with a gravel subdrain system. The drain system should start with a minimum 4-inch diameter perforated PVC Schedule 40 or ABS pipe, which is placed at the heel of the wall footing and below the adjacent slab level. The pipe should be sloped at least 1 percent to a suitable outlet, such as an approved site drainage system or off-site storm drain. The pipe should be surrounded by a gravel backfill consisting of tamped $\frac{3}{4}$ -inch sized gravel. This gravel backfill zone should be a minimum of 12 inches wide and should extend from slightly below the drain pipe up to approximately two-thirds of wall height. The entire gravel section should be wrapped in a filter cloth, such as Mirafi 140 NS or similar, to prevent contamination with fines. Alternatively, walls can be drained using geo-composite panel drains that connect to a



gravel sub-drain at the heel of the wall. In addition, the wall should be properly moisture proofed per the project architect. See the Retaining Wall Drain Details (Figure 4 in Appendix A).

Foundation and Slab Concrete – Testing of the soils has revealed they possess negligible soluble sulfate concentrations and as such, no special concrete mix design for soluble sulfate is required. The concrete should be mixed and placed in accordance with ACI specifications. Water should not be added to the concrete at the site, as this can reduce the mix quality and lead to increased porosity and shrinkage cracking.

Proper curing techniques and a reduction in mixing water can help reduce cracking and concrete permeability. In order to further reduce shrinkage cracking and permeability, consideration should be given to using a concrete mix that possesses a maximum water cement ratio of 0.5.

It should be noted that TCI does not consult in the field of corrosion engineering. Thus, the client project architect and project engineer should agree on the level of corrosion protection required for the project and seek consultation from a qualified professional, as warranted.

Appurtenances – Site appurtenances, such as planter walls, site walls, etc., can be constructed on continuous footings. Footings for such appurtenances should be a minimum of 18 inches deep, 12 inches wide, and minimally reinforced with four No. 4 bars, two top and two bottom. The bearing capacity for such appurtenances is 1,500 psf. Footings near slopes should be provided with a minimum horizontal setback distance of 10 feet measured from the lower leading footing edge to the face of an adjacent descending slope.

7.7 Trench Backfill

Trench excavations for utility lines should be properly backfilled and compacted. Utilities should be properly bedded and backfilled with clean sand or approved granular soil to a depth of at least 1-foot over the pipe. This backfill should be uniformly watered and compacted to a firm condition for both vertical and lateral pipe support. The remainder of the backfill may be on-site soil or low expansion potential import soil placed near optimum moisture content in lifts not exceeding 8 inches in thickness and mechanically compacted to at least 90 percent relative compaction.



7.8 Temporary Excavations

Foundation excavations, utility trenches, or other temporary vertical cuts may be conducted in compacted engineered fill or formational soils to a maximum height of 4 feet. Any temporary cuts beyond the above height restraint could experience sloughing or caving and, therefore should be either shored or laid-back. Temporary slopes should not exceed $1\frac{1}{2}$:1 (horizontal to vertical) in bedrock and 1:1 in fill material. Unshored backcuts should not intersect a 1:1 projection down from the base of any adjacent footing. Special attention to cobble and boulder sized rock that may potentially become dislodged should be provided and may include installation of protective barriers or netting. Ultimately, the soil engineer should visit the site during the initial stages of excavation to evaluate the soil conditions which are encountered and to assess the stability of temporary construction slopes. Follow up reviews should also be made periodically while the temporary slopes are exposed.

Regional safety measures should be enforced and all excavations should be conducted in strict accordance with OSHA guidelines.

Excavation spoils should not be stockpiled adjacent to excavations as they can surcharge the soils and trigger failure. In addition, proper erosion protection, including runoff diversion, is recommended to reduce the possibility for erosion of slopes during grading and building construction. Ultimately, it is the contractor's responsibility to maintain safe working conditions for persons on-site.

7.9 Site Drainage

Drainage should be designed to direct surface water away from structures and the project slopes, and on to an approved disposal area as determined by the project civil engineer. For earth areas, a minimum gradient of 2 percent should be maintained, with drainage directed away from the bluff and towards approved swales or collection facilities. It is critical that drainage patterns approved after grading should be maintained throughout the life of the development. In addition, it is recommended that roof gutters be installed with downspouts that are tied into a tight-lined drain system directed to the approved disposal away from the building foundation.

7.10 Storm Water Infiltration / Percolation BMPs

As a part of our geotechnical investigation, and in accordance with the City of San Diego Water Standards November 2017 edition, percolation testing was conducted on-site. The open pit testing was conducted on December 20, 2017 at two locations on-site at depths



ranging from 18 inches to 20 inches bgs. The test locations are presented on the Geotechnical Plan, Sheet 1 in Appendix A. The testing was conducted in accordance with the City of San Diego Open Pit Method. Percolation rates were converted to infiltration rates using the Porchet Method and a factor of safety of 2 was applied. The results are indicated below:

Percolation Test No.	Percolation Test Result Inches Per Hour	Infiltration Result Inches Per Hour	Infiltration Rate with factor-of- safety applied
P-1	0.125	0.068	0.034
P-2	0.250	0.13	0.065

The following items should be considered when evaluating for site infiltration. Utilizing the Geotracker website, there are no LUST Cleanup, Cleanup Program, or DTSC Cleanup sites located within 1,000 feet of the project location.

The Web Soil Survey USDA website indicates that a majority of the site, including the proposed development limits, is located within a soil unit designated as Terrace Escarpments. The Terrace Escarpments are not hydric soils and there is no soil group assigned to this unit. Other soil units indicated on-site include Olivehain - Urban Land Complex. This unit is not categorized as hydric soils. It is assigned to hydrologic soil group D.

The project civil engineer should evaluate the feasibility of using infiltration on-site. Based on the City of San Diego Storm Water Standards November 2017 Edition, the site falls into a "No Infiltration" category based on the low infiltration rates. However, if required for design purposes, an infiltration rate of 0.03-inch per hour can be used. Worksheet C.4-2 is included in Appendix G.

As is always the case, the addition of on-site infiltration systems may have a negative impact to surrounding proposed or existing structures, improvements, and slope areas due to the increased soil saturation levels. To minimize the potential for adverse impacts, it is recommended that if infiltration is to be used, the system be placed an adequate distance away from any structures and slopes and incorporate some form of overflow protection that outlets/connects to an off-site drain system.

7.11 Plan Review and Geotechnical Observation

When the grading and/or foundation plans are completed, they should be reviewed by TCI for compliance with the recommendations herein. Observation by the geotechnical consultant is essential during grading and/or construction to confirm conditions anticipated



by the preliminary investigation, to adjust designs to actual field conditions, and to determine that grading is conducted in general accordance with our recommendations. In addition, all foundation excavations should be reviewed for conformance with the plans prior to the placement of forms, reinforcement, or concrete. Observation, testing, and engineering consulting services are provided by our firm and should be budgeted within the cost of development.

8.0 CLOSURE

8.1 Limits of Investigation

Our investigation was performed using the skill and degree of care ordinarily exercised, under similar circumstances, by reputable soils engineers and engineering geologists practicing in this or similar localities. No warranty, expressed or implied, is made as to the conclusions and professional advice in this report. This report is prepared for the sole use of our client and may not be assigned to others without the written consent of the client and TCI.

The samples taken and used for testing, and the observations made, are believed representative of the site conditions; however, soil and geologic conditions can vary significantly between test excavations and surface exposures. As in most projects, conditions revealed by construction excavations may vary with the preliminary findings. If this occurs, the geotechnical engineer should evaluate the changed conditions and adjust recommendations and designs, as necessary.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineer. Appropriate recommendations should be incorporated into the structural plans and the necessary steps taken to see that the contractor and subcontractors carry out such recommendations in the field.

The findings of this report are valid as of the present date. However, the conditions can change with the passage of time, whether they are due to natural processes or the works of man. In addition, changes in applicable or appropriate standards may occur from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside of our control. This report is subject to review and should be updated after a period of 3 years.



8.2 Additional Services

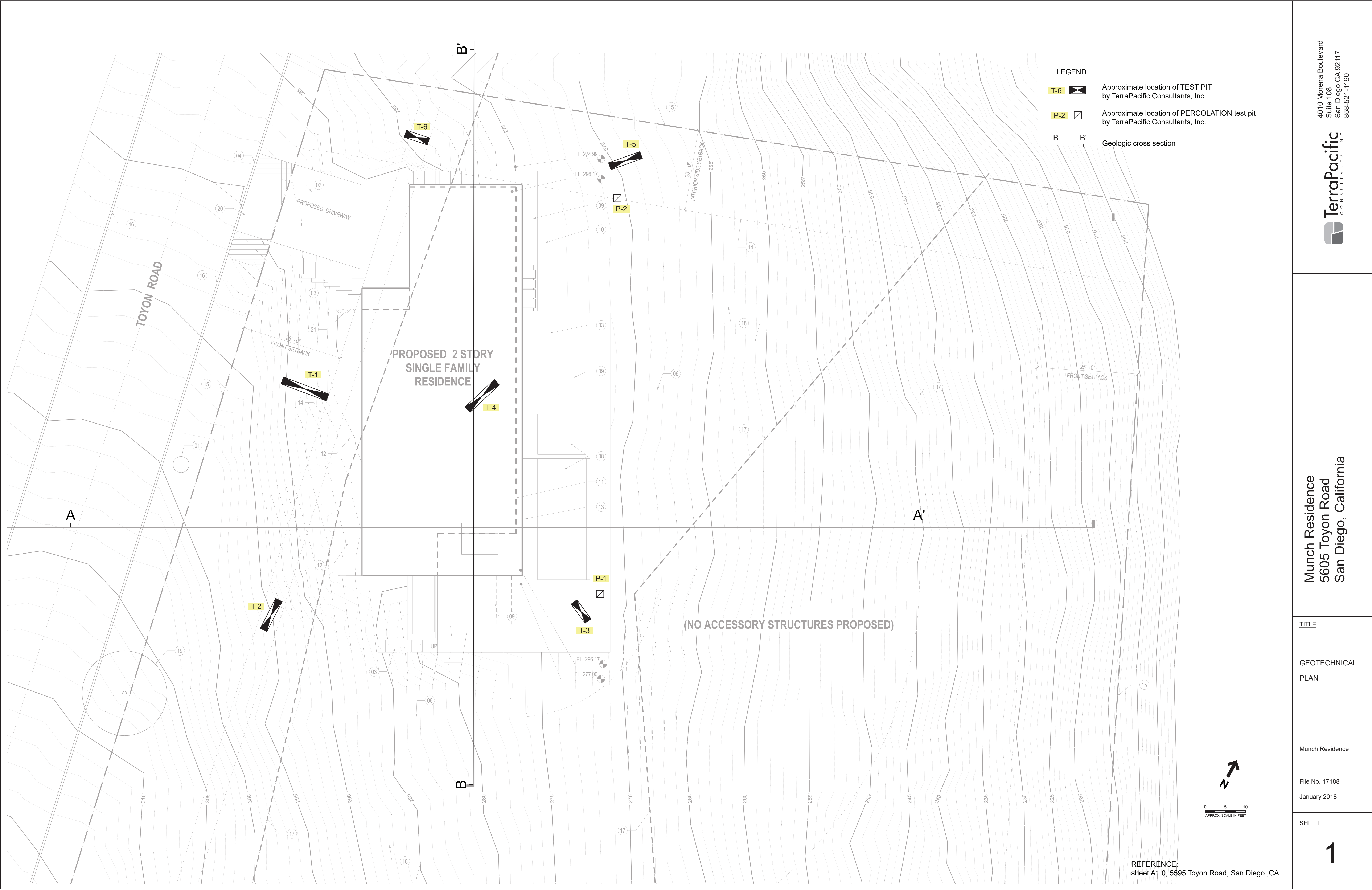
The review of plans and specifications, field observations and testing under our direction is an integral part of the recommendations made in this report. If TCI is not retained for these services, the client agrees to assume our responsibility for any potential claims that may arise during construction. Consultation and testing includes, but is not limited to: observations and testing during site preparation, grading and placement of engineered fill, inspection of footing trenches prior to placement of steel and concrete and consultation as required or requested. Observation, testing, and engineering consulting services are provided by our firm and should be budgeted within the cost of development.

*** * * TerraPacific Consultants, Inc. * * ***



APPENDIX A

Figures



4010 Morena Boulevard
Suite 108
San Diego CA 92117
858-521-1190



Munch Residence
5605 Toyon Road
San Diego, California

TITLE

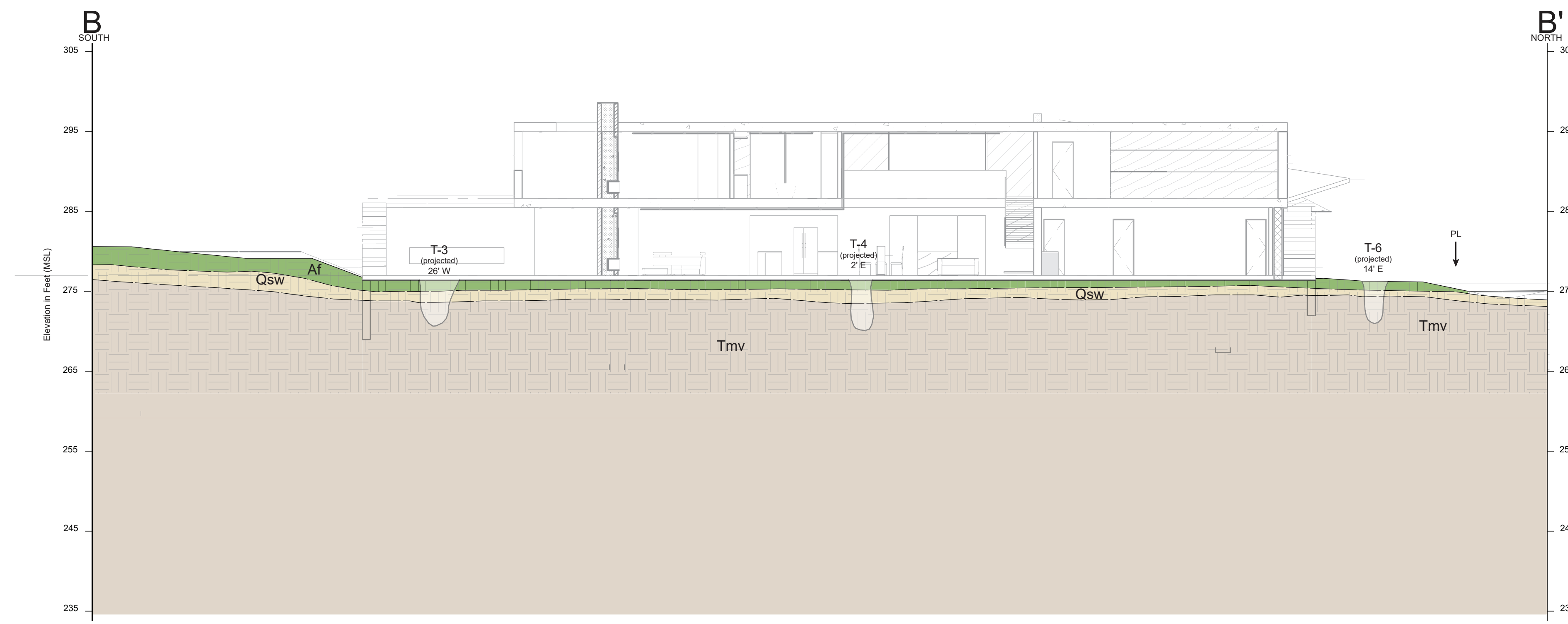
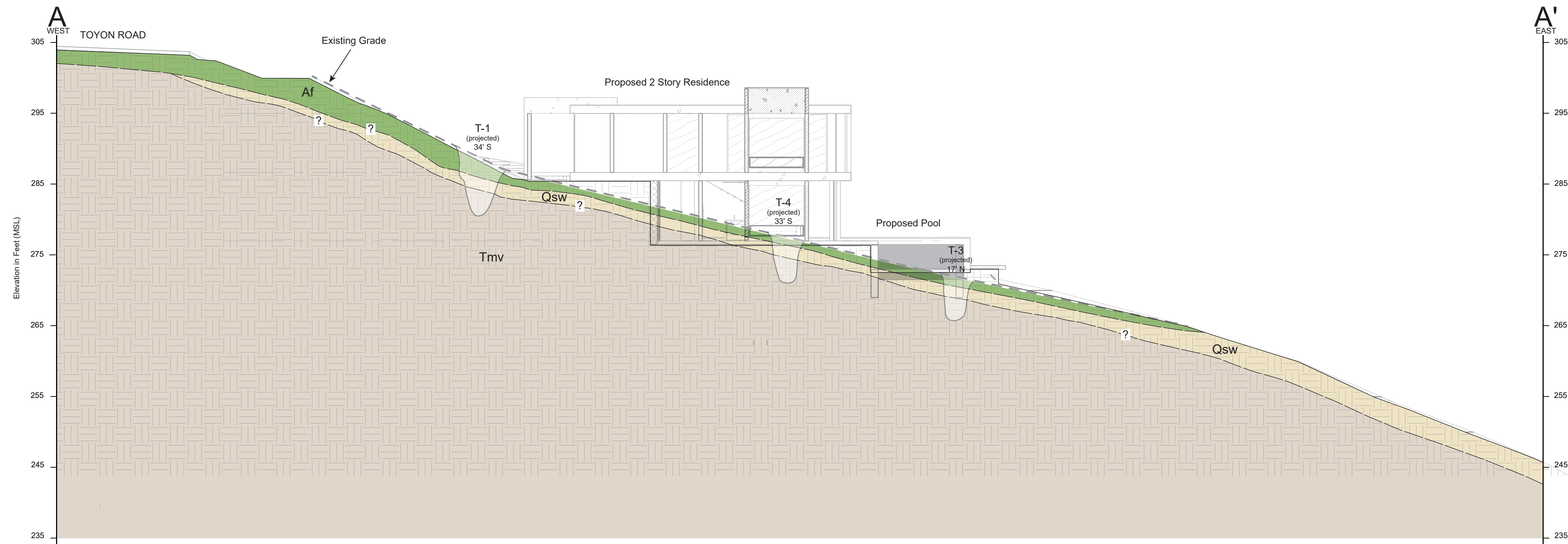
GEOTECHNICAL
PLAN

Munch Residence

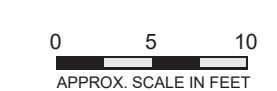
File No. 17188
January 2018

SHEET

1

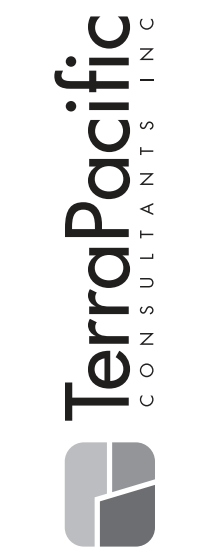


- LEGEND**
- Af Artificial fill
 - Qsw Quaternary-aged slope wash deposits
 - Tmv Tertiary-aged Mission Valley Formation
 - Geologic contact (dashed where queried)



REFERENCE:
sheet A1.1, 5595 Toyon Road, San Diego ,CA
REFERENCE:
sheet A1.0, 5595 Toyon Road, San Diego ,CA

4010 Morena Boulevard
Suite 108
San Diego CA 92117
858-521-1190



Munch Residence
5605 Toyon Road
San Diego, California

TITLE

GEOLOGIC
CROSS
SECTIONS

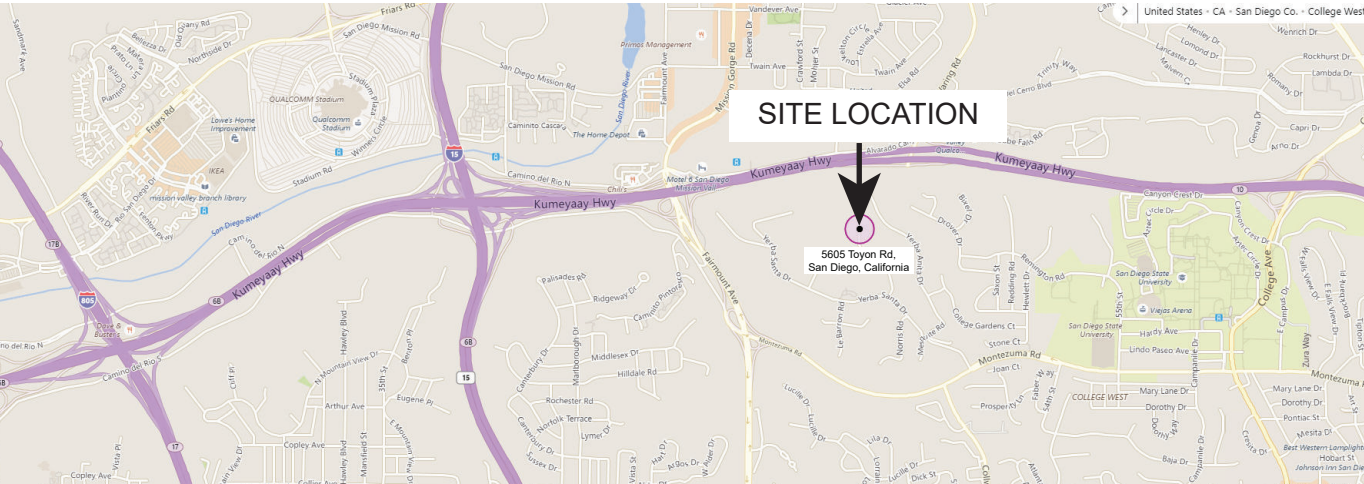
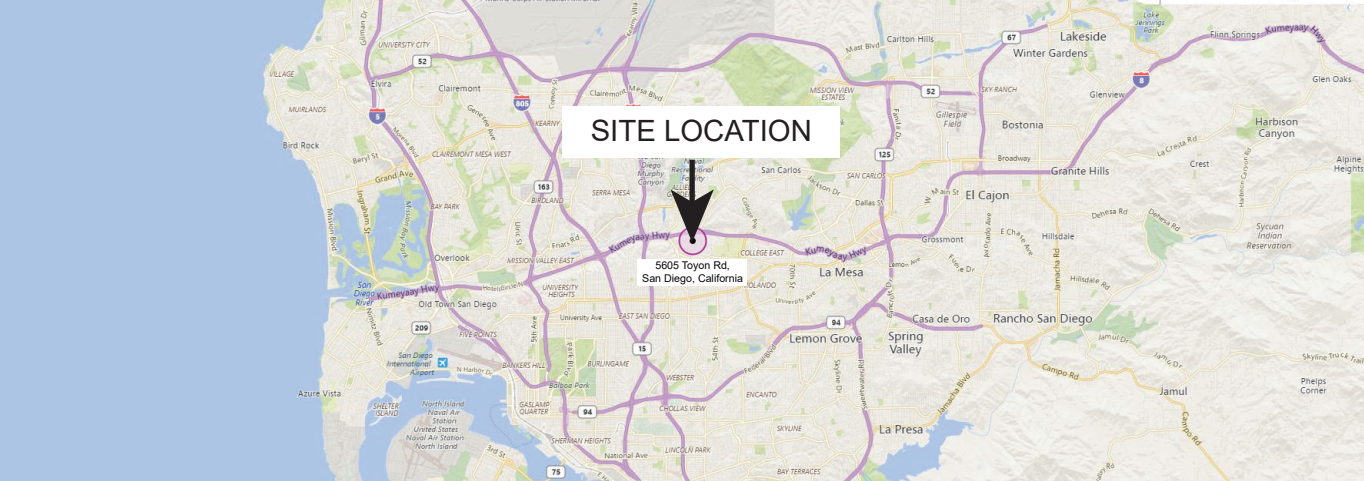
Munch Residence

File No. 17188
January 2018

SHEET

2

LOCATION:
5605 Toyon Rd,
San Diego, California



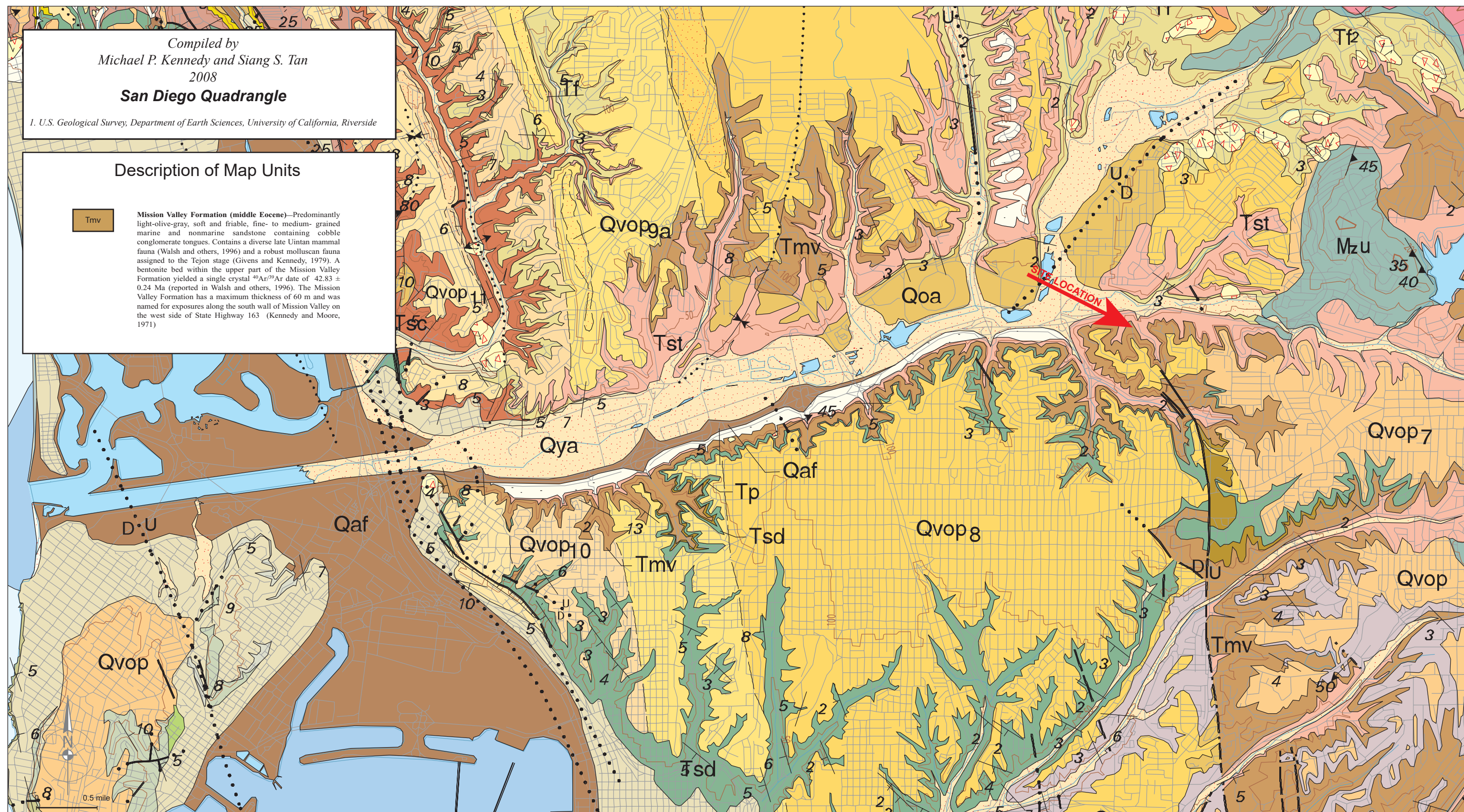
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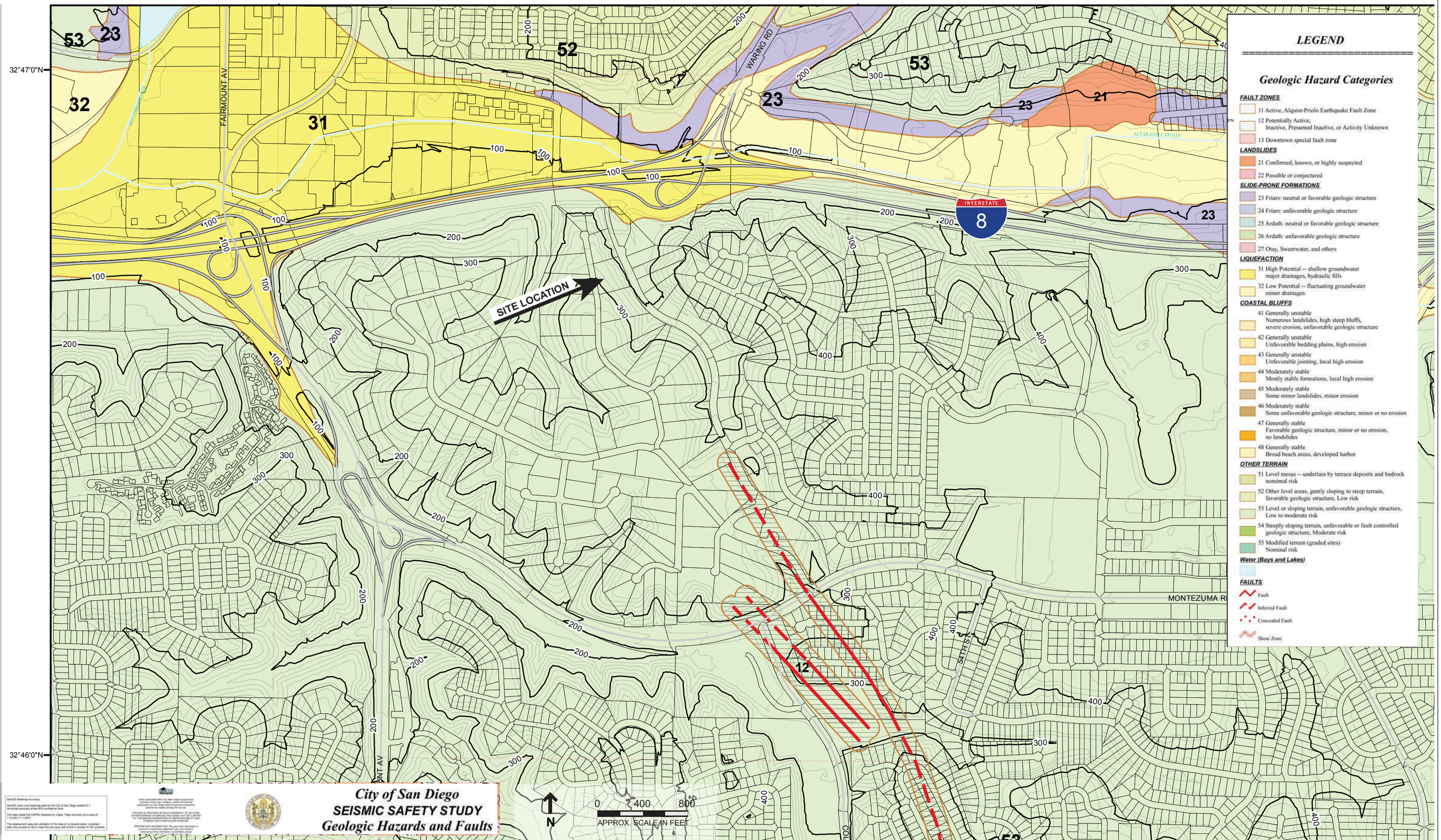


1. U.S. Geological Survey, Department of Earth Sciences, University of California, Riverside

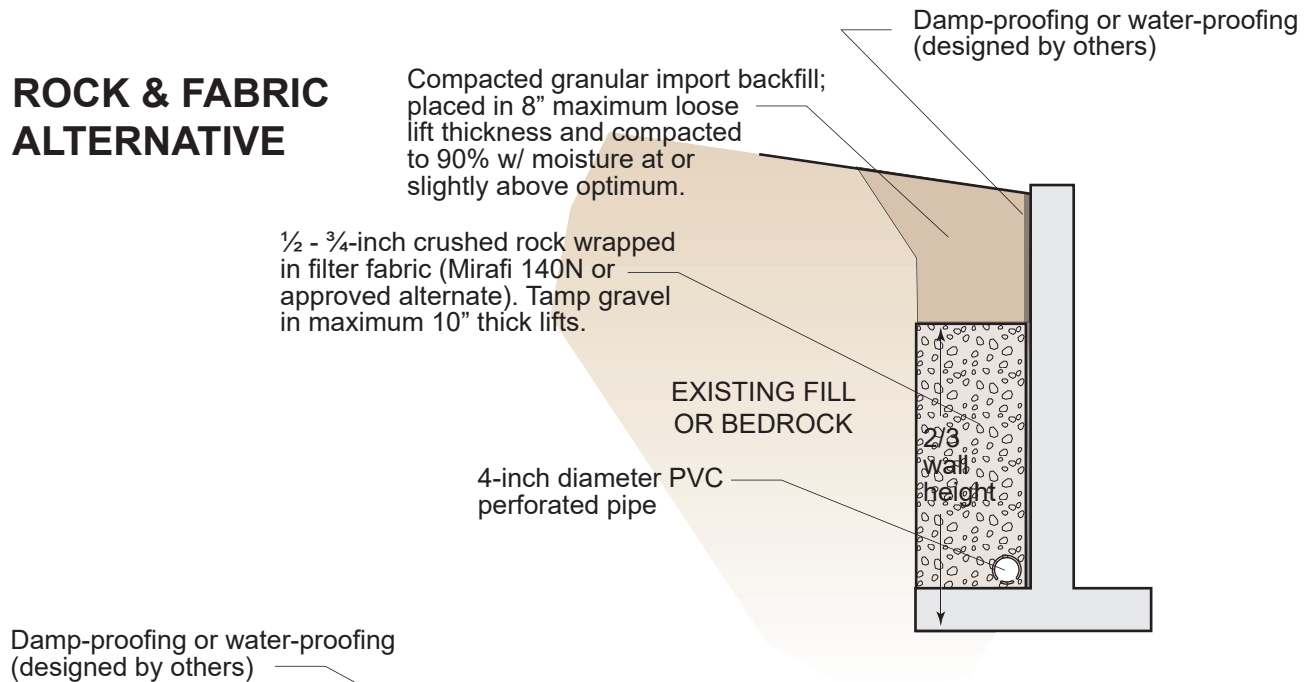
Tmv

Mission Valley Formation (middle Eocene)—Predominantly light-olive-gray, soft and friable, fine- to medium-grained marine and nonmarine sandstone containing cobble conglomerate tongues. Contains a diverse late Uintan mammal fauna (Walsh and others, 1996) and a robust molluscan fauna assigned to the Tejon stage (Givens and Kennedy, 1979). A bentonite bed within the upper part of the Mission Valley Formation yielded a single crystal $^{40}\text{Ar}/^{39}\text{Ar}$ date of 42.83 ± 0.24 Ma (reported in Walsh and others, 1996). The Mission Valley Formation has a maximum thickness of 60 m and was named for exposures along the south wall of Mission Valley on the west side of State Highway 163 (Kennedy and Moore, 1971).

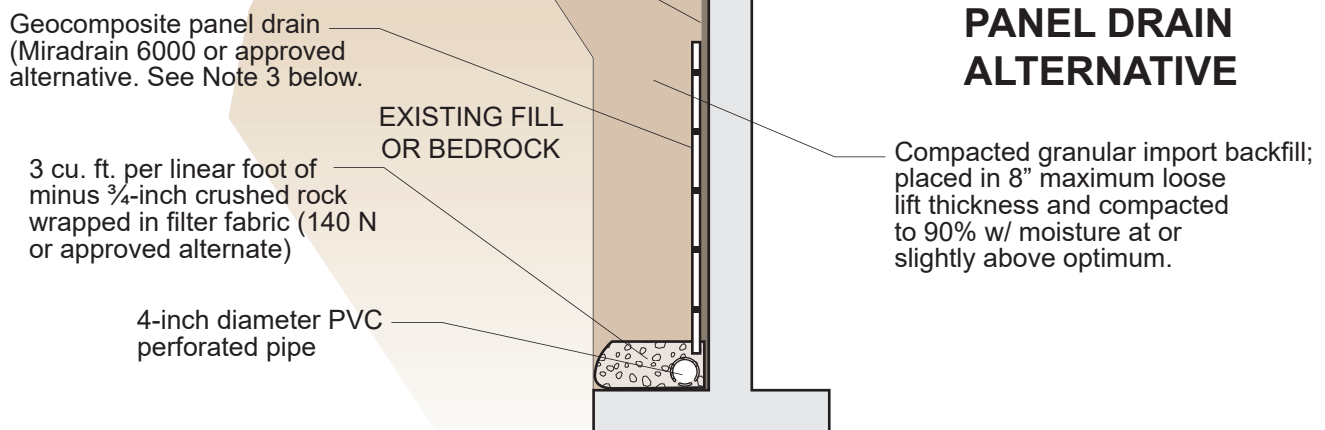




ROCK & FABRIC ALTERNATIVE



PANEL DRAIN ALTERNATIVE



NOTES:

- 1) Perforated pipe should outlet through to a solid pipe at maximum 25 foot centers to a free gravity outfall. Perforated pipe and outlet pipe should have a fall of at least 1%.
- 2) Filter fabric should consist of Mirafi 140N or similar approved fabric. Filter fabric should be overlapped at least 6-inches.
- 3) Geocomposite panel drain should consist of Miradrain 6000, Mirafi G100N, J-Drain 400, or approved similar product.
- 4) Drain installation should be observed by the geotechnical consultant prior to backfilling.

NOT TO SCALE



APPENDIX B

References



REFERENCES

- 1) American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE Standard 7-05, 2006.
- 2) American Society for Testing and Materials, Annual Books of ASTM Standards, Section 4, Construction, Volume 04.08 Soil and Rock (I): D 420 – D 4914, West Conshohocken, PA, 2008.
- 3) Bing or Google Maps, Site Location Map for 5605 Toyon Road, San Diego, California 92103.
- 4) Blake, T.F., EQFAULT, EQSEARCH, FRISK: Computer Programs for Estimation of Peak Horizontal Acceleration from Southern California Historic Earthquakes, 2000.
- 5) City of San Diego Seismic Safety Study, 2008, Sheet 21.
- 6) City of San Diego, Guidelines for Geotechnical Reports, 2011.
- 7) City of San Diego, Storm Water Standards, November 2017.
- 8) California Building Standards Commission, California Building Code, 2016 Edition.
- 9) California Department of Conservation, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Special Publication 42, California Geological Survey, Interim Revision 2007.
- 10) California Geological Survey, Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117, 2008.
- 11) California Geological Survey, Probabilistic Seismic Hazards Mapping Ground Motion Page, California Geological Survey website.
- 12) Harden, D., California Geology, 1997.
- 13) Plans for Munch Residence, 5605 Toyon Road, San Diego, California, Sheets A1.0 and A1.1
- 14) Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas, California Division of Mines and Geology, Map No. 6, Scale 1:750,000.
- 15) Kennedy, Michael P. and Peterson, G.L., 1975, Geology of San Diego Metropolitan Area, California, California Department of Conservatory Division of Mines and Geology, Bulletin 200.
- 16) Kennedy, M.P. and Tan, S.S., 2008, Geologic Map of the San Diego 30' by 60' Quadrangle, California, California Geological Survey, Regional Geologic Map Series, 1:100,000 Scale, Map No. 3, San Diego Quadrangle.
- 17) Krier, Robert, July 6, 2005, Wave Warning, Tsunami Risk on San Diego Coast Could Be Higher Than Previously Thought, San Diego Union Tribune Article.



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- 18) Leyendecker, Frankel, and Rukstales, Earthquake Ground Motion Parameters Version 5.0.9a, dated November 13, 2009.
- 19) Norris, Robert M. and Webb, Robert W., 1976, Geology of California, John Wiley & Sons.
- 20) Treiman, J.A., The Rose Canyon Fault Zone, Southern California, California Department of Conservation, Division of Mines and Geology, DMG open-file report 93-02, 1993.
- 21) United States Geological Survey, California-Nevada Active Faults Index Map, <http://quake.wr.usgs.gov/info/faultmaps/index.html>.
- 22) United States Geological Survey, Earthquake Hazards Program, Seismic Hazards Maps and Data, <http://earthquake.usgs.gov/hazards>.
- 23) United States Geological Survey, Earthquake Hazards Program, 2010 Fault Activity Map of California, <http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html>.
- 24) Wesnousky, S.G., 1986, Earthquakes, Quaternary Faults and Seismic Hazard in California, Journal of Geophysical Research, Vol. 91, No. B12, pp. 2587-2631.



APPENDIX C

Subsurface Excavation Logs

Percolation Testing Log

Percolation Test No: P-1

Project No: 17188 Project Name: Munch Residence Location: See Plan Sample Method: Modified California Sampler Instrumentation: None installed Elevation: F.S.		Date: 12/20/17 Logged By: O. Brambila Excavating Company: R&R Backhoe Excavator: Rick Excavation Method: Backhoe Hammer Wt. & Drop: 35 lbs. for 30"	
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Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
------------	-----------	-----------------------	------	-------------	-------------	-------------------	--------------

0		FILL: From 0.0', Sandy Clay, medium gray brown, moist, medium stiff	0																					
1		SLOPEWASH: From 0.8', Sandy clay, dark brown, slightly moist, soft Simple Open Pit Test (26L" x 24"W x 20"D, 6" water added) 3rd Test Results <table><tr><td>Time (t)</td><td>Total Depth (Dt)</td><td>Water Depth (Do,Df)</td><td>Drop (DeltaH)</td></tr><tr><td>0</td><td>20"</td><td>14"</td><td>0"</td></tr><tr><td>1 hr</td><td>20"</td><td>17.5"</td><td>3.5"</td></tr><tr><td>2 hr</td><td>20"</td><td>15.25"</td><td>1.25"</td></tr><tr><td>3 hr</td><td>20"</td><td>14.125"</td><td>0.125"</td></tr></table> Infiltration Rate (Porchet Method)- $I_t = \Delta H \cdot 60 \cdot r / \Delta t \cdot (r + 2H_{avg})$ $r = (A/\pi)^{0.5}$ $I_t = (0.125)(60 \text{ min/hr})(14.1)/(60 \text{ min})(26.1)$ $I_t = 0.068"/\text{hr}$	Time (t)	Total Depth (Dt)	Water Depth (Do,Df)	Drop (DeltaH)	0	20"	14"	0"	1 hr	20"	17.5"	3.5"	2 hr	20"	15.25"	1.25"	3 hr	20"	14.125"	0.125"	1	
Time (t)	Total Depth (Dt)	Water Depth (Do,Df)	Drop (DeltaH)																					
0	20"	14"	0"																					
1 hr	20"	17.5"	3.5"																					
2 hr	20"	15.25"	1.25"																					
3 hr	20"	14.125"	0.125"																					
2			2																					
3			3																					
4			4																					
5			5																					

Total Depth: 20' Water: -- Caving: -- Hole Diameter: 26" x 24"	Perc. Test P-1 Page 1 of 1
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Percolation Testing Log

Percolation Test No: P-2

Project No: 17188 Project Name: Munch Residence Location: See Plan Sample Method: Modified California Sampler Instrumentation: None installed Elevation: F.S.		Date: 12/20/17 Logged By: O. Brambila Excavating Company: R&R Backhoe Excavator: Rick Excavation Method: Backhoe Hammer Wt. & Drop: 35 lbs. for 30"	
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Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
------------	-----------	-----------------------	------	-------------	-------------	-------------------	--------------

0		FILL: From 0.0', Sandy clay, medium gray brown, moist, medium stiff	0																								
1		SLOPEWASH: From 0.9', Sandy clay, dark brown, slightly moist, soft	1																								
2		Simple Open Pit Test (22" L x 26" W x 18" D, 6" water added) 3rd Test Results <table><tr><td>Time (t)</td><td>Total Depth (Dt)</td><td>Water Depth (Do,Df)</td><td>Drop (DeltaH)</td></tr><tr><td>0</td><td>18"</td><td>12"</td><td>0"</td></tr><tr><td>1 hr</td><td>18"</td><td>14"</td><td>4"</td></tr><tr><td>2 hr</td><td>18"</td><td>13"</td><td>1"</td></tr><tr><td>3 hr</td><td>18"</td><td>12.25"</td><td>0.25"</td></tr></table> Infiltration Rate (Porchet Method)- $It = \frac{\Delta H \cdot 60 \cdot r}{\Delta t \cdot (r + 2H_{avg})}$ $r = (A/\pi)^{0.5}$ $It = (0.25") \cdot (60 \text{ min/hr}) / (13.5") \cdot (60 \text{ min}) / (25.5")$ $It = 0.13"/\text{hr}$	Time (t)	Total Depth (Dt)	Water Depth (Do,Df)	Drop (DeltaH)	0	18"	12"	0"	1 hr	18"	14"	4"	2 hr	18"	13"	1"	3 hr	18"	12.25"	0.25"	2				
Time (t)	Total Depth (Dt)	Water Depth (Do,Df)	Drop (DeltaH)																								
0	18"	12"	0"																								
1 hr	18"	14"	4"																								
2 hr	18"	13"	1"																								
3 hr	18"	12.25"	0.25"																								
3			3																								
4			4																								
5			5																								

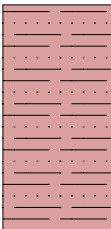
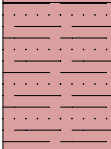
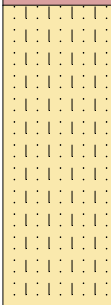
Total Depth: 1.5' Water: No Caving: No Hole Diameter: 22" x 26"	Perc. Test P-2 Page 1 of 1
--	--

Test Pit Log

Test Pit No: T-1

Project No: 17188	Date: 12/20/17
Project Name: Munch Residence	Logged By: O. Brambila
Location: See Plan	Excavating Company: R&R Backhoe
Sample Method: Modified California Sampler	Excavator: Rick
Instrumentation: None installed	Excavation Method: Backhoe
Elevation: F.S.	Hammer Wt. & Drop: 35 lbs. for 30"

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
---------------	-----------	-----------------------	------	----------------	----------------	----------------------	-----------------

0		FILL: From 0.0', Sandy clay, medium gray brown, moist, medium stiff, few gravel and cobbles, some roots					
1							
2							
3		SLOPEWASH: From 3.0', Sandy clay, dark brown, slighty moist, soft to medium stiff, some porosity					
4							
5		NATIVE (Mission Valley Formation): From 5.0', Sandstone, light olive gray, dry, moderately hard, fine to medium grained, weathered		Bulk	--	--	--
6							
7		@ 7.0', Becomes hard, difficult to excavate		Ring	50+	--	--
8							
9							
10							
11							
12							
13							
14							
15							

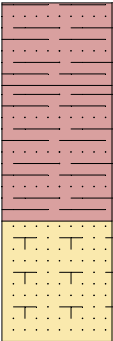
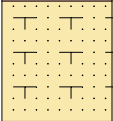
Total Depth: 9.0' Water: No Caving: No Footing Dimensions: N/A	Test Pit T-1 Page 1 of 1
---	--

Test Pit Log

Test Pit No: T-2

Project No: 17188	Date: 12/20/17
Project Name: Munch Residence	Logged By: O. Brambila
Location: See Plan	Excavating Company: R&R Backhoe
Sample Method: Modified California Sampler	Excavator: Rick
Instrumentation: None installed	Excavation Method: Backhoe
Elevation: F.S.	Hammer Wt. & Drop: 35 lbs. for 30"

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
---------------	-----------	-----------------------	------	----------------	----------------	----------------------	-----------------

0		FILL: From 0.0', Sandy clay, medium gray brown, moist, medium stiff, few gravel and cobbles, some roots					
1		SLOPEWASH: From 1.1', Sandy clay, dark brown, slightly moist, soft, some roots, very porous					
2							
3		NATIVE (Mission Valley Formation): From 2.9', Silty sandstone, light gray, dry, moderately hard, fine to medium grained					
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Depth: 4.5' Water: No Caving: No Footing Dimensions: N/A	Test Pit T-2 Page 1 of 1
---	--

Test Pit Log

Test Pit No: T-3

Project No: 17188	Date: 12/20/17
Project Name: Munch Residence	Logged By: O. Brambila
Location: See Plan	Excavating Company: R&R Backhoe
Sample Method: Modified California Sampler	Excavator: Rick
Instrumentation: None installed	Excavation Method: Backhoe
Elevation: F.S.	Hammer Wt. & Drop: 35 lbs. for 30"

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
---------------	-----------	-----------------------	------	----------------	----------------	----------------------	-----------------

0		FILL: From 0.0', Sandy clay, medium to dark brown, slightly moist, soft to medium stiff, abundant roots		Bulk	--	112.0	14.0
1							
2		SLOPEWASH: From 1.4', Sandy clay, medium to dark brown, slightly moist, soft to medium stiff, abundant roots					
3							
4		NATIVE (Mission Valley Formation): From 3.0', Sandstone, olive brown, dry, moderately hard, fine to medium grained, weathered					
5							
6		NATIVE (Stadium Conglomerate): From 4.5', Sandstone, tan to light brown, slightly moist, hard, moderately cemented, abundant cobbles and boulders, difficult to excavate					
7		@ 6.0', Practical refusal					
8							
9							
10							
11							
12							
13							
14							
15							

Total Depth: 6.0' Water: No Caving: No Footing Dimensions: N/A	Test Pit T-3 Page 1 of 1
---	--

Test Pit Log

Test Pit No: T-4

Project No: 17188	Date: 12/20/17
Project Name: Munch Residence	Logged By: O. Brambila
Location: See Plan	Excavating Company: R&R Backhoe
Sample Method: Modified California Sampler	Excavator: Rick
Instrumentation: None installed	Excavation Method: Backhoe
Elevation: F.S.	Hammer Wt. & Drop: 35 lbs. for 30"

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
---------------	-----------	-----------------------	------	----------------	----------------	----------------------	-----------------

0		FILL: From 0.0', Sandy clay, medium to dark brown, slightly moist, soft to medium stiff, abundant roots					
1							
2		SLOPEWASH: From 1.3', Sandy clay, dark brown, slightly moist, soft to medium stiff, abundant roots, very porous					
3							
4		NATIVE (Mission Valley Formation): From 2.8', Silty sandstone, light gray, dry, moderately hard, fine to medium grained, weathered					
5							
6		@ 5.5', Moderately cemented, difficult to excavate					
7		@ 6.3', Terminated					
8							
9							
10							
11							
12							
13							
14							
15							

Total Depth: 6.3'	Test Pit
Water: No	T-4
Caving: No	
Footing Dimensions: N/A	Page 1 of 1

Test Pit Log

Test Pit No: T-5

Project No: 17188 Project Name: Munch Residence Location: See Plan Sample Method: Modified California Sampler Instrumentation: None installed Elevation: F.S.	Date: 12/20/17 Logged By: O. Brambila Excavating Company: R&R Backhoe Excavator: Rick Excavation Method: Backhoe Hammer Wt. & Drop: 35 lbs. for 30"
--	--

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
------------	-----------	-----------------------	------	-------------	-------------	-------------------	--------------

0		FILL: From 0.0', Sandy clay, medium to dark brown, slightly moist, soft to medium stiff, abundant roots					
1							
2		SLOPEWASH: From 1.2', Sandy clay, dark brown, slightly moist, soft, abundant roots, very porous, few cobbles					
3		NATIVE (Mission Valley Formation): From 2.8', Silty sandstone, light gray, dry, moderately hard, fine to medium grained, very weathered					
4		From 3.5', Sandstone, light brown, slightly moist, hard, moderately cemented, common cobbles and boulders to +/- 12" diameter, difficult to excavate					
5		@ 4.8', Practical refusal					
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Depth: 4.8' Water: No Caving: No Footings Dimensions: N/A	Test Pit T-5 Page 1 of 1
--	--

Test Pit Log

Test Pit No: T-6

Project No: 17188 Project Name: Munch Residence Location: See Plan Sample Method: Modified California Sampler Instrumentation: None installed Elevation: Finished Surface	Date: 12/20/17 Logged By: O. Brambila Excavating Company: R&R Backhoe Excavator: Rick Excavation Method: Backhoe Hammer Wt. & Drop: 35 lbs. for 30"
--	--

Depth (ft)	Lithology	DESCRIPTION & REMARKS	USCS	Sample Type	Blow Counts	Dry Density (pcf)	Moisture (%)
---------------	-----------	-----------------------	------	----------------	----------------	----------------------	-----------------

0		FILL: From 0.0', Sandy clay, medium to dark brown, slightly moist, soft to medium stiff, abundant roots					
1		SLOPEWASH: From 0.0', Sandy clay, dark brown, slightly moist, soft, very porous, some roots, few cobbles					
2							
3		NATIVE (Mission Valley Formation): From 1.7', Sandstone, light gray, dry, moderately hard, fine to medium grained, weathered @ 3.5', Becomes hard					
4		From 4.1', Moderately difficult to excavate					
5		@ 4.8', Terminated					
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Depth: 4.8' Water: No Caving: No Footing Dimensions: N/A	Test Pit T-6 Page 1 of 1
---	--



APPENDIX D

Laboratory Test Results

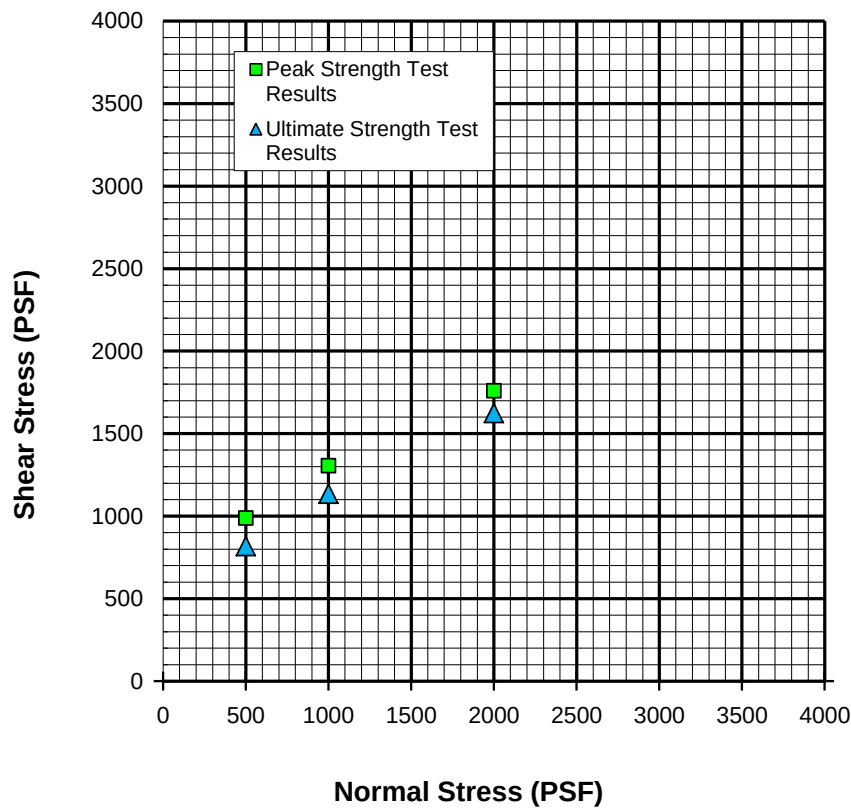
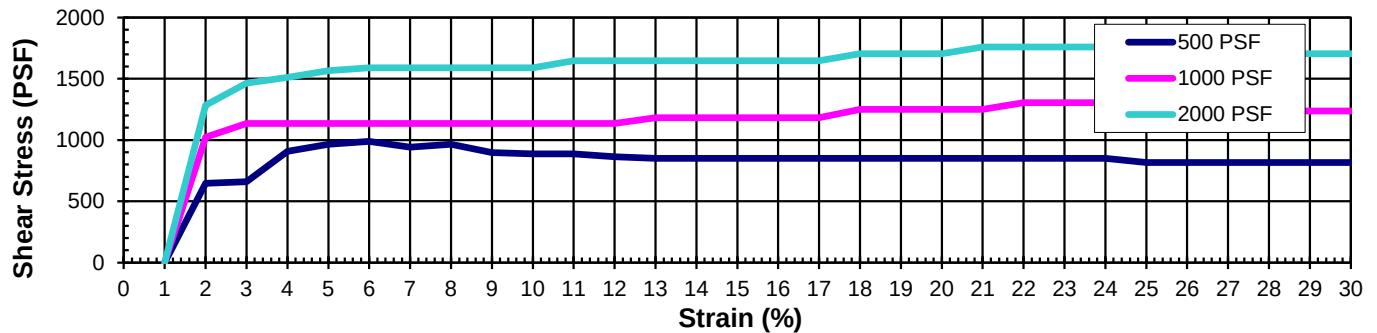
Munch Residence
Summary of Laboratory Test Results

FN:17188

Sample Location			Corrosivity Series		ASTM D 1557		ASTM D 3080		ASTM D 4829	
			CTM422	CTM 417						
Location	Sample Depth (ft)	Sample Type	Chloride Content (%)	Sulfate Content (%)	Maximum Dry Density (pcf)	Opt. Moist Content (%)	Peak ϕ (degrees)	Peak c (psf)	Expansion Index	Expansion Potential
T-3	0-2'	L Bulk	0.005	0.009	112.0	14.0	30.0	700.0	68	MED

DIRECT SHEAR TEST
Laboratory Report

File Name: Munch Residence
File No.: 17188
Date: 1/9/2018
Technician: JS



Sample No. & Location: T-3 @ 0-2

Soil Description: Dark Brown Sandy Clay

Sample Type: Remolded

Specimen Preparation: Inundated

	Peak	Ultimate
Friction Angle Φ' (deg)	30	30
Cohesion C' (psf)	700	500

COMPACTION TEST

ASTM D 1557

Modified Proctor

Project Name: Munch Residence

Project No. : 17188

Boring No.: T-3 @ 0-2'

Technician: JS

Date: 1/3/18

Visual Sample Description: Dark Brown Clayey Sand

X

Manual Ram

Ram Weight 10 LBS Drop 18 inches

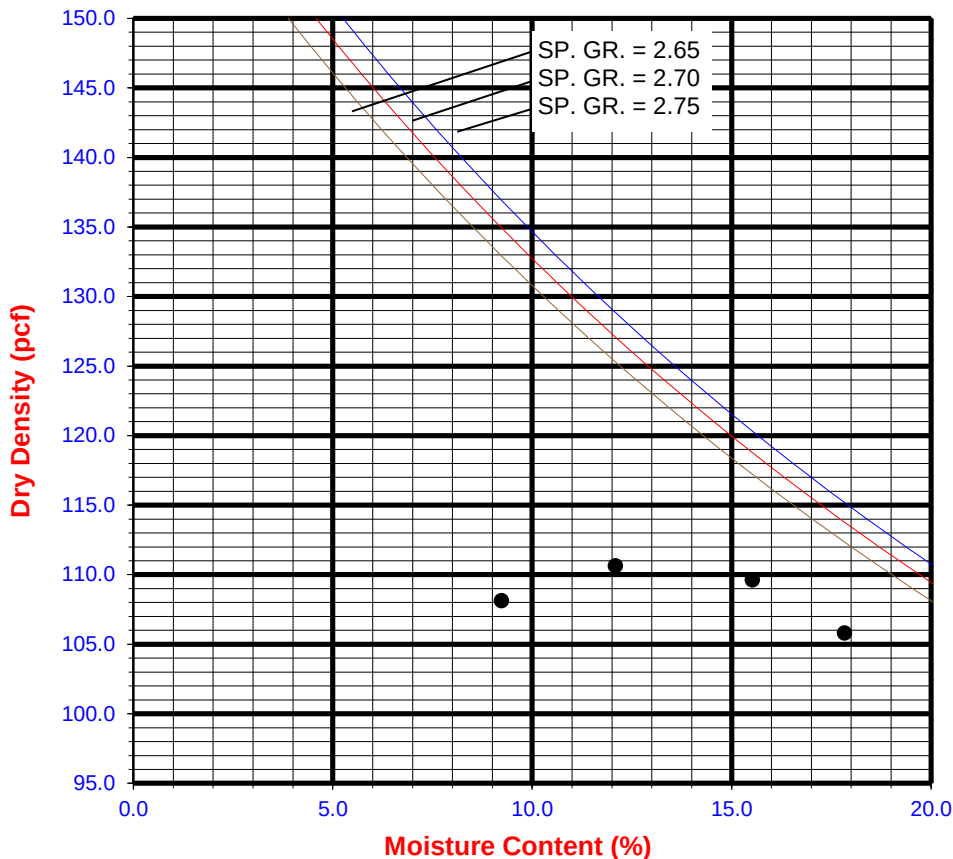
	TEST NO.	1	2	3	4	5	6
A	Wt. Comp. Soil + Mold (gm.)	3620.00	3710.00	3750.00	3720.00		
B	Wt. of Mold (gm.)	1820.00	1820.00	1820.00	1820.00		
C	Net Wt. of Soil (gm.)	A - B	1890.00	1930.00	1900.00		
D	Wet Wt. of Soil + Cont. (gm.)	811.1	1339.3	718.2	1052.7		
E	Dry Wt. of Soil + Cont. (gm.)	767.9	1215.6	652.2	922.5		
F	Wt. of Container (gm.)	299.8	192.3	226.9	192.5		
G	Moisture Content (%)	$\frac{[(D-F)-(E-F)]/(E-F)}{C \cdot 29.76 / 453.6}$	9.2	12.1	15.5	17.8	
H	Wet Density (pcf)	$H/(1+G/100)$	118.1	124.0	126.6	124.7	
I	Dry Density (pcf)		108.1	110.6	109.6	105.8	

Maximum Dry Density (pcf)

112.0

Optimum Moisture Content (%)

14.0



PROCEDURE USED

Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

Procedure B

Soil Passing 3/8 in. Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained > 20%



APPENDIX E

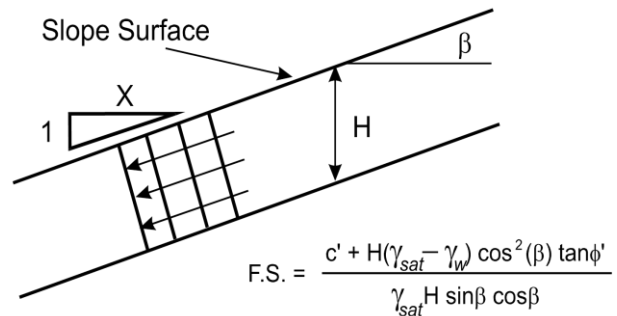
Slope Stability Analysis

INPUT PARAMETERS

Friction Angle (CD)	30	[DEGREES]
Cohesion (CD)	250	[PSF]
Dry Unit Weight	110	[PCF]
Water Content	10	[%]
Specific Gravity	2.65	
Slope Angle X	2.50	

CALCULATED PARAMETERS

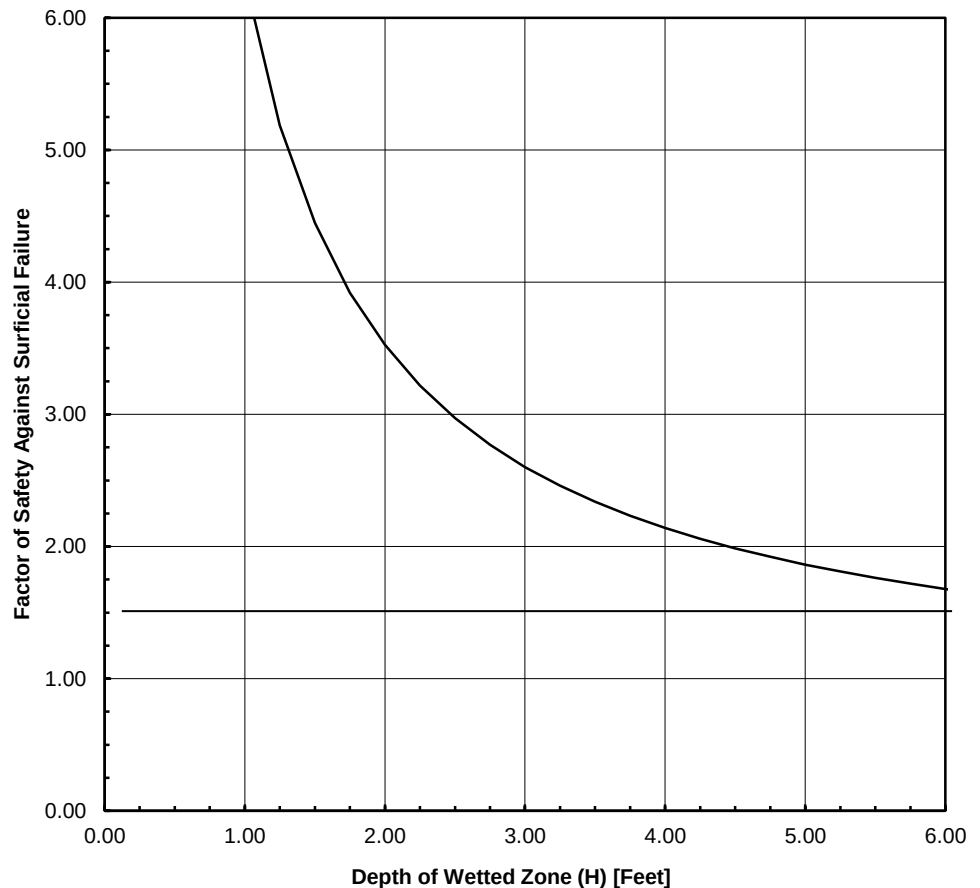
Void Ratio	0.50	
Moist Unit Weight	121	[PCF]
Saturated Unit Weight	131	[PCF]
Friction Angle	0.52	[RADIANS]
Slope Angle	0.38	[RADIANS]



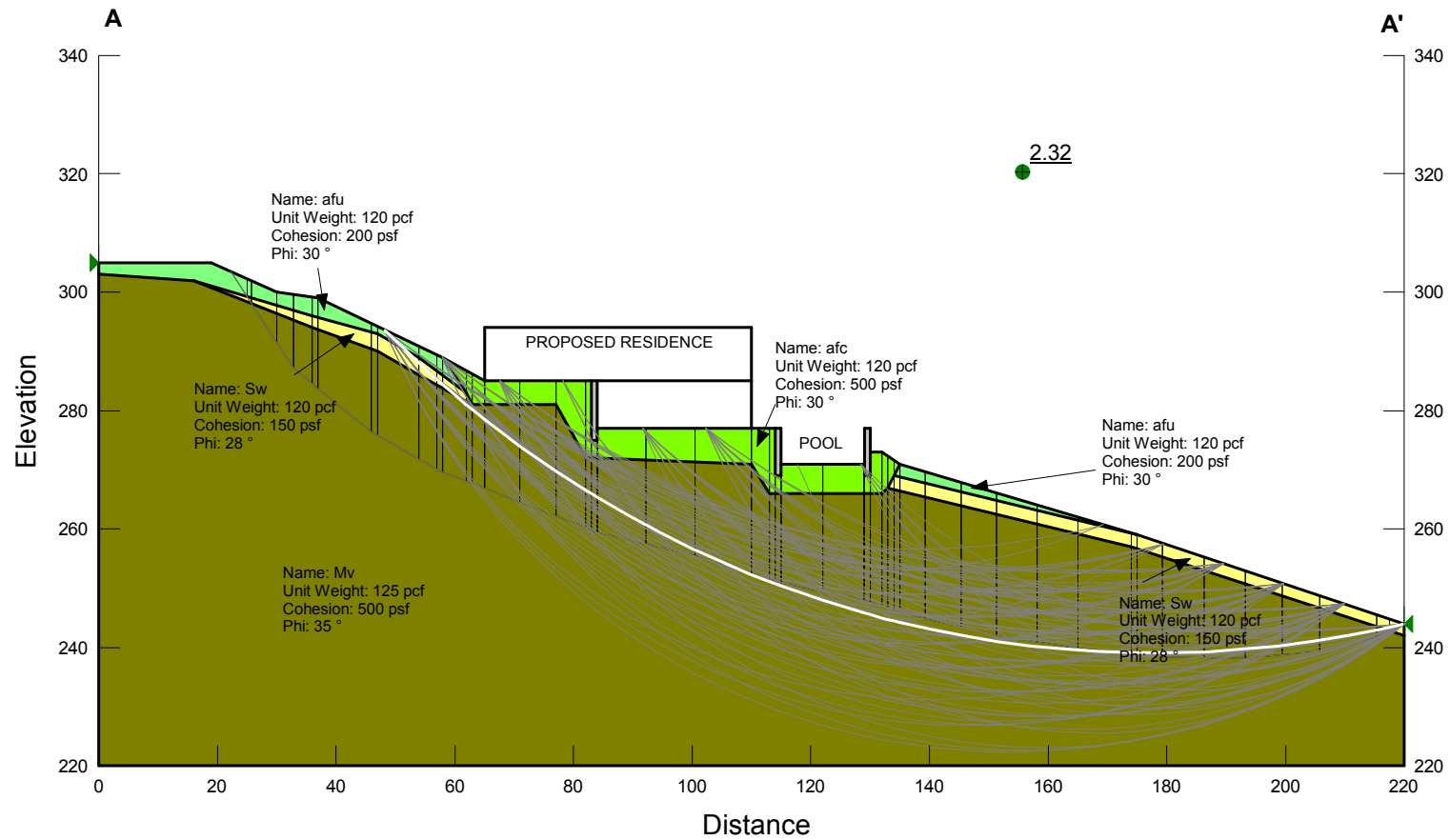
SURFICIAL STABILITY

(After Abrahamson et. al, 1996)

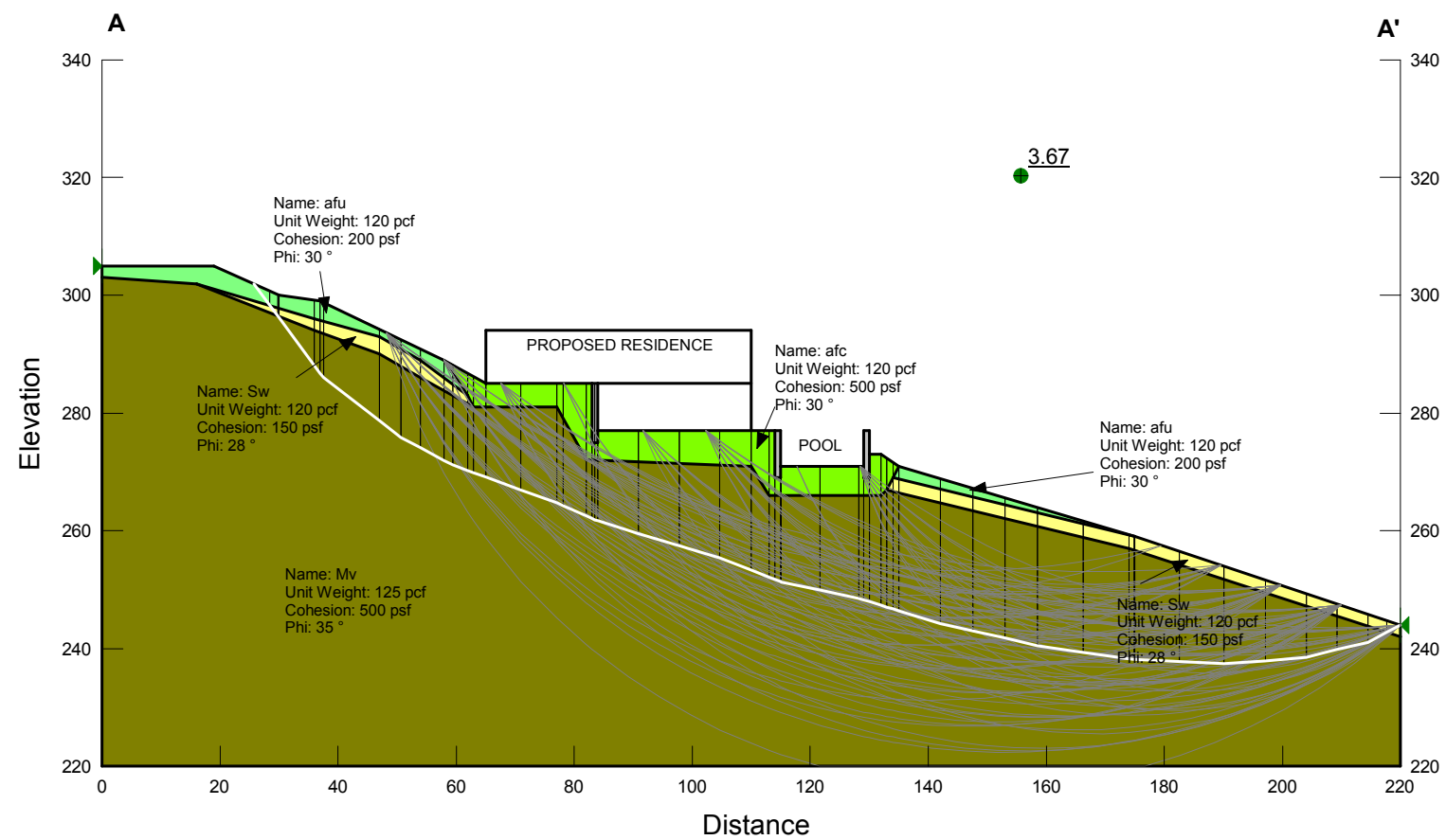
(H) [FT]	F.S.
0.50	11.83
0.75	8.14
1.00	6.29
1.25	5.19
1.50	4.45
1.75	3.92
2.00	3.52
2.25	3.22
2.50	2.97
2.75	2.77
3.00	2.60
3.25	2.46
3.50	2.34
3.75	2.23
4.00	2.14
4.25	2.06
4.50	1.99
4.75	1.92
5.00	1.86
5.25	1.81
5.50	1.76
5.75	1.72
6.00	1.68
6.25	1.64
6.50	1.61



Project Name: Munch Residence
File No. 17188
Method: Spencer
Horz Seismic Load: 0.15



Project Name: Munch Residence
File No. 17188
Method: Spencer
Horz Seismic Load: 0





APPENDIX F

Summary of Active Faults

Toyon.OUT

```
*****  
*                               *  
*   E Q F A U L T             *  
*                               *  
*   Version 3.00              *  
*                               *  
*****
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 17188

DATE: 01-16-2018

JOB NAME: Toyon Road

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CDMGFLTE_new.dat

SITE COORDINATES:

SITE LATITUDE: 32.7786
SITE LONGITUDE: 117.0907

SEARCH RADIUS: 62.4 mi

ATTENUATION RELATION: 15) Campbell & Bozorgnia (1997 Rev.) - Soft Rock
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: 1 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CDMGFLTE_new.dat

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT		
		MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
ROSE CANYON	5.3(8.6)	7.2	0.466	X
CORONADO BANK	18.7(30.1)	7.6	0.211	VIII
NEWPORT-INGLEWOOD (offshore)	32.7(52.6)	7.1	0.071	VI
ELSINORE-JULIAN	35.8(57.6)	7.1	0.063	VI
EARTHQUAKE VALLEY	40.7(65.5)	6.5	0.031	V
ELSINORE-TEMECULA	41.6(67.0)	6.8	0.039	V
ELSINORE-COYOTE MOUNTAIN	44.3(71.3)	6.8	0.035	V
SAN JACINTO-COYOTE CREEK	57.2(92.1)	6.8	0.024	V
SAN JACINTO-ANZA	58.0(93.4)	7.2	0.034	V
SAN JACINTO - BORREGO	59.7(96.1)	6.6	0.019	IV
PALOS VERDES	60.3(97.1)	7.1	0.029	V
ELSINORE-GLEN IVY	61.6(99.1)	6.8	0.022	IV

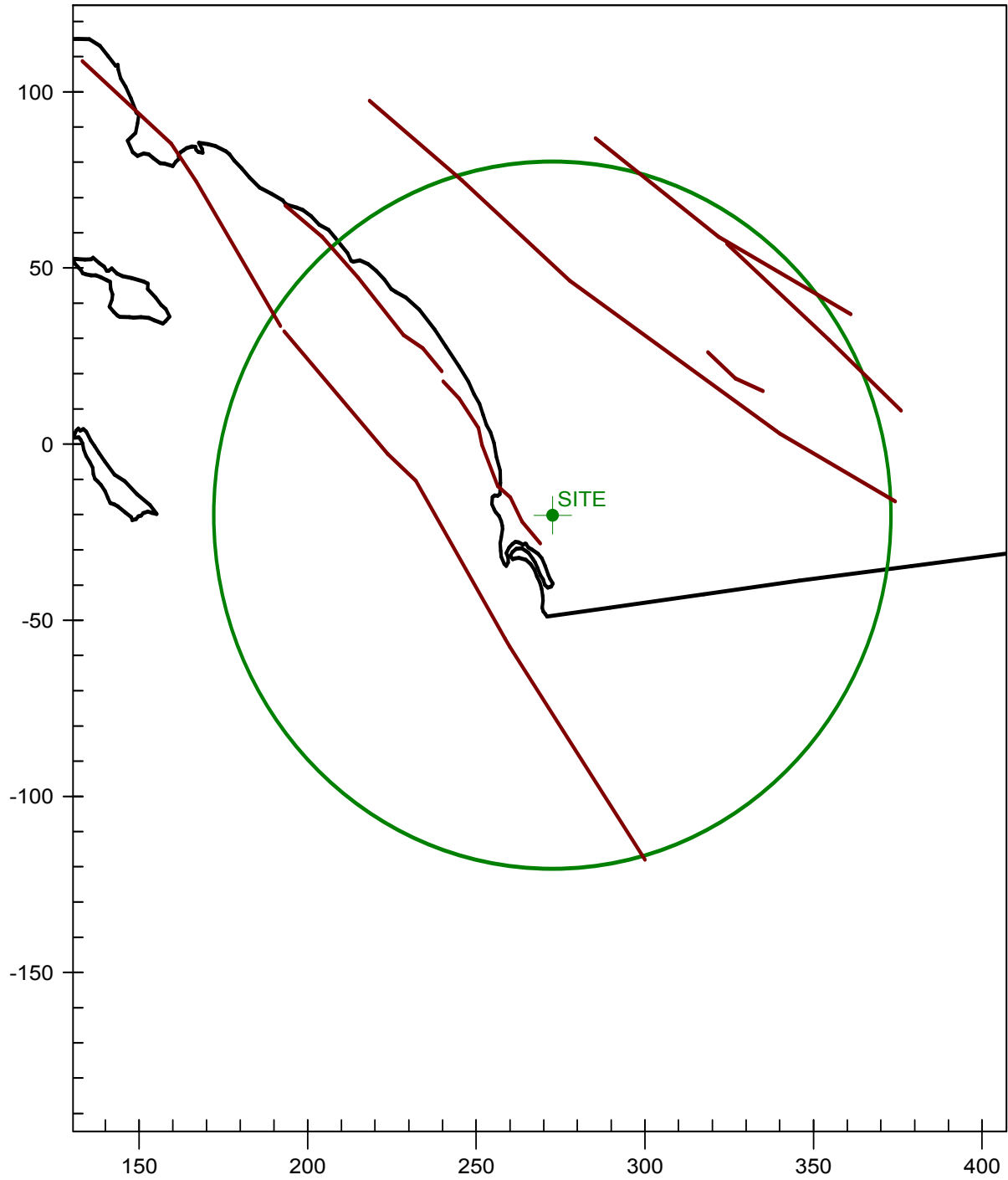
-END OF SEARCH- 12 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 5.3 MILES (8.6 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4662 g

CALIFORNIA FAULT MAP

Toyon Road





APPENDIX G

Storm Water Standards

Appendix C: Geotechnical and Groundwater Investigation Requirements

Worksheet C.4-2: Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions¹⁴

Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions		Worksheet C.4-2: Form I-8B ¹⁵
Part 1 - Full Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:	Project Phase:	
All DMA(s)	Construction	
Criteria 1: Groundwater Screening		
1A	Groundwater Depth. Is the depth to seasonally high groundwater tables (normal high depth during the wet season) beneath the base of any full infiltration BMP greater than 10 feet? ☒ Yes; continue to Step 1B. ☐ No; The depth to groundwater is less than or equal to 10 feet, but site layout changes or reasonable mitigation measures can be proposed to support full infiltration BMPs. Continue to step 1B. ☐ No; The depth to groundwater is less than or equal to 10 feet and site layout changes or reasonable mitigation measures cannot be proposed to support full infiltration BMPs. Answer “No” for Criteria 1 Result.	
1B	Contaminated Soil/Groundwater. Are proposed full infiltration BMPs at least 250 feet away from contaminated soil or groundwater sites? This can be confirmed using GeoTracker (geotracker.waterboards.ca.gov) to identify open contaminated sites. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP. ☒ Yes; continue to Step 1C. ☐ No; However, site layout changes or reasonable mitigation measures can be proposed to support full infiltration BMPs. Continue to Step 1C. ☐ No; Site layout changes or reasonable mitigation measures cannot be proposed to support full infiltration BMPs. Answer “No” to Criteria 1 Result.	

¹⁴ Note that it is not required to investigate each and every criterion in the worksheet, a single “no” answer in Part 1, Part 2, part 3, or Part 4 determines a full, partial, or no infiltration condition.

¹⁵ This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.



Appendix C: Geotechnical and Groundwater Investigation Requirements

Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions	Worksheet C.4-2: Form I-8B ¹⁵
1C	Inadequate Soil Treatment Capacity. Are full infiltration BMPs proposed in DMA soils that have adequate soil treatment capacity? The DMA has adequate soil treatment capacity if ALL of the following criteria (detailed in C.2.2.1) for all soil layers beneath the infiltrating surface are met: - USDA texture class is sandy loam or loam or silt loam or silt or sandy clay loam or clay loam or silty clay loam or sandy clay or silty clay or clay; and - Cation Exchange Capacity (CEC) greater than 5 milliequivalents/100g; and - Soil organic matter is greater than 1%; and - Groundwater table is equal to or greater than 10 feet beneath the base of the full infiltration BMP. ☒ Yes; continue to Step 1D. ☐ No; However, site layout changes or reasonable mitigation measures can be proposed to support full infiltration BMPs. Continue to Step 1D. ☐ No; Site layout changes or reasonable mitigation measures cannot be proposed to support full infiltration BMPs. Answer “No” to Criteria 1 Result.
1D	Other Groundwater Contamination Hazards. Are there site-specific groundwater contamination hazards not already mentioned (refer to Appendix C.2.2) that can be reasonably mitigated to support full infiltration BMPs? ☐ Yes; there are other contamination hazards identified that can be mitigated. Answer “Yes” to Criteria 1 Result. ☐ No; there are other contamination hazards identified that cannot be mitigated. Answer “No” to Criteria 1 Result. ☒ N/A; no contamination hazards are identified. Answer “Yes” to Criteria 1 Result.
Criteria 1 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination that cannot be reasonably mitigated to an acceptable level? See Appendix C.2.2.8 for a list of typically reasonable and typically unreasonable mitigation measures. ☐ Yes; Continue to Part 1, Criteria 2. ☒ No; Continue to Part 1 Result.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions	Worksheet C.4-2: Form I-8B ¹⁵
Summarize potential water balance effects. Documentation should focus on mapping and soil data regarding proximity to ephemeral streams and groundwater depth.	
Part 1 – Full Infiltration Groundwater and Water Balance Screening Result¹⁶	Result
If answers to Criteria 1 and 2 are “Yes”, a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration based on groundwater conditions. If answer to Criteria 1 or Criteria 2 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design based on groundwater conditions. Proceed to Part 2.	☐ Full Infiltration ☒ Complete Part 2

¹⁶ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Appendix C: Geotechnical and Groundwater Investigation Requirements

Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions	Worksheet C.4-2: Form I-8B ¹⁵
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
All DMA(s)	Construction
Criteria 3: Groundwater Screening	
Contaminated Soil/Groundwater. Are partial infiltration BMPs proposed at least 100 feet away from contaminated soil or groundwater sites? This can be confirmed using GeoTracker (geotracker.waterboards.ca.gov) to identify open contaminated sites. This criterion is intentionally a smaller radius than full infiltration, as the potential quantity of infiltration from partial infiltration BMPs is smaller. ☒ Yes; Answer “Yes” to Criteria 3 Result. ☐ No; However, site layout changes can be proposed to avoid contaminated soils or soils that lack adequate treatment capacity. Select “Yes” to Criteria 3 Result. It is a requirement for the SWQMP preparer to identify potential mitigation measures. ☐ No; Contaminated soils or soils that lack adequate treatment capacity cannot be avoided and partial infiltration BMPs are not feasible. Select “No” to Criteria 3 Result.	
Criteria 3 Result: Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing risk of groundwater contamination that cannot be reasonably mitigated to an acceptable level? ☐ Yes; Continue to Part 2, Criteria 4. ☒ No; Skip to Part 2 Result.	
Summarize findings and basis. Documentation should focus on mapped soil types and contaminated site locations.	

Appendix C: Geotechnical and Groundwater Investigation Requirements

Categorization of Infiltration Feasibility Condition based on Groundwater and Water Balance Conditions	Worksheet C.4-2: Form I-8B ¹⁵
Criteria 4: Water Balance Screening	
Additional studies. In the event that water balance effects are used to reject partial infiltration (anticipated to be rare), a qualified professional must provide an analysis of the incremental effects of partial infiltration BMPs on the water balance compared to incidental infiltration under a no infiltration scenario (e.g. precipitation, irrigation, etc.).	
Criteria 4 Result: Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams? ☐ Yes: Continue to Part 2 Result. ☐ No: Continue to Part 2 Result.	
Summarize potential water balance effects. Documentation should focus on mapping and soil data regarding proximity to ephemeral streams and groundwater depth.	
Part 2 – Partial Infiltration Groundwater and Water Balance Screening Result ¹⁷	Result
If answers to Criteria 3 and Criteria 4 are “Yes”, a partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration based on groundwater and water balance conditions. If answer to Criteria 3 or Criteria 4 is “No”, then infiltration of any volume is considered to be infeasible within the site. The feasibility screening category is No Infiltration based on groundwater or water balance condition.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

¹⁷ To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.



APPENDIX H

Standard Grading Guidelines

STANDARD GUIDELINES FOR GRADING PROJECTS

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GENERAL

The guidelines contained herein and the standard details attached hereto represent this firm's standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications.

All plates attached hereto shall be considered as part of these guidelines.

The Contractor should not vary from these guidelines without prior recommendation by the Geotechnical Consultant and the approval of the Client or his authorized representative. Recommendation by the Geotechnical Consultant and/or Client should not be considered to preclude requirements for approval by the controlling agency prior to the execution of any changes.

These Standard Grading Guidelines and Standard Details may be modified and/or superseded by recommendations contained in the text of the preliminary geotechnical report and/or subsequent reports.

If disputes arise out of the interpretation of these grading guidelines or standard details, the Geotechnical Consultant shall provide the governing interpretation.

DEFINITIONS OF TERMS

ALLUVIUM - Unconsolidated soil deposits resulting from flow of water, including sediments deposited in river beds, canyons, flood plains, lakes, fans and estuaries.

AS-GRADED (AS-BUILT) - The surface and subsurface conditions at completion of grading.

BACKCUT - A temporary construction slope at the rear of earth retaining structures such as buttresses, shear keys, stabilization fills or retaining walls.

BACKDRAIN - Generally a pipe and gravel or similar drainage system placed behind earth retaining structures such buttresses, stabilization fills, and retaining walls.

BEDROCK - Relatively undisturbed formational rock, more or less solid, either at the surface or beneath superficial deposits of soil.

BENCH - A relatively level step and near vertical rise excavated into sloping ground on which fill is to be placed.

BORROW (Import) - Any fill material hauled to the project site from off-site areas.

BUTTRESS FILL - A fill mass, the configuration of which is designed by engineering calculations to retain slope conditions containing adverse geologic features. A buttress is generally specified by minimum key width and depth and by maximum backcut angle. A buttress normally contains a back-drainage system.

CIVIL ENGINEER - The Registered Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topographic conditions.

CLIENT - The Developer or his authorized representative who is chiefly in charge of the project. He shall have the responsibility of reviewing the findings and recommendations made by the Geotechnical Consultant and shall authorize the Contractor and/or other consultants to perform work and/or provide services.

COLLUVIUM - Generally loose deposits usually found near the base of slopes and brought there chiefly by gravity through slow continuous downhill creep (also see Slope Wash).

COMPACTION - Densification of man-placed fill by mechanical means.

CONTRACTOR - A person or company under contract or otherwise retained by the Client to perform demolition, grading and other site improvements.

DEBRIS - All products of clearing, grubbing, demolition, contaminated soil materials unsuitable for reuse as compacted fill and/or any other material so designated by the Geotechnical Consultant.

ENGINEERING GEOLOGIST - A Geologist holding a valid certificate of registration in the specialty of Engineering Geology.

ENGINEERED FILL - A fill of which the Geotechnical Consultant or his representative, during grading, has made sufficient tests to enable him to conclude that the fill has been placed in substantial compliance with the recommendations of the Geotechnical Consultant and the governing agency requirements.

EROSION - The wearing away of the ground surface as a result of the movement of wind and/or water.

EXCAVATION - The mechanical removal of earth materials.

EXISTING GRADE - The ground surface configuration prior to grading.

FILL - Any deposits of soil, rock, soil-rock blends or other similar materials placed by man.

FINISH GRADE - The ground surface configuration at which time the surface elevations conform to the approved plan.

GEOFABRIC - Any engineering textile utilized in geotechnical applications including subgrade stabilization and filtering.

GEOLOGIST - A representative of the Geotechnical Consultant educated and trained in the field of geology.

GEOTECHNICAL CONSULTANT - The Geotechnical Engineering and Engineering Geology consulting firm retained to provide technical services for the project. For the purpose of these specifications, observations by the Geotechnical Consultant include observations by the Soil Engineer, Geotechnical Engineer, Engineering Geologist and those performed by persons employed by and responsible to the Geotechnical Consultants.

GEOTECHNICAL ENGINEER - A licensed Geotechnical Engineer or Civil Engineer who applies scientific methods, engineering principles and professional experience to the acquisition, interpretation and use of knowledge of materials of the earth's crust for the evaluation of engineering problems. Geotechnical Engineering encompasses many of the engineering aspects of soil mechanics, rock mechanics, geology, geophysics, hydrology and related sciences.

GRADING - Any operation consisting of excavation, filling or combinations thereof and associated operations.

LANDSLIDE DEBRIS - Material, generally porous and of low density, produced from instability of natural or man-made slopes.

MAXIMUM DENSITY - Standard laboratory test for maximum dry unit weight. Unless otherwise specified, the maximum dry unit weight shall be determined in accordance with ASTM Method of Test D 1557-78.

OPTIMUM MOISTURE - Soil moisture content at the test maximum density.

RELATIVE COMPACTION - The degree of compaction (expressed as a percentage) of dry unit weight of a material as compared to the maximum dry unit weight of the material.

ROUGH GRADE - The ground surface configuration at which time the surface elevations approximately conform to the approved plan.

SITE - The particular parcel of land where grading is being performed.

SHEAR KEY - Similar to buttress, however, it is generally constructed by excavating a slot within a natural slope in order to stabilize the upper portion of the slope without grading encroaching into the lower portion of the slope.

SLOPE - An inclined ground surface the steepness of which is generally specified as a ratio of horizontal:vertical (e.g., 2:1).

SLOPE WASH - Soil and/or rock material that has been transported down a slope by action of gravity assisted by runoff water not confined by channels (also see Colluvium).

SOIL - Naturally occurring deposits of sand, silt, clay, etc., or combinations thereof.

SOIL ENGINEER - Licensed Geotechnical Engineer or Civil Engineer experienced in soil mechanics (also see Geotechnical Engineer).

STABILIZATION FILL - A fill mass, the configuration of which is typically related to slope height and is specified by the standards of practice for enhancing the stability of locally adverse conditions. A stabilization fill is normally specified by minimum key width and depth and by maximum backcut angle. A stabilization fill may or may not have a back drainage system specified.

SUBDRAIN - Generally a pipe and gravel or similar drainage system placed beneath a fill in the alignment of canyons or former drainage channels.

SLOUGH - Loose, non-compacted fill material generated during grading operations.

TAILINGS - Non-engineered fill which accumulates on or adjacent to equipment haul-roads.

TERRACE - Relatively level step constructed in the face of graded slope surface for drainage control and maintenance purposes.

TOPSOIL - The presumable fertile upper zone of soil which is usually darker in color and loose.

WINDROW - A string of large rocks buried within engineered fill in accordance with guidelines set forth by the Geotechnical Consultant.

OBLIGATIONS OF PARTIES

The Geotechnical Consultant should provide observation and testing services and should make evaluations in order to advise the Client on geotechnical matters. The Geotechnical Consultant should report his findings and recommendations to the Client or his authorized representative.

The client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the Geotechnical Consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor should be responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including but not limited to, earthwork in accordance with the project plans, specifications and controlling agency requirements. During grading, the Contractor or his authorized representative should remain on-site. Overnight and on days off, the Contractor should remain accessible.

SITE PREPARATION

The Client, prior to any site preparation or grading, should arrange and attend a meeting among the Grading Contractor, the Design Engineer, the Geotechnical Consultant, representatives of the appropriate governing authorities as well as any other concerned parties. All parties should be given at least 48 hours notice.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, roots of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or re-routing pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the Geotechnical Consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the Contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the Geotechnical Consultant.

The Client or Contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

SITE PROTECTION

Protection of the site during the period of grading should be the responsibility of the Contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the Geotechnical Consultant, the Client and the regulating agencies.

The Contractor should be responsible for the stability of all temporary excavations. Recommendations by the Geotechnical Consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the Contractor. Recommendations by the Geotechnical Consultant should not be considered to preclude more restrictive requirements by the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding, or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas can not be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the Contractor should install check dams, desilting basins, riprap, sand bags or other devices or methods necessary to control erosion and provide safe conditions.

During periods of rainfall, the Geotechnical Consultant should be kept informed by the Contractor as to the nature of remedial or preventative work being performed (e.g., pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

Following periods of rainfall, the Contractor should contact the Geotechnical Consultant and arrange a walk-over of the site in order to visually assess rain related damage. The Geotechnical Consultant may also recommend excavations and testing in order to aid in his assessments. At the request of the Geotechnical Consultant, the Contractor shall make excavations in order to evaluate the extent of rain related damage.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions identified by the Geotechnical Consultant. Soil adversely affected should be classified as Unsuitable Materials and should be subject to over-excavation and replacement with compacted fill or other remedial grading as recommended by the Geotechnical Consultant.

Relatively level areas, where saturated soils and/or erosion gullies exist to depths of greater than 1-foot, should be over-excavated to unaffected, competent material. Where less than 1-foot in depth, unsuitable materials may be processed in-place to achieve near optimum moisture conditions, then thoroughly recompacted in accordance with the applicable specifications. If the desired results are not achieved, the affected materials should be over-excavated, then replaced in accordance with the applicable specifications.

In slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1 foot, they should be over-excavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1 foot or less below

proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be over-excavated and replaced as compacted fill in accordance with the slope repair recommendations herein. As field conditions dictate, other slope repair procedures may be recommended by the Geotechnical Consultant.

EXCAVATIONS

Unsuitable Materials

Materials which are unsuitable should be excavated under observation and recommendations of the Geotechnical Consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and non-engineered or otherwise deleterious fill materials.

Material identified by the Geotechnical Consultant as unsatisfactory due to its moisture conditions should be over-excavated, watered or dried, as needed, and thoroughly blended to a uniform near optimum moisture condition (per Moisture guidelines presented herein) prior to placement as compacted fill.

Cut Slopes

Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal:vertical).

If excavations for cut slopes expose loose, cohesionless, significantly fractured or otherwise unsuitable material, over-excavation and replacement of the unsuitable materials with a compacted stabilization fill should be accomplished as recommended by the Geotechnical Consultant. Unless otherwise specified by the Geotechnical Consultant, stabilization fill construction should conform to the requirements of the Standard Details.

The Geotechnical Consultant should review cut slopes during excavation. The Geotechnical Consultant should be notified by the contractor prior to beginning slope excavations.

If, during the course of grading, adverse or potentially adverse geotechnical conditions are encountered which were not anticipated in the preliminary report, the Geotechnical Consultant should explore, analyze and make recommendations to treat these problems.

When cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top-of-cut.

Pad Areas

All lot pad areas, including side yard terraces, above stabilization fills or buttresses should be over-excavated to provide for a minimum of 3-feet (refer to Standard Details) of compacted fill over the entire pad area. Pad areas with both fill and cut materials exposed and pad areas containing both very shallow (less than 3-feet) and deeper fill should be over-excavated to provide for a uniform compacted fill blanket with a minimum of 3-feet in thickness (refer to Standard Details).

Cut areas exposing significantly varying material types should also be overexcavated to provide for at least a 3-foot thick compacted fill blanket. Geotechnical conditions may require greater depth of over-excavation. The actual depth should be delineated by the Geotechnical Consultant during grading.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

COMPACTED FILL

All fill materials should be compacted as specified below or by other methods specifically recommended by the Geotechnical Consultant. Unless otherwise specified, the minimum degree of compaction (relative compaction) should be 90 percent of the laboratory maximum density.

Placement

Prior to placement of compacted fill, the Contractor should request a review by the Geotechnical Consultant of the exposed ground surface. Unless otherwise recommended, the exposed ground surface should then be scarified (6-inches minimum), watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions, then thoroughly compacted to a minimum of 90 percent of the maximum density. The review by the Geotechnical Consultant should not be considered to preclude requirements of inspection and approval by the governing agency.

Compacted fill should be placed in thin horizontal lifts not exceeding 8-inches in loose thickness prior to compaction. Each lift should be watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions then thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The Contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials. If necessary, excavation equipment should be "shut down" temporarily in order to permit proper compaction of fills. Earth moving equipment should only be considered a supplement and not substituted for conventional compaction equipment.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least 6-foot wide benches and minimum of 4-feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Consultant.

Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill. Typical keying and benching details have been included within the accompanying Standard Details.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benchng should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Fill should be tested for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-64, D 2922-78 and/or D 2937-71. Tests should be provided for about every 2 vertical feet or 1,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the Geotechnical Consultant.

The Contractor should assist the Geotechnical Consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill.

As recommended by the Geotechnical Consultant, the Contractor should "shut down" or remove grading equipment from an area being tested.

The Geotechnical Consultant should maintain a plan with estimated locations of field tests. Unless the client provides for actual surveying of test locations, the estimated locations by the Geotechnical Consultant should only be considered rough estimates and should not be utilized for the purpose of preparing cross sections showing test locations or in any case for the purpose of after-the-fact evaluating of the sequence of fill placement.

Moisture

For field testing purposes, "near optimum" moisture will vary with material type and other factors including compaction procedures. "Near optimum" may be specifically recommended in Preliminary Investigation Reports and/or may be evaluated during grading.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, watered or dried as needed, thoroughly blended to near-optimum moisture conditions, then recompact to a minimum of 90 percent of laboratory maximum dry density. Where wet or other dry or other unsuitable materials exist to depths of greater than 1 foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Fill Material

Excavated on-site materials which are acceptable to the Geotechnical Consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement.

Where import materials are required for use on-site, the Geotechnical Consultant should be notified at least 72 hours in advance of importing, in order to sample and test materials from proposed borrow sites. No import materials should be delivered for use on-site without prior sampling and testing by Geotechnical Consultant.

Where oversized rock or similar irreducible material is generated during grading, it is recommended, where practical, to waste such material off-site or on-site in areas designated as "nonstructural rock disposal areas". Rock placed in disposal areas should be placed with sufficient fines to fill voids. The rock should be compacted in lifts to an unyielding condition. The disposal area should be covered with at least 3 feet of compacted fill which is free of oversized material. The upper 3 feet should be placed in accordance with the guidelines for compacted fill herein.

Rocks 12 inches in maximum dimension and smaller may be utilized within the compacted fill, provided they are placed in such a manner that nesting of the rock is avoided. Fill should be placed and thoroughly compacted over and around all rock. The amount of rock should not exceed 40 percent by dry weight passing the $\frac{3}{4}$ -inch sieve size. The 12-inch and 40 percent recommendations herein may vary as field conditions dictate.

During the course of grading operations, rocks or similar irreducible materials greater than 12-inches maximum dimension (oversized material) may be generated. These rocks should not be placed within the compacted fill unless placed as recommended by the Geotechnical Consultant.

Where rocks or similar irreducible materials of greater than 12 inches but less than 4 feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the accompanying Standard Details is recommended. Rocks greater than 4 feet should be broken down or disposed off-site. Rocks up to 4 feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 20-feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed.

Oversized material should be placed in windrows on a clean, over-excavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so that successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the Geotechnical Consultant at the time of placement. Material that is considered unsuitable by the Geotechnical Consultant should not be utilized in the compacted fill.

During grading operations, placing and mixing the materials from the cut and/or borrow areas may result in soil mixtures which possess unique physical properties. Testing may be required of samples obtained directly from the fill areas in order to verify conformance with the specifications. Processing of these additional samples may take two or more working days. The Contractor may elect to move the operation to other areas within the project, or may continue placing compacted fill pending laboratory and field test results. Should he elect the second alternative, fill placed is done so at the Contractor's risk.

Any fill placed in areas not previously reviewed and evaluated by the Geotechnical Consultant, and/or in other areas, without prior notification to the Geotechnical Consultant may require removal and recompaction at the Contractor's expense. Determination of over-excavations should be made upon review of field conditions by the Geotechnical Consultant.

Fill Slopes

Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal to vertical).

Except as specifically recommended otherwise or as otherwise provided for in these grading guidelines (Reference Fill Materials), compacted fill slopes should be overbuilt and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be over-excavated and reconstructed under the guidelines of the Geotechnical Consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the Contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

Although no construction procedure produces a slope free from risk of future movement, overfilling and cutting back of slope to a compacted inner core is, given no other constraints, the most desirable procedure. Other constraints, however, must often be considered. These constraints may include property line situations, access, the critical nature of the development and cost. Where such constraints are identified, slope face compaction may be attempted by conventional construction procedures including back rolling techniques upon specific recommendation by the Geotechnical Consultant.

As a second best alternative for slopes of 2:1 (horizontal to vertical) or flatter, slope construction may be attempted as outlined herein. Fill placement should proceed in thin lifts, (i.e., 6 to 8 inch loose thickness). Each lift should be moisture conditioned and thoroughly compacted. The desired moisture condition should be maintained and/or reestablished, where necessary, during the period between successive lifts. Selected lifts should be tested to ascertain that desired compaction is being achieved. Care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately establish desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope.

Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding 4 feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly backrolled utilizing a conventional sheeps foot-type roller. Care should be taken to maintain the desired moisture conditions and/or reestablishing same as needed prior to backrolling. Upon achieving final grade, the slopes should again be moisture conditioned and thoroughly backrolled. The use of a side-boom roller will probably be necessary and vibratory methods are strongly recommended. Without delay, so as to avoid (if possible) further moisture conditioning, the slopes should then be grid-rolled to achieve a relatively smooth surface and uniformly compact condition.

In order to monitor slope construction procedures, moisture and density tests will be taken at regular intervals. Failure to achieve the desired results will likely result in a recommendation by the Geotechnical Consultant to over-excavate the slope surfaces followed by reconstruction of the slopes utilizing overfilling and cutting back procedures and/or further attempt at the conventional backrolling approach. Other recommendations may also be provided which would be commensurate with field conditions.

Where placement of fill above a natural slope or above a cut slope is proposed, the fill slope configuration as presented in the accompanying Standard Details should be adopted.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and pad gradients of at least 2 percent in soil areas.

Off-Site Fill

Off-site fill should be treated in the same manner as recommended in these specifications for site preparation, excavation, drains, compaction, etc.

Off-site canyon fill should be placed in preparation for future additional fill, as shown in the accompanying Standard Details.

Off-site fill subdrains temporarily terminated (up canyon) should be surveyed for future relocation and connection.

DRAINAGE

Canyon subdrain systems specified by the Geotechnical Consultant should be installed in accordance with the Standard Details.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications of the accompanying Standard Details.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, concrete swales).

For drainage over soil areas immediately away from structures (i.e., within 4 feet), a minimum of 5 percent gradient should be maintained. Pad drainage of at least 2 percent should be maintained over soil areas. Pad drainage may be reduced to at least 1 percent for projects where no slopes exist, either natural or man-made, or greater than 10-feet in height and where no slopes are planned, either natural or man-made, steeper than 2:1 (horizontal to vertical slope ratio).

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns can be detrimental to slope stability and foundation performance.

STAKING

In all fill areas, the fill should be compacted prior to the placement of the stakes. This particularly is important on fill slopes. Slope stakes should not be placed until the slope is thoroughly compacted (backrolled). If stakes must be placed prior to the completion of compaction procedures, it must be recognized that they will be removed and/or demolished at such time as compaction procedures resume.

In order to allow for remedial grading operations, which could include over-excavations or slope stabilization, appropriate staking offsets should be provided. For finished slope and stabilization backcut areas, we recommend at least a 10-foot setback from proposed toes and tops-of-cut.

SLOPE MAINTENANCE

Landscape Plants

In order to enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect would be the best party to consult regarding actual types of plants and planting configuration.

Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

Though not a requirement, consideration should be given to the installation of near-surface moisture monitoring control devices. Such devices can aid in the maintenance of relatively uniform and reasonably constant moisture conditions.

Property owners should be made aware that overwatering of slopes is detrimental to slope stability.

Maintenance

Periodic inspections of landscaped slope areas should be planned and appropriate measures should be taken to control weeds and enhance growth of the landscape plants. Some areas may require occasional replanting and/or reseeding.

Terrace drains and down drains should be periodically inspected and maintained free of debris. Damage to drainage improvements should be repaired immediately.

Property owners should be made aware that burrowing animals can be detrimental to slope stability. A preventative program should be established to control burrowing animals.

As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period of time prior to landscape planting.

Repairs

If slope failures occur, the Geotechnical Consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

If slope failures occur as a result of exposure to periods of heavy rainfall, the failure area and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer 1 foot to 3 feet of a slope face).

TRENCH BACKFILL

Utility trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Backfill of exterior and interior trenches extending below a 1:1 projection from the outer edge of foundations should be mechanically compacted to a minimum of 90 percent of the laboratory maximum density.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the Geotechnical Consultant.

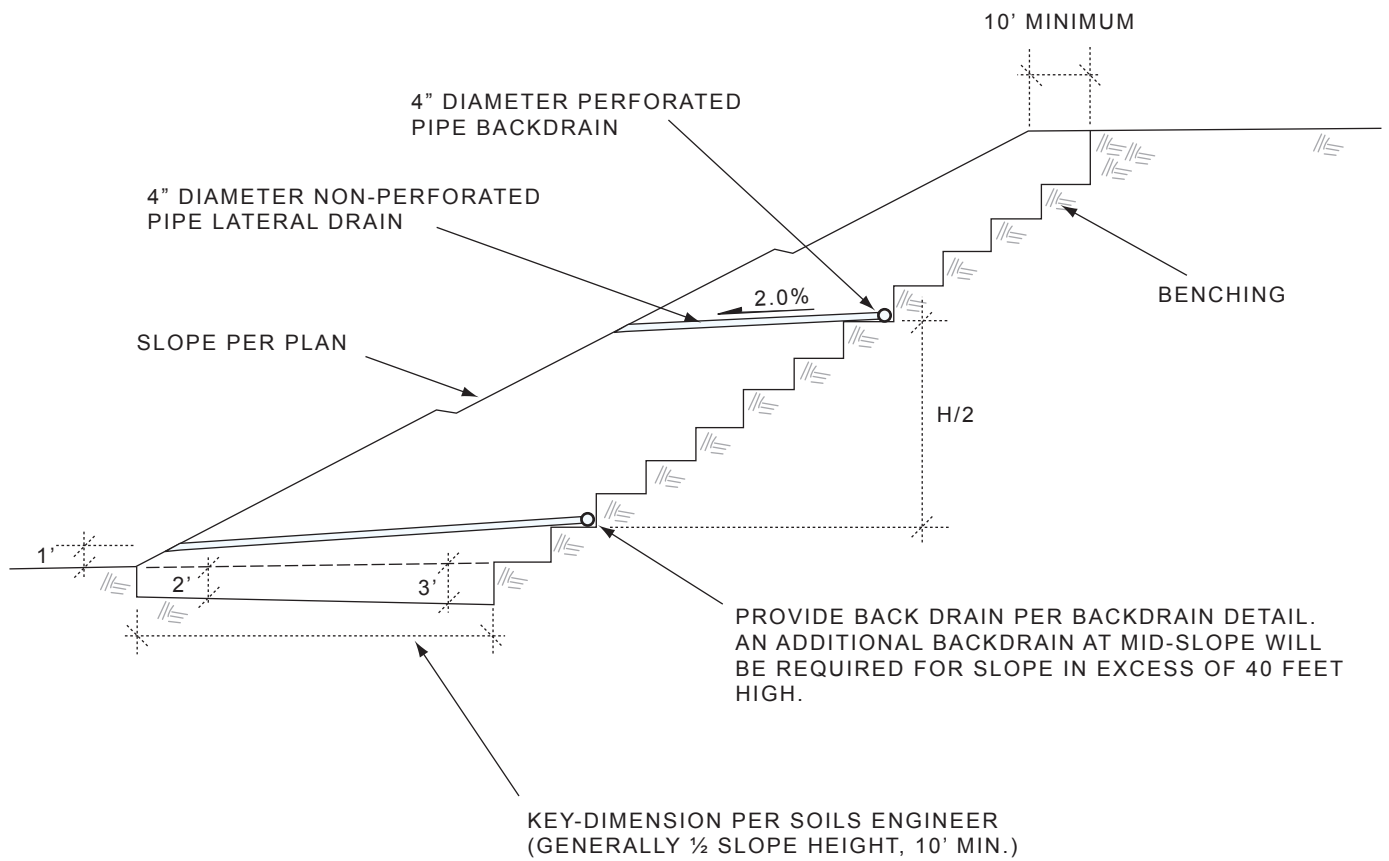
Clean Granular backfill and/or bedding are not recommended in slope areas unless provisions are made for a drainage system to mitigate the potential build-up of seepage forces.

STATUS OF GRADING

Prior of proceeding with any grading operation, the Geotechnical Consultant should be notified at least two working days in advance in order to schedule the necessary observation and testing services.

Prior to any significant expansion or cut back in the grading operation, the Geotechnical Consultant should be provided with adequate notice (i.e., two days) in order to make appropriate adjustments in observation and testing services.

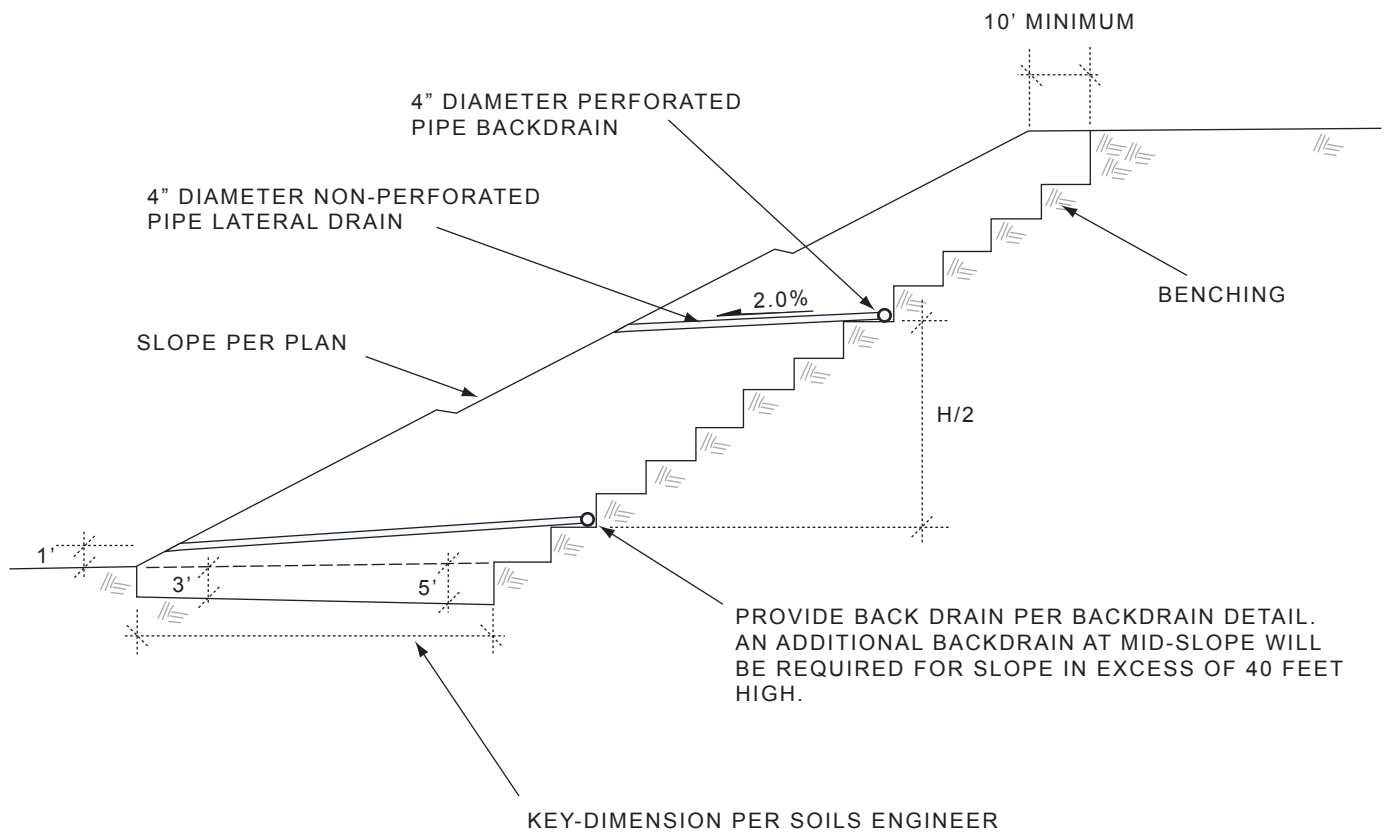
Following completion of grading operations and/or between phases of a grading operation, the Geotechnical Consultant should be provided with at least two working days notice in advance of commencement of additional grading operations.



TYPICAL STABILIZATION FILL DETAIL

NOT TO SCALE

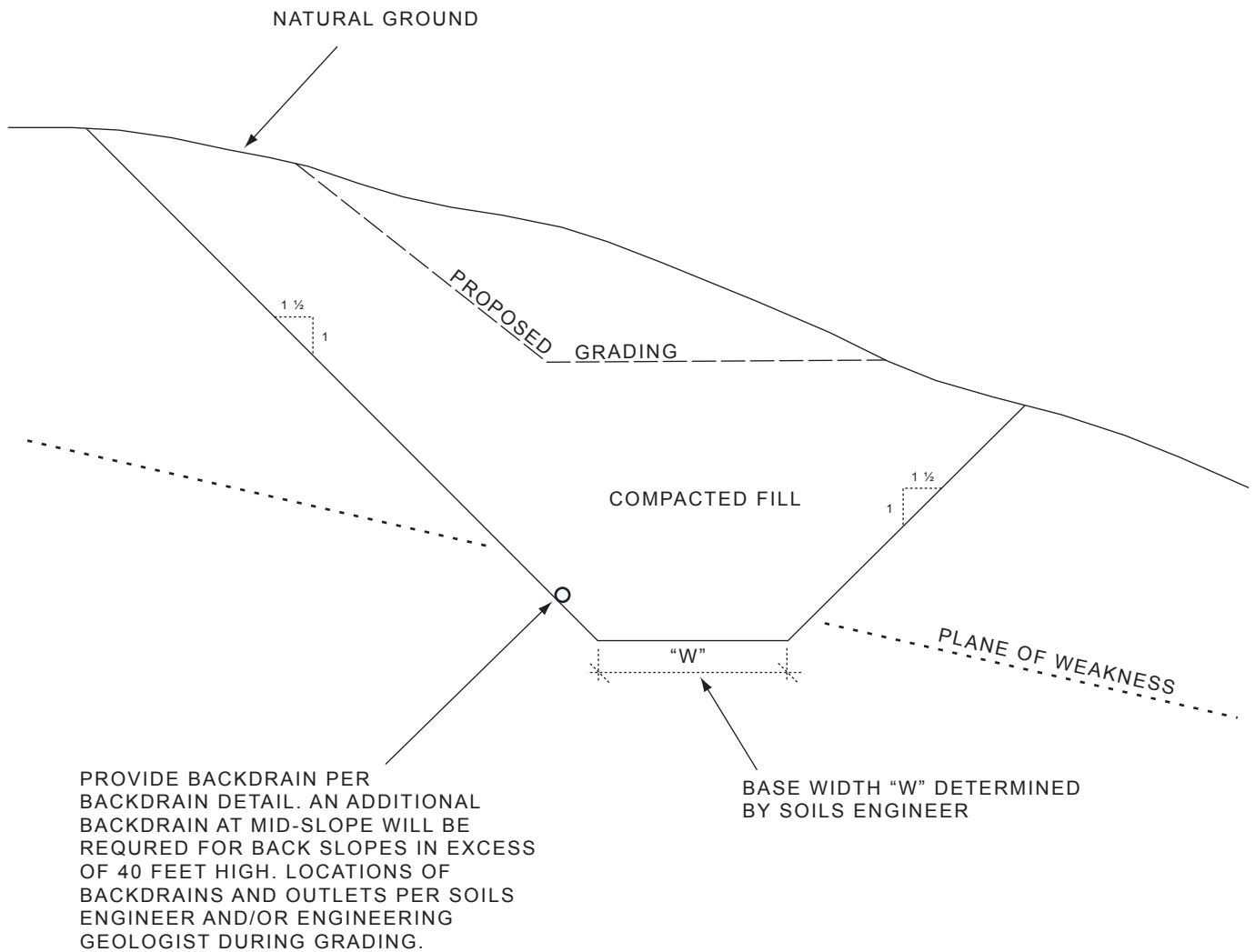
FIGURE 1



TYPICAL BUTTRESS FILL DETAIL

NOT TO SCALE

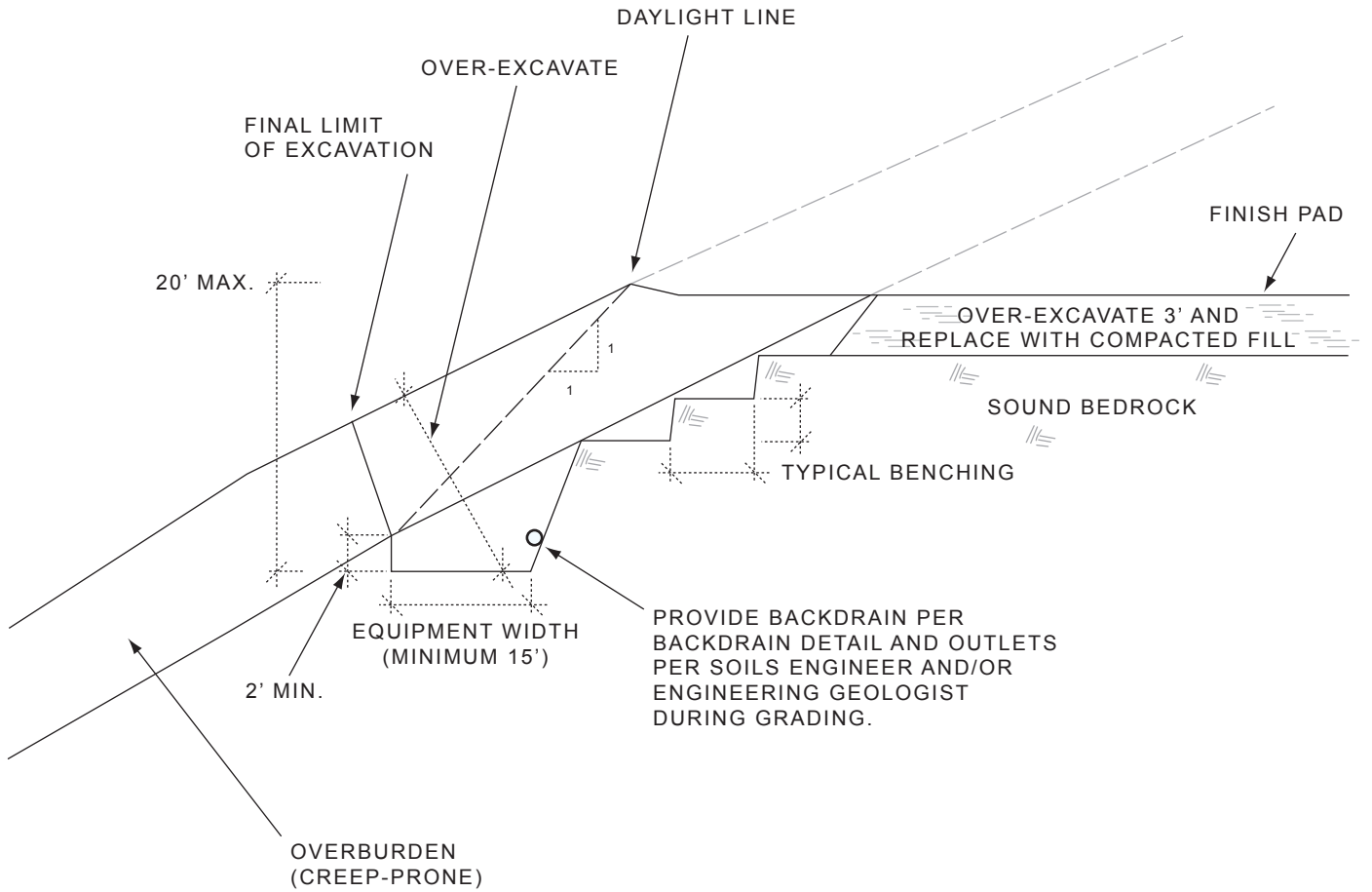
FIGURE 2



TYPICAL SHEAR KEY DETAIL

NOT TO SCALE

FIGURE 3

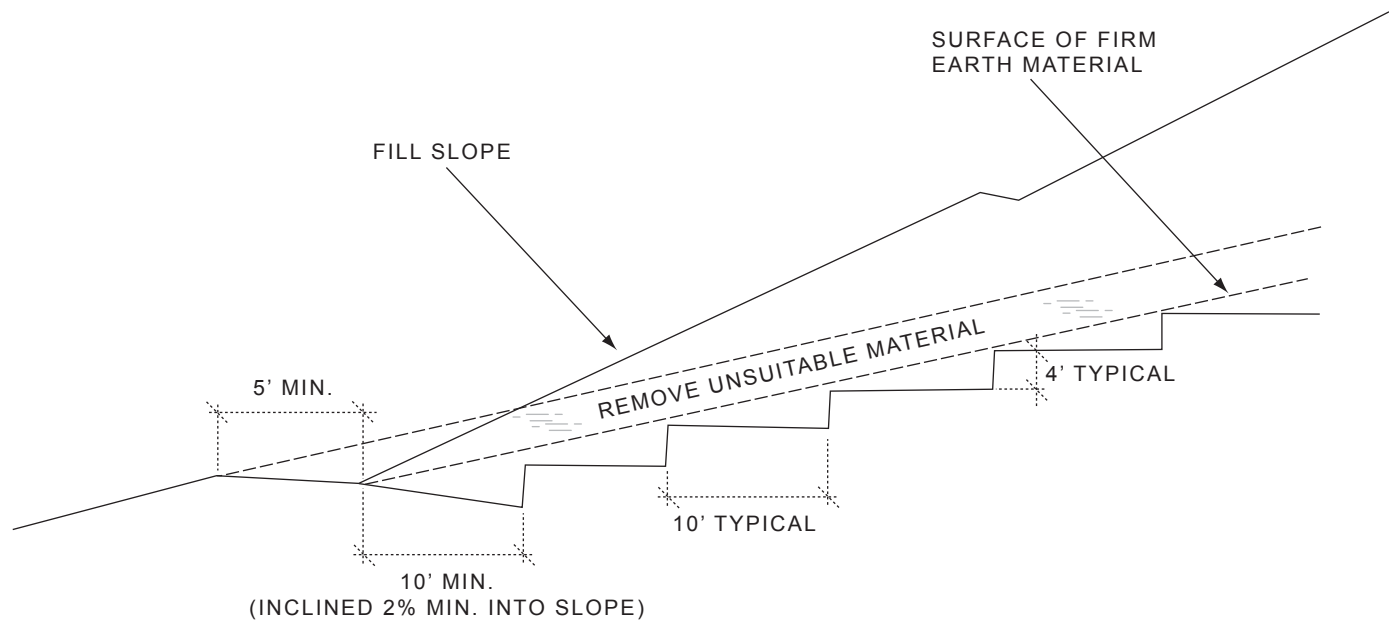


DAYLIGHT SHEAR KEY DETAIL

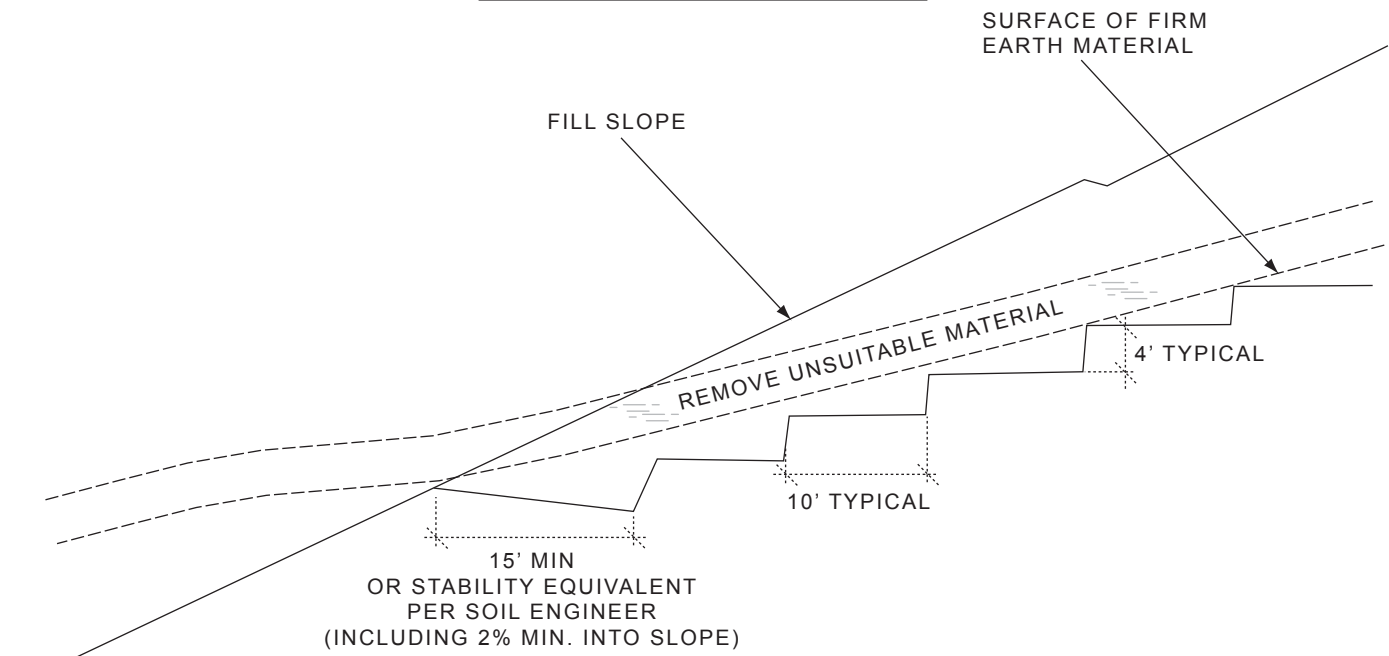
NOT TO SCALE

FIGURE 4

BENCHING FILL OVER NATURAL



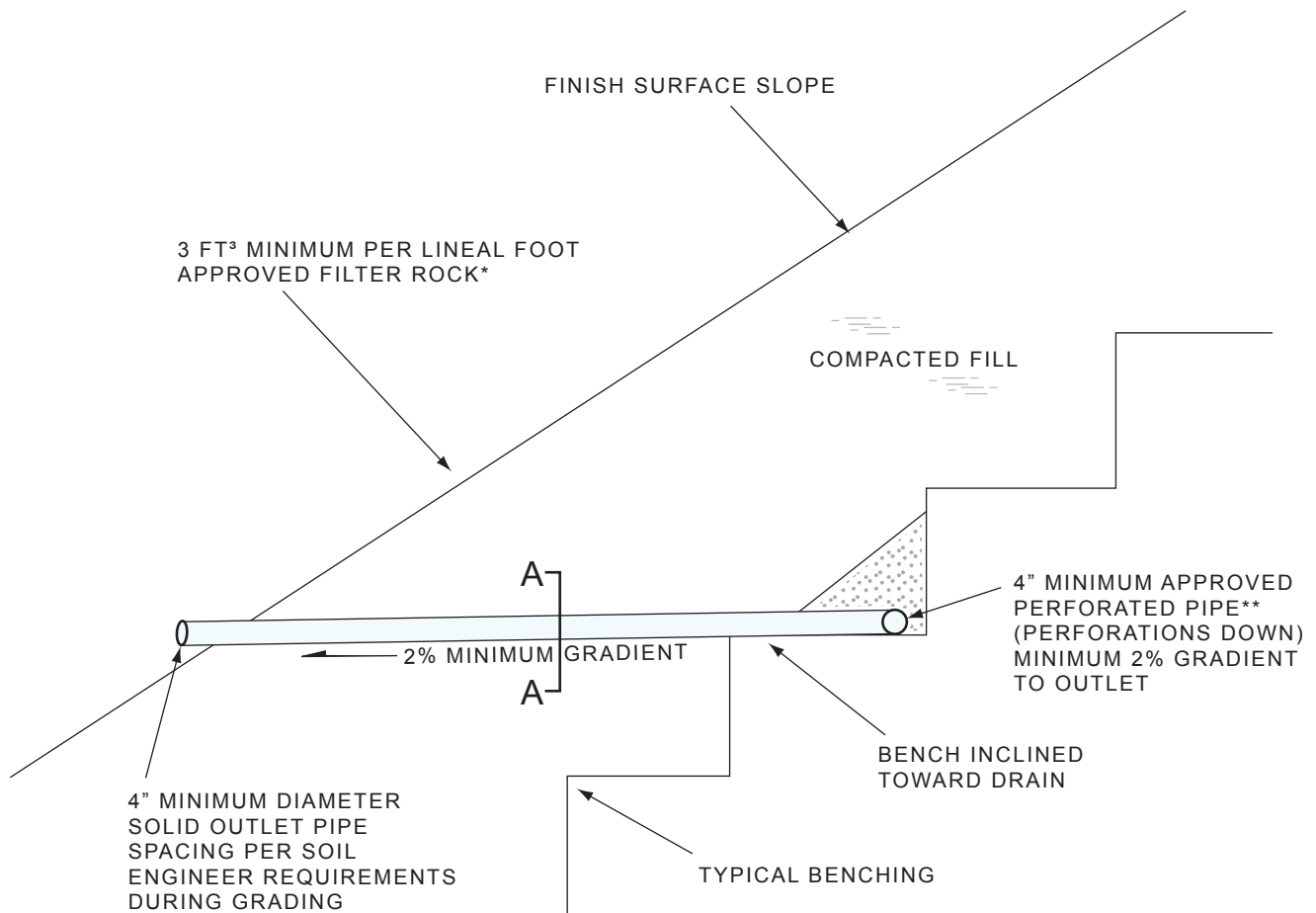
BENCHING FILL OVER CUT



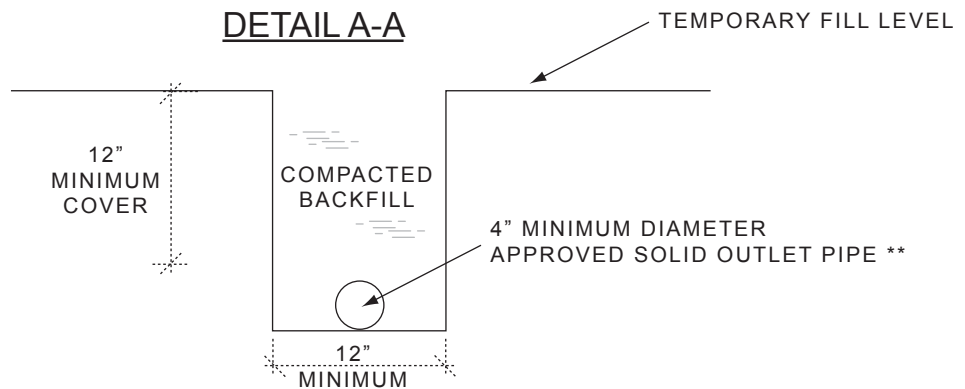
BENCHING FOR COMPACTED FILL DETAIL

NOT TO SCALE

FIGURE 5



DETAIL A-A



* Filter rock to meet following specifications or approved equal.

Sieve	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No.4	25-40
No.30	5-15
No.50	0-7
No.200	0-3

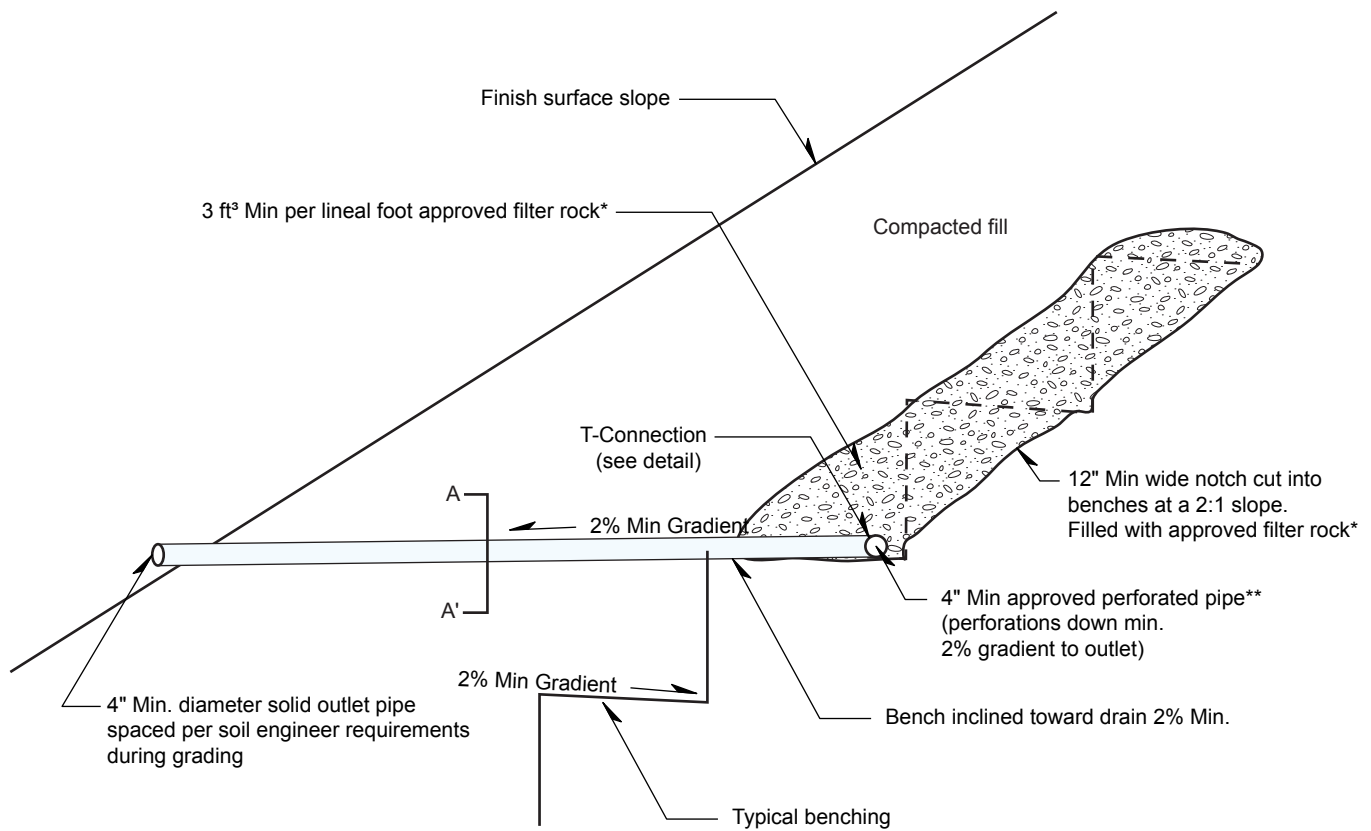
** APPROVED PIPE TYPE

Schedule 40 polyvinyl chloride (P.V.C.) or approved equal.
Min. crush strength 1000 PSI.

TYPICAL BACKDRAIN DETAIL

NOT TO SCALE

FIGURE 6



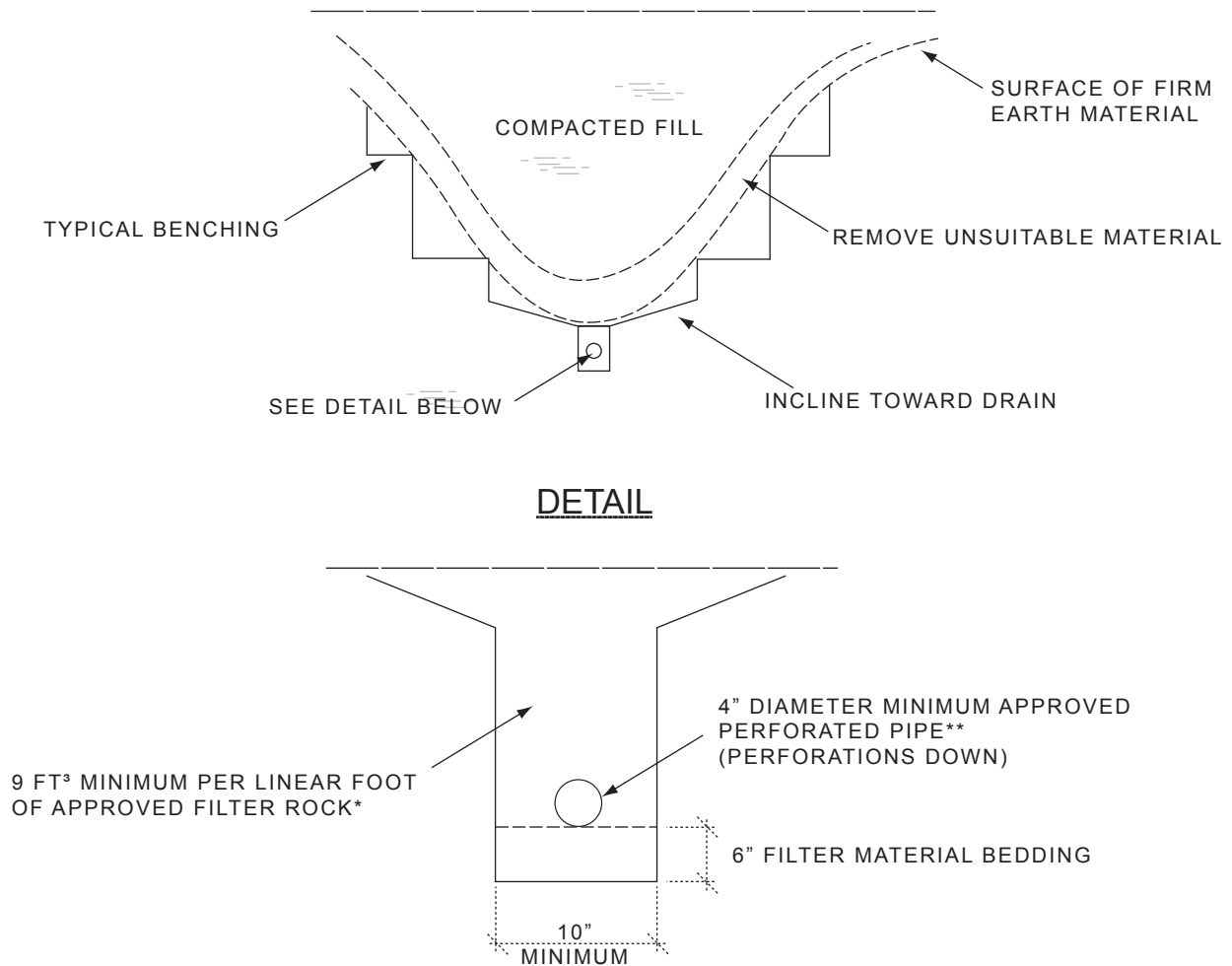
* Filter rock to meet following specifications or approved equal.

Sieve	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No.4	25-40
No.30	5-15
No.50	0-7
No.200	0-3

** Approved pipe type:

Schedule 40 polyvinyl chloride (P.V.C.) or approved equal.
Min. crush strength 1000 PSI.

BACKDRAIN DETAIL (GEOFABRIC)



* Filter rock to meet following specifications or approved equal.

Sieve	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 30	5-15
No. 50	0-7
No. 200	0-3

** APPROVED PIPE TYPE

Schedule 40 polyvinyl chloride (P.V.C.) or approved equal. Min. crush strength 1000 PSI.

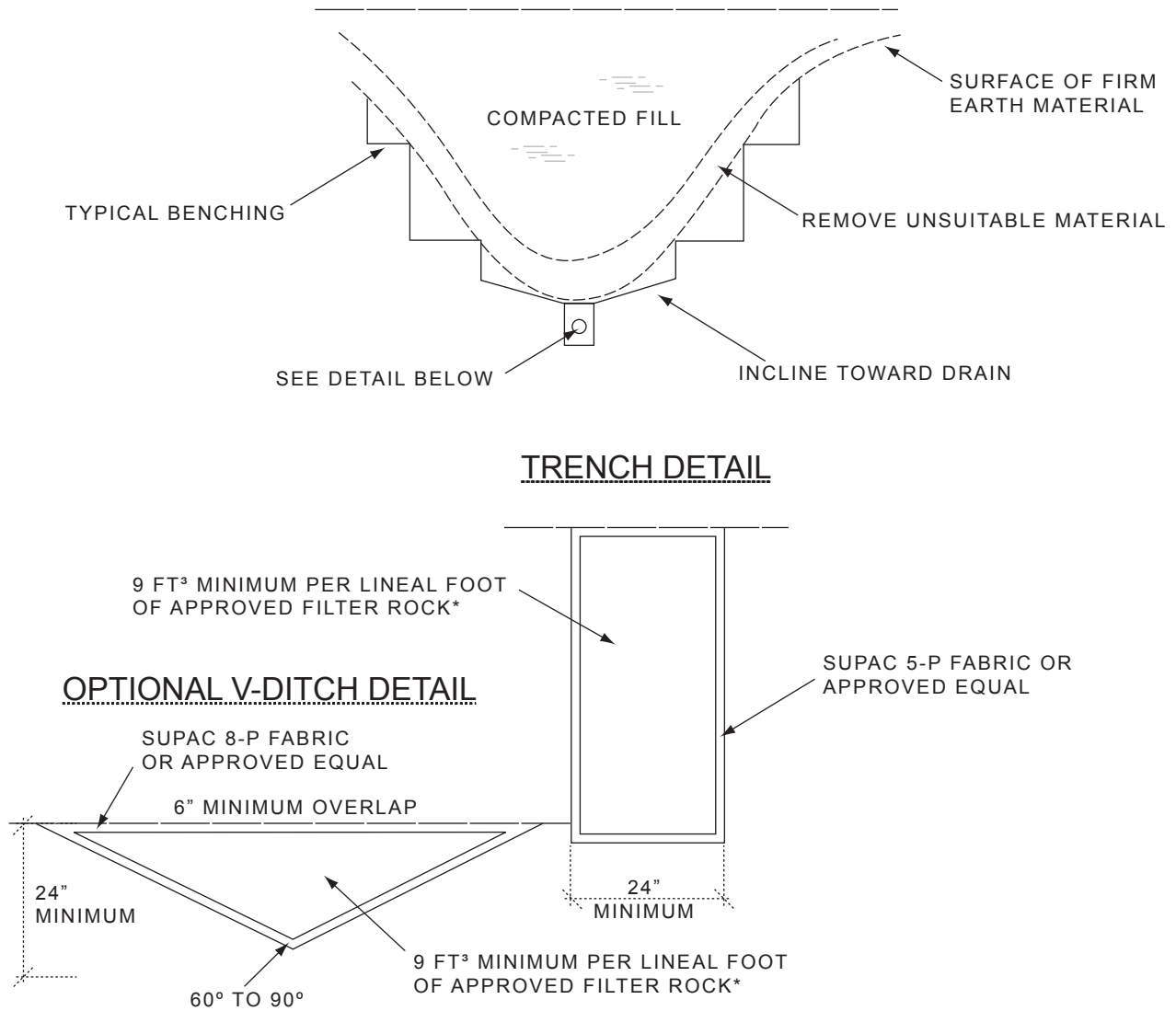
Pipe diameter to meet the following criteria. Subject to field review based on actual geotechnical conditions encountered during grading.

Length of Run	Pipe Diameter
Upper 500'	4"
Next 1000'	6"
>1500'	8"

TYPICAL CANYON SUBDRAIN DETAIL

NOT TO SCALE

FIGURE 8



* Drainage material to meet following specifications or approved equal.

Sieve	% Passing
1 1/2"	88-100
1"	5-40
3/4"	0-17
3/8"	0-7
No.200	0-3

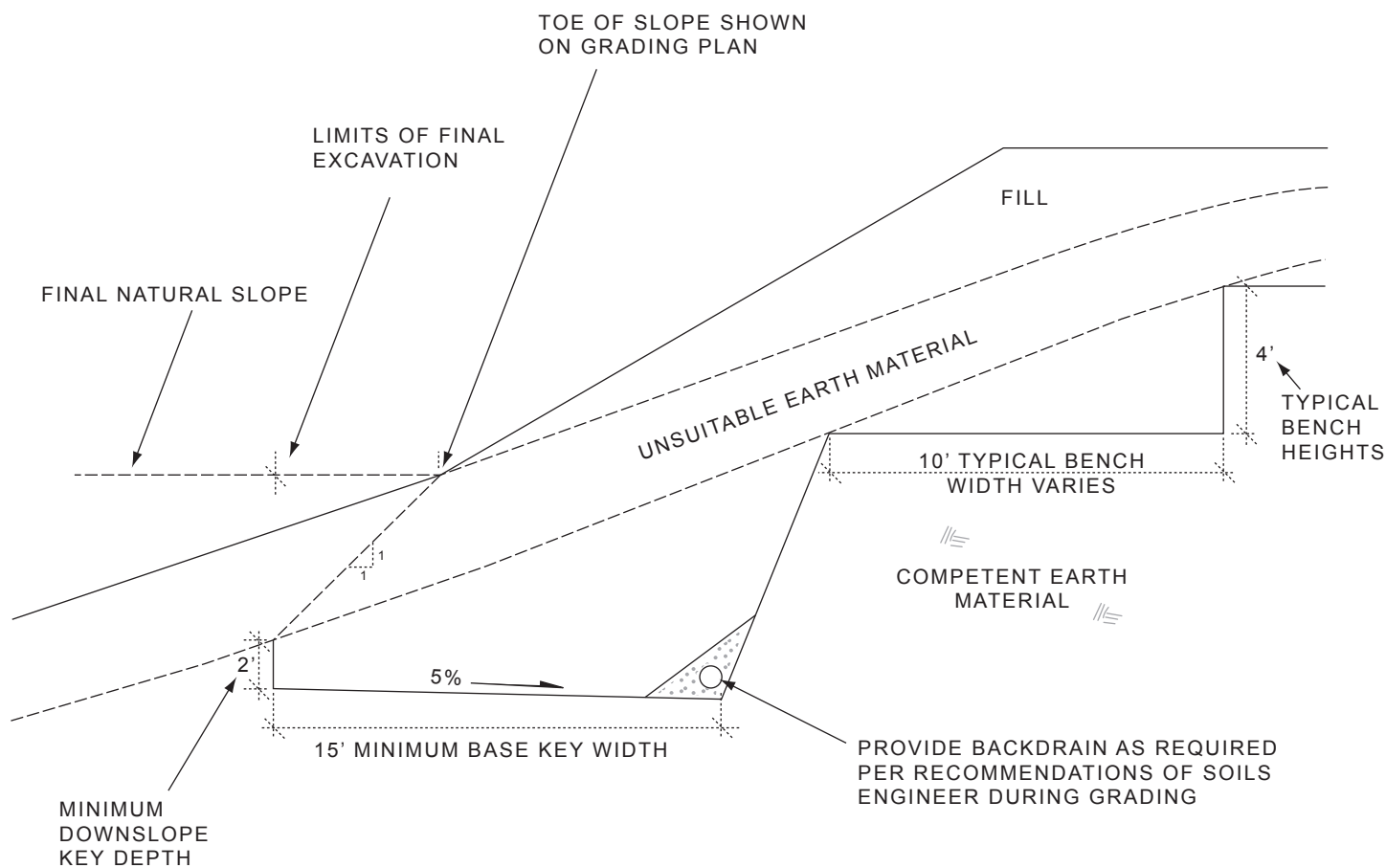
ADD MINIMUM 4" DIAMETER APPROVED PERFORATED PIPE WHEN GRADIENT IS LESS THAN 2%

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

GEOFABRIC SUBDRAIN

NOT TO SCALE

FIGURE 9

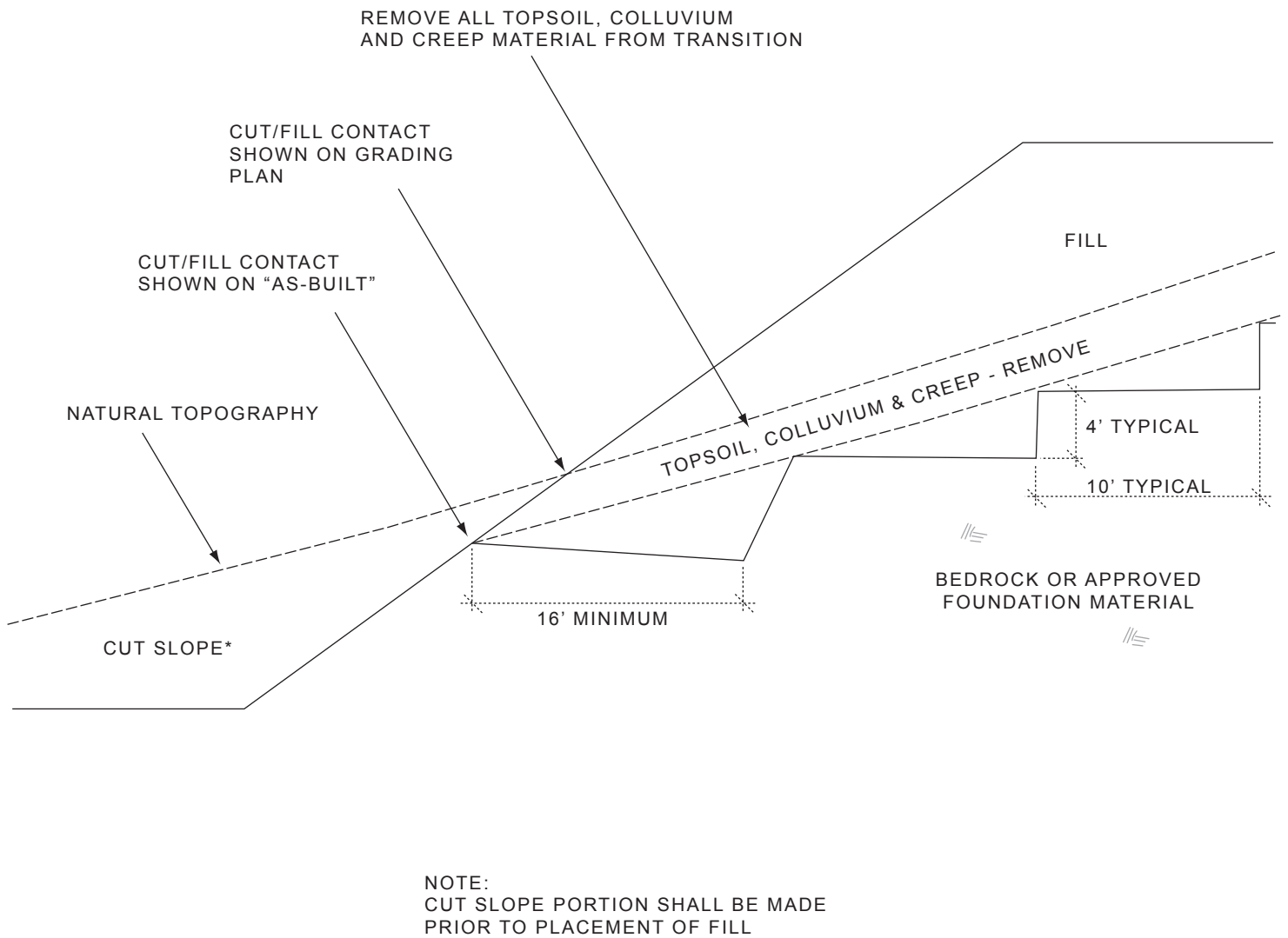


WHERE NATURAL SLOPE GRADIENT IS 5:1 OR LESS, BENCHING IS NOT NECESSARY. HOWEVER, FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

FILL SLOPE ABOVE NATURAL GROUND DETAIL

NOT TO SCALE

FIGURE 10

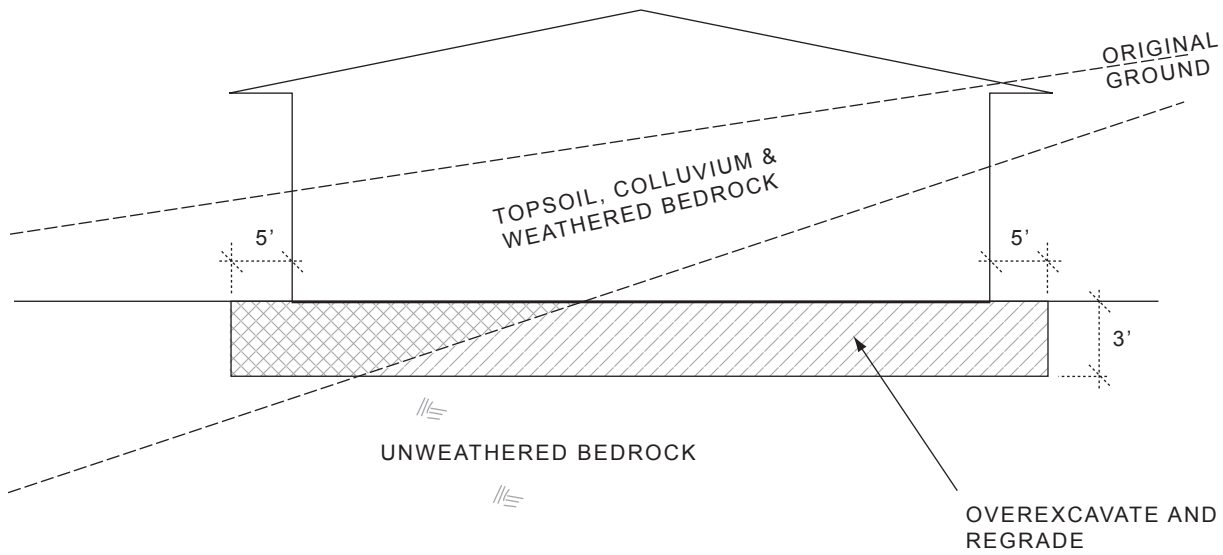


FILL SLOPE ABOVE CUT SLOPE DETAIL

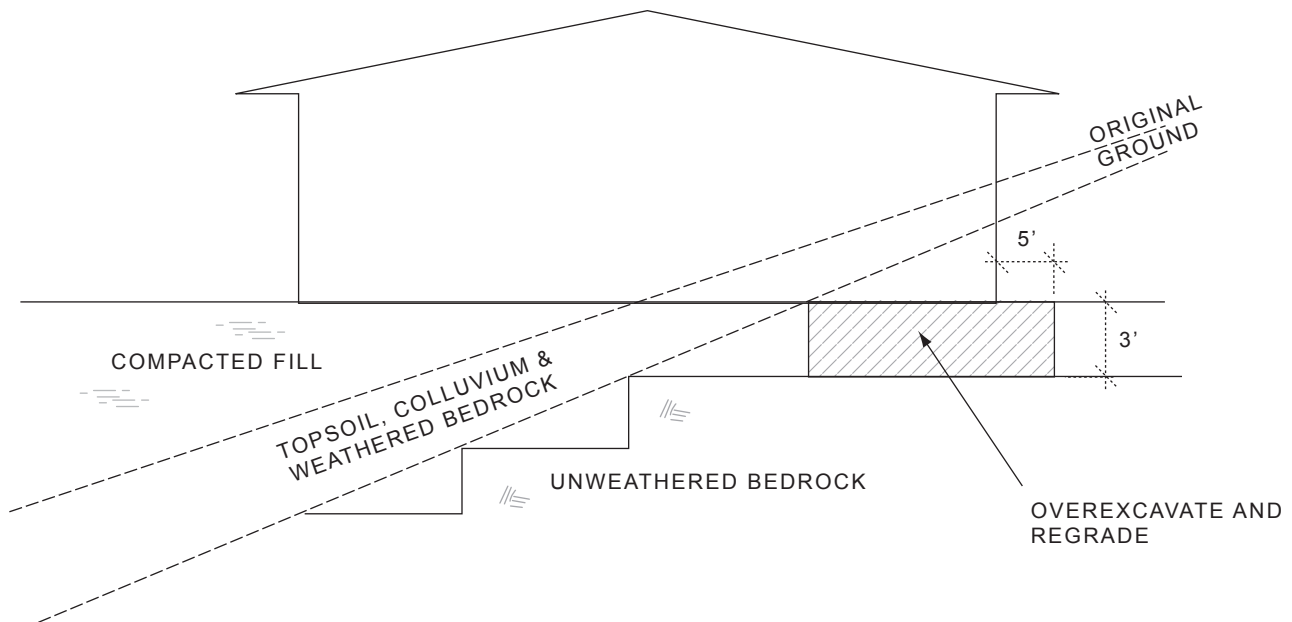
NOT TO SCALE

FIGURE 11

CUT LOT



CUT/FILL LOT (TRANSITION)

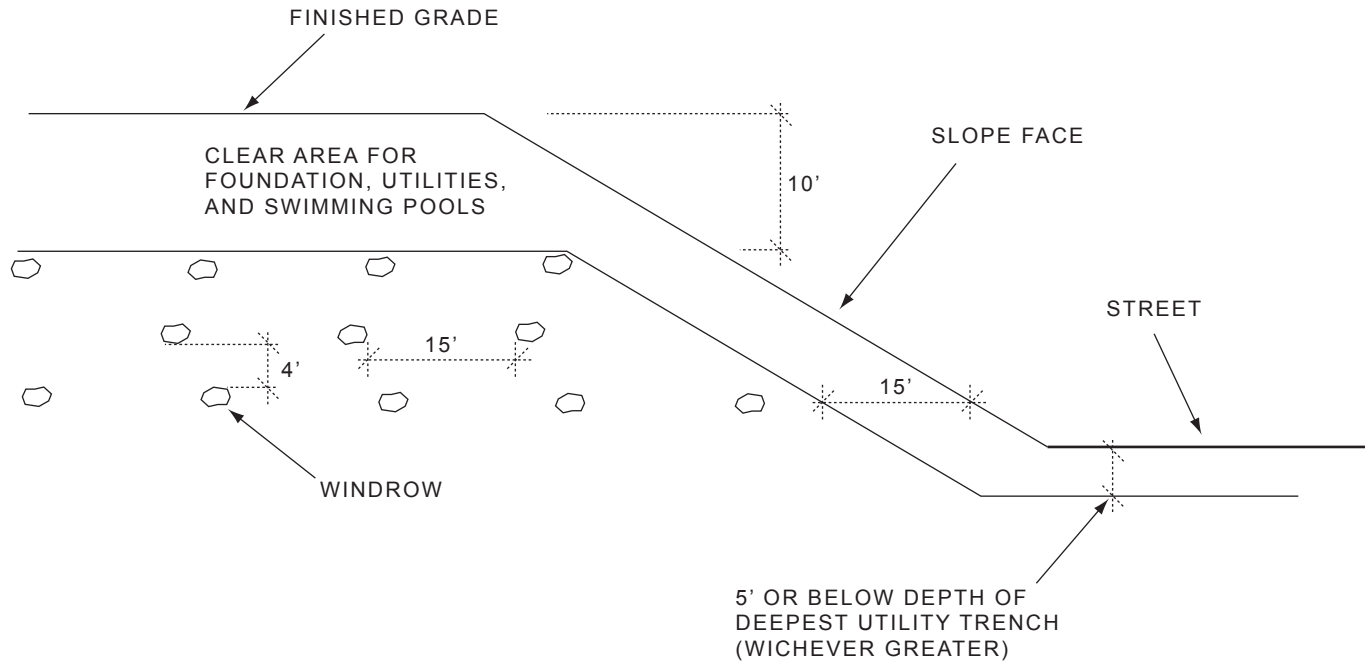


TRANSITION LOT DETAIL

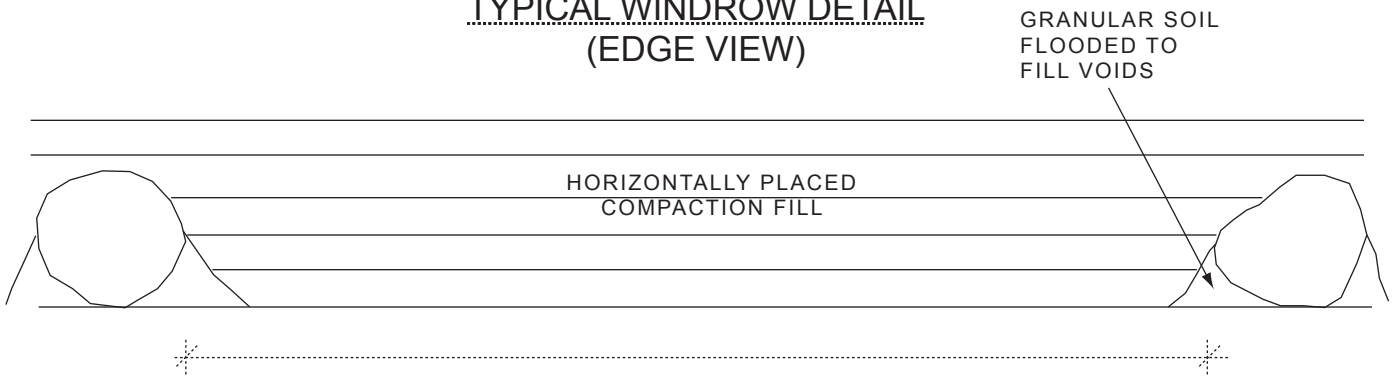
NOT TO SCALE

FIGURE 12

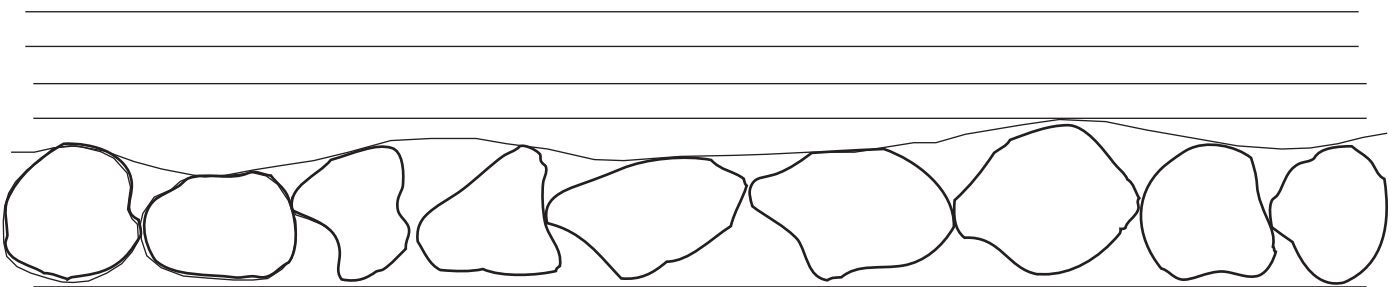
BUILDING



TYPICAL WINDROW DETAIL (EDGE VIEW)



(PROFILE VIEW)



ROCK DISPOSAL DETAIL

NOT TO SCALE

FIGURE 13