APPENDIX M

Storm Water Quality Management Plan

Permit Application Number: T21-00001

CITY OF OCEANSIDE
ENGINEERING DIVISION

PRIORITY DEVELOPMENT PROJECT

STORM WATER QUALITY MANAGEMENT PLAN

FOR

Cypress Point Subdivision

ENGINEER OF WORK

Patric de Boer RCE 83583 exp:3/31/23

PREPARED FOR:

Concordia Homes

380 Stevens Avenue, Suite 307

Solana Beach, CA 92075

PREPARED BY:

Omega Engineering Consultants

4340 Viewridge Ave, Suite B

San Diego, CA 92123

Ph: (858) 634-8620

How to Use This Template

This template, assembled by GHD Inc. on behalf of the City of Oceanside, is for the development of Storm Water Quality Management Plans (SWQMPs) for Priority Development Projects (PDPs) proposed within Oceanside, CA. It is based on requirements set forth in the Regional Water Quality Control Board's National Pollutant Discharge Elimination System MS4 Permit that covers the San Diego Region (Order No. R9-2013-0001).

All references within the template refer to the City of Oceanside BMP Design Manual dated February 2016 (Manual). Use of this template in conjunction with the Manual is intended to help a project applicant develop a SWQMP compliant with City of Oceanside and MS4 Permit requirements.

Template Date: February 16, 2016

Assembled By:

Quick Reference Guide

Item	Project Information
Project Name	Cypress Point Subdivision
Application Number(s)	T21-00001
Project Address	Vacant Lot, west end of Pala Road
Total Parcel Area	316,904 sq. ft.
Project Description	The site is a vacant lot at the western terminus of Pala Road. It is sparsely covered with scrub and grass. The development proposes 54 single-family homes, private roads, hardscape, landscaping and vegetated biofiltration basins.
Proposed Disturbed Area	326,912 sq. ft.
Created or Replaced Impervious	195,166 sq. ft.
Project Hydrologic Unit Watershed	☐ Santa Maria ☒ San Luis Rey ☐ Carlsbad
Required to implement HMP	☒ Yes ☐ No

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CERTIFICATION PAGE

Project Name: Cypress Point Subdivision
Permit Application Number: T21-00001

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the City of Oceanside BMP Design Manual, which is based on the requirements of San Diego Regional Water Quality Control Board Order No. R9-2013-0001 (MS4 Permit).

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

As Engineer of Work, I agree to indemnify, defend, and hold harmless the City of Oceanside, its officers, agents, and employees from any and all liability, claims, damages, or injuries to any person or property which might arise from the negligent acts, errors, or omissions of the Engineer of Work, my employees, agents or consultants.

C83583 exp:3/31/2023

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

Patric de Boer

Print Name

Omega Engineering Consultants

Company

3/19/2021

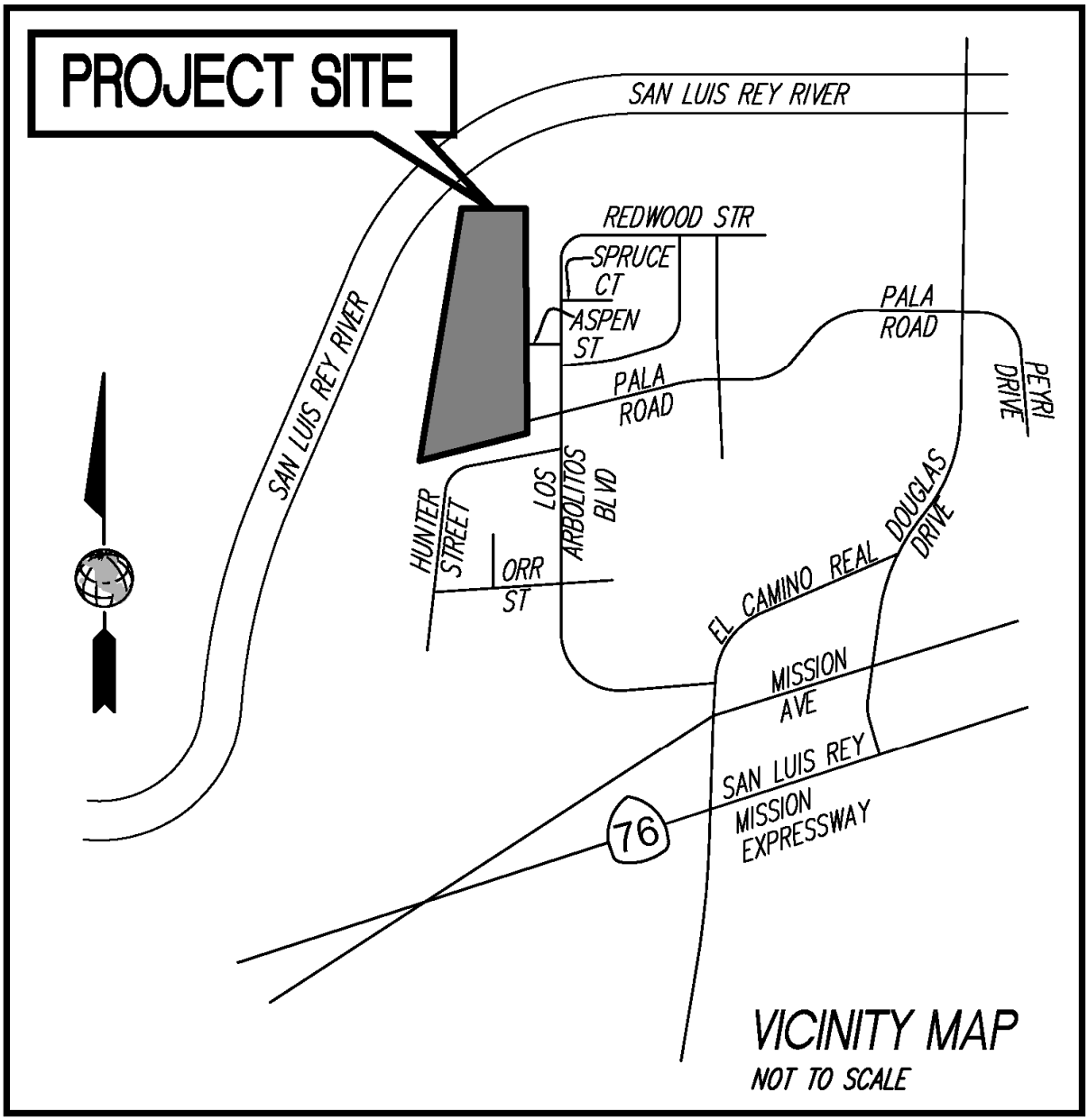
Date

SUBMITTAL RECORD

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

Submittal Number	Date	Project Status	Changes
1	12/24/2020	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	1ST Submittal
2	03/18/2021	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Redlines Addressed
3		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	
4		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	Click here to enter text.

Project Vicinity Map



Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1

Project Identification

Project Name: Cypress Point Subdivision

Permit Application Number: **T21-00001** | Date:12/21/2020

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop".
Refer to the manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the manual for guidance.	☒Yes	Go to Step 2.
	☐No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, PDP, or exception to PDP definitions? To answer this item, see Section 1.4 of the manual *in its entirety* for guidance, AND complete Form I-2, Project Type Determination.	☐Standard Project	Stop. Standard Project requirements apply, including Standard Project SWQMP.
	☒PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable: N/A		

Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual for guidance.	☐Yes	Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*): N/A		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual for guidance.	☒Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☐No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply: N/A		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual for guidance.	☐Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☒No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: **No mapped CCSYA's exist onsite or upstream of the site.**		

Project Type Determination Checklist			Form I-2
Project Information			
Project Name: Cypress Point Subdivision			
Permit Application Number: T21-00001			
Project Type Determination: Standard Project or PDP			
The project is (select one): ☒New Development ☐Redevelopment			
The total proposed newly created or replaced impervious area is: **195,166 ft² (4.48) acres**			
Is the project in any of the following categories, (a) through (f)?			
Yes ☒	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(c)	New and redevelopment projects that create 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption SIC code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Form I-2 Page 2 of 2			
Yes ☐	No ☒	(d)	New or redevelopment projects that create or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and SDRWQCB; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and SDRWQCB; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See manual Section 1.4.2 for additional guidance.
Yes ☐	No ☒	(e)	New development projects that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets. This category includes retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day.
Yes ☒	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the PDP categories (a) through (f) listed above?

☐ No – the project is not a PDP (Standard Project).

☒ Yes – the project is a PDP.

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: N/A ft² (A)
The total proposed newly created or replaced impervious area is: N/A ft² (B)
Percent impervious surface created or replaced (A/B)*100: N/A %
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP

OR

☐ greater than fifty percent (50%) – the entire project site is a PDP

Site Information Checklist For PDPs	Form I-3B (PDPs)
Project Summary Information	
Project Name:	Cypress Point Subdivision
Project Address:	Terminus of Pala Road, Oceanside, CA 92058
Assessor's Parcel Number(s)	158-301-46-00
Permit Application Number	T21-00001
Project Watershed (Hydrologic Unit)	Select One: ☐Santa Margarita 902 ☒San Luis Rey 903 ☐Carlsbad 904
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	7.28 Acres (316,904 Square Feet)
Area to be disturbed by the project (Project Area)	7.50 Acres (326,912 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	4.48 Acres (195,166 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	3.02 Acres (131,746 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Hydrologic Unit	Hydrologic Area	Hydrologic Sub-Area
Santa Margarita 902.00	☐ Ysidora 902.10	☐ Lower Ysidora 902.11
San Luis Rey 903.00	☒ Lower San Luis 903.10	☒ Mission 903.11
		☐ Bonsall 903.12
Carlsbad 904.00	☐ Loma Alta 904.10	Not Applicable
	☐ Buena Vista Creek 904.20	☐ El Salto 904.21
		☐ Vista 904.22
	☐ Agua Hedionda 4.30	☐ Los Monos 904.31

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

☐Existing development

☐Previously graded but not built out

☐Agricultural or other non-impervious use

☒Vacant, undeveloped/natural

Description / Additional Information:

The existing site is a bare, vacant lot with several feet of artificial fill. No drainage improvements exist on the site. Site receives run-on from areas to the east of the site.

Existing Land Cover Includes (select all that apply):

☒Vegetative Cover

☒Non-Vegetated Pervious Areas

☐Impervious Areas

Description / Additional Information:

Site cover consists of bare dirt and seasonal grasses/shrubs. Site is underlain by several feet of artificial fill.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

☐NRCS Type A

☐NRCS Type B

☐NRCS Type C

☒NRCS Type D

Approximate Depth to Groundwater:

☐Groundwater Depth < 5 feet

☐5 feet < Groundwater Depth < 10 feet

☒10 feet < Groundwater Depth < 20 feet

☐Groundwater Depth > 20 feet

Description of Existing Site Topography and Drainage [How is storm water runoff conveyed from the site? At a minimum, this description should answer (1) whether existing drainage conveyance is natural or urban; (2) describe existing constructed storm water conveyance systems, if applicable; and (3) is runoff from offsite conveyed through the site? If so, describe]:

1) The existing drainage is natural, as it occurs via overland flow and concentrated flow in earthen ditches.

2) No permanent stormwater conveyances exist on site. A graded ditch accepts runoff from the dead end of Aspen Street and conveys it west across the site to a concrete channel that borders the site.

3) Offsite runoff is conveyed through the site at Aspen Street, and at the dead end of Pala Road.

The on-site and offsite runoff discharges to an existing drainage channel that runs adjacent to San Luis River. The runoff then confluences with San Luis River (Lower) approximately 1600 feet south of the site. The distance from this point to the Pacific Ocean is approximately 3.5 miles.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project proposes 54 single family, two story homes with attached garages. There will also be a private road constructed to access the residential area. Pala road will be extended to a proposed cul-de-sac. 4 biofiltration basins are proposed for water quality and HMP compliance purposes. Onsite storm drains are proposed to intercept onsite and offsite runoff and convey it to a surface discharge point at the southwest corner of the project site.

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

54 single family homes, private road, concrete walkways

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

Landscaping, tree wells, decomposed granite walkways, biofiltration basins

Does the project include grading and changes to site topography?

☒Yes

☐No

Description / Additional Information:

Project will import several feet of fill to raise the site above the 100-year flood elevation. The site will be regraded to slope at approximately 0.5% to the south.

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

☒Yes

☐No

Description / Additional Information:

Project will construct onsite and offsite stormdrains to bypass the run-on from offsite areas. The run-on from Aspen Street will be intercepted by 2 curb inlets near the intersection of Aspen Street and Cypress Point Bouleveard. This runoff will be conveyed through the site via a 30" trunk storm drain eventually being discharged to a surface outfall southwest of the site.

Offsite runoff from Pala Road will be intercepted by 2 curb inlets and conveyed west along the proposed street extension in a 24"x72" box culvert, eventually discharging to the same outfall as the previously described runoff from Aspen Street.

Onsite runoff will be conveyed on the surface via gutters to the four biofiltration basins for Water Quality Treatment and HMP detention. These 4 BMPs will drain via the previously described 30" trunk storm drain to the previously described surface outfall.

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

☒Onsite storm drain inlets

☐Interior floor drains and elevator shaft sump pumps

☐Interior parking garages

☒Need for future indoor & structural pest control

☒Landscape/outdoor pesticide use

☐Pools, spas, ponds, decorative fountains, and other water features

☐Food service

☐Refuse areas

☐Industrial processes

☐Outdoor storage of equipment or materials

☐Vehicle and equipment cleaning

☐Vehicle/equipment repair and maintenance

☐Fuel dispensing areas

☐Loading docks

☒Fire sprinkler test water

☒Miscellaneous drain or wash water

☒Plazas, sidewalks, and parking lots

Form I-3B Page 6 of 10
Identification of Receiving Water Pollutants of Concern
Describe path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): **Project surface drains to the 4 proposed biofiltration basins. These BMPs drain via a 30" stormdrain to a proposed 60" storm drain in Pala Road. The 60" stormdrain outfalls to a vegetated area adjacent to San Luis Rey River. San Luis Rey River then outlets to the Pacific Ocean.**
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs
San Luis Rey River, Lower	Chloride Enterococcus Fecal Coliform Phosphorus Total Dissolved Solids Total Nitrogen as N Toxicity	Est 2019 Est 2021 Est 2021 Est 2021 Est 2019 Est 2021 Est 2021
Pacific Ocean Shoreline, San Luis Rey HU, at San Luis Rey River Mouth	Esterococcus	Est 2021

Form I-3B Page 7 of 10
Identification of Project Site Pollutants*   ***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)**
Identify pollutants expected from the project site based on all proposed use(s) of the site (see manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			
Oil & Grease			
Bacteria & Viruses			
Pesticides			

Note: Indicator Bacteria shall be addressed as a Pollutant of Concern (POC) for projects located in the Lower San Luis Hydrologic Area and for projects that discharge to the Pacific Ocean Shoreline within the boundaries of the City of Oceanside.

Note: Nutrients shall be addressed as a Pollutant of Concern (POC) for projects located in the Loma Alta Hydrologic Area.

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the manual)?

☒Yes, hydromodification management flow control structural BMPs required.

☐No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

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

Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

☐Yes

☒No, no critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the manual been performed?

☐6.2.1 Verification of GLUs Onsite

☐6.2.2 Downstream Systems Sensitivity to Coarse Sediment

☐6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

☐No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☐No critical coarse sediment yield areas to be protected based on verification of GLUs onsite.

☐Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP.

☐Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

N/A

Flow Control for Post-Project Runoff*

***This Section only required if hydromodification management requirements apply**

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

POC 1 is located at the outfall to the vegetated area adjacent to San Luis Rey River. The flow does not immediately drain into the river. It flows west approximately ½ mile before flowing into the river. For this reason the site is not HMP exempt.

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

☒No, the low flow threshold is 0.1Q2 (default low flow threshold)

☐Yes, the result is the low flow threshold is 0.1Q2

☐Yes, the result is the low flow threshold is 0.3Q2

☐Yes, the result is the low flow threshold is 0.5Q2

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

N/A

Discussion / Additional Information: (optional)

N/A

Other Site Requirements and Constraints

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

Approximately 0.5-acres of the project disturbed area drains to the roadway frontage of Rancho Del Oro Drive. The hydromodification management of this area is accounted for in the calculations for POC 1. The water quality treatment of this 0.5-acres is provided via proposed street trees in the landscaped area along Rancho Del Oro Drive.

Optional Additional Information or Continuation of Previous Sections as Needed

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

N/A

Source Control BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-4

Project Identification

Project Name Cypress Point Subdivision

Permit Application Number: T21-00001

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Implemented?		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented: **No outdoor material storage areas proposed.**			

Form I-4 Page 2 of 3			
Source Control Requirement	**Implemented?**		
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented: **No outdoor work areas proposed.**			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented:			

Form I-4 Page 3 of 3			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	**Implemented?**		
Onsite storm drain inlets	☒ Yes	☐ No	☐ N/A
Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☒ N/A
Interior parking garages	☐ Yes	☐ No	☒ N/A
Need for future indoor & structural pest control	☒ Yes	☐ No	☐ N/A
Landscape/outdoor pesticide use	☒ Yes	☐ No	☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	☒ N/A
Food service	☐ Yes	☐ No	☒ N/A
Refuse area	☒ Yes	☐ No	☐ N/A
Industrial processes	☐ Yes	☐ No	☒ N/A
Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
Vehicle and equipment cleaning	☒ Yes	☐ No	☐ N/A
Vehicle/equipment repair and maintenance	☐ Yes	☐ No	☒ N/A
Fuel dispensing areas	☐ Yes	☐ No	☒ N/A
Loading docks	☐ Yes	☐ No	☒ N/A
Fire sprinkler test water	☒ Yes	☐ No	☐ N/A
Miscellaneous drain or wash water	☒ Yes	☐ No	☐ N/A
Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.			

Site Design BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-5

Project Identification

Project Name: Cypress Point Subdivision

Permit Application Number: T21-00001

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-1 not implemented: No natural drainage pathways or hydrologic features exist on this mass graded site			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-2 not implemented: No natural areas exist on this mass graded site.			
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented: SD-4 will be implemented in all landscaped areas. The soil will be amended with organics and mulch to provide a better growing medium than the native soil.			

Form I-5 Page 2 of 2			
Site Design Requirement	**Applied?**		
SD-5 Impervious Area Dispersion	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-5 not implemented: Sufficient Landscaped area is not available to properly implement impervious area dispersion as it is specified in the BMP design manual. The building roofs will however drain to the landscaping adjacent to the proposed houses before flowing to the gutter.			
SD-6 Runoff Collection	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented:			
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-8 not implemented: Harvest and use will not be used on this site. Please see Form I-7 provided in Attachment 1. The expense of the rain barrels, pumps, and irrigation system interconnection does not justify the benefit of SD-8. Additionally it is not feasible to implement a separate system for each residence.			

Summary of PDP Structural BMPs	Form I-6 (PDPs)
Project Identification	
Project Name: Cypress Point Subdivision	
Permit Application Number: T21-0000	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative to certify construction of the structural BMPs (see Section 1.12 of the manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

The strategy for BMP selection is as follows:

Harvest and Use was deemed infeasible due to the demand for harvested water being insufficient to justify the cost of the system. Please see Form I-7 provided in Attachment 1. Additionally, it is not feasible to provide 54 separate systems (one for each of the houses).

Full retention via infiltration was investigated next. It was found to be infeasible due to the presence of liquifiable soils. Full and partial retention were ruled out because of this.

Biofiltration was considered next and found to be feasible. Four fully lined biofiltration basins with additional gravel storage were designed. These will be used for Water Quality Treatment as well as Hydromodification storage.

Portions of the proposed site that are within the public right of way could not be feasibly drained to a biofiltration basin. These areas will drain to street trees with amended soils. The DCV tributary to these trees will be less than 25% of the total project DCV.

The street trees are not used for hydromodification compliance and do not use the DCV multipliers. Hydromodification compliance for the whole site is met through detention in the four biofiltration basins.

(Continue on page 2 as necessary.)

Form I-6 Page 3 of 6 (Copy as many as needed)	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. **BMP-1**	
Construction Plan Sheet No. C-6	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☒Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☐Pollutant control only ☐Hydromodification control only ☒Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Andrew Kann Omega Engineering Consultants 858-634-8620
Who will be the final owner of this BMP?	An HOA will be formed, BMPs will be owned by the HOA. Details are not yet available
Who will maintain this BMP into perpetuity?	The proposed HOA will maintain the BMP
What is the funding mechanism for maintenance?	Funding will come from HOA fees

Form I-6 Page 4 of 6 (Copy as many as needed)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No. **BMP-2**
Construction Plan Sheet No. C-6
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☒Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)
Purpose: ☐Pollutant control only ☐Hydromodification control only ☒Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Andrew Kann Omega Engineering Consultants 858-634-8620
Who will be the final owner of this BMP?	An HOA will be formed, BMPs will be owned by the HOA. Details are not yet available
Who will maintain this BMP into perpetuity?	The proposed HOA will maintain the BMP
What is the funding mechanism for maintenance?	Funding will come from HOA fees

Form I-6 Page 5 of 6 (Copy as many as needed)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No. **BMP-3**
Construction Plan Sheet No. C-6
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☒Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)
Purpose: ☐Pollutant control only ☐Hydromodification control only ☒Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Andrew Kann Omega Engineering Consultants 858-634-8620
Who will be the final owner of this BMP?	An HOA will be formed, BMPs will be owned by the HOA. Details are not yet available
Who will maintain this BMP into perpetuity?	The proposed HOA will maintain the BMP
What is the funding mechanism for maintenance?	Funding will come from HOA fees

Form I-6 Page 6 of 6 (Copy as many as needed)	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. **BMP-4**	
Construction Plan Sheet No. C-6	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☒Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☐Pollutant control only ☐Hydromodification control only ☒Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Andrew Kann Omega Engineering Consultants 858-634-8620
Who will be the final owner of this BMP?	An HOA will be formed, BMPs will be owned by the HOA. Details are not yet available
Who will maintain this BMP into perpetuity?	The proposed HOA will maintain the BMP
What is the funding mechanism for maintenance?	Funding will come from HOA fees

City of Oceanside 300 N Coast Highway Oceanside, CA 92054	**Permanent BMP Construction** **Self Certification Form**	February 2016

Date Prepared: Click here to enter text.	Project No.: T21-00001
Project Applicant:	Phone:
Project Address:	
Project Engineer: Andrew Kann	Phone: 619-634-8620

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and installing contractor and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of Oceanside.

ENGINEER'S CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 of the San Diego Regional Water Quality Control Board.

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

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No._____

Engineer's Stamp

CONTRACTOR'S CERTIFICATION:

As the professional in responsible charge for construction of the above project, I certify that all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; have been constructed in compliance with the approved plans and all applicable specifications, permits, and ordinances.

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

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included:

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

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

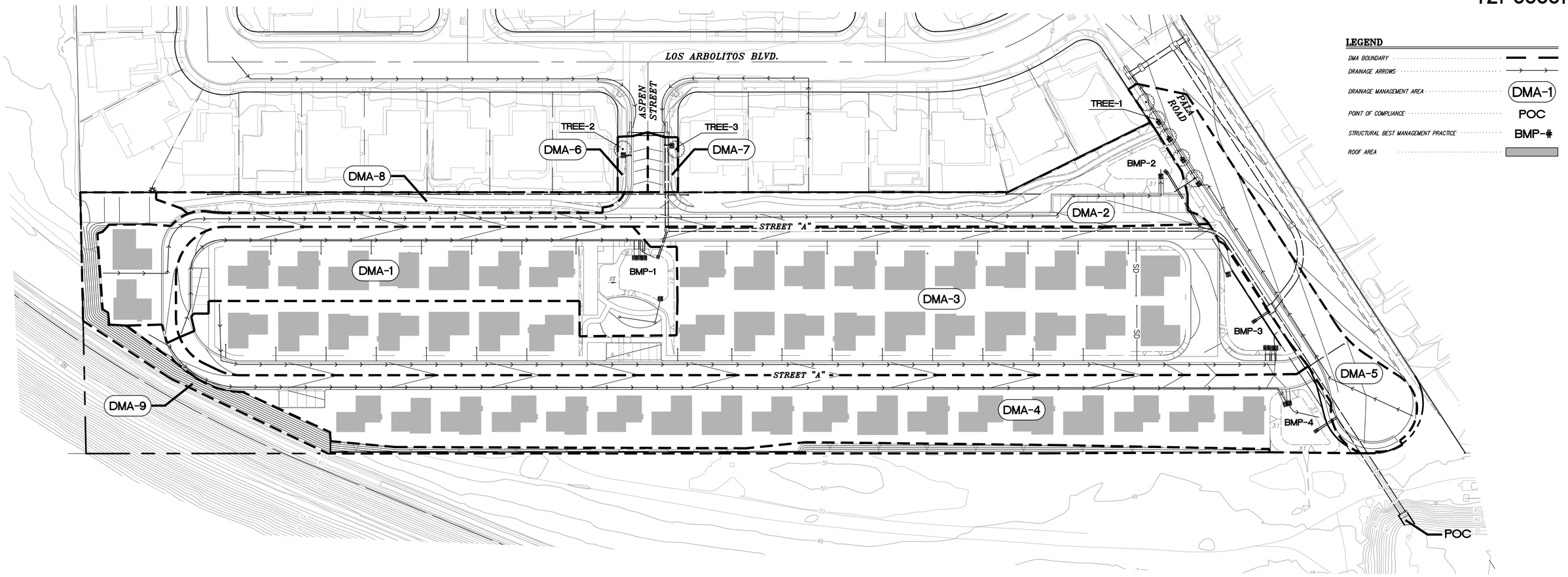
The DMA Exhibit must identify:

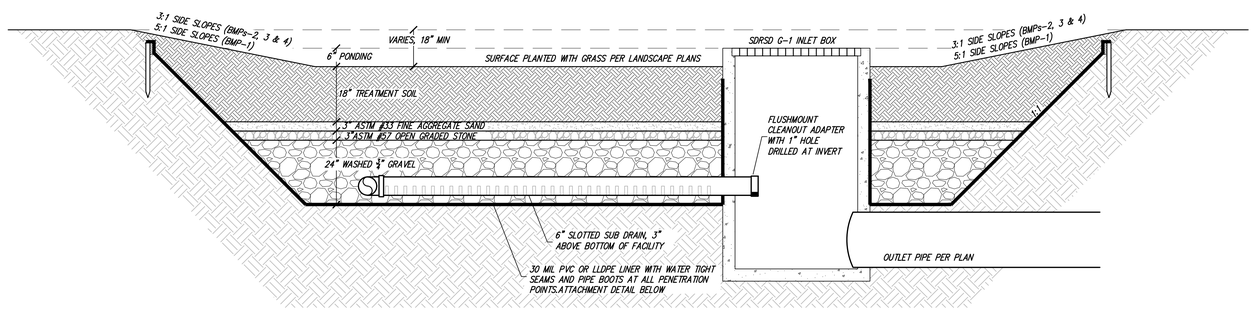
☒Underlying hydrologic soil group
☒Approximate depth to groundwater
☒Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☐Critical coarse sediment yield areas to be protected
☒Existing topography and impervious areas
☒Existing and proposed site drainage network and connections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

Placeholder – **DMA Exhibit**

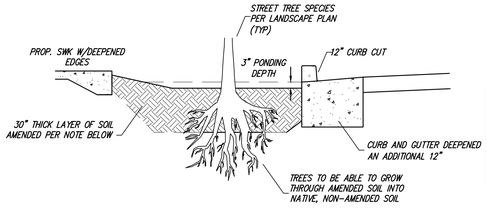
Please provide the Exhibit in 24”x36” format with map pocket, wet stamp, and date.

T21-00001





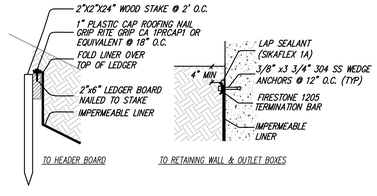
BIOFILTRATION BASIN SECTION (TYPICAL)



STREET TREE CROSS SECTION

SOIL AMENDMENT NOTE

THE SOIL IN THE SPECIFIED AREA AROUND THE STREET TREES IS TO BE AMENDED TO PROMOTE TREE GROWTH AND STORMWATER RETENTION. THE SOIL SHALL BE EXCAVATED TO THE SPECIFIED DEPTH, THE BOTTOM OF THE EXCAVATION SHALL BE ROUGHED UP/ROTOTILLED, THE EXCAVATED SOIL SHALL BE THOROUGHLY MIXED WITH MULCH AND PLACED BACK IN THE EXCAVATION WITHOUT COMPACTION.



IMPERMEABLE LINER ATTACHMENT DETAIL

BMP INSPECTION SCHEDULE NOTES

CONTRACTOR MUST CONTACT ENGINEER FOR INSPECTION OF BMPS AT THE FOLLOWING STAGES OF CONSTRUCTION:

--PRIOR TO START OF CONSTRUCTION OF BIOFILTRATION AREA
--PRIOR TO CONSTRUCTION OF OUTLET STRUCTURES
--AFTER GRADING OF THE BASIN AREA FOR CERTIFICATION
--AFTER PLACEMENT OF IMPERMEABLE LINER (W/ EXTRA LENGTH FOR EMBEDMENT)
--AFTER PLACEMENT OF SUB-DRAIN
--AFTER THE PLACEMENT OF GRAVEL DRAINAGE LAYER
--AFTER PLACEMENT OF TREATMENT SOIL
--AFTER IRRIGATION AND LANDSCAPING ACTIVITIES

*SURVEY STAKES SHALL BE AVAILABLE FOR EACH AND EVERY INSPECTION

BIOFILTRATION SOIL MEDIA NOTE

1. LONG-TERM PERCOLATION RATE OF 5.0 IN/HR MIN. & MAXIMUM RATE OF 10 IN/HR.
2. SOIL MEDIA SHALL BE LOOSELY PLACED (<80% COMPACTION)
3. CONTRACTOR SHALL SUBMIT BIO-MEDIA BLEND MATERIAL CUTSHEETS AND INFILTRATION INFORMATION FOR REVIEW AND APPROVAL PRIOR TO ORDERING AND PLACEMENT.
4. BIORETENTION SOIL MEDIA COMPOSITION BY VOLUME:*
   - 80% SAND (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 5% SILT (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 5% CLAY (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 10% ORGANIC MATTER

SOURCE CONTROL BMP NOTES

ALL APPLICABLE SOURCE CONTROL BMPS SHALL BE UTILIZED

A. ALL ONSITE INLETS TO BE MARKED "NO DUMPING" OR SIMILAR AND ALL OPERATIONAL PRECAUTIONS TO AVOID NON STORM WATER DISCHARGE SHALL BE FOLLOWED PER THE CITY'S BMP DESIGN MANUAL.
B. OWNER TO BE RESPONSIBLE FOR SWEEPING PLAZAS, SIDEWALKS, AND PARKING LOTS. THIS IS TO BE DONE REGULARLY AND AS NEEDED TO PREVENT ACCUMULATION OF LITTER AND DEBRIS.

MISC NOTES

1. UNDERLYING NRCS HYDROLOGIC SOIL GROUP FOR SITE IS TYPE D
2. GROUNDWATER DEPTH IS ASSUMED MORE THAN 10'
3. NO EXISTING NATURAL HYDROLOGIC FEATURES
4. NO CRITICAL COARSE SEDIMENT YIELD AREAS ON SITE
5. AVOID USING COOPER WHEN SELECTING ROOF DRAINAGE AND ROOFING TRIM MATERIALS

DMA DATA TABLE

DMA-NO.	TOT. AREA (SF)	IMPERVIOUS (%)	DESIGN DCV (CF)	NOTES
DMA-1	39,810	59	1,379	DRAINS TO BMP-1 (BIOFILTRATION)
DMA-2	40,275	58	1,374	DRAINS TO BMP-2 (BIOFILTRATION)
DMA-3	118,918	67	4,370	DRAINS TO BMP-3 (BIOFILTRATION)
DMA-4	76,376	60	2,646	DRAINS TO BMP-4 (BIOFILTRATION)
DMA-5	23,092	87	994	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-1)
DMA-6	1,797	70	68	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-2)
DMA-7	1,685	74	66	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-3)
DMA-8	9,025	0	142	SELF MITIGATING
DMA-9	15,934	0	251	SELF MITIGATING
TOTAL DCV			11,290	
DCV RETAINED BY TREES			1,480	

BMP DATA TABLE

BMP-NO.	TRIBUTARY DMA	PROPOSED FOOTPRINT	% OF TOTAL TRIBUTARY AREA	NOTES
BMP-1	DMA-1	2,126 SF	8.1%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-2	DMA-2	1,732 SF	6.6%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-3	DMA-3	2,568 SF	3.1%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-4	DMA-4	1,650 SF	2.2%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE

STREET TREE TABLE

TREE-NO.	INITIAL DCV (CF)	SOIL AREA (SF)	SOIL DEPTH (FT)	SOIL VOLUME (CF)	DCV REDUCTION CREDIT	NOTES
TREE-1	994	1,520	2.5	3,801	1,120 CF	5- 22 FT DIAMETER TREES
TREE-2	68	141	2.5	353	100 CF	1- 15 FT DIAMETER TREE
TREE-3	66	141	25.	353	100 CF	1- 15 FT DIAMETER TREE

GRAPHICAL SCALE: 1" = 40'
20 40 80 120

PREPARED BY:
OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-3620
No. 50940 REGISTERED PROFESSIONAL ENGINEER ANDREW J. KANE CIVIL STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/03/21	
	FIRST SUBMITTAL	01/05/21	OEC

BMP PLAN FOR:

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-6

Placeholder – **Tabular Summary of DMAs (if separate from DMA Exhibit)**

Leave placeholder intact if not applicable.

☒Not Applicable – Tabular Summary included on DMA Exhibit

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA-1	DMA-2	DMA-3	DMA-4	DMA-5	DMA-6	DMA-7	DMA-8	DMA-9		unitless
	2	85th Percentile 24-hr Storm Depth	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63		inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	23,560	23,409	80,054	45,616	20,027	1,250	1,250	0	0		sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	16,250	16,866	38,864	30,760	3,065	547	435	9,025	15,934		sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	Yes	Yes	Yes	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A					5	1	1				#
	19	Average Mature Tree Canopy Diameter					22	15	15				ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	39,810	40,275	118,918	76,376	23,092	1,797	1,685	9,025	15,934	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.66	0.65	0.70	0.66	0.82	0.72	0.75	0.30	0.30	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.66	0.65	0.70	0.66	0.82	0.72	0.75	0.30	0.30	0.00	unitless
	26	Initial Design Capture Volume	1,379	1,374	4,370	2,646	994	68	66	142	251	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.66	0.65	0.70	0.66	0.82	0.72	0.75	0.30	0.30	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	1,379	1,374	4,370	2,646	994	68	66	142	251	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	1,120	100	100	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.66	0.65	0.70	0.66	0.00	0.00	0.00	0.30	0.30	0.00	unitless
	36	Final Effective Tributary Area	26,275	26,179	83,243	50,408	0	0	0	2,708	4,780	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	1,120	100	100	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	1,379	1,374	4,370	2,646	0	0	0	142	251	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	DMA-1	DMA-2	DMA-3	DMA-4	DMA-5	DMA-6	DMA-7	DMA-8	DMA-9	-	unitless
	2	85th Percentile Rainfall Depth	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	D	D	D	D	D	D	D	D		unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted		unitless
	5	Nature of Restriction	Other	Other	Other	Other	Other	Other	Other	Other	Other		unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No	No	No	No		yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	-	percentage
	12	Fraction of DCV Requiring Retention	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	ratio
	13	Required Retention Volume	14	14	44	26	0	0	0	1	3	-	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	DMA-1	DMA-2	DMA-3	DMA-4	DMA-5	DMA-6	DMA-7	DMA-8	DMA-9	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	in/hr
	3	Design Capture Volume Tributary to BMP	1,379	1,374	4,370	2,646	0	0	0	142	251	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated							unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined							unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain							unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard							unitless
	8	Provided Surface Area	2,126	1,732	2,568	1,650							sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6							inches
	10	Provided Soil Media Thickness	18	18	18	18							inches
	11	Provided Gravel Thickness (Total Thickness)	12	12	12	12							inches
	12	Underdrain Offset	3	3	3	3							inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.00	1.00	1.00	1.00							inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	2.10	2.10	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.27	0.22	0.10	0.11	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.28	0.24	0.12	0.13	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	387	327	528	346	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	992	1,047	3,842	2,300	0	0	0	142	251	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.0432	0.0432	0.0432	0.0432	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.88	1.08	0.73	1.13	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.88	1.08	0.73	1.13	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	5.27	6.47	4.36	6.79	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	13.20	13.20	13.20	13.20	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	7	6	8	5	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	15	12	18	12	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	18.47	19.67	17.56	19.99	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	1,487	1,570	5,763	3,450	0	0	0	213	377	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	1,487	1,570	3,758	2,749	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	744	785	2,882	1,725	0	0	0	107	188	0	cubic-feet
	44	Option 2 - Provided Storage Volume	744	785	2,825	1,725	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	0.98	1.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**n/a**	**n/a**	**n/a**	**-142**	**-251**	**n/a**	cubic-feet

Attention!

-Minimum annual retention criteria are not satisfied for each individual drainage area. Implement additional site design elements, increase structural BMP retention capacity, or demonstrate that such requirements are satisfied at the project-level
-This BMP does not fully satisfy the performance standards for pollutant control for the drainage area.

Harvest and Use Feasibility Checklist	Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing

☒ Landscape irrigation

☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.

Irrigation Demand = (1,470 gallons/acre) x (3.02 acres) = 4,439 gallons = 594 cf
Toilet Demand = (216 residents) x (9.3 gallons per resident) x (1.5 days) = 3,013 gallons = 403 cf
*Note: 3-4 residents per unit, 54 units total = 4 residents * 54 units = 216 residents

Total = Irrigation Demand + Toilet Demand = 997 cf

3. Calculate the DCV using worksheet B-2.1.

DCV = 11,290 (cubic feet)

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☒ No ⇨ ⇩	☐ Yes / ☒ No ⇨ ⇩	☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Infiltration has not been measured onsite. Infiltration is precluded by the presence of liquefiable soils below the site

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

No, underlying soils are sandy, liquefiable soil.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: **No. Per Geotechnical Report, "Infiltration could create groundwater mounding due to geologic variability of the alluvial material."** Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: **Infiltration would not be anticipated to cause water balance issues or increase discharge of contaminated groundwater.** Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2	☐Full Infiltration ☒No	

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

Form I-8 Page 3 of 4

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

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

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

Provide basis:

Infiltration has not been measured onsite. Infiltration is precluded by the presence of liquefiable soils below the site.

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

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

Provide basis:

No, underlying soils are sandy, liquefiable soil and are not suitable for infiltration at any rate.

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

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: **No. Per Geotechnical Report, "Infiltration could create groundwater mounding due to geologic variability of the alluvial material."** Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: **No downstream water rights are known to exist.** Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	☐Partial Infiltration ☒No Infiltration	

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

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	1. Hydromodification Management Exhibit (Required)	☒Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐6.2.1 Verification of Geomorphic Landscape Units Onsite ☐6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒Not performed ☐Included ☐Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☒Included ☐Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐Included ☒Not required because BMPs will drain in less than 96 hours

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

The Hydromodification Management Exhibit must identify:

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

Please provide the Exhibit in 24”x36” format with map pocket, wet date, and stamp.

SEE DMA MAP FOR HMP INFO

Placeholder – **Hydromodification Management Exhibit**

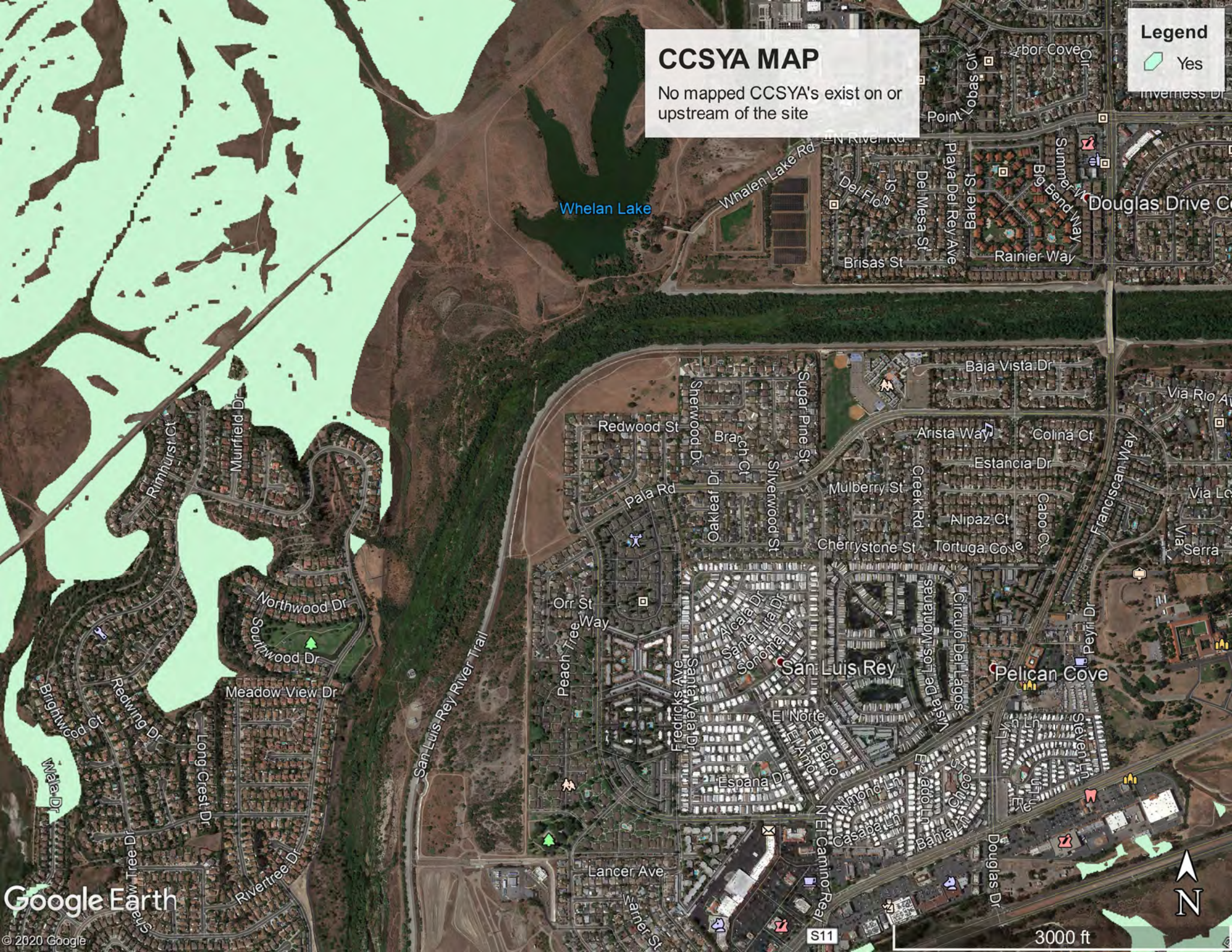
Replace placeholder with required exhibit.

Placeholder – **6.2.1 Verification of GLUs Onsite** (if applicable)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

☒Not Applicable


CCSYA MAP
No mapped CCSYA's exist on or upstream of the site
Legend
Yes
Whelan Lake
Whalen Lake Rd
N River Rd
Del Flora St
Del Mesa St
Playa Del Rey Ave
Baker St
Big Bend Way
Summer Wy
Rainier Way
Brisas St
Douglas Drive
Point
Harbor Cove Cir
Inverness Dr
Baja Vista Dr
Via Rio
Redwood St
Sherwood Dr
Branch Ct
Sugar Pine St
Arista Way
Colina Ct
Estancia Dr
Pala Rd
Oakleaf Dr
Silverwood St
Mulberry St
Creek Rd
Cabo Ct
Alipaz Ct
Cherrystone St
Tortuga Cove
Francisca Way
Via Serra
Via Lo
Rimhurst Ct
Muirfield Dr
Northwood Dr
Southwood Dr
Meadow View Dr
Brightwood Ct
Redwing Dr
Long Crest Dr
Waja Dr
Shadow Tree Dr
Rivertree Dr
San Luis Rey River Trail
Orr St
Peach Tree Way
Alcala Dr
Santa Lia Dr
Sonoma Dr
San Luis Rey
Pelican Cove
Fredricks Ave
Santa Vela Dr
El Norte
El Barro
El Amo
Vista De Los Montanas
Circulo Del Lagos
Playa Dr
Steven Ln
Espana Dr
Almond Ln
Casabel Ln
Bahia Ln
N El Camino Real
Douglas Dr
Lancer Ave
Warner St
S11
Google Earth
© 2020 Google
3000 ft
N

Placeholder – **6.2.3 Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite** (Optional)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

Not Applicable

Placeholder – **6.3.4 Geomorphic Assessment of Receiving Channels** (Optional)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

Not Applicable

Placeholder - **Flow Control Facility Design and Structural BMP Drawdown Calculations**

Replace placeholder with required calculations/documentation.

See Chapter 6 and Appendix G of the BMP Design Manual

EVENT THRESHOLD CALCULATION

Pre-project Flow Frequency - Long-term Simulation

Statistics - Node e-poc Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	1/4/1978	4	7.076	0.22	58
2	4/14/2003	8	6.463	0.44	29
3	10/1/1983	3	5.648	0.66	19.33
4	1/4/1995	7	5.459	0.88	14.5
5	1/15/1979	5	5.349	1.11	11.6
6	9/23/1986	1	4.8	1.33	9.67
7	2/25/1969	19	4.423	1.55	8.29
8	2/25/2003	5	4.395	1.77	7.25
9	2/3/1958	16	4.349	1.99	6.44
10	10/27/2004	7	4.063	2.21	5.8
11	10/29/2000	3	4.02	2.43	5.27
12	3/17/1982	18	3.99	2.65	4.83
13	2/18/2005	3	3.977	2.88	4.46
14	1/16/1952	9	3.952	3.1	4.14
15	1/13/1993	10	3.903	3.32	3.87
16	2/28/1978	14	3.893	3.54	3.63
17	2/20/1980	13	3.713	3.76	3.41
18	4/1/1958	9	3.656	3.98	3.22
19	1/28/1983	5	3.494	4.2	3.05
20	2/10/1978	4	3.48	4.42	2.9
21	11/22/1965	25	3.411	4.65	2.76
22	2/14/1986	7	3.375	4.87	2.64
23	2/16/1980	4	3.334	5.09	2.52
24	10/20/2004	7	3.316	5.31	2.42
25	3/2/1980	4	3.298	5.53	2.32
26	2/3/1998	6	3.287	5.75	2.23
27	2/27/1983	5	3.189	5.97	2.15
28	1/27/2008	6	3.181	6.19	2.07
29	12/29/1991	13	3.169	6.42	2
30	3/16/1963	4	3.16	6.64	1.93
31	2/23/1998	12	3.154	6.86	1.87
32	4/28/2005	3	3.114	7.08	1.81
33	12/19/1970	2	3.112	7.3	1.76
34	2/22/2008	7	3.104	7.52	1.71
35	2/17/1998	10	2.969	7.74	1.66
36	12/1/1961	20	2.93	7.96	1.61
37	2/4/1994	3	2.925	8.19	1.57
38	11/15/1952	2	2.92	8.41	1.53
39	2/18/1993	1	2.906	8.63	1.49
40	1/6/2008	3	2.897	8.85	1.45
41	1/18/1993	8	2.897	9.07	1.41
42	11/11/1985	4	2.892	9.29	1.38
43	1/28/1980	11	2.765	9.51	1.35
44	3/1/1983	4	2.757	9.73	1.32
45	3/11/1995	3	2.756	9.96	1.29
46	1/16/1978	6	2.731	10.18	1.26
47	1/10/1980	13	2.711	10.4	1.23
48	2/17/1980	11	2.645	10.62	1.21
49	2/14/1998	8	2.631	10.84	1.18
50	2/27/1991	6	2.627	11.06	1.16
51	12/18/1967	11	2.604	11.28	1.14
52	2/12/1992	6	2.581	11.5	1.12
53	3/15/1986	3	2.575	11.73	1.09
54	1/12/1960	6	2.561	11.95	1.07
55	8/17/1977	3	2.506	12.17	1.05
56	1/15/1993	35	2.479	12.39	1.04
57	3/19/1981	3	2.44	12.61	1.02
58	4/27/1960	3	2.42	12.83	1
59	12/24/1983	2	2.41	13.05	0.98
60	3/1/1991	11	2.401	13.27	0.97
61	2/22/2005	11	2.401	13.5	0.95
62	2/8/1993	3	2.395	13.72	0.94
63	2/22/1998	6	2.389	13.94	0.92
64	1/20/1962	7	2.388	14.16	0.91
65	12/22/1982	1	2.378	14.38	0.89
66	1/16/1972	3	2.371	14.6	0.88
67	3/8/1968	6	2.32	14.82	0.87
68	2/6/1969	7	2.308	15.04	0.85
69	2/12/2003	3	2.278	15.27	0.84
70	12/25/1983	7	2.265	15.49	0.83
71	12/24/1971	3	2.256	15.71	0.82
72	12/31/2004	3	2.252	15.93	0.81
73	1/11/2005	9	2.216	16.15	0.79
74	3/20/1973	5	2.206	16.37	0.78
75	1/27/1983	7	2.197	16.59	0.77
76	3/27/1991	5	2.178	16.81	0.76
77	9/18/1963	4	2.177	17.04	0.75
78	11/22/1973	2	2.161	17.26	0.74
79	1/14/1978	14	2.149	17.48	0.73
80	1/30/2007	1	2.143	17.7	0.73
81	2/19/1980	2	2.13	17.92	0.72
82	1/9/2005	18	2.113	18.14	0.71
83	12/29/1977	1	2.084	18.36	0.7
84	2/21/2005	6	2.073	18.58	0.69
85	3/15/2003	4	2.067	18.81	0.68

10-year Q: 4.894 cfs (Adjust Column "I" to interpolate from Table)

2-year Q: 3.169 cfs

Lower Flow Threshold: 10%

0.1xQ2 (Pre): 0.317 cfs

86	3/15/1952	9	2.056	19.03	0.67
87	2/19/1958	3	2.048	19.25	0.67
88	2/13/1992	2	2.042	19.47	0.66
89	1/12/1995	6	2.04	19.69	0.65
90	1/3/2005	3	2.021	19.91	0.64
91	2/26/2004	5	2.019	20.13	0.64
92	1/26/2001	1	2.018	20.35	0.63
93	9/5/1978	2	2	20.58	0.62
94	2/11/1959	3	2	20.8	0.62
95	3/24/1994	4	1.991	21.02	0.61
96	12/24/1988	3	1.986	21.24	0.6
97	1/13/1957	5	1.982	21.46	0.6
98	1/19/1954	6	1.98	21.68	0.59
99	2/15/1992	5	1.98	21.9	0.59
100	11/8/2002	1	1.976	22.12	0.58
101	11/14/1972	2	1.947	22.35	0.57
102	1/9/1980	14	1.939	22.57	0.57
103	1/13/1997	4	1.937	22.79	0.56
104	2/19/1993	2	1.926	23.01	0.56
105	2/14/2001	3	1.923	23.23	0.55
106	1/12/1997	3	1.922	23.45	0.55
107	12/5/1966	9	1.91	23.67	0.54
108	2/12/1978	6	1.904	23.89	0.54
109	3/25/1991	3	1.896	24.12	0.53
110	12/10/1965	4	1.87	24.34	0.53
111	1/5/1979	7	1.87	24.56	0.52
112	11/7/1979	1	1.862	24.78	0.52
113	3/13/1967	2	1.861	25	0.51
114	1/26/1999	2	1.855	25.22	0.51
115	11/25/1988	3	1.855	25.44	0.5
116	2/13/1954	3	1.851	25.66	0.5
117	11/24/1983	2	1.838	25.88	0.5
118	1/15/1997	3	1.818	26.11	0.49
119	3/19/1991	3	1.815	26.33	0.49
120	11/30/1952	4	1.784	26.55	0.48
121	11/21/1996	12	1.782	26.77	0.48
122	5/11/1957	2	1.77	26.99	0.48
123	11/18/1986	2	1.769	27.21	0.47
124	4/8/1975	9	1.758	27.43	0.47
125	11/17/1964	3	1.748	27.65	0.46
126	2/21/2005	10	1.74	27.88	0.46
127	1/11/2001	3	1.734	28.1	0.46
128	12/24/1959	2	1.725	28.32	0.45
129	2/1/1960	4	1.713	28.54	0.45
130	2/17/1990	4	1.704	28.76	0.45
131	1/24/1969	36	1.682	28.98	0.44
132	2/28/1991	2	1.682	29.2	0.44
133	10/14/2006	1	1.674	29.42	0.44
134	3/16/1958	6	1.669	29.65	0.43
135	3/11/1995	7	1.669	29.87	0.43
136	11/30/1967	1	1.668	30.09	0.43
137	3/2/1983	10	1.659	30.31	0.42
138	11/28/1981	6	1.652	30.53	0.42
139	4/13/1956	7	1.646	30.75	0.42
140	12/25/1968	1	1.644	30.97	0.41
141	2/13/1978	3	1.64	31.19	0.41
142	1/26/1995	1	1.618	31.42	0.41
143	2/22/2004	1	1.614	31.64	0.41
144	11/20/1963	9	1.607	31.86	0.4
145	2/14/1980	4	1.599	32.08	0.4
146	12/2/1952	1	1.598	32.3	0.4
147	4/3/1958	3	1.595	32.52	0.39
148	1/10/1978	2	1.584	32.74	0.39
149	1/17/1988	2	1.579	32.96	0.39
150	4/20/1988	4	1.577	33.19	0.39
151	12/20/2002	4	1.57	33.41	0.38
152	2/25/2001	4	1.564	33.63	0.38
153	3/3/1983	2	1.526	33.85	0.38
154	11/17/1972	1	1.525	34.07	0.38
155	3/21/1958	13	1.519	34.29	0.37
156	3/20/1991	4	1.513	34.51	0.37
157	9/10/1976	7	1.509	34.73	0.37
158	11/30/2007	13	1.505	34.96	0.37
159	1/29/1998	4	1.499	35.18	0.36
160	12/16/1987	4	1.492	35.4	0.36
161	4/3/1965	2	1.489	35.62	0.36
162	3/20/1992	2	1.482	35.84	0.36
163	3/24/1983	4	1.479	36.06	0.36
164	12/7/1982	3	1.479	36.28	0.35
165	4/20/1983	3	1.469	36.5	0.35
166	1/17/1990	3	1.467	36.73	0.35
167	3/5/1995	15	1.461	36.95	0.35
168	11/29/1985	8	1.46	37.17	0.35
169	3/30/1978	1	1.454	37.39	0.34
170	4/7/1958	12	1.449	37.61	0.34
171	1/22/1967	7	1.446	37.83	0.34
172	3/11/2006	1	1.436	38.05	0.34
173	3/6/1980	3	1.427	38.27	0.34
174	12/28/2004	2	1.426	38.5	0.33
175	1/26/1956	14	1.424	38.72	0.33
176	2/7/1966	2	1.421	38.94	0.33
177	12/17/1987	7	1.42	39.16	0.33
178	3/19/1979	3	1.419	39.38	0.33
179	1/6/1993	14	1.418	39.6	0.32

180	1/3/1977	2	1.416	39.82	0.32
181	1/29/1957	10	1.414	40.04	0.32
182	11/16/1965	7	1.411	40.27	0.32
183	1/7/2005	7	1.411	40.49	0.32
184	12/21/1988	4	1.404	40.71	0.32
185	12/29/2004	7	1.402	40.93	0.31
186	1/17/1952	11	1.402	41.15	0.31
187	12/11/1985	3	1.4	41.37	0.31
188	12/29/1965	2	1.4	41.59	0.31
189	2/11/2003	1	1.385	41.81	0.31
190	11/19/1967	2	1.381	42.04	0.31
191	2/8/1998	4	1.379	42.26	0.3
192	10/12/1987	6	1.372	42.48	0.3
193	1/14/1960	4	1.36	42.7	0.3
194	2/28/1970	2	1.357	42.92	0.3
195	11/30/1993	1	1.341	43.14	0.3
196	4/8/1965	11	1.339	43.36	0.3
197	3/1/1960	1	1.336	43.58	0.29
198	2/16/1959	7	1.333	43.81	0.29
199	1/18/1955	5	1.319	44.03	0.29
200	3/7/1952	5	1.318	44.25	0.29
201	1/25/1958	1	1.316	44.47	0.29
202	11/25/1985	2	1.295	44.69	0.29
203	11/28/1981	2	1.294	44.91	0.29
204	10/18/2004	1	1.285	45.13	0.28
205	11/16/1972	6	1.283	45.35	0.28
206	7/22/1976	3	1.276	45.58	0.28
207	12/9/2001	3	1.27	45.8	0.28
208	2/7/1998	3	1.264	46.02	0.28
209	1/1/1982	2	1.264	46.24	0.28
210	3/5/2000	3	1.254	46.46	0.28
211	2/28/1957	1	1.249	46.68	0.27
212	2/15/1980	1	1.243	46.9	0.27
213	1/7/1992	4	1.226	47.12	0.27
214	3/5/1980	4	1.22	47.35	0.27
215	2/8/1993	1	1.214	47.57	0.27
216	3/30/1954	1	1.214	47.79	0.27
217	1/12/1980	7	1.212	48.01	0.27
218	9/25/1986	4	1.208	48.23	0.27
219	2/26/2001	3	1.206	48.45	0.26
220	1/10/1955	1	1.206	48.67	0.26
221	11/21/1963	7	1.198	48.89	0.26
222	2/22/2004	2	1.19	49.12	0.26
223	12/7/1992	2	1.184	49.34	0.26
224	1/29/1981	2	1.183	49.56	0.26
225	11/5/1960	2	1.163	49.78	0.26
226	1/26/1969	3	1.161	50	0.26
227	3/17/1979	1	1.157	50.22	0.26
228	1/25/1997	8	1.151	50.44	0.25
229	11/24/2001	2	1.147	50.66	0.25
230	11/21/1967	2	1.145	50.88	0.25
231	11/11/1954	9	1.145	51.11	0.25
232	4/11/1967	3	1.143	51.33	0.25
233	10/14/1957	2	1.14	51.55	0.25
234	1/26/1958	1	1.137	51.77	0.25
235	1/7/1995	13	1.114	51.99	0.25
236	2/13/1973	3	1.099	52.21	0.25
237	2/7/1978	4	1.092	52.43	0.24
238	4/7/2001	1	1.092	52.65	0.24
239	12/21/1970	1	1.085	52.88	0.24
240	1/6/1977	20	1.072	53.1	0.24
241	1/5/1992	14	1.071	53.32	0.24
242	12/29/1951	13	1.07	53.54	0.24
243	3/10/1986	2	1.056	53.76	0.24
244	11/23/1951	1	1.049	53.98	0.24
245	5/12/1998	1	1.047	54.2	0.24
246	1/30/1966	1	1.033	54.42	0.24
247	3/25/1977	3	1.032	54.65	0.23
248	4/18/1995	2	1.021	54.87	0.23
249	12/6/1966	3	1.02	55.09	0.23
250	1/10/1995	7	1.02	55.31	0.23
251	2/6/1976	3	1.016	55.53	0.23
252	3/1/1970	2	1.012	55.75	0.23
253	12/19/1967	2	1.004	55.97	0.23
254	1/21/1964	2	1.004	56.19	0.23
255	1/7/1957	6	0.998	56.42	0.23
256	2/20/1969	1	0.994	56.64	0.23
257	3/2/1970	1	0.994	56.86	0.23
258	12/19/1984	2	0.97	57.08	0.22
259	3/28/1993	2	0.964	57.3	0.22
260	2/3/1958	7	0.962	57.52	0.22
262	2/21/2000	2	0.954	57.96	0.22
262	2/20/2000	2	0.954	57.96	0.22
263	3/11/1973	2	0.949	58.19	0.22
264	3/2/1981	3	0.946	58.41	0.22
265	12/27/1984	5	0.943	58.63	0.22
266	2/25/1987	1	0.94	58.85	0.22
267	3/19/1962	3	0.927	59.07	0.22
268	12/18/1984	7	0.926	59.29	0.22
269	1/5/1982	3	0.924	59.51	0.22
270	3/6/1983	1	0.906	59.73	0.21
271	3/4/1978	2	0.904	59.96	0.21
272	12/25/2003	1	0.904	60.18	0.21
273	3/4/1983	3	0.902	60.4	0.21

274	1/9/1998	2	0.898	60.62	0.21
275	3/12/1978	2	0.892	60.84	0.21
276	1/22/1964	1	0.89	61.06	0.21
277	2/23/1969	12	0.89	61.28	0.21
278	3/23/1954	3	0.889	61.5	0.21
279	2/10/1963	1	0.886	61.73	0.21
280	2/8/1978	6	0.88	61.95	0.21
281	3/20/1979	1	0.88	62.17	0.21
282	3/11/1973	1	0.878	62.39	0.21
283	2/7/1994	2	0.877	62.61	0.2
284	12/4/1974	1	0.871	62.83	0.2
285	12/16/2002	1	0.86	63.05	0.2
286	2/10/1982	7	0.855	63.27	0.2
287	3/10/1986	5	0.852	63.5	0.2
288	11/24/1984	4	0.848	63.72	0.2
289	3/1/1981	3	0.836	63.94	0.2
290	11/30/1970	10	0.836	64.16	0.2
291	4/21/1988	1	0.836	64.38	0.2
292	3/8/1973	1	0.831	64.6	0.2
293	3/28/1979	1	0.831	64.82	0.2
294	3/8/1975	1	0.829	65.04	0.2
295	3/5/1981	7	0.828	65.27	0.2
296	1/9/1978	5	0.825	65.49	0.2
297	3/8/1974	9	0.819	65.71	0.2
298	2/9/1985	2	0.816	65.93	0.19
299	3/8/1952	1	0.814	66.15	0.19
300	2/18/1969	7	0.809	66.37	0.19
301	2/26/1983	1	0.808	66.59	0.19
302	2/8/1962	8	0.805	66.81	0.19
304	3/25/1998	2	0.793	67.26	0.19
304	3/31/1998	2	0.793	67.26	0.19
305	1/20/1982	1	0.791	67.48	0.19
306	2/17/1994	2	0.782	67.7	0.19
307	12/3/1966	2	0.777	67.92	0.19
308	1/30/1966	2	0.775	68.14	0.19
309	1/13/1952	5	0.774	68.36	0.19
310	2/16/1959	1	0.769	68.58	0.19
311	1/5/1977	10	0.767	68.81	0.19
312	1/27/2008	3	0.766	69.03	0.19
313	11/19/1967	2	0.763	69.25	0.19
314	2/13/2001	1	0.763	69.47	0.18
315	2/6/1978	1	0.76	69.69	0.18
316	4/20/2007	1	0.758	69.91	0.18
317	7/8/1976	2	0.758	70.13	0.18
318	12/11/1996	9	0.758	70.35	0.18
319	4/12/1956	3	0.753	70.58	0.18
320	4/20/1957	3	0.753	70.8	0.18
321	3/25/1954	3	0.752	71.02	0.18
322	2/9/1981	2	0.749	71.24	0.18
323	1/5/2008	2	0.744	71.46	0.18
324	1/31/1993	1	0.743	71.68	0.18
325	1/25/1995	5	0.735	71.9	0.18
326	12/6/1997	1	0.735	72.12	0.18
327	3/1/1957	2	0.735	72.35	0.18
328	2/22/1969	6	0.734	72.57	0.18
329	1/29/1980	8	0.733	72.79	0.18
330	3/4/1970	2	0.733	73.01	0.18
331	7/15/1976	3	0.731	73.23	0.18
332	3/31/1978	3	0.724	73.45	0.17
333	4/1/1982	2	0.72	73.67	0.17
334	3/3/1980	1	0.72	73.89	0.17
335	2/5/1978	3	0.717	74.12	0.17
336	2/6/1965	1	0.716	74.34	0.17
337	12/24/1971	2	0.711	74.56	0.17
338	2/21/1959	3	0.708	74.78	0.17
339	3/11/1978	1	0.706	75	0.17
340	12/16/1965	6	0.691	75.22	0.17
341	2/25/1958	1	0.69	75.44	0.17
342	1/18/1972	6	0.689	75.66	0.17
343	2/8/1983	1	0.689	75.88	0.17
344	2/15/1973	1	0.687	76.11	0.17
345	11/14/1988	3	0.671	76.33	0.17
346	1/24/1967	5	0.647	76.55	0.17
347	2/27/1996	1	0.626	76.77	0.17
348	1/24/1954	4	0.62	76.99	0.17
349	3/20/1994	2	0.614	77.21	0.17
350	2/3/1994	1	0.608	77.43	0.17
351	2/27/1955	1	0.602	77.65	0.17
352	1/31/1979	2	0.601	77.88	0.16
353	1/8/1974	3	0.588	78.1	0.16
354	4/4/2006	3	0.582	78.32	0.16
355	3/16/2003	1	0.565	78.54	0.16
356	2/26/1996	1	0.564	78.76	0.16
357	11/12/1983	1	0.564	78.98	0.16
358	2/10/1976	1	0.553	79.2	0.16
359	2/6/1966	2	0.55	79.42	0.16
360	2/11/2005	5	0.539	79.65	0.16
361	1/11/1995	6	0.536	79.87	0.16
362	1/7/1993	5	0.521	80.09	0.16
363	3/22/1954	3	0.496	80.31	0.16
364	1/7/1993	3	0.495	80.53	0.16
365	5/9/1977	1	0.492	80.75	0.16
366	3/10/1975	3	0.491	80.97	0.16
367	2/28/2006	1	0.483	81.19	0.16

368	3/14/1982	1	0.475	81.42	0.16
369	1/9/1991	1	0.468	81.64	0.16
370	3/1/1953	1	0.466	81.86	0.16
371	3/15/1958	1	0.453	82.08	0.16
372	1/27/2001	1	0.441	82.3	0.16
373	3/16/1954	1	0.428	82.52	0.16
376	2/16/1998	1	0.423	83.19	0.15
376	2/19/1998	1	0.423	83.19	0.15
376	2/27/2001	1	0.423	83.19	0.15
377	3/7/1994	2	0.421	83.41	0.15
378	1/20/1982	1	0.407	83.63	0.15
379	11/8/1998	1	0.407	83.85	0.15
380	1/28/1957	2	0.402	84.07	0.15
381	3/18/1983	1	0.396	84.29	0.15
382	3/23/1992	1	0.393	84.51	0.15
383	12/7/1980	2	0.371	84.73	0.15
384	12/30/1977	3	0.365	84.96	0.15
385	12/27/1971	2	0.363	85.18	0.15
386	11/14/1965	4	0.362	85.4	0.15
387	12/8/1984	2	0.361	85.62	0.15
388	3/10/1975	3	0.359	85.84	0.15
389	11/6/1960	1	0.359	86.06	0.15
390	1/10/1978	4	0.348	86.28	0.15
391	9/17/1963	1	0.345	86.5	0.15
392	2/11/1973	1	0.335	86.73	0.15
393	3/21/1991	4	0.326	86.95	0.15
394	3/13/1986	1	0.319	87.17	0.15
395	1/4/2005	3	0.317	87.39	0.15
396	1/16/1970	2	0.313	87.61	0.15
397	12/28/1971	3	0.31	87.83	0.15
398	4/11/1998	1	0.309	88.05	0.15
399	1/19/1978	1	0.309	88.27	0.15
400	1/8/1985	2	0.307	88.5	0.14
401	1/6/2008	1	0.305	88.72	0.14
402	3/16/1957	1	0.302	88.94	0.14
403	2/21/1962	2	0.3	89.16	0.14
404	3/26/1991	4	0.297	89.38	0.14
405	12/20/1984	1	0.296	89.6	0.14
406	2/1/1996	1	0.295	89.82	0.14
407	4/14/1971	1	0.293	90.04	0.14
408	3/6/1958	1	0.29	90.27	0.14
409	1/18/1980	2	0.283	90.49	0.14
410	4/5/1969	1	0.278	90.71	0.14
411	4/18/1983	1	0.272	90.93	0.14
412	12/26/1977	1	0.271	91.15	0.14
413	12/4/1987	1	0.265	91.37	0.14
414	12/27/1984	6	0.256	91.59	0.14
415	3/16/1986	1	0.246	91.81	0.14
416	3/21/1983	1	0.246	92.04	0.14
417	1/7/1993	2	0.245	92.26	0.14
418	4/12/1999	2	0.22	92.48	0.14
419	4/10/1952	3	0.219	92.7	0.14
420	3/21/1969	1	0.219	92.92	0.14
421	11/7/1969	1	0.218	93.14	0.14
422	2/18/2005	1	0.214	93.36	0.14
423	3/22/1992	1	0.214	93.58	0.14
424	4/15/1976	1	0.212	93.81	0.14
425	12/20/1952	3	0.212	94.03	0.14
426	11/7/1966	2	0.207	94.25	0.14
427	1/31/1996	1	0.204	94.47	0.14
428	12/14/1965	1	0.204	94.69	0.14
429	2/9/1963	2	0.204	94.91	0.14
430	1/12/2001	6	0.202	95.13	0.13
431	3/25/1980	2	0.192	95.35	0.13
432	1/24/1995	1	0.183	95.58	0.13
434	3/6/2001	1	0.181	96.02	0.13
434	3/26/1998	1	0.181	96.02	0.13
435	12/30/1952	1	0.175	96.24	0.13
436	1/31/1956	1	0.163	96.46	0.13
437	1/28/1969	3	0.15	96.68	0.13
438	3/20/1958	2	0.143	96.9	0.13
439	3/10/1980	1	0.134	97.12	0.13
440	2/29/1960	1	0.116	97.35	0.13
441	6/10/1957	2	0.113	97.57	0.13
442	12/16/1988	1	0.106	97.79	0.13
443	2/19/1980	1	0.103	98.01	0.13
444	1/17/1993	1	0.095	98.23	0.13
445	3/9/1978	2	0.072	98.45	0.13
446	2/11/2005	1	0.071	98.67	0.13
447	2/8/1976	1	0.049	98.89	0.13
448	3/12/1973	1	0.03	99.12	0.13
449	4/17/1963	1	0.029	99.34	0.13
450	12/19/1970	1	0.028	99.56	0.13
451	12/6/1998	1	0.02	99.78	0.13

FLOW DURATION CURVE CALCULATION

Low-flow Threshold:	10%	
0.1xQ2 (Pre):	0.317	cfs
Q10 (Pre):	4.894	cfs
Ordinate #:	100	
Incremental Q (Pre):	0.04577	cfs
Total Hourly Data:	497374	hours

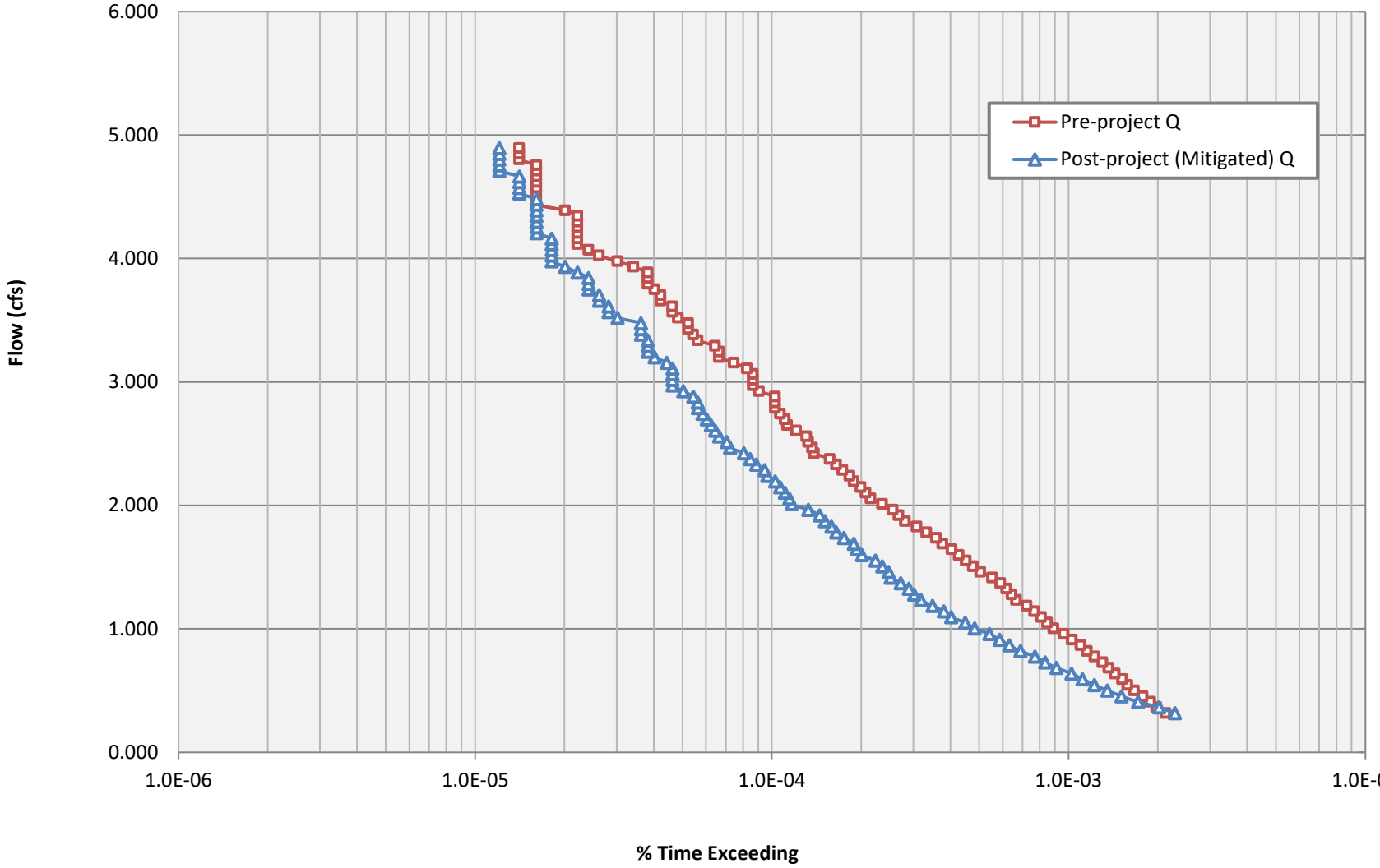
The proposed BMP: PASSED

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
0	0.317	1057	2.13E-03	1134	2.28E-03	107%	Pass
1	0.363	984	1.98E-03	1004	2.02E-03	102%	Pass
2	0.408	939	1.89E-03	852	1.71E-03	91%	Pass
3	0.454	884	1.78E-03	749	1.51E-03	85%	Pass
4	0.500	826	1.66E-03	672	1.35E-03	81%	Pass
5	0.546	786	1.58E-03	608	1.22E-03	77%	Pass
6	0.592	755	1.52E-03	554	1.11E-03	73%	Pass
7	0.637	713	1.43E-03	509	1.02E-03	71%	Pass
8	0.683	678	1.36E-03	453	9.11E-04	67%	Pass
9	0.729	647	1.30E-03	415	8.34E-04	64%	Pass
10	0.775	609	1.22E-03	383	7.70E-04	63%	Pass
11	0.820	574	1.15E-03	342	6.88E-04	60%	Pass
12	0.866	546	1.10E-03	314	6.31E-04	58%	Pass
13	0.912	511	1.03E-03	291	5.85E-04	57%	Pass
14	0.958	479	9.63E-04	269	5.41E-04	56%	Pass
15	1.003	443	8.91E-04	240	4.83E-04	54%	Pass
16	1.049	421	8.46E-04	223	4.48E-04	53%	Pass
17	1.095	402	8.08E-04	200	4.02E-04	50%	Pass
18	1.141	381	7.66E-04	189	3.80E-04	50%	Pass
19	1.187	359	7.22E-04	173	3.48E-04	48%	Pass
20	1.232	331	6.65E-04	158	3.18E-04	48%	Pass
21	1.278	320	6.43E-04	150	3.02E-04	47%	Pass
22	1.324	307	6.17E-04	144	2.90E-04	47%	Pass
23	1.370	293	5.89E-04	135	2.71E-04	46%	Pass
24	1.415	275	5.53E-04	125	2.51E-04	45%	Pass
25	1.461	251	5.05E-04	123	2.47E-04	49%	Pass
26	1.507	237	4.77E-04	117	2.35E-04	49%	Pass
27	1.553	224	4.50E-04	111	2.23E-04	50%	Pass
28	1.598	212	4.26E-04	100	2.01E-04	47%	Pass
29	1.644	201	4.04E-04	96	1.93E-04	48%	Pass
30	1.690	187	3.76E-04	94	1.89E-04	50%	Pass
31	1.736	178	3.58E-04	87	1.75E-04	49%	Pass
32	1.782	165	3.32E-04	82	1.65E-04	50%	Pass
33	1.827	153	3.08E-04	79	1.59E-04	52%	Pass
34	1.873	140	2.81E-04	75	1.51E-04	54%	Pass
35	1.919	133	2.67E-04	72	1.45E-04	54%	Pass
36	1.965	127	2.55E-04	66	1.33E-04	52%	Pass
37	2.010	117	2.35E-04	58	1.17E-04	50%	Pass
38	2.056	107	2.15E-04	57	1.15E-04	53%	Pass
39	2.102	103	2.07E-04	55	1.11E-04	53%	Pass
40	2.148	99	1.99E-04	53	1.07E-04	54%	Pass
41	2.193	94	1.89E-04	51	1.03E-04	54%	Pass
42	2.239	91	1.83E-04	48	9.65E-05	53%	Pass
43	2.285	86	1.73E-04	47	9.45E-05	55%	Pass
44	2.331	82	1.65E-04	44	8.85E-05	54%	Pass
45	2.377	78	1.57E-04	42	8.44E-05	54%	Pass
46	2.422	69	1.39E-04	40	8.04E-05	58%	Pass
47	2.468	68	1.37E-04	36	7.24E-05	53%	Pass
48	2.514	66	1.33E-04	35	7.04E-05	53%	Pass
49	2.560	65	1.31E-04	33	6.63E-05	51%	Pass
50	2.605	60	1.21E-04	32	6.43E-05	53%	Pass
51	2.651	56	1.13E-04	31	6.23E-05	55%	Pass
52	2.697	55	1.11E-04	30	6.03E-05	55%	Pass
53	2.743	53	1.07E-04	29	5.83E-05	55%	Pass
54	2.788	51	1.03E-04	28	5.63E-05	55%	Pass
55	2.834	51	1.03E-04	28	5.63E-05	55%	Pass
56	2.880	51	1.03E-04	27	5.43E-05	53%	Pass
57	2.926	45	9.05E-05	25	5.03E-05	56%	Pass

FLOW DURATION CURVE CALCULATION

Interval	Pre-project Flow (cfs)	Pre-project Hours	Pre-project % Time Exceeding	Post-project Hours	Post-project % Time Exceeding	Percentage	Pass/Fail
58	2.972	43	8.65E-05	23	4.62E-05	53%	Pass
59	3.017	43	8.65E-05	23	4.62E-05	53%	Pass
60	3.063	43	8.65E-05	23	4.62E-05	53%	Pass
61	3.109	41	8.24E-05	23	4.62E-05	56%	Pass
62	3.155	37	7.44E-05	22	4.42E-05	59%	Pass
63	3.200	33	6.63E-05	20	4.02E-05	61%	Pass
64	3.246	33	6.63E-05	19	3.82E-05	58%	Pass
65	3.292	32	6.43E-05	19	3.82E-05	59%	Pass
66	3.338	28	5.63E-05	19	3.82E-05	68%	Pass
67	3.383	27	5.43E-05	18	3.62E-05	67%	Pass
68	3.429	26	5.23E-05	18	3.62E-05	69%	Pass
69	3.475	26	5.23E-05	18	3.62E-05	69%	Pass
70	3.521	24	4.83E-05	15	3.02E-05	63%	Pass
71	3.567	23	4.62E-05	14	2.81E-05	61%	Pass
72	3.612	23	4.62E-05	14	2.81E-05	61%	Pass
73	3.658	21	4.22E-05	13	2.61E-05	62%	Pass
74	3.704	21	4.22E-05	13	2.61E-05	62%	Pass
75	3.750	20	4.02E-05	12	2.41E-05	60%	Pass
76	3.795	19	3.82E-05	12	2.41E-05	63%	Pass
77	3.841	19	3.82E-05	12	2.41E-05	63%	Pass
78	3.887	19	3.82E-05	11	2.21E-05	58%	Pass
79	3.933	17	3.42E-05	10	2.01E-05	59%	Pass
80	3.978	15	3.02E-05	9	1.81E-05	60%	Pass
81	4.024	13	2.61E-05	9	1.81E-05	69%	Pass
82	4.070	12	2.41E-05	9	1.81E-05	75%	Pass
83	4.116	11	2.21E-05	9	1.81E-05	82%	Pass
84	4.162	11	2.21E-05	9	1.81E-05	82%	Pass
85	4.207	11	2.21E-05	8	1.61E-05	73%	Pass
86	4.253	11	2.21E-05	8	1.61E-05	73%	Pass
87	4.299	11	2.21E-05	8	1.61E-05	73%	Pass
88	4.345	11	2.21E-05	8	1.61E-05	73%	Pass
89	4.390	10	2.01E-05	8	1.61E-05	80%	Pass
90	4.436	8	1.61E-05	8	1.61E-05	100%	Pass
91	4.482	8	1.61E-05	8	1.61E-05	100%	Pass
92	4.528	8	1.61E-05	7	1.41E-05	88%	Pass
93	4.573	8	1.61E-05	7	1.41E-05	88%	Pass
94	4.619	8	1.61E-05	7	1.41E-05	88%	Pass
95	4.665	8	1.61E-05	7	1.41E-05	88%	Pass
96	4.711	8	1.61E-05	6	1.21E-05	75%	Pass
97	4.757	8	1.61E-05	6	1.21E-05	75%	Pass
98	4.802	7	1.41E-05	6	1.21E-05	86%	Pass
99	4.848	7	1.41E-05	6	1.21E-05	86%	Pass
100	4.894	7	1.41E-05	6	1.21E-05	86%	Pass

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



```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option            Value
FLOW_UNITS          CFS
INFILTRATION        GREEN_AMPT
FLOW_ROUTING        KINWAVE
LINK_OFFSETS        DEPTH
MIN_SLOPE           0
ALLOW_PONDING       NO
SKIP_STEADY_STATE   YES

START_DATE          08/28/1951
START_TIME          00:05:00
REPORT_START_DATE   08/28/1951
REPORT_START_TIME   00:05:00
END_DATE            05/23/2008
END_TIME            23:00:00
SWEEP_START         01/01
SWEEP_END           12/31
DRY_DAYS            0
REPORT_STEP         01:00:00
WET_STEP            00:15:00
DRY_STEP            04:00:00
ROUTING_STEP        0:01:00
RULE_STEP           00:00:00

INERTIAL_DAMPING    PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP       0.75
LENGTHENING_STEP    0
MIN_SURFAREA        12.557
MAX_TRIALS          8
HEAD_TOLERANCE      0.005
SYS_FLOW_TOL        5
LAT_FLOW_TOL        5
MINIMUM_STEP        0.5
THREADS             4

[EVAPORATION]
;;Data Source    Parameters
;;--------------- ----------------
MONTHLY         0.06  0.08  0.11  0.15  0.17  0.79  0.19  0.18  0.15  0.11  0.08  0.06
DRY_ONLY        NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
```

OCEANSIDE_GAUGE INTENSITY 1:00   1.0   TIMESERIES OCEANSIDE_SERIES

[SUBCATCHMENTS]
;;Name   Rain Gage   Outlet   Area   %Imperv Width   %Slope   CurbLen SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
EX-SITE   OCEANSIDE_GAUGE E-POC   7.50   0.0   3800   2.0   0
DMA-1   OCEANSIDE_GAUGE P-POC   0.91   59   796   0.4   0
DMA-2   OCEANSIDE_GAUGE P-POC   0.92   58   806   0.5   0
DMA-3   OCEANSIDE_GAUGE P-POC   2.73   678   2378   0.5   0
DMA-4   OCEANSIDE_GAUGE P-POC   1.75   60   1528   0.5   0
DMA-5   OCEANSIDE_GAUGE P-POC   0.53   87   462   0.5   0
DMA-6   OCEANSIDE_GAUGE P-POC   0.04   70   36   2.0   0
DMA-7   OCEANSIDE_GAUGE P-POC   0.04   74   34   2   0
DMA-8   OCEANSIDE_GAUGE P-POC   0.21   0.0   181   0.5   0
DMA-9   OCEANSIDE_GAUGE P-POC   0.37   0.0   319   0.7   0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv   S-Imperv   S-Perv   PctZero   RouteTo   PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
EX-SITE   0.01   0.03   0.05   0.10   25   OUTLET
DMA-1   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-2   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-3   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-4   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-5   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-6   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-7   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-8   0.01   0.08   0.05   0.10   25   PERVIOUS   100
DMA-9   0.01   0.10   0.05   0.05   25   PERVIOUS   100

[INFILTRATION]
;;Subcatchment   Param1   Param2   Param3   Param4   Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
EX-SITE   9.0   0.025   0.33   7   0
DMA-1   6.0   0.1   0.32   7   0
DMA-2   6.0   0.1   0.32   7   0
DMA-3   6.0   0.1   0.32   7   0
DMA-4   6.0   0.1   0.32   7   0
DMA-5   6.0   0.1   0.32   7   0
DMA-6   6.0   0.1   0.32   7   0
DMA-7   6.0   0.1   0.32   7   0
DMA-8   6.0   0.1   0.32   7   0
DMA-9   6.0   0.10   0.32   7   0

[LID_CONTROLS]
;;Name   Type/Layer Parameters
;;-------------- ---------- ----------
BMP   BC
BMP   SURFACE   6   0.0   0   0   5
BMP   SOIL   18   0.4   0.2   0.1   5   5   1.5

BMP STORAGE 24 0.67 0.0 0
BMP DRAIN 0.2217 0.5 0 6 0 0

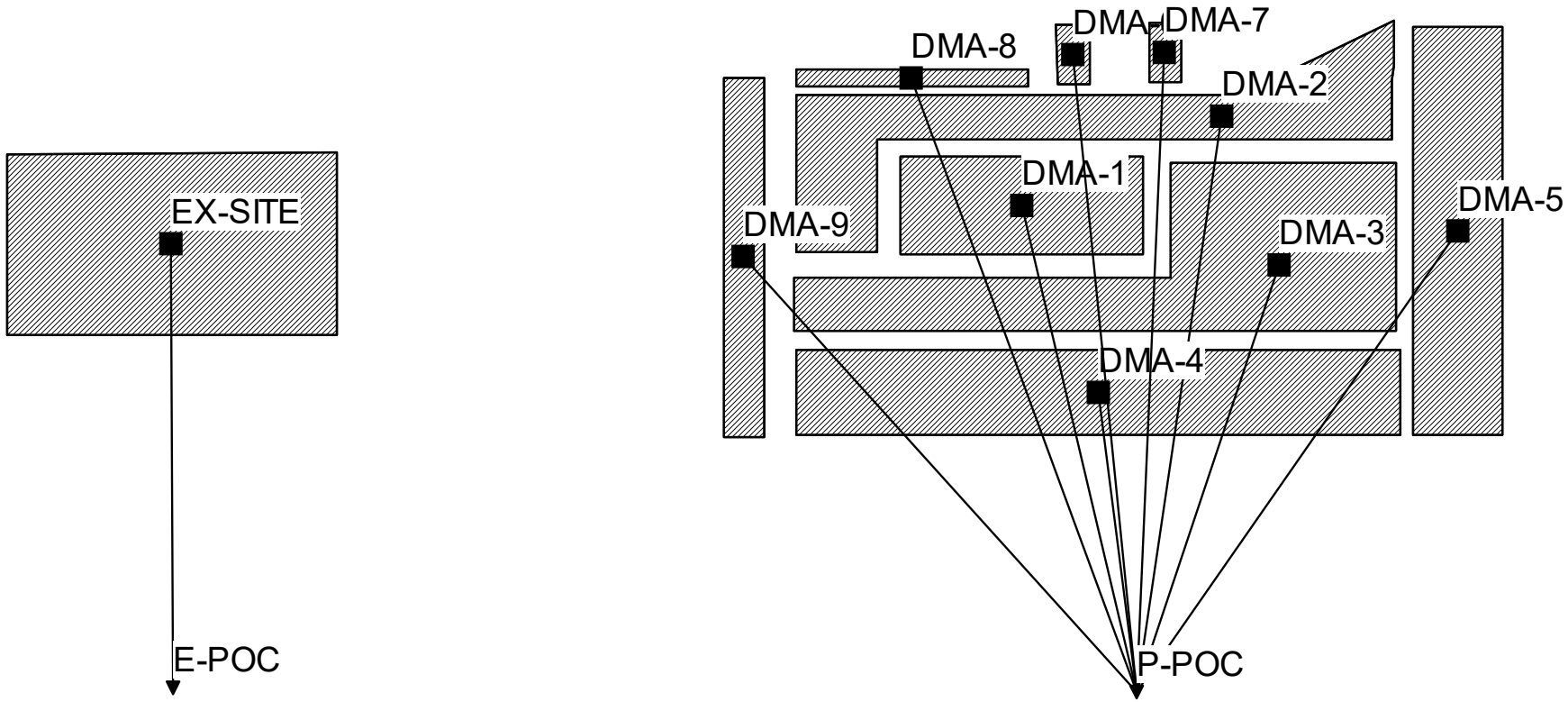
[LID_USAGE]
;;Subcatchment LID Process Number Area Width InitSat FromImp ToPerv RptFile DrainTo FromPerv
;;-------------- ---------- ------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1 BMP 1 2126 0 0 100 0 * * 100
DMA-2 BMP 1 1732 0 0 100 0 * * 100
DMA-3 BMP 1 2568 0 0 100 0 * * 100
DMA-4 BMP 1 1650 0 0 100 0 * * 100

[OUTFALLS]
;;Name Elevation Type Stage Data Gated Route To
;;-------------- ---------- ---------- ---------- -------- ----------
E-POC 0 FREE NO
P-POC 0 FREE NO

[TIMESERIES]
;;Name Date Time Value
;;-------------- ---------- ---------- ----------
OCEANSIDE_SERIES 8/28/1951 5:00 0.06
OCEANSIDE_SERIES 8/28/1951 6:00 0.11
OCEANSIDE_SERIES 8/28/1951 7:00 0.12
OCEANSIDE_SERIES 8/28/1951 8:00 0.15
OCEANSIDE_SERIES 8/28/1951 9:00 0.21
OCEANSIDE_SERIES 8/28/1951 10:00 0.04
OCEANSIDE_SERIES 8/28/1951 11:00 0.01
OCEANSIDE_SERIES 8/28/1951 12:00 0.02
OCEANSIDE_SERIES 8/28/1951 20:00 0.01
OCEANSIDE_SERIES 8/28/1951 22:00 0.01
OCEANSIDE_SERIES 8/28/1951 23:00 0.01
OCEANSIDE_SERIES 8/28/1951 24:00 0.01
OCEANSIDE_SERIES 8/29/1951 1:00 0.03
OCEANSIDE_SERIES 8/29/1951 2:00 0.01
OCEANSIDE_SERIES 8/29/1951 3:00 0.02
OCEANSIDE_SERIES 8/29/1951 4:00 0.01
OCEANSIDE_SERIES 8/30/1951 4:00 0.01
OCEANSIDE_SERIES 8/30/1951 5:00 0.01
OCEANSIDE_SERIES 9/28/1951 2:00 0.02
OCEANSIDE_SERIES 9/28/1951 4:00 0.01
OCEANSIDE_SERIES 9/28/1951 5:00 0.03
OCEANSIDE_SERIES 9/29/1951 3:00 0.01
OCEANSIDE_SERIES 9/30/1951 4:00 0.01
OCEANSIDE_SERIES 10/1/1951 5:00 0.01
OCEANSIDE_SERIES 10/2/1951 24:00 0.01
OCEANSIDE_SERIES 10/3/1951 1:00 0.02
OCEANSIDE_SERIES 10/4/1951 2:00 0.02
OCEANSIDE_SERIES 10/5/1951 3:00 0.03
OCEANSIDE_SERIES 10/6/1951 4:00 0.02
OCEANSIDE_SERIES 10/7/1951 5:00 0.08

Rain Gauge time series is appended here as the full set is several hundred pages long. The full time series was used in the analysis.

OCEANSIDE_GAUGE



Placeholder – **Vector Control Plan** (required when structural BMPs will drain in 96 hours)

Replace placeholder with required documentation.

Leave placeholder intact if not applicable.

Not Applicable

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☒Included ☐Not Applicable

CITY OF OCEANSIDE

BEST MANAGEMENT PRACTICES OPERATIONS AND MAINTENANCE PLAN
FOR PRIORITY PROJECTS

PROJECT NAME: CYPRESS POINT SUBDIVISION

PARCEL NUMBER: _____

PROJECT NUMBER: T21-00001

APPLICANT NAME: CONCORDIA COMMUNITIES, LLC

DATE: 03/18/2021

Prepared for:

City of Oceanside
Engineering Division
300 North Coast Hwy
Oceanside, CA 92054

Deemed Complete by the City of Oceanside
Engineering Division

Name: _____ Date: _____

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Table of Contents

TABLES

ATTACHMENTS

I. COMPLIANCE WITH STORMWATER BEST MANAGEMENT PRACTICES MAINTENANCE REQUIREMENTS

All applicants are responsible for ensuring that stormwater best management practices (BMPs) or facilities installed on their property are properly maintained and that they function as designed. Tenants shall be aware of their responsibilities regarding stormwater facility maintenance and need to be familiar with the contents of this Operations and Maintenance Plan (O&M Plan). Applicants have signed and agreed to a Standard Storm Water Facilities Maintenance Agreement with Access Rights and Covenants (SWFMA). All other maintenance agreements between the applicant and their maintenance employees associated with this property shall be included in Attachment 10.

II. DESIGNATION RESPONSIBLE PARTIES

Responsible parties shall be designated and identified in Table 1.

- The Responsible BMP Party is individual, party, or parties that shall have direct responsibility for the maintenance of stormwater controls. This individual shall be the designated contact with City of Oceanside inspectors and should sign self-inspection reports and any correspondence regarding verification of inspections and required maintenance.

- The Duly Authorized Representative is the corporate officer authorized to negotiate and execute any contracts that might be necessary for future changes to operation and maintenance or to implement remedial measures if problems occur.

- The Designated Emergency Respondent is the party responsible for emergencies such as clogged drains, broken irrigation pipes, etc., that would require immediate response should they occur during off-hours.

TABLE 1
OWNERSHIP AND MAINTENANCE

	Name	Address	Phone / Email
Responsible BMP Party (if different than above)	HOA to be determined	TBD	TBD
Employees reporting to Responsible BMP Party			
Duly Authorized			

Representative			
Designated Emergency Respondent[1]			

[1] The Designated Emergency Respondent's phone number must be a cellular phone that is reachable 24 hours a day.

Updated contact information must be provided to City of Oceanside immediately whenever a property is sold and whenever designated individuals or contractors change.

A. Maintenance Personnel

Maintenance personnel including Responsible BMP Party, Employees Reporting to Responsible BMP Party, and the Designated Emergency Respondent, must be qualified to properly maintain stormwater BMPs (including treatment and flow-control facilities), especially for restoration or rehabilitation work. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

B. Organizational Chart

An organization chart showing the relationships of authority and responsibility between the individuals responsible for maintenance is provided in Attachment 1.

C. Training

Periodic training is conducted by the responsible BMP party for all personnel affiliated with the maintenance of stormwater BMPs. New staff and/or contractors training regarding the purpose, mode of operation, and maintenance requirements for the site's storm water facilities will be provided by the site. Necessary ongoing training for staff and/or contractors will also be provided. The site's Staff Training Program is described in Attachment 2.

TABLE 2 BMP OPERATION AND MAINTENANCE FUNDING	
Sources of Funding	The proposed HOA will maintain the BMP's.
Budget Category for Expenditures	

Process for establishing Annual O&M Budget	
Process for obtaining unexpected expenditures for major corrective activities	

D. BMP Maintenance Funding

The funding for BMP operation and maintenance shall be described in Table 2; including sources of funds, budget category for expenditures, process for establishing the annual operations and maintenance budget, and process for obtaining authority should unexpected expenditures for major corrective maintenance be required. Any supplemental information, including calculations and documentation shall be included in Attachment 3.

III. LOW IMPACT DEVELOPMENT AND SITE DESIGN BMPS

Low Impact Development (LID) and Site Design BMPs have been incorporated into the project to minimize stormwater impacts. LID BMPs collectively minimize directly connected impervious area and promote infiltration on the project site. Site design BMPs are permanent measures and are similar to LID BMPs.

The LID and Site Design BMPs for the project which require maintenance are identified along with their locations, including Drainage Management Areas (DMAs), in the project SWQMP. A LID Inspection form for the site is provided in Attachment 4. In the event that a project use should change or maintenance considerations may require the site to become amended, Table 22 should be referenced for original site constraints and design guidelines.

IV. SOURCE CONTROL BMPS

Source control BMPs have been selected for the project in order to minimize or prevent pollutant generation. The SWQMP and Table 4 of this O&M identifies the potential pollutant sources and corresponding permanent and operational source controls as well as their locations.

Source control BMPs should be inspected routinely in order to reduce or prevent pollution from accumulating in these areas. Routine inspections of the site's source controls are discussed in the site's maintenance schedule. Source control inspection forms are in Attachment 5.

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒On-site storm drain inlets	• All inlets shall be marked with City of Oceanside storm drain markers	• Maintain and periodically replace inlet markers, as necessary. • Review stormwater pollution prevention information applicable to the site. • Adhere to applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • Do not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.	As needed
☐Interior floor drains and elevator shaft sump pumps	• Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	• Inspect and maintain drains to prevent blockages and overflow. • Regularly clear all associated cleanouts and hand holes.	
☐Interior parking garages	• Parking garage floor drains will be plumbed to the sanitary sewer.	• Inspect and maintain drains to prevent blockages and overflow.	

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒Landscape/ Outdoor Pesticide Use	• Final site landscape plans shall be placed in Attachment 7 and shall be used to maintain the following: o Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. o Minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. o Where landscaped areas are used to retain or detain stormwater, maintain and replace, as necessary, plants that are tolerant of saturated soil conditions. o Consider using pest-resistant plants, especially adjacent to hardscape. o To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using a minimum amount of or no pesticides (consider the use of organic techniques). • Review and adhere to applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • Review IMP information and provide to landscape and maintenance personnel.	
☒Use efficient irrigation systems	• Employ rain shutoff devices to prevent irrigation after precipitation. • Design irrigation systems to each landscape area's specific water requirements. • Use flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. • Employ other comparable, equally effective, methods to reduce irrigation water runoff.	• Inspect irrigation system for leaks and/or malfunctions. • Inspect that water usage is consistent with vegetation requirements. • Inspect that irrigation shut-off controls operate correctly.	Landscape areas

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒Need for future indoor & structural pest control	• Note building design features that discourage entry of pests.	• Review Integrated Pest Management information and provide to other maintenance personnel.	Proposed houses along the development
☐Pools, spas, ponds, decorative fountains, and other water features.	• Plumb pools to the sanitary sewer in accordance with local requirements.	• Review and adhere to applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	
☐Food service	• Describe the location and features of the designated cleaning area. • Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.		

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒Refuse areas	• State how site refuse will be handled and provide supporting detail to what is shown on plans. • Prohibitive signs shall be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. • Any drains from dumpsters, compactors, and bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	• Provide adequate number of receptacles. • Inspect receptacles regularly; repair or replace leaky receptacles. • Keep receptacles covered at all times. • Prohibit/prevent dumping of liquid or hazardous wastes. • Post and replace, as necessary, "no hazardous materials" signs. • Inspect and pick up litter daily and clean up spills immediately. • Keep spill control materials available on-site. Review Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	
☐Industrial processes.	• Cover or enclose areas that would be the most significant source of pollutants; or, slope the area toward a dead-end sump; or, discharge to the sanitary sewer system in compliance with the applicable municipal waste water district's requirements (include a copy of the waste acceptance letter from the agency accepting the waste in Attachment 10). • Grade or berm area to prevent run-on from surrounding areas. • Installation of storm drains in areas of equipment repair is prohibited. • Implement other features which are comparable or equally effective.	• Review and adhere to Fact Sheet SC-10, "Non- Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	

TABLE 3 SOURCE CONTROL BMPS			
Potential Pollutant Sources	**Description**	**Operational BMPs**	**Location**
☐ Outdoor storage of equipment or materials	• Comply with all requirements of local Hazardous Materials Programs for: o Hazardous Waste Generation o Hazardous Materials Release Response and Inventory o California Accidental Release (CalARP) o Aboveground Storage Tank o Uniform Fire Code Article 80 Section 103(b) & (c) 1991 • Underground Storage Tank • Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. • Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	• Review and adhere to the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC- 33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	
	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.		

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒Vehicle and Equipment Cleaning	• If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced. • Equip wash area with a clarifier, grease trap or other pretreatment facility, as appropriate and properly connect to the sanitary sewer. • Implement other features which are comparable or equally effective • Commercial/ industrial facilities having vehicle/ equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. • Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. • Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed and permitted by proper regulatory authorities (attach permits in Attachment 10, as necessary).	• Follow operational measures to implement the following (if applicable): o Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. o Car dealerships and similar may rinse cars with water only. o Review and adhere to Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	Future residents may wash their vehicles on the lot's driveway. Commercial car wash facilities not proposed.

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☐ Vehicle/Equipment Repair and Maintenance	• No vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. • An industrial waste discharge permit will be obtained. For floor drains connected to the sanitary sewer; design will meet the permitting agency's requirements. • An industrial waste discharge permit will be obtained for tanks, containers or sinks to be used for parts cleaning or rinsing; design will meet the permitting agency's requirements. • Accommodate all vehicle equipment repair and maintenance indoors or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. • Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.	• The following restrictions apply to use the site: o No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinse water from parts cleaning into storm drains. o No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. o No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.	

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☐Fuel Dispensing Areas	• Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: o Graded at the minimum slope necessary to prevent ponding o Separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. • Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1]. The canopy [or cover] shall not drain onto the fueling area.	• The fueling area is to be dry swept routinely. • Review and adhere to the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	

[1] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

TABLE 3 SOURCE CONTROL BMPS			
Potential Pollutant Sources	**Description**	**Operational BMPs**	**Location**
☐Loading Docks	• Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. • Provide a roof overhang over the loading area or install door skirts cowling) at each bay that enclose the end of the trailer. • Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible.	• Move loaded and unloaded items indoors as soon as possible. • Review and adhere to Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	
☒Fire Sprinkler Test Water	• Provide a means to drain fire sprinkler test water to the sanitary sewer.	• Review the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	Each house will have it's own fire sprinkler test system.

TABLE 3
SOURCE CONTROL BMPS

Potential Pollutant Sources	Description	Operational BMPs	Location
☒Miscellaneous Drain or Wash Water • Boiler drain lines Condensate drain lines • Rooftop equipment Drainage sumps • Roofing, gutters, and trim	• Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. • Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. • Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. • Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. • Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.		
☒Plazas, sidewalks, and parking lots		• Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.	

V. DRAINAGE AREAS

Table 5 summarizes the drainage management areas (DMAs) on site.

TABLE 4
DRAINAGE MANAGEMENT AREAS

DMA No.	Designation	Description
DMA-1	BMP-1	Portion of paved private rd. & multiple houses
DMA-2	BMP-2	Portion of paved private rd. & sidewalk
DMA-3	BMP-3	Portion of paved private rd. & multiple houses
DMA-4	BMP-4	Portion of paved private rd. & multiple houses
DMA-5	Street Tree	Portion of paved private rd
DMA-6	Street Tree	Portion of paved private rd. & sidewalk
DMA-7	Street Tree	Portion of paved private rd. & sidewalk
DMA-8	-	Portion of landscape area
DMA-9	-	Portion of landscape area

The site map in Attachment 6 shows the DMAs and their flow patterns. The map indicates, using flow patterns, how the flow from each DMA is routed to the corresponding storm water facility. Impervious and pervious areas are shown on the map.

VI. STORMWATER TREATMENT CONTROL BMPS

Treatment control BMPs treating runoff from DMAs are summarized in Table 5.

TABLE 5
STORMWATER TREATMENT CONTROL BMPS

Treatment Control BMP Type	Description	Size or Treatment Control BMP Capacity	Area Drained or Water Quality Flow
BMP-1	Fully Lined Biofiltration	1,379 CF	39,810 SF
BMP-2	Fully Lined Biofiltration	1,374 CF	40,275 SF
BMP-3	Fully Lined Biofiltration	4,370 CF	118,918 SF
BMP-4	Fully Lined Biofiltration	2,646 CF	76,376 SF

The location and type of each of the project's stormwater facilities on site are shown on the site map in Attachment 6.
The as-built drawings[2], manufacturer's data, cut-sheets, manuals, and specific operation and maintenance requirements for each treatment control BMP shall be provided in Attachment 7.

[2] As-built drawings must be included after construction is complete.

VII. INSPECTING STORMWATER BMPS

The quality of stormwater entering the waters of the U.S. or waters of the state relies heavily on the proper operation and maintenance of permanent BMPs. LID, source control, and treatment control stormwater BMPs must be periodically inspected to ensure that they are functioning as designed. Inspections will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

All stormwater treatment BMPs are required to be inspected a minimum of once per year. The Inspection and Maintenance Checklist(s) that is applicable to the site is provided in Attachment 8.

B. Inspection Report

The person(s) conducting the inspection activities (Responsible BMP Party. Employees reporting to Responsible BMP Party, or the Designated Emergency Respondent) shall complete the appropriate inspection checklist for the specific facility. All completed checklists are located in Attachment 8. All facilities are to be inspected on an annual basis at a minimum. A copy of each inspection form shall be kept by the applicant a minimum of 5 years.

Inspection Scoring

For each inspection item, a score is given to identify the urgency for any required maintenance. The scoring is as follows:

0 = No deficiencies identified.

1 = Monitor – Although maintenance may not be required at this time, a potential problem exists that will most likely need to be addressed in the future. This can include items like minor erosion, concrete cracks/spalling, or minor sediment accumulation. This item should be revisited at the next inspection.

2 = Routine Maintenance Required – Some inspection items can be addressed through the routine maintenance program. This can include items like vegetation management or debris/trash removal.

3 = Immediate Repair Necessary – This item needs immediate attention because failure is imminent or has already occurred. This could include items such as structural failure of a feature (outlet, weir, manhole, etc.), significant erosion, or significant sediment accumulation. This score should be given to an item that can significantly affect the function of the facility.

N/A = This is checked by an item that may not exist in a facility. Not all facilities have all of the features identified on the form (outlet, weir, manhole, etc.).

Overall Facility Rating

An overall rating is given for each facility inspected. The overall facility rating should correspond with the highest score (0, 1, 2, 3) given to any feature on the inspection form.

C. Verification of Inspection and Checklist Submittal

The Stormwater BMP Inspection and Maintenance Checklist (in Attachment 8) provides a record of inspections and the need for maintenance activities at the facility. Verification of the inspection of the stormwater facilities and the facility inspection checklist(s) shall be available to the City of Oceansideif requested.

VIII. MAINTENANCE SCHEDULE FOR STORMWATER BMPS

A maintenance schedule for the stormwater source control and treatment control BMPs on site is provided in Attachment 9. Attachment 9 includes schedules for routine inspection and maintenance, annual inspection and maintenance, and inspection and maintenance after major storm events.

A service agreement with any contractors hired to perform stormwater treatment control BMP maintenance is also provided in Attachment 10.

IX. MAINTAINING STORMWATER BMPS

Stormwater BMPs must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis, can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained.

A. Maintenance Categories

Stormwater BMP maintenance programs are separated into three broad categories of work: routine, restoration, and rehabilitation. The categories are separated based upon the magnitude and type of the maintenance activities performed. A description of each category follows:

Routine Work

This work includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as road and parking lot sweeping, weed control, mosquito treatment, and algae treatment. These activities normally will be performed

numerous times during the year. These items can be completed without any prior correspondence; however, inspection and maintenance forms shall be completed.

Restoration Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. These items do not require prior correspondence. However, completed maintenance forms are required.

Rehabilitation Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater BMP. This work requires consultation with the City of Oceanside and may require an engineering design with construction plans to be prepared for review and approval.

B. Maintenance Forms

The Stormwater BMP Inspection and Maintenance Form provides a record of maintenance activities and includes general cost information to assist in budgeting for future maintenance. Maintenance Forms for each facility type are provided in Appendix 3. Maintenance Forms shall be completed by the responsible BMP party. The form shall then be reviewed by the applicant or an authorized agent of the applicant and made available for review upon inspection by the City of Oceanside.

X. PREVENTATIVE MEASURES TO REDUCE MAINTENANCE COSTS

The most effective way to maintain a stormwater quality facility is to prevent pollutants from entering the facility. Common pollutants include sediment, trash & debris, chemicals, pet wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. This maintenance program includes measures to address these potential contaminants at the source and save time and money in the long run. The maintenance program will consider the following:

- Educate employees and patrons to be aware of how their actions affect water quality and how they can help reduce maintenance costs.
- Keep properties, streets, gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper use, storage, and disposal of hazardous wastes and chemicals. Promptly clean up spilled materials and dispose of properly.

- Plan landscape care to minimize and properly use chemicals and pesticides.
- Sweep paved surfaces and put the sweepings back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Encourage pet owners to clean up pet wastes.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean any private storm drainage system components, including inlets, storm drains, and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.

XI. INSPECTION & MAINTENANCE – ANNUAL REPORTING

The tenant is responsible for providing verification that the stormwater treatment control BMPs have been properly inspected and maintained unless otherwise noted. Verification includes records of inspections and maintenance performed on site. Any maintenance required will be identified and described.
Records should be available at the City of Oceanside's request.

ATTACHMENT 1

ORGANIZATIONAL CHART

ATTACHMENT 2

TRAINING PROGRAM

ATTACHMENT 3

BMP OPERATION AND MAINTENANCE FUNDING SUPPLEMENTAL INFORMATION

ATTACHMENT 4

LID BMPS INSPECTION FORM

LID BMP INSPECTION FORM

Date:	**Inspector:**		**Weather:**		
Reason for Inspection:			**Comments:**		
LID BMP Type	**Description**	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
☐Bioretention			☐Regularly weed and water during plant establishment phase	☐No ☐ Yes	
			☐Area is free of litter and excess sediment	☐No ☐ Yes	
			☐Area free of erosion and stabilized	☐No ☐ Yes	
			☐Plants are healthy and thriving	☐No ☐ Yes	
			☐Plant types are those from original design	☐No ☐ Yes	
☐Filter Strips			☐Regularly weed and water during plant establishment phase	☐No ☐ Yes	
			☐Plants are healthy and thriving	☐No ☐ Yes	
			☐Area free of erosion and stabilized	☐No ☐ Yes	
			☐Area is free of litter and excess sediment	☐No ☐ Yes	
			☐Plant types are those from original design	☐No ☐ Yes	
			☐Flow spreader is free of debris and is not clogged	☐No ☐ Yes	

LID BMP INSPECTION FORM					
Date:	**Inspector:**		**Weather:**		
Reason for Inspection:			**Comments:**		
LID BMP Type	**Description**	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
☐Vegetated Buffers			☐Regularly weed and water during plant establishment phase	☐No ☐ Yes	
			☐Plants are healthy and thriving	☐No ☐ Yes	
			☐Area free of erosion and stabilized	☐No ☐ Yes	
			☐Area is free of litter and excess sediment	☐No ☐ Yes	
			☐Plant types are those from original design	☐No ☐ Yes	
			☐Flow spreader is free of debris and is not clogged	☐No ☐ Yes	
☐Bioswale/Grassed Swale			☐Regularly weed and water during plant establishment phase	☐No ☐ Yes	
			☐Plants are healthy and thriving	☐No ☐ Yes	
			☐Area free of erosion and stabilized	☐No ☐ Yes	
			☐Area is free of litter and excess sediment	☐No ☐ Yes	
			☐Plant types are those from original design	☐No ☐ Yes	
☐Green Roofs			☐Regularly weed and water during plant establishment phase	☐No ☐ Yes	

LID BMP INSPECTION FORM					
Date:	**Inspector:**		**Weather:**		
Reason for Inspection:			**Comments:**		
LID BMP Type	**Description**	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
☐*Green Roofs Cont'd*			☐Plants are healthy and thriving	☐No ☐ Yes	
☐Rain Barrels / Cisterns			☐Roof catchment and gutters are free of debris and sediment	☐No ☐ Yes	
			☐Downspouts are free of leaks and obstructions	☐No ☐ Yes	
			☐Rain barrel, top, and seal are free of leaks	☐No ☐ Yes	
			☐Overflow pipe is not causing erosion	☐No ☐ Yes	
☐Porous Pavement			☐Pavement is free of debris and sediment	☐No ☐ Yes	
			☐Pavement is swept monthly	☐No ☐ Yes	
			☐Pavement is in good condition and stabilized	☐No ☐ Yes	
			☐Area is dry swept regularly	☐No ☐ Yes	
☐Soil Structure Enhancement (use of compost)			☐Area is protected from compaction	☐No ☐ Yes	
			☐Limited foot traffic	☐No ☐ Yes	
			☐2 to 1 ratio of compost soil and existing soil is present	☐No ☐ Yes	

ATTACHMENT 5

SOURCE CONTROL BMP INSPECTION FORM

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
☐On-site storm drain inlets		☐Maintain and periodically replace inlet markers, if necessary.	☐No ☐ Yes	
		☐Review stormwater pollution prevention information applicable to the site.	☐No ☐ Yes	
		☐Adhere to applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
		☐Do not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.	☐No ☐ Yes	
☐Interior floor drains and elevator shaft sump pumps		☐Inspect and maintain drains to prevent blockages and overflow.	☐No ☐ Yes	
☐Interior parking garages		☐Inspect and maintain drains to prevent blockages and overflow.	☐No ☐ Yes	
☐Landscape/ Outdoor Pesticide Use		☐Maintain landscaping using minimum or no pesticides.	☐No ☐ Yes	
		☐Review and adhere to applicable operational BMPs in Fact Sheet SC-41, `“Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
Landscape/Outdoor pesticide Use Continued		☐Review IMP information and provide to landscape and maintenance personnel.	☐No ☐ Yes	
☐Use efficient irrigation systems		☐Inspect irrigation system for leaks and/or malfunctions.	☐No ☐ Yes	
☐Need for future indoor & structural pest control		☐Review Integrated Pest Management information and provide to other maintenance personnel.	☐No ☐ Yes	
☐Pools, spas, ponds, decorative fountains, and other water features.		☐Review and adhere to applicable operational BMPs in Fact Sheet SC-72, “Fountain and Pool Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Food service		☐Grease traps cleaned, as necessary. ☐See Refuse Areas.	☐No ☐ Yes	
☐Refuse areas		☐Provide adequate number of receptacles.	☐No ☐ Yes	
		☐Inspect receptacles regularly; repair or replace leaky receptacles.	☐No ☐ Yes	
		☐Keep receptacles covered at all times.	☐No ☐ Yes	
		☐Prohibit/prevent dumping of liquid or hazardous wastes.	☐No ☐ Yes	
		☐Post “no hazardous materials” signs.	☐No ☐ Yes	

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
Refuse areas- Continued		☐Inspect and pick up litter daily and clean up spills immediately.	☐No ☐ Yes	
		☐Keep spill control materials available on- site. Review Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Industrial processes.		☐Review and adhere to Fact Sheet SC-10, "Non- Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Outdoor storage of equipment or materials		☐Review and adhere to the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC- 33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Vehicle and Equipment Cleaning		**Follow operational measures to implement the following (if applicable):**		
		☐Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.	☐No ☐ Yes	

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
Vehicle and Equipment Cleaning Continued		☐Car dealerships and similar may rinse cars with potable water only. Any excess water shall be drained through landscaping and dechlorinated prior to discharge to the storm drain system.	☐No ☐ Yes	
		☐Review and adhere to Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Vehicle/Equipment Repair and Maintenance		**The following restrictions apply to use the site:**		
		☐No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinse water from parts cleaning into storm drains.	☐No ☐ Yes	
		☐No vehicle fluid removal shall be performed outside a building, Nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.	☐No ☐ Yes	

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
Vehicle/Equipment Repair and Maintenance Continued		☐No person shall leave unattended drip parts or other open containers of chemicals such as vehicle fluid, unless such containers are in use or in an area of secondary containment.	☐No ☐ Yes	
☐Fuel Dispensing Areas		☐The fueling area is to be dry swept routinely.	☐No ☐ Yes	
		☐Review and adhere to the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
		☐Fueling areas are covered by a canopy.	☐No ☐ Yes	
		☐The canopy does not drain onto the fueling area.	☐No ☐ Yes	
		☐Grading of the area prevents run-on of stormwater to the maximum extent practicable.	☐No ☐ Yes	
☐Loading Docks		☐Move loaded and unloaded items indoors as soon as possible.	☐No ☐ Yes	
		☐Review and adhere to Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	

SOURCE CONTROL BMP INSPECTION FORM

Date:	**Inspector:**	**Weather:**
Reason for Inspection:		**Comments:**

Potential Pollutant Sources	**Location**	**Operational BMPs**	**Maintenance Required**	**Maintenance Performed/Comments**
☐Fire Sprinkler Test Water		☐Review the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com	☐No ☐ Yes	
☐Miscellaneous Drain or Wash Water • Boiler drain lines Condensate drain lines • Rooftop equipment Drainage sumps • Roofing, gutters, and trim			☐No ☐ Yes	
☐Plazas, sidewalks, and parking lots		☐Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.	☐No ☐ Yes	

ATTACHMENT 6

SITE MAP

ATTACHMENT 7

AS-BUILT DRAWINGS

ATTACHMENT 8

TREATMENT CONTROL BMP INSPECTION AND MAINTENANCE CHECKLIST(S)

Tree Well Filter
INSPECTION AND MAINTENANCE CHECKLIST

Property Address: _____ Property Applicant: _____

Treatment Measure No.: _____ Date of Inspection: _____ Type of Inspection: ˜ Monthly ˜ Pre-Wet Season ˜ After heavy runoff ˜ End of Wet Season

Inspector(s): _____ Overall Facility Score*:_____ ˜ Other:_____

Defect	Conditions When Maintenance Is Needed	Maintenance Score**	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	Results Expected When Maintenance Is Performed	Date Complete / Initial
1. Vegetation	Vegetation is dead, diseased and/or overgrown.			Vegetation is healthy and attractive in appearance.	
2. Planting Mix	Planting mix too deep or too shallow.			Planting mix is at proper depth for optimum filtration and flow.	
3. Mulch	Mulch is missing or patchy in appearance. Areas of bare earth are exposed, or mulch layer is less than 3 inches in depth.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even in appearance, at a depth of 3 inches.	
4. Trash and Debris Accumulation	Trash and debris accumulated in the tree well filter. Filter does not drain as specified.			Trash and debris removed from tree well filter and disposed of properly. Filter drains per design specifications.	
5. Sediment	Evidence of sedimentation in tree well filter.			Material removed so that there is no clogging or blockage. Sediment is disposed of properly.	

Tree Well Filter - Inspection and Maintenance Checklist
Property Address: _____

Date of Inspection:_____
Treatment Measure No.:_____

Defect	Conditions When Maintenance Is Needed	Maintenance Score**	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	Results Expected When Maintenance Is Performed	Date Complete / Initial
6. Standing Water	When water stands in the tree well filter between storms and does not drain within five days after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following may apply: sediment or trash blockages removed, overflow pipe repaired.	
7. Overflow Pipe	Does not safely convey excess flows to storm drain. Piping damaged or disconnected.			Overflow pipe conveys excess flow to storm drain efficiently.	
8. Miscellaneous	Any condition not covered above that needs attention in order for the tree well filter to function as designed.			Meet the design specifications.	

*Overall Facility Score = Worst Score from all Defect Items Noted.
**Scores: 0 = OK, 1 = Monitor, 2 = Routine Maintenance, 3 = Immediate Repair Necessary.

Bioretention Area
INSPECTION AND MAINTENANCE CHECKLIST

Property Address: _____ Property Applicant: _____

Treatment Measure No.: _____ Date of Inspection: _____ Type of Inspection: ˜ Monthly ˜ Pre-Wet Season
˜ After heavy runoff ˜ End of Wet Season

Inspector(s): _____ Overall Facility Score*:_____ ˜ Other:_____

Defect	Conditions When Maintenance Is Needed	Maintenance Score**	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	Results Expected When Maintenance Is Performed
1. Standing Water	When water stands in the bioretention area between storms and does not drain within five days after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following may apply: sediment or trash blockages removed, improved grade from head to foot of bioretention area, or added underdrains.
2. Trash and Debris Accumulation	Trash and debris accumulated in the bioretention area.			Trash and debris removed from bioretention area and disposed of properly.
3. Sediment	Evidence of sedimentation in bioretention area.			Material removed so that there is no clogging or blockage. Material is disposed of properly.
4. Erosion	Channels have formed around inlets, there are areas of bare soil, and/or other evidence of erosion.			Obstructions and sediment removed so that water flows freely and disperses over a wide area. Obstructions and sediment are disposed of properly.
5. Vegetation	Vegetation is dead, diseased and/or overgrown.			Vegetation is healthy and attractive in appearance.

Bioretention Area - Inspection and Maintenance Checklist
Property Address: _____

Date of Inspection:_____
Treatment Measure No.:_____

Defect	Conditions When Maintenance Is Needed	Maintenance Score**	Comments (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	Results Expected When Maintenance Is Performed
6. Mulch	Mulch is missing or patchy in appearance. Areas of bare earth are exposed, or mulch layer is less than 3 inches in depth.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even in appearance, at a depth of 3 inches.
7. Miscellaneous	Any condition not covered above that needs attention in order for the bioretention area to function as designed.			Meet the design specifications.

*Overall Facility Score = Worst Score from all Defect Items Noted.
**Scores: 0 = OK, 1 = Monitor, 2 = Routine Maintenance, 3 = Immediate Repair Necessary

ATTACHMENT 9

MAINTENANCE SCHEDULE

ATTACHMENT 10

STORMWATER FACILITIES MAINTENANCE AGREEMENT WITH ACCESS RIGHTS AND COVENANTS (SWFMA)

RECORDING REQUESTED BY AND
WHEN RECORDED RETURN TO:

CITY OF OCEANSIDE
OFFICE OF THE CITY CLERK
300 NORTH COAST HIGHWAY
OCEANSIDE, CA 92054

Above Space for Recorder's Use

STORMWATER FACILITIES MAINTENANCE AGREEMENT WITH ACCESS RIGHTS AND COVENANTS

[Cypress Point Subdivision]

This AGREEMENT for the maintenance and repair of certain Stormwater Management Facilities is entered into between Concordia Communities, LLC (hereinafter referred to as "OWNER") and the City of Oceanside (hereinafter referred to as "CITY") for the benefit of the CITY, the OWNER, the successors in interest to the CITY or the OWNER, and the public generally.

RECITALS

A. OWNER is the owner of certain real property located in the City of Oceanside, California, more particularly described in Exhibit "A" attached hereto and made a part of (hereinafter referred to as the "PROPERTY"), and has proposed that the PROPERTY be developed as a 54 unit residential subdivision in accordance with applications for Tentative Map No. T21-00001, Development Plan No. _____, Conditional Use Permit No. _____, Grading Plan (Permit) No. _____which are on file with the CITY. This Agreement is required as a condition of approval for such development as set forth in Resolution No. _____.

B. In accordance with the City of Oceanside's Urban Runoff Regulations, Oceanside City Code, Chapter 40 (the "Stormwater Ordinance"), the City of Oceanside Subdivision Ordinance, the City of Oceanside Zoning Ordinance, The City of Oceanside Grading Ordinance and/or other ordinances or regulations of CITY which regulate land development and urban runoff, OWNER has prepared and submitted to CITY, a Stormwater Quality Mitigation Plan (hereinafter referred to as SWQMP), which is on file at the CITY. The SWQMP proposes that stormwater runoff from the PROPERTY be managed by the use of Stormwater Management Facilities which are identified in the SWQMP as "Best Management Practices" or "BMPs".

The precise location(s) and extent of the post construction BMPs are indicated in the approved SWQMP dated [TBD]. The SWQMP specifies the manner and standards by which the BMP's must be repaired and maintained in order to retain their effectiveness, as set forth in the Operation Maintenance Plan (hereinafter referred to as "O&M PLAN"). The approved SWQMP and O&M PLAN containing any revisions thereto are on file with the CITY.

C. The information contained in the SWQMP and OWNER's representations that the BMPs will be maintained pursuant to the SWQMP have been relied upon by CITY in approving OWNER's development applications. It is the purpose of this Agreement to assure that the BMPs are maintained, by creating obligations which are enforceable against the OWNER and the OWNER's successors in interest in the PROPERTY. It is intended that these obligations be enforceable notwithstanding other provisions related to BMP maintenance which are provided by law.

AGREEMENT

NOW, THEREFORE, for consideration of (a) CITY's approval of the above development applications and (b) the mutual covenants set forth herein, IT IS HEREBY AGREED AS FOLLOWS:

1. **Maintenance of Stormwater Management Facilities.** OWNER agrees, for itself and its successors in interest, to all or any portion of the PROPERTY, to comply in all respects with the requirements of the Stormwater Ordinance and the SWQMP with regards to the maintenance of BMPs designated in the SWQMP, and in particular agrees to perform, at its sole cost, expense and liability, the following "MAINTENANCE ACTIVITIES": all inspections, cleaning, repairs, servicing, maintenance and other actions specified in the O&M PLAN, with respect to all of the BMPs listed at Recital "B" above, at the times and in the manner specified in the O&M PLAN. OWNER shall initiate, perform and complete all MAINTENANCE ACTIVITIES at the required time, without request or demand from CITY or any other agency. OWNER further agrees that "MAINTENANCE ACTIVITIES" shall include replacement or modification of the BMPs in the event that said BMPs do not function as intended. Replacement shall be with an identical type, size and model of BMP, except that:

(a) The CITY Engineer may authorize substitution of an alternative BMP if he or she determines that it will function as well or better than the original BMP; and

(b) Pursuant to Section 40.2.3(c) of the Stormwater Ordinance, if the failure of the BMP, in the judgment of the CITY Engineer indicates that the BMP in use is inappropriate or inadequate to the circumstances, the BMP must be modified or replaced with an upgraded BMP to prevent future failure.

2. **Notices.** OWNER further agrees that it shall, prior to transferring ownership of any land on which any of the above BMPs are located, and also prior to transferring ownership of any such BMP, provide clear written notice of the above maintenance obligations associated with that BMP to the transferee. OWNER further agrees to provide evidence to CITY that OWNER has requested the California Department of Real Estate to include in the public report issued for the development of the PROPERTY, a notification regarding the BMP maintenance requirements described herein.

3. **CITY's Right to Perform Maintenance.** It is agreed that CITY shall have the right, but not the obligation, to elect to perform any or all of the MAINTENANCE ACTIVITIES if, in the CITY's sole judgment, OWNER has failed to perform the same. It is recognized and understood that the CITY makes no representation that it intends to or will perform any of the MAINTENANCE ACTIVITIES and any election by CITY to perform any of the MAINTENANCE ACTIVITIES, shall in no way relieve OWNER of its continuing maintenance obligations under this agreement. If CITY elects to perform any of the MAINTENANCE ACTIVITIES, it is understood that CITY shall be deemed to be acting as the agent of the OWNER and said work shall be without warranty or representation by CITY as to safety or effectiveness, shall be deemed to be accepted by OWNER "as is", and shall be covered by OWNER's indemnity provisions below.

If CITY performs any of the MAINTENANCE ACTIVITIES, after CITY has demanded that OWNER perform the same and OWNER has failed to do so within a reasonable time stated in the CITY's demand, then OWNER shall pay all of CITY's costs incurred in performing the MAINTENANCE ACTIVITIES. OWNER's obligation to pay CITY's costs of performing MAINTENANCE ACTIVITIES is a continuing obligation and shall apply whether or not CITY has utilized all or any portion of the security provided pursuant to Paragraph 5.

4. **CITY'S Access Rights.** OWNER hereby authorizes the CITY to access perpetually over, under and across [insert either "all of the PROPERTY" or "that portion of the PROPERTY described in Exhibit "B" hereto"] , for purposes of accessing the BMPs and performing any of the MAINTENANCE ACTIVITIES specified in Paragraph 1 above. CITY shall have the right, at any time and without prior notice to OWNER, to enter upon any part of said area as may be necessary or convenient for such purposes. OWNER shall at all times maintain the PROPERTY so as to make CITY's access clear and unobstructed.

5. **Security.** OWNER has provided CITY with non-refundable security to assure the faithful performance of the obligations of this agreement. The security is in the form of a Cash Deposit in the amount of $_____. CITY may utilize the security to provide funding for the cost of CITY performing any of the MAINTENANCE ACTIVITIES under Paragraph 3 above. CITY may utilize all or any part of the security at any time pursuant to this Agreement. Should any portion of the security be used by CITY,

OWNER or a Subsequent Owner, as applicable, shall deposit additional funds in the amount utilized by CITY, thereby restoring the security to the amount initially deposited by OWNER.

6. **Administration of Agreement for CITY.** CITY hereby designates its Engineer as the officer charged with responsibility and authority to administer this Agreement on behalf of CITY. Any notice or communication related to the implementation of this Agreement desired or required to be delivered to CITY shall be addressed to:

City Engineer
City of Oceanside
300 North Coast Highway
Oceanside, CA 92054

The City Engineer is also granted authority to enter into appropriate amendments to this Agreement on behalf of CITY, provided that the amendment is consistent with the purposes of this Agreement as set forth above.

7. **Defense and Indemnity.** CITY shall not be liable for, and OWNER and its successors in interest shall defend and indemnify CITY and the employees and agents of CITY (collectively "CITY PARTIES"), against any and all claims, demands, liability, judgments, awards, fines, mechanic's liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "CLAIMS"), related to this Agreement and arising either directly or indirectly from any act, error, omission or negligence of OWNER, OWNER's successors, or their contractors, licensees, agents, servants or employees, including, without limitation, claims caused by the concurrent negligent act, error or omission, whether active or passive, of CITY PARTIES. OWNER shall have no obligation, however, to defend or indemnify CITY PARTIES from a claim if it is determined by a court of competent jurisdiction that such claim was caused by the sole negligence or willful misconduct of CITY PARTIES. Nothing in this Agreement, CITY's approval of the subdivision or other applications or plans and specifications, or inspection of the work, is intended to acknowledge responsibility for any such matter, and CITY PARTIES shall have absolutely no responsibility or liability therefor unless otherwise provided by applicable law.

8. **Common Interest Developments.** If the PROPERTY is developed as a "Common Interest Development" as defined in Civil Code section 1351(c) which will include membership in or ownership of an "ASSOCIATION" as defined in Civil Code section 1351(a), then the following provisions of this Paragraph 8 shall apply during such time as the PROPERTY is encumbered by a "DECLARATION" as defined in Civil Code section 1351(h), and the Common Area, as "Common Area" is defined in Civil Code section 1351(b), of the PROPERTY is managed and controlled by the ASSOCIATION:

(a) The ASSOCIATION, through its Board of Directors, shall assume full responsibility to perform the MAINTENANCE ACTIVITIES pursuant to this Agreement, and shall undertake all actions and efforts necessary to accomplish the MAINTENANCE ACTIVITIES, including but not limited to, levying regular or special assessments against each member of the ASSOCIATION sufficient to provide funding for the MAINTENANCE ACTIVITIES, conducting a vote of the membership related to such assessments if required by law. In the event insufficient votes have been obtained to authorize an assessment, the ASSOCIATION shall seek authority from a court of competent jurisdiction for a reduced percentage of affirmative votes necessary to authorize the assessment, re-conducting the vote of the membership in order to obtain the votes necessary to authorize an assessment, and the ASSOCIATION shall take all action authorized by the DECLARATION or California law to collect delinquent assessments, including but not limited to, the recording and foreclosure of assessment liens.

(b) No provision of the DECLARATION, nor any other governing document of the ASSOCIATION or grant of authority to its members, shall grant or recognize a right of any member or other person to alter, improve, maintain or repair any of the PROPERTY in any manner which would impair the functioning of the BMPs to manage drainage or stormwater runoff as described in the SWQMP. In the event of any conflict between the terms of this Agreement and the DECLARATION or other ASSOCIATION governing documents, the provisions of this Agreement shall prevail.

9. **Agreement Binds Successors and Runs with the PROPERTY.** It is understood and agreed that the terms, covenants and conditions herein contained shall constitute covenants running with the land and shall be binding upon the heirs, executors, administrators, successors and assigns of OWNER and CITY, shall be deemed to be for the benefit of all persons owning any interest in the PROPERTY (including the interest of CITY or its successors in the Access Rights authorized herein). It is the intent of the parties hereto that this Agreement may be recorded and shall be binding upon all persons purchasing or otherwise acquiring all or any lot, unit or other portion of the PROPERTY, who shall be deemed to have consented to and become bound by all the provisions hereof.

10. **OWNER's Continuing Responsibilities Where Work Commenced or Permit Obtained.** Notwithstanding any other provision of this Agreement, no transfer or conveyance of the PROPERTY or any portion thereof shall in any way relieve OWNER of

or otherwise affect OWNER's responsibilities for installation or maintenance of BMPs which may have arisen under the ordinances or regulations of CITY referred to in Recital B above, or other federal, state or CITY laws, on account of OWNER having obtained a permit which creates such obligations or having commenced grading, construction or other land disturbance work.

11. **Amendment and Release.** The terms of this Agreement may be modified only by a written amendment approved and signed by the City Council or the CITY Engineer acting on behalf of CITY and by OWNER or OWNER's successor(s) in interest. This Agreement may be terminated and OWNER and the PROPERTY released from the covenants set forth herein, by a Release which CITY may execute if it determines that another mechanism will assure the ongoing maintenance of the BMPs or that it is no longer necessary to assure such maintenance.

12. **Governing Law and Severability.** This Agreement shall be governed by the laws of the State of California. Venue in any action related to this Agreement shall be in the Superior Court of the State of California, County of San Diego, North County Division. In the event that any of the provisions of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, the validity, and enforceability of the remaining provisions shall not be affected thereby.

IN WITNESS WHEREOF, the parties hereto for themselves, their heirs, executors, administrators, successors and assigns do hereby agree to the full performance of the covenants herein contained and have caused this Agreement to be executed by setting hereunto their signatures on the dates indicated below:

OWNER(s):

By: _____
Name/Title

Date: _____

By: _____
Name/Title

Date: _____

CITY OF OCEANSIDE:

By: _____
City Engineer

Date: _____

APPROVED AS TO FORM:

_____
City Attorney

NOTARY ACKNOWLEDGEMENT MUST BE ATTACHED

I:\City Attorney\SWFMA-Stormwater Facilities Maintenance Agreement FORMAT(Rev September 2018)

ATTACHMENT 11

ANNUAL INSPECTION AND MAINTENANCE REPORTING FORM

URBAN STORMWATER MITIGATION PLAN REPORTING FORM
ANNUAL INSPECTION AND MAINTENANCE OF TREATMENT CONTROL BMPS
(SIDE A)

Responsible Party for Inspection Maintenance: _____ Signature:_____
Date:_____ Print Name/Title

Facility Name:_____

BMP Type	Location Lat/Lon or Inlet #	Date of Construction	Inspection Date(s)	Condition of BMP Indicate whether the BMP is present and in working condition, requires cleaning or replacement.	*Maintenance required? (Y/N) If yes, complete reverse side.

* Maintenance is to be carried out as needed and in accordance with approved Operation and Maintenance Plan.

URBAN STORMWATER MITIGATION PLAN REPORTING FORM
ANNUAL INSPECTION AND MAINTENANCE OF TREATMENT CONTROL BMPS
(SIDE B)

BMP Type	BMP Location (lat/lon or Inlet #)	Date of Maintenance Activity	Description of maintenance performed	If applicable, describe any additional work required.

* Maintenance is to be carried out as needed and in accordance with the City of Oceanside's Operation and Maintenance Plan.

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

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

The plans must identify:

☒Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs

☒The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit

☒Details and specifications for construction of structural BMP(s)

☒Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer

☐How to access the structural BMP(s) to inspect and perform maintenance

☐Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)

☐Manufacturer and part number for proprietary parts of structural BMP(s) when applicable

☐Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)

☐Recommended equipment to perform maintenance

☐When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

☐Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)

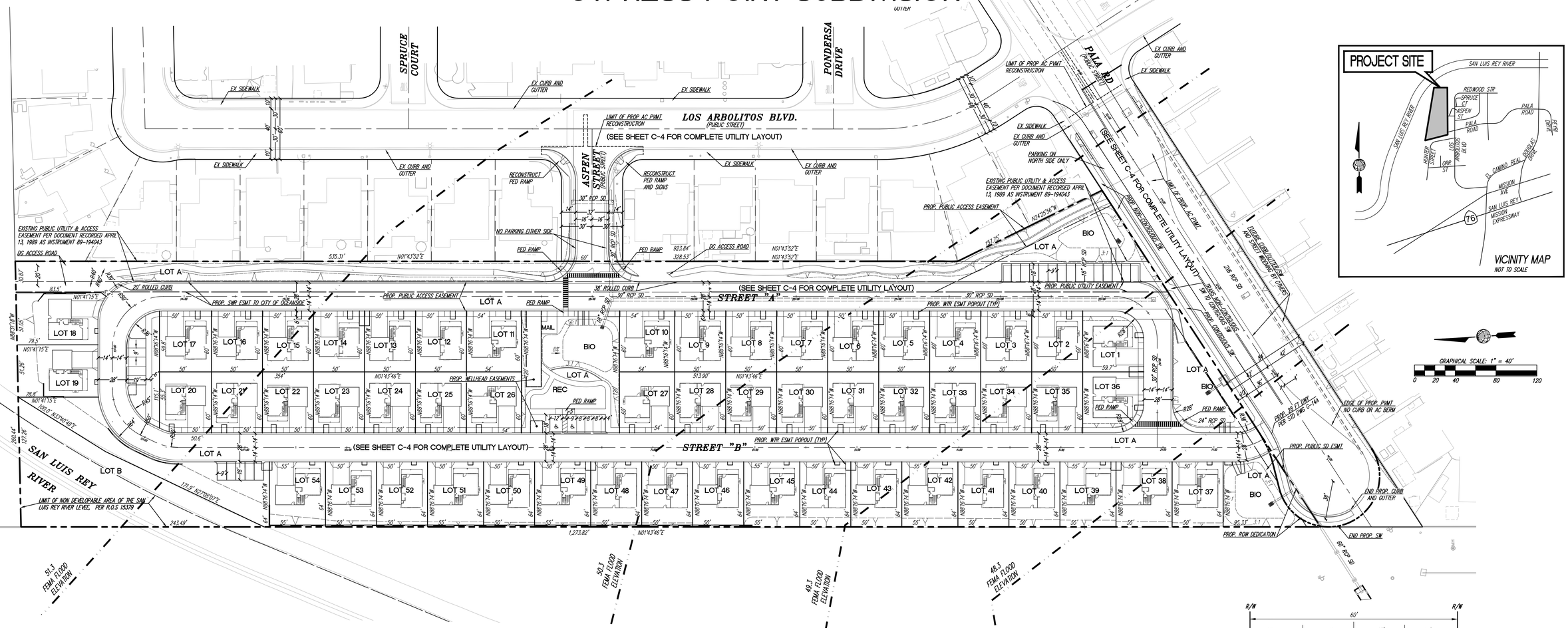
☒All BMPs must be fully dimensioned on the plans

☐When proprietary BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Brochure photocopies are not allowed.

TENTATIVE MAP FOR:

CYPRESS POINT SUBDIVISION

T21-00001



SCOPE OF WORK

THE PROJECT PROPOSES TO SPLIT THE EXISTING LOT INTO 56 LOTS, 54 LOTS FOR DETACHED RESIDENTIAL UNITS, 1 OPEN SPACE LOT AND 1 HOA LOT FOR STREETS, UTILITIES, BMP'S, PARKING AND COMMON AREAS ALONG WITH STREET DEDICATION ON PALA ROAD.

LIST OF ABBREVIATIONS:

BB	=	BROOK'S BOX	N	=	NORTH OR NORTHING
BF	=	BOTTOM FLOOR	NTS	=	NOT TO SCALE
BLDG	=	BUILDING	OSD	=	OCEANSIDE STD. DRAWING
CB	=	CATCH BASIN	P	=	PAVEMENT GRADE
CL	=	CENTER LINE	PAD	=	BUILDING PAD ELEVATION
CO	=	CLEAN OUT	PCC	=	PORTLAND CEMENT CONC.
EA	=	EACH	PE	=	PROFESSIONAL ENGINEER
EG	=	EXISTING GRADE	PROP.	=	PROPOSED
EP	=	EDGE OF PAVEMENT	PIV	=	POST INDICATOR VALVE
EX	=	EXISTING	PROP.	=	PROPOSED
(')	=	FEET OR MINUTES	PVC	=	POLYVINYL CHLORIDE
FH	=	FIRE HYDRANT	PVT	=	PRIVATE
FF	=	FINISHED FLOOR	R	=	RADIUS
FG	=	FINISH GRADE	RIM	=	RIM ELEVATION
FL	=	FLOW LINE	RD	=	ROOF DRAIN
FS	=	FINISH SURFACE	R/W	=	RIGHT OF WAY
FS	=	FIRE SERVICE/SUPPLY	S	=	SLOPE
GB	=	GRADE BREAK	SD	=	STORM DRAIN
GR	=	GRAITE ELEVATION	SWR	=	SEWER
GTR	=	GUTTER	SWK	=	SIDEWALK
(")	=	INCHES OR SECONDS	TC	=	TOP OF CURB
IE	=	INVERT ELEVATION	TOF	=	TOP OF FOOTING
IRR	=	IRRIGATION SERVICE	TW	=	TOP OF WALL
MH	=	MANHOLE	TYP	=	TYPICAL

REFERENCE PLANS

R-02805
S-1799
S-00047
S-00691
S-01800
S-2106
S-2107
PW19-00002

FEMA INFORMATION

LOMC20-00007
MAP NO. 06073C0752F
PANEL 752 OF 2375
DATED 06/19/1997
FIRMETTE 06073C0752H
EFF. 05/16/2012
FLOODING SOURCE: SAN LUIS REY RIVER
DATUM SHIFT VALUE: +2.3

TITLE INFORMATION

TITLE INFORMATION FOR THIS SURVEY BASED ON A PRELIMINARY REPORT PREPARED BY STEWART TITLE GUARANTY COMPANY AS ORDER NO. 20000480081, DATED: JULY 1, 2020.

ZONING - GP DESINATION

EXISTING AND PROPOSED ZONING:
RS – SINGLE FAMILY RESIDENTIAL
GENERAL PLAN DESIGNATION:
SFD-R

SITE ACCESS

SITE WILL TAKE ACCESS FROM PALA ROAD – A PUBLIC DEDICATED ROADWAY

SITE AREA SUMMARY

EXISTING:
GROSS AREA = 316,904 SF
NET AREA = 316,904 SF
PROPOSED:
RESIDENTIAL = 171,975 SF
PALA ROAD DED. = 518 SF
COMMON AREA = 130,246 SF
OPEN SPACE = 14,165 SF

(ALL AREAS AREA ARE MORE OR LESS)

SETBACKS

FRONT YARD: 5 FT
SIDE YARD INTERIORS: 5 FT
SIDE YARD STREET SIDE: 5 FT
REAR YARD: 10 FT

PARKING SUMMARY

UNIT EXCLUSIVE PARKING:
4 PER UNIT = 216 SPACES
NON-EXCLUSIVE PARKING (VISITOR)
REGULAR SPACES = 28 SPACES
ADA SPACES = 2 SPACES
TOTAL PROJECT SPACES = 246 SPACES

LOT AREA - PLAN MIX

LOT NO.	LOT AREA	HOUSE PLAN*
1	3,420	4
2	3,000	4
3	3,000	4
4	3,000	1
5	3,000	3
6	3,000	4
7	3,000	3
8	3,000	3
9	3,000	4
10	3,240	2
11	3,240	2
12	3,000	3
13	3,000	4
14	3,000	1
15	3,000	4
16	3,000	3
17	3,059	3
18	4,174	4
19	4,049	3
20	3,032	4
21	3,000	4
22	3,000	1
23	3,000	3
24	3,000	1
25	3,000	4
26	3,240	2
27	3,240	2
28	3,000	4
29	3,000	1
30	3,000	3
31	3,000	4
32	3,000	1
33	3,000	4
34	3,000	3
35	3,000	1
36	4,430	4
37	3,200	3
38	3,520	2
39	3,520	2
40	3,200	4
41	3,200	3
42	3,520	2
43	3,200	3
44	3,200	4
45	3,520	2
46	3,200	3
47	3,200	4
48	3,200	4
49	3,520	2
50	3,200	3
51	3,520	2
52	3,200	3
53	3,200	1
54	3,520	2
54	3,520	2

* HOUSE PLAN AREAS:

1. 1,206 SF
2. 1,373 SF
3. 1,500 SF
4. 1,703 SF

VERTICAL BENCHMARK

DESCRIPTION: CITY OF OCEANSIDE LOCAL CONTROL NETWORK STATION "1030" AS SHOWN ON ROS 21787.
ELEVATION: 41.87' (NAVD88)

SOURCE OF TOPOGRAPHY

TOPOGRAPHY SHOWN HEREON IS BASED ON AERIAL PHOTOGRAMMETRIC MAPPING CONDUCTED BY AEROTECH MAPPING INC. AS PHOTOGRAPHED ON AUGUST 13, 2020. HORIZONTAL AND VERTICAL GROUND CONTROL WERE ESTABLISHED BY OMEGA LAND SURVEYING, INC. ON AUGUST 5, 2020 WITH SUPPLEMENTAL DATA COLLECTED BETWEEN AUGUST 5 AND AUGUST 25, 2020.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM 83 (CCS83), ZONE 6, NAD83, EPOCH 2011.00, GRID BEARING AS DETERMINED LOCALLY BY A LINE BETWEEN CITY OF OCEANSIDE LOCAL CONTROL NETWORK STATION "1030" AND STATION "1031" AS SAID STATIONS ARE SHOWN ON ROS 21787, SAID BEARING BEING "N 31° 06' 40.10" E".

QUOTED BEARINGS FROM REFERENCE MAPS OR DEEDS MAY OR MAY NOT BE IN TERMS OF SAID SYSTEM. ALL DISTANCES SHOWN ARE U.S. SURVEY FEET GROUND, UNLESS OTHERWISE NOTED.

BOUNDARY NOTES

THE BOUNDARY AND ALL DIMENSIONS SHOWN HEREON ARE BASED ON A FIELD SURVEY COMPLETED BY OMEGA LAND SURVEYING ON 08/25/2020 TO BE SHOWN ON A FORTHCOMING PARCEL MAP TO BE FILED WITH THE COUNTY SURVEYOR OF SAN DIEGO COUNTY.

THE BOUNDARY SHOWN HEREON IS TENTATIVE UNTIL THE COMPLETION AND RECORDATION OF SAID RECORD OF SURVEY.

SITE SURVEY SUMMARY

THE BOUNDARY AND ALL DIMENSIONS SHOWN HEREON ARE BASED ON A FIELD SURVEY COMPLETED BY OMEGA LAND SURVEYING ON 08/25/2020 TO BE SHOWN ON A FORTHCOMING PARCEL MAP TO BE FILED WITH THE COUNTY SURVEYOR OF SAN DIEGO COUNTY.

THE BOUNDARY SHOWN HEREON IS TENTATIVE UNTIL THE COMPLETION AND RECORDATION OF SAID RECORD OF SURVEY.

SOLAR ACCESS STATEMENT

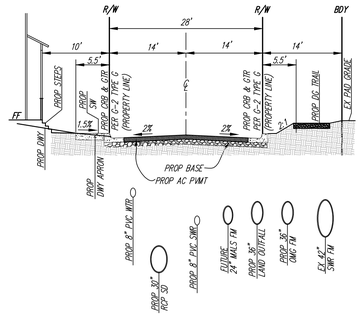
ALL LOTS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION.

STREET LIGHT STATEMENT

THIS PROJECT DOES NOT PROPOSE TO CONSTRUCT STREET LIGHTS ON THE PRIVATE STREETS

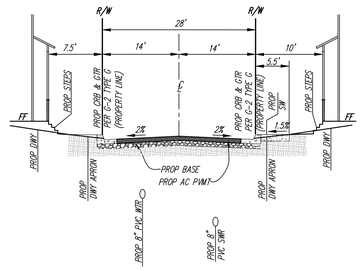
FIRE DEPARTMENT NOTES

1. ROADS & DRIVEWAYS SHALL BE PAVED & BE CAPABLE TO SUPPORT 75,000 LB VEHICLE.
2. ON-SITE STREETS SHALL BE PAINTED AND STRIPED "NO PARKING FIRE LANE".



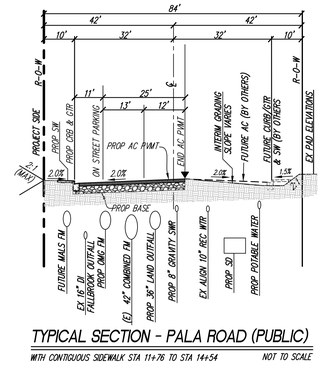
TYPICAL SECTION - STREET "A" (PRIVATE) EASTERLY

NO STREET PARKING — NOT TO SCALE



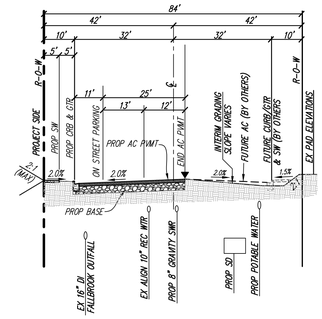
TYPICAL SECTION - STREET "A" (PRIVATE) WESTERLY

NO STREET PARKING — NOT TO SCALE



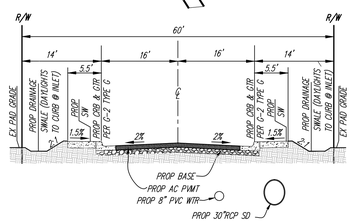
TYPICAL SECTION - PALA ROAD (PUBLIC)

WITH CONTIGUOUS SIDEWALK STA 11+76 TO STA 14+54 — NOT TO SCALE



TYPICAL SECTION - PALA ROAD (PUBLIC)

WITH NON-CONTIGUOUS SIDEWALK STA 10+00 TO STA 11+76 — NOT TO SCALE



TYPICAL SECTION - ASPEN STREET (PUBLIC)

NOT TO SCALE

SITE ADDRESS

TERMINUS OF PALA ROAD
OCEANSIDE, CA 92058

ASSESSOR'S PARCEL NO.

158-301-46

LEGAL DESCRIPTION

LOT 82 OF LOS ARBOLITOS UNIT NO. 3, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 6781, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JANUARY 23, 1978.

EXCEPTING THEREFROM ANY PORTION THEREOF LYING WITHIN LOS ARBOLITOS ADDITION NO. 4, AS PER TRACT MAP NO. 13959, AS FILED IN THE COUNTY RECORDER OF SAID COUNTY.

OWNER

CITY OF OCEANSIDE, A MUNICIPAL CORPORATION OF THE STATE OF CALIFORNIA
UNDER CONTRACT AGREEMENT TO DEVELOP:
CONCORDIA COMMUNITIES, LLC
380 STEVENS AVENUE
SOLANA BEACH, CA 92075
ATTN: JEB HALL
858-280-7103

SHEET INDEX

PREPARED BY:
OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE, SUITE B
SAN DIEGO, CA 92123
PH: (858) 634-8620

REGISTERED PROFESSIONAL ENGINEER — JUSTIN J. KERN — No. 70940 — CIVIL — STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/02/21	
	FIRST SUBMITTAL	01/05/21	OEC

TENTATIVE MAP FOR:

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-1

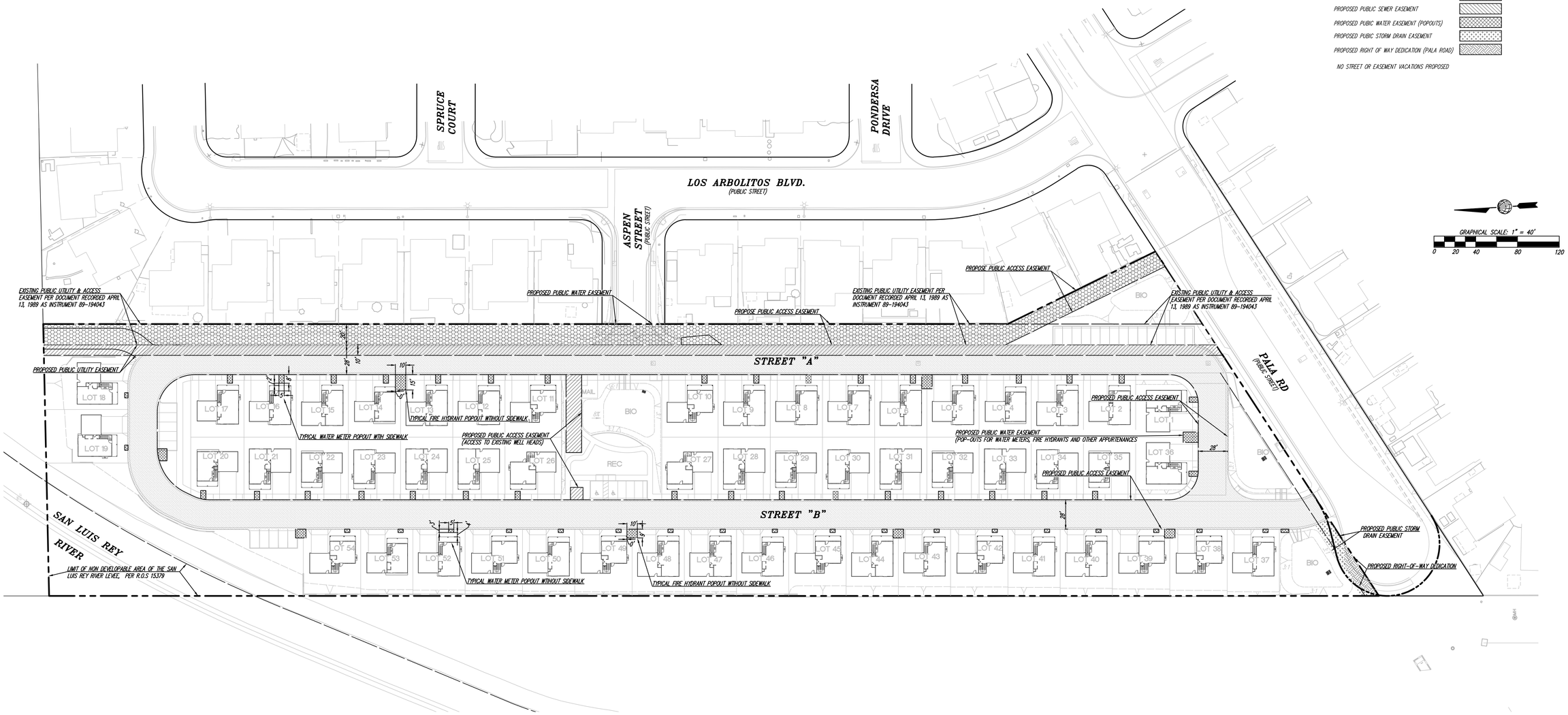
FILENAME: P:\ENG OMEGA\0811 LAS ARBOLITOS SUB\ACAD\TENTATIVE MAP\0811-TM-01-CONCEPT.DWG
DATE: 3/12/2021 5:14:51 PM

T21-00001

EASEMENT / RIGHT OF WAY LEGEND

- PROPOSED PUBLIC ACCESS EASEMENT
- PROPOSED PUBLIC WATER & STORM DRAIN EASEMENT
- PROPOSED PUBLIC SEWER EASEMENT
- PROPOSED PUBIC WATER EASEMENT (POPOUTS)
- PROPOSED PUBIC STORM DRAIN EASEMENT
- PROPOSED RIGHT OF WAY DEDICATION (PALA ROAD)

NO STREET OR EASEMENT VACATIONS PROPOSED



PREPARED BY:	NO.	REVISIONS	DATE	BY
OMEGA ENGINEERING CONSULTANTS 4340 VIEWRIDGE AVE. SUITE B SAN DIEGO, CA 92123 PH:(858) 634-3620				
		SECOND SUBMITTAL	03/30/21	
		FIRST SUBMITTAL	01/05/21	OEC

EASEMENTS AND DEDICAITONS FOR:

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-2

FILENAME: P:\ENG OMEGA\0611 LAS ARBOLITOS SUB\ACAD\TENTATIVE MAP\0611-TM-02-EASEMENTS.DWG

DATE: 3/12/2021 5:16:01 PM

T21-00001

PRELIMINARY GRADING QUANTITIES

GRADED AREA	8.05 [AC]	MAX. CUT DEPTH	6 FT
CUT QUANTITIES	3,139 [CY]	MAX CUT SLOPE RATIO	2:1 MAX
FILL QUANTITIES	29,898 [CY]	MAX. FILL DEPTH	9.5 FT
UNDERCUT QUANTITIES	7,431 [CY]	MAX FILL SLOPE RATIO	2:1 MAX
SHRINKAGE QUANTITIES	13,765 [CY]		
IMPORT QUANTITIES	33,093 [CY]		

RETAINING WALLS: 5 TOTAL WALLS, MAX LENGTH = 1,000', MAX HEIGHT = 5' (EXPOSED)

THIS PROJECT PROPOSES TO IMPORT 34,366 CUBIC YARDS OF MATERIAL TO THIS SITE. ANY EXPORT MATERIAL SHALL BE DISCHARGED TO A LEGAL DISPOSAL SITE. THE APPROVAL OF THIS PROJECT DOES NOT ALLOW PROCESSING AND SALE OF THE MATERIAL. ALL SUCH ACTIVITIES REQUIRE A SEPARATE CONDITIONAL USE PERMIT.

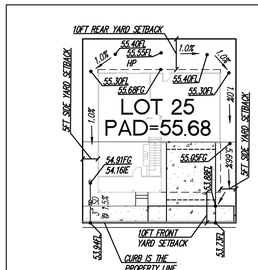
CONCEPTUAL GRADING LEGEND

SLOPE
PROPOSED CONTOUR (55)
EXISTING CONTOUR (52)
RIP RAP
GRADIENT (XXX%)
DRIVEWAY
CURB RAMP
ASPHALT
DG (WALKING)
DG (ROADWAY)
SIDEWALK
BIORETENTION
RETAINING WALL

GRAPHICAL SCALE: 1" = 40'
0 20 40 80 120

LOS ARBOLITOS BLVD.
ASPEN STREET
PATA ROAD
STREET "A"
SAN LUIS REY RIVER
SIGHT DISTANCE PER OCEANSIDE T-1 (SSD) 25 MPH = 150 FT PER CALTRANS 201.1)
(SEE SHEET C-4 FOR COMPLETE UTILITY LAYOUT)
DG ACCESS PATH FOR SEWER MAINS
ROLLED CURB & GUTTER
STREET TREES/STORM WATER QUALITY AREA
STREET TREES/STORM WATER QUALITY AREA (100 FT)
DG ACCESS PATH TO SEWER MANHOLE ROLLED CURB
PROP. PUBLIC ACCESS EASEMENT
PROP. PUBLIC UTILITY EASEMENT
PROP. MELLHEAD EASEMENTS
4" RETAINING WALL (EXPOSED)
5' RETAINING WALL (EXPOSED)
4.0' RETAINING WALL (EXPOSED) 4 FT DEEPENED FTG
LIMIT OF NON DEVELOPABLE AREA OF THE SAN LUIS REY RIVER LEVEE, PER R.O.S 15379
PUBLIC ST. ESM'T
PROP. ROW DEDICATION
BIO-47.0FG
BIO-48.4FG
LOT A
LOT B
LOTS 1 - 54

TYPICAL LOT GRADING
SCALE: 1"=20'



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OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/XX/21	
	FIRST SUBMITTAL	01/05/21	GEC

CONCEPTUAL GRADING PLAN FOR:
CYPRESS POINT
CITY OF OCEANSIDE, CALIFORNIA

SHEET C-3

DATE:3/15/2021 4:31:39 PM
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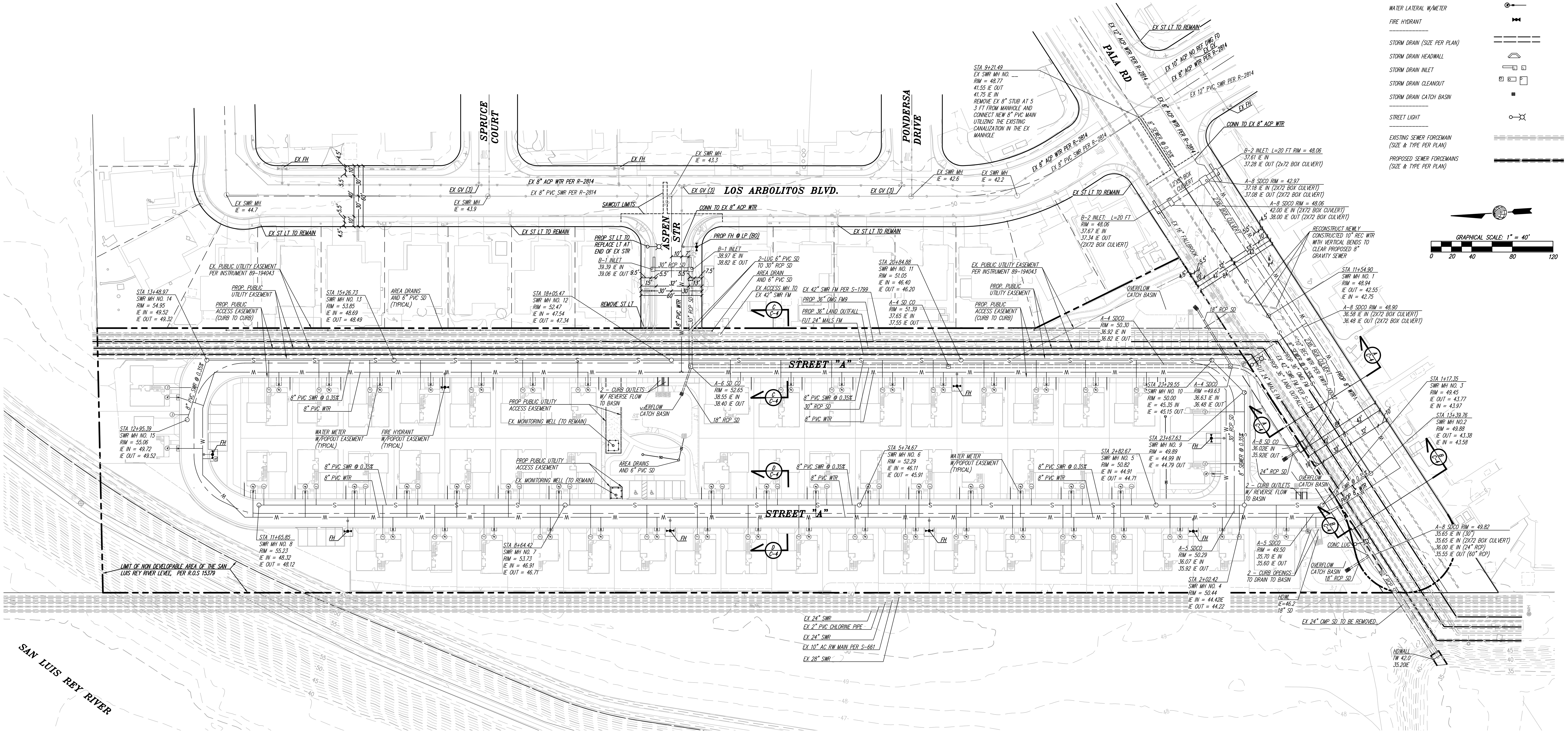
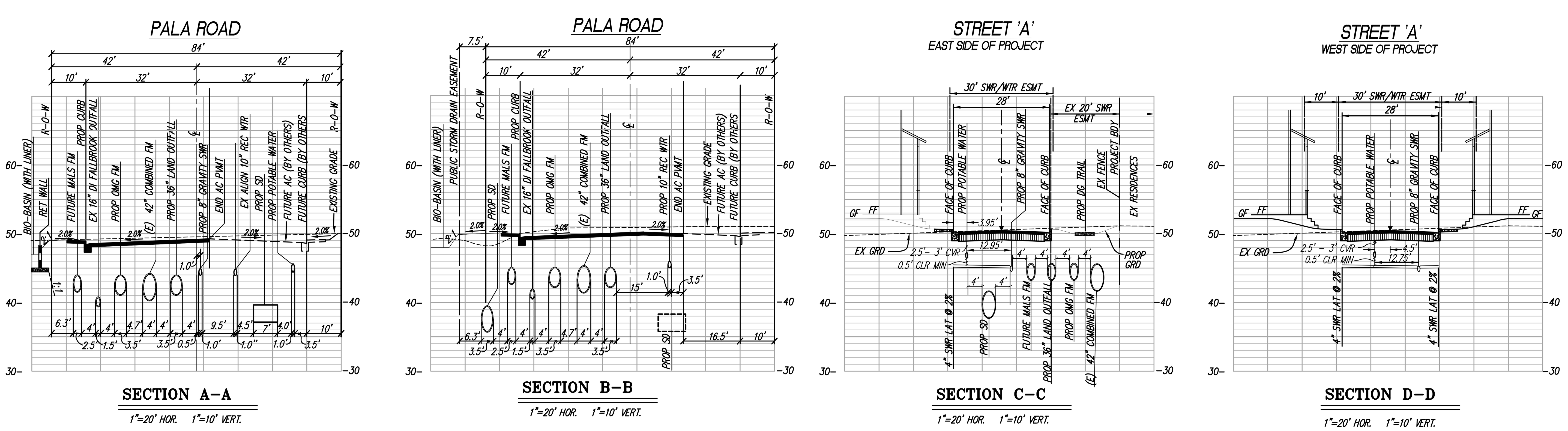
T21-00001

CONCEPTUAL UTILITY LEGEND

- SEWER MAIN (SIZE PER PLAN)
- SEWER LATERAL
- SEWER MANHOLE
- WATER MAIN (SIZE PER PLAN)
- WATER LATERAL W/METER
- FIRE HYDRANT
- STORM DRAIN (SIZE PER PLAN)
- STORM DRAIN HEADWALL
- STORM DRAIN INLET
- STORM DRAIN CLEANOUT
- STORM DRAIN CATCH BASIN
- STREET LIGHT
- EXISTING SEWER FORCEMAIN (SIZE & TYPE PER PLAN)
- PROPOSED SEWER FORCEMAINS (SIZE & TYPE PER PLAN)





DESIGN EXCEPTIONS

GENERAL:

1. THE LOCATION OF THE SEWER, WATER AND STORM DRAIN MAINS (PUBLIC OR PRIVATE) SHALL BE AS SHOWN HEREON AND THE STANDARD LOCATIONS PER THE CITY STANDARDS WILL NOT APPLY FOR ON-SITE OR OFF-SITE SEWER MAINS.
2. THE HORIZONTAL MINIMUM SEPARATION OF THE SEWER MAINS TO OTHER SEWER MAINS AND STORM DRAIN MAINS SHALL BE 4.0 FT MINIMUM (OUTSIDE OF PIPE TO OUTSIDE OF PIPE).

EASEMENTS:

1. THE ON-SITE EASEMENT FOR THE PUBLIC WATER MAIN SHALL BE CURB TO CURB WITH POP OUT EASEMENTS FOR THE WATER METERS, FIRE HYDRANTS AND OTHER MISCELLANEOUS APPURTENANCES. MINIMUM DROP IN STRUCTURES SHALL BE 0.1 FT
2. MINIMUM CLEARANCE OF STORM DRAIN TO SEWER MAINS SHALL BE 0.5 FT.
3. THE OUTSIDE EDGE OF BUILDING FOOTINGS AND OVERHANGS SHALL BE A MINIMUM OF 2 FT FROM THE EDGE OF THE WATER EASEMENT.

WATER:

1. MINIMUM COVER OVER MAINS OR LATERALS SHALL BE 30" (2.5 FT)
2. FIRE HYDRANT VALVES SHALL BE ALLOW TO BE IMMEDIATELY ADJACENT TO THE EDGE OF THE CONCRETE GUTTER.
3. MINIMUM CLEARANCE BETWEEN THE WATER MAIN AND HOUSE SEWER LATERALS SHALL BE 0.5 FT.

SEWER:

1. THE LOCATION OF THE SEWER MAINS SHALL BE AS SHOWN HEREON AND THE STANDARD LOCATIONS PER THE CITY STANDARDS WILL NOT APPLY FOR ON-SITE OR OFF-SITE SEWER MAINS.
2. THE HORIZONTAL MINIMUM SEPARATION OF THE SEWER MAINS TO OTHER SEWER MAINS AND STORM DRAIN MAINS SHALL BE 4.0 FT MINIMUM (OUTSIDE OF PIPE TO OUTSIDE OF PIPE).
3. SLOPE OF SEWER MAINS SHALL BE ALLOWED TO BE 0.35% MINIMUM. THE MINIMUM SLOPE OF 1.6% TO ACHIEVE A VELOCITY OF 2.0 FPS WILL NOT BE REQUIRED.
4. MINIMUM DEPTH OF SEWER MAINS SHALL BE 4.0 FT
5. MINIMUM DROP IN MANHOLES SHALL BE 0.1 FT FOR BOTH STRAIGHT THROUGH AND 90 DEGREE TURNS.
6. SEWER LATERAL RISE AT THE MAIN SHALL BE 0.5 FT MINIMUM
7. DEPTH OF SEWER LATERAL AT CURB/PROPERTY LINE SHALL BE 4.0 FT
8. SEWER MANHOLES SHALL BE ALLOWED IN AREAS OF FLOODING.
9. MINIMUM CLEARAND BETWEEN THE WATER MAIN AND THE HOUSE SEWER LATERALS SHALL BE 0.5FT.

STORM DRAIN:

1. MINIMUM SLOPE OF THE STORM DRAIN SHALL BE 0.3%
2. MINIMUM DROP IN STRUCTURES SHALL BE 0.1 FT
3. MINIMUM CLEARANCE OF STORM DRAIN TO SEWER MAINS SHALL BE 0.5 FT.

PREPARED BY:

OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KANN
No. 50940
CIVIL
STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/XX/21	
	FIRST SUBMITTAL	01/05/21	OEC

CONCEPTUAL UTILITY PLAN FOR:

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-4

FILENAME: P:\DWG OMEGA\0611 LAS ARBOLITOS SUB\ACAD\TENTATIVE MAP\0611-TM-04 UTILITY.DWG DATE: 3/12/2021 5:25:08 PM

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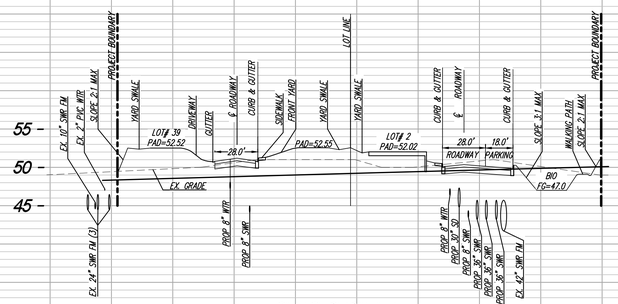
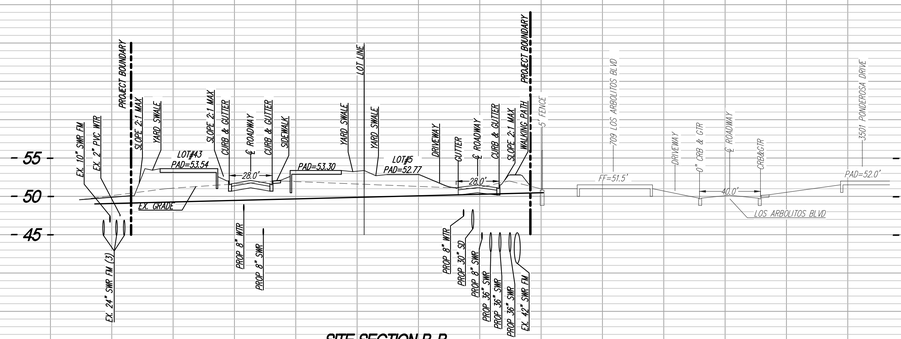


SITE SECTION A-A

SCALE: 1"=40' HORZ. 1"=8' VERT.



SITE SECTION B-B

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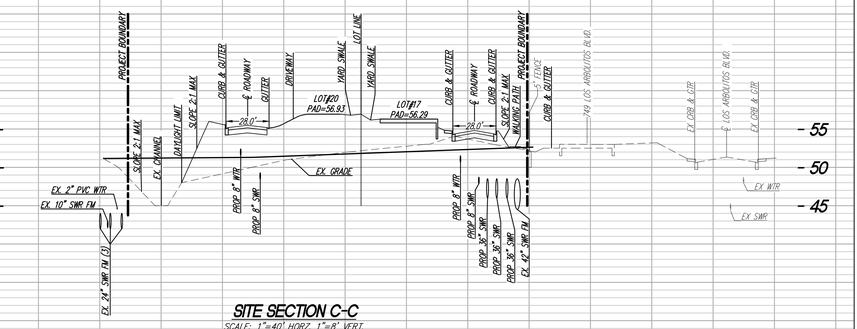

SITE SECTION C-C

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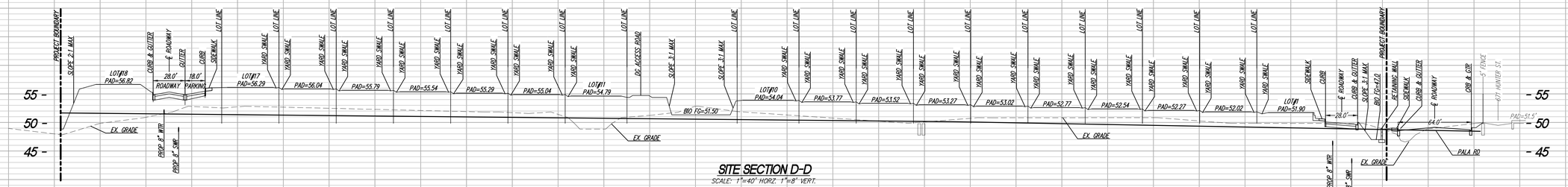

SITE SECTION D-D

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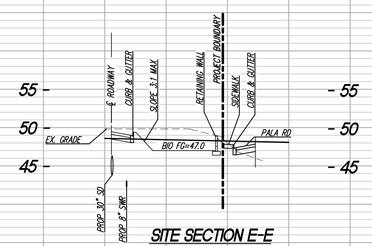

SITE SECTION E-E

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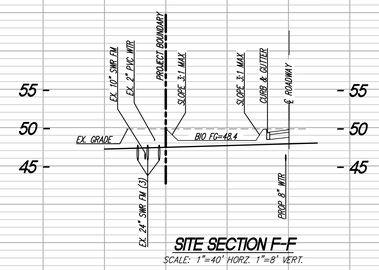


SITE SECTION F-F

SCALE: 1"=40' HORZ. 1"=8' VERT.

DATE: 3/15/2021 5:02:08 PM

FILENAME: P:\DWG OMEGA\0811 LAS ARBOLITOS SUB\ACAD\TENTATIVE MAP\0811-TM-05-SECTIONS.DWG

PREPARED BY:

OMEGA
ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH: (858) 634-8620

REGISTERED PROFESSIONAL ENGINEER — ANDREW J. EVANS — No. 50940 — CIVIL — STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/30/21	
	FIRST SUBMITTAL	01/05/21	GEC

SECTIONS FOR:

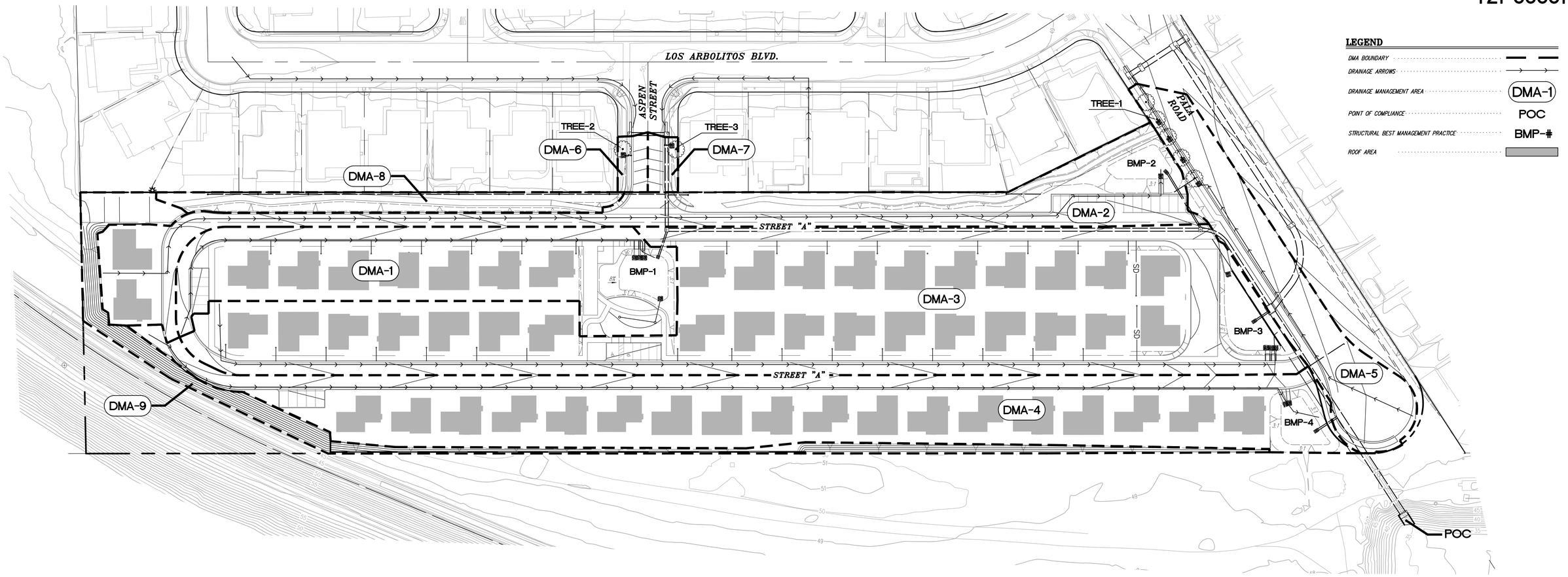
CYPRESS POINT

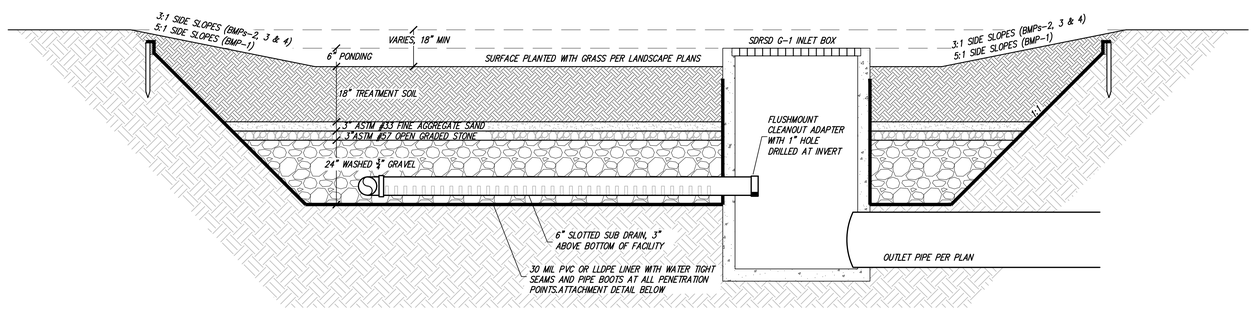
CITY OF OCEANSIDE, CALIFORNIA

SHEET

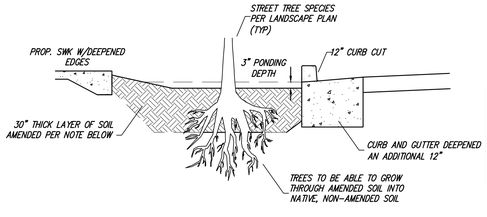
C-5

T21-00001





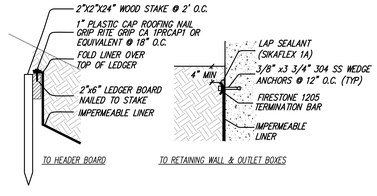
BIOFILTRATION BASIN SECTION (TYPICAL)



STREET TREE CROSS SECTION

SOIL AMENDMENT NOTE

THE SOIL IN THE SPECIFIED AREA AROUND THE STREET TREES IS TO BE AMENDED TO PROMOTE TREE GROWTH AND STORMWATER RETENTION. THE SOIL SHALL BE EXCAVATED TO THE SPECIFIED DEPTH, THE BOTTOM OF THE EXCAVATION SHALL BE ROUGHED UP/ROTOTILLED, THE EXCAVATED SOIL SHALL BE THOROUGHLY MIXED WITH MULCH AND PLACED BACK IN THE EXCAVATION WITHOUT COMPACTION.



IMPERMEABLE LINER ATTACHMENT DETAIL

BMP INSPECTION SCHEDULE NOTES

CONTRACTOR MUST CONTACT ENGINEER FOR INSPECTION OF BMPS AT THE FOLLOWING STAGES OF CONSTRUCTION:

--PRIOR TO START OF CONSTRUCTION OF BIOFILTRATION AREA
--PRIOR TO CONSTRUCTION OF OUTLET STRUCTURES
--AFTER GRADING OF THE BASIN AREA FOR CERTIFICATION
--AFTER PLACEMENT OF IMPERMEABLE LINER (W/ EXTRA LENGTH FOR EMBEDMENT)
--AFTER PLACEMENT OF SUB-DRAIN
--AFTER THE PLACEMENT OF GRAVEL DRAINAGE LAYER
--AFTER PLACEMENT OF TREATMENT SOIL
--AFTER IRRIGATION AND LANDSCAPING ACTIVITIES

*SURVEY STAKES SHALL BE AVAILABLE FOR EACH AND EVERY INSPECTION

BIOFILTRATION SOIL MEDIA NOTE

1. LONG-TERM PERCOLATION RATE OF 5.0 IN/HR MIN. & MAXIMUM RATE OF 10 IN/HR.
2. SOIL MEDIA SHALL BE LOOSELY PLACED (<80% COMPACTION)
3. CONTRACTOR SHALL SUBMIT BIO-MEDIA BLEND MATERIAL CUTSHEETS AND INFILTRATION INFORMATION FOR REVIEW AND APPROVAL PRIOR TO ORDERING AND PLACEMENT.
4. BIORETENTION SOIL MEDIA COMPOSITION BY VOLUME:*
   - 80% SAND (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 5% SILT (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 5% CLAY (PER APPENDIX G.1, COUNTY OF SAN DIEGO LID MANUAL)
   - 10% ORGANIC MATTER

SOURCE CONTROL BMP NOTES

ALL APPLICABLE SOURCE CONTROL BMPS SHALL BE UTILIZED

A. ALL ONSITE INLETS TO BE MARKED "NO DUMPING" OR SIMILAR AND ALL OPERATIONAL PRECAUTIONS TO AVOID NON STORM WATER DISCHARGE SHALL BE FOLLOWED PER THE CITY'S BMP DESIGN MANUAL.
B. OWNER TO BE RESPONSIBLE FOR SWEEPING PLAZAS, SIDEWALKS, AND PARKING LOTS. THIS IS TO BE DONE REGULARLY AND AS NEEDED TO PREVENT ACCUMULATION OF LITTER AND DEBRIS.

MISC NOTES

1. UNDERLYING NRCS HYDROLOGIC SOIL GROUP FOR SITE IS TYPE D
2. GROUNDWATER DEPTH IS ASSUMED MORE THAN 10'
3. NO EXISTING NATURAL HYDROLOGIC FEATURES
4. NO CRITICAL COARSE SEDIMENT YIELD AREAS ON SITE
5. AVOID USING COOPER WHEN SELECTING ROOF DRAINAGE AND ROOFING TRIM MATERIALS

DMA DATA TABLE

DMA-NO.	TOT. AREA (SF)	IMPERVIOUS (%)	DESIGN DCV (CF)	NOTES
DMA-1	39,810	59	1,379	DRAINS TO BMP-1 (BIOFILTRATION)
DMA-2	40,275	58	1,374	DRAINS TO BMP-2 (BIOFILTRATION)
DMA-3	118,918	67	4,370	DRAINS TO BMP-3 (BIOFILTRATION)
DMA-4	76,376	60	2,646	DRAINS TO BMP-4 (BIOFILTRATION)
DMA-5	23,092	87	994	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-1)
DMA-6	1,797	70	68	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-2)
DMA-7	1,685	74	66	SELF RETAINING VIA SITE DESIGN BMPS (STREET TREE-3)
DMA-8	9,025	0	142	SELF MITIGATING
DMA-9	15,934	0	251	SELF MITIGATING
TOTAL DCV			11,290	
DCV RETAINED BY TREES			1,480	

BMP DATA TABLE

BMP-NO.	TRIBUTARY DMA	PROPOSED FOOTPRINT	% OF TOTAL TRIBUTARY AREA	NOTES
BMP-1	DMA-1	2,126 SF	8.1%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-2	DMA-2	1,732 SF	6.6%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-3	DMA-3	2,568 SF	3.1%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE
BMP-4	DMA-4	1,650 SF	2.2%	FULLY LINED BIOFILTRATION BASIN WITH 1" LOW FLOW ORIFICE

STREET TREE TABLE

TREE-NO.	INITIAL DCV (CF)	SOIL AREA (SF)	SOIL DEPTH (FT)	SOIL VOLUME (CF)	DCV REDUCTION CREDIT	NOTES
TREE-1	994	1,520	2.5	3,801	1,120 CF	5- 22 FT DIAMETER TREES
TREE-2	68	141	2.5	353	100 CF	1- 15 FT DIAMETER TREE
TREE-3	66	141	25.	353	100 CF	1- 15 FT DIAMETER TREE

GRAPHICAL SCALE: 1" = 40'
20 40 80 120

PREPARED BY:
OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-3620
No. 50940 REGISTERED PROFESSIONAL ENGINEER ANDREW J. KANE CIVIL STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/03/21	
	FIRST SUBMITTAL	01/05/21	OEC

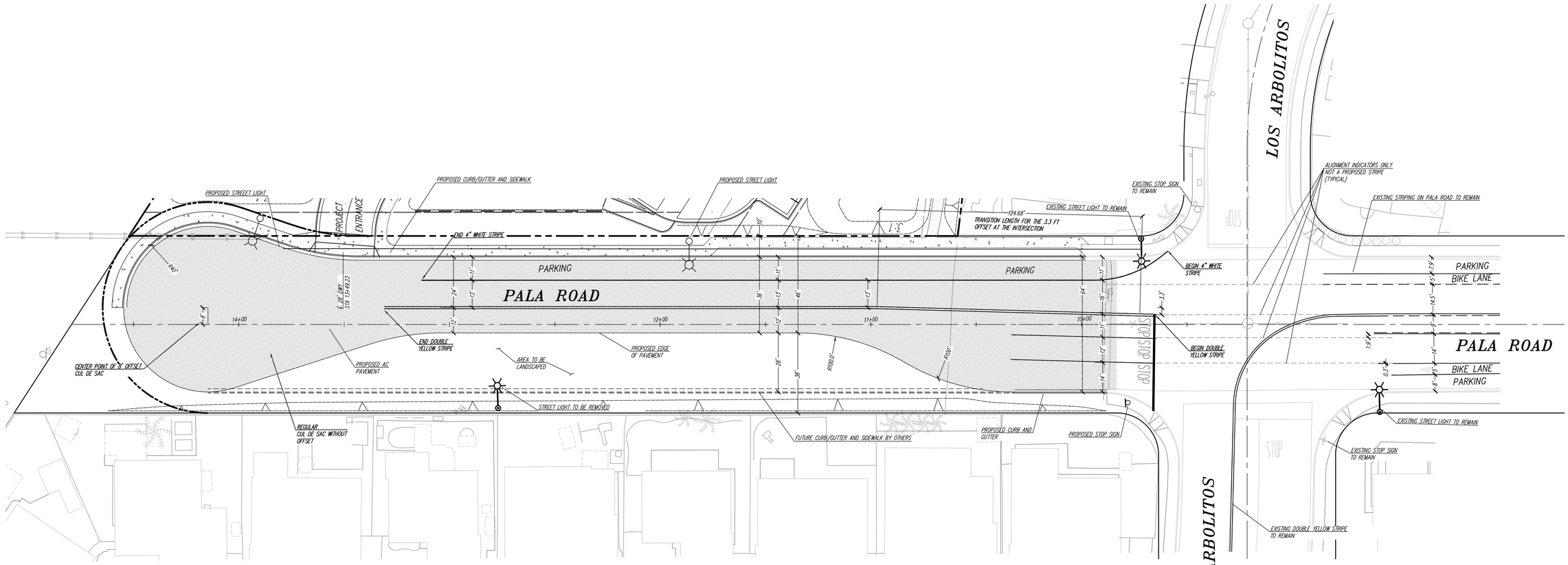
BMP PLAN FOR:

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-6

T21-00001



GRAPHICAL SCALE: 1" = 20'

0 20 40

PREPARED BY:

OMEGA ENGINEERING CONSULTANTS
4340 VIEWRIDGE AVE. SUITE B
SAN DIEGO, CA 92123
PH:(858) 634-8620

REGISTERED PROFESSIONAL ENGINEER ANDREW J. EVANS No. 50340 CIVIL STATE OF CALIFORNIA

NO.	REVISIONS	DATE	BY
	SECOND SUBMITTAL	03/XX/21	
	FIRST SUBMITTAL	01/05/21	GEC

PALA ROAD

CYPRESS POINT

CITY OF OCEANSIDE, CALIFORNIA

SHEET C-7

FILENAME: P:\DWG OMEGA\0611 LAS ARBOLITOS SUB\ACAD\TENTATIVE MAP\0611-TM-07-PALA ROAD.DWG

DATE: 3/12/2021 5:28:33 PM

BF-1
Biofiltration

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP BF-1 BIOFILTRATION

Biofiltration facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Biofiltration facilities have limited or no infiltration. They are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Typical biofiltration components include:

- Inflow distribution mechanisms (e.g., perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure

Normal Expected Maintenance

Biofiltration requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.
- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations

Biofiltration is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, **routine maintenance is key to preventing this scenario**.

BF-1
Biofiltration

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable	• Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	• Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.
https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet BF-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

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BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 1 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials, without damage to the vegetation ☐ If sediment, litter, or debris accumulation exceeds 25% of the surface ponding volume within one month (25% full*), add a forebay or other pre-treatment measures within the tributary area draining to the BMP to intercept the materials. ☐ Other / Comments:		
Poor vegetation establishment Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 2 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		
Overgrown vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Mow or trim as appropriate ☐ Other / Comments:		
2/3 of mulch has decomposed, or mulch has been removed Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 3 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Erosion due to concentrated irrigation flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas and adjust the irrigation system ☐ Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan ☐ If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction ☐ Other / Comments:		

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 4 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Obstructed inlet or outlet structure Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Underdrain clogged (inspect underdrain if standing water is observed for longer than 24-96 hours following a storm event) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Damage to structural components such as weirs, inlet or outlet structures Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		

BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 5 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Standing water in BMP for longer than 24-96 hours following a storm event* Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils ☐ Other / Comments:		
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Apply corrective measures to remove standing water in BMP when standing water occurs for longer than 24-96 hours following a storm event.** ☐ Other / Comments:		

*Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

**If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.

SD-1
Tree Wells

BMP MAINTENANCE FACT SHEET
FOR
SITE DESIGN BMP SD-1 TREE WELLS

Tree wells as site design BMPs are trees planted in configurations that allow storm water runoff to be directed into the soil immediately surrounding the tree. The tree may be contained within a planter box or structural cells. The surrounding area will be graded to direct runoff to the tree well. There may be features such as tree grates, suspended pavement design, or shallow surface depressions designed to allow runoff into the tree well. Typical tree well components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals
- Entrance/opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression)
- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Normal Expected Maintenance

Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

Tree wells are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations

Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

SD-1
Tree Wells

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR SD-1 TREE WELLS		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintenance when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintenance when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet SD-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

SD-1
Tree Wells

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 1 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased tree Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased tree ☐ Replace per original plans ☐ Other / Comments:		
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Loosen or replace soils surrounding the tree to restore drainage ☐ Other / Comments:		

SD-1
Tree Wells

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 2 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Disperse any standing water from the tree well to nearby landscaping ☐ Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water) ☐ Other / Comments:		
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make repairs as appropriate to restore drainage into the tree well ☐ Other / Comments:		

ATTACHMENT 5
Drainage Report

This is the cover sheet for Attachment 5.

Cypress Point Subdivision
Drainage Study
Los Arbolitos Boulevard and Pala Road

Date Prepared:
March 19, 2021

Prepared for:
Concordia Homes
380 Stevens Avenue, Suite 307
Solana Beach, CA 92075

Prepared By:

ΩMEGA
ENGINEERING CONSULTANTS
4340 Viewridge Ave, Suite B
San Diego, CA 92113
Ph: (858) 634-8620

Declaration of Responsible Charge:
I hereby declare that I am the engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions code, and that the design is consistent with current standards. I understand that the check of the project drawings and specifications by the City of Oceanside is confined to a review only and does not relieve me, as an engineer of work, of my responsibilities for project design.

Patric T. de Boer RCE 83583
Registration Expires 3-31-2023

Table of Contents

Appendices

Site & Project Description

This drainage study has been prepared for the development of vacant lot at the west end of Pala Road.

The project will involve the regrading of the 7.28 acre site, and the construction 54 single family homes. The project will also include four biofiltration basins, for stormwater quality and Hydromodification Compliance.

The project will also extend Pala Road to a proposed cul-de-sac at the southeast corner of the site. The project will include storm drains on and off -site to intercept runoff and convey it to a discharge point to a vegetated basin adjacent to San Luis Rey River.

Offsite runoff currently enters the site from the Aspen Street and Pala Road. Private and public storm drains will intercept this flow and convey it through the site to the discharge point.

Methodology

This drainage report has been prepared in accordance with current City of Oceanside regulations and procedures. The Modified Rational Method was used to determine the peak flowrates generated by the existing and proposed site conditions. The flowrates generated by sub-basins were confluenced according to the junction equations as detailed on page 3-24 of the San Diego County Hydrology Manual.

Initial Time of Concentration was determined via Table 3-2 of the County Hydrology Manual. Travel Time was determined via the Kirpich Formula for natural drainage areas. For developed drainage areas, the Travel Time was determined by the specific pipe hydraulics, or when applicable, the Gutter and Roadway Discharge Velocity Chart from the San Diego County Hydraulic Design Manual.

See the attached calculations for particulars. The following references have been used in preparation of this report:

(1) Handbook of Hydraulics, E.F. Brater & H.W. King, 6th Ed., 1976.
(2) County of San Diego Hydrology Manual, 2003

Existing Conditions

The existing site is a bare, pad with no permanent improvements. Ground surface conditions consist of seasonal grasses and shrubs. Onsite drainage is overland flow and concentrated natural flow.

Runoff from the residential area to the west flows onto the site at the dead-end of Aspen Street. It then flows across the site in a graded channel and enters a concrete drainage channel that runs along the east side of the site, discharging to a vegetated area adjacent to San Luis Rey River

Runoff from Pala road enters the site immediately south of the intersection of Los Arbolitos Boulevard and Pala Road. This runoff flows east across the undeveloped right-of-way and discharges to the same vegetated area as the onsite flows.

The County of San Diego Soil Hydrologic Group Map indicates Group 'A' Soil on the site, but the entire site has a layer of artificial fill. As a conservative measure the soils onsite are assumed to be Type 'D'.

The project is in a Special Flood Hazard Area, as designated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) map number 06073C0752G.

Proposed Conditions

In the proposed conditions, 54 single family homes will be constructed. Onsite areas will surface drain to the proposed private streets, and then to one of four onsite biofiltration BMPs. The BMPs will drain via a private storm drain system.

Flow from offsite areas that drain to the site will be intercepted and conveyed through the site. Runoff from offsite tributary areas and onsite areas will confluence in the proposed storm drain under Pala Road and will be discharged via a 60" storm drain to a headwall located at the existing point of discharge southwest of the site.

Existing Rational Analysis

The existing area of analysis was modeled as 8 separate basins, 4 onsite, and 4 offsite.
Basins O-1 and O-2 contain the neighborhood immediately east of the site. This runoff enters the site at the dead end of Aspen Street. Basins O-3 and O-4 contain areas that drain to both sides of Pala Road extending east of the site for approximately ½ mile. This project does not propose changes within Basins O-1 through O-4.

Basins E-1, E-2, E-3 are entirely onsite. Basin E-4 contains the offsite extension of Pala road.

C values were determined using table 3-1 of the county hydrology manual, included as Appendix 5 of this report. The initial time of concentration (Ti) and maximum overland flow length (Lm) were determined using Table 3-2 of the Hydrology Manual. Travel Time (Tt) was determined via the kirpich method, Manning's Equation for Pipes, and the Gutter and Roadway Discharge Velocity Chart. The 100-yr, 6-hr storm depth (P_6) was determined using the isopluvial map included as Appendix 2 of this report.

The total time of concentration was determined by adding the Ti value to the travel time (Tt).

$$\mathbf{Tc = Ti+Tt}$$

The Tc and the P_6 values were entered into the peak intensity formula from page 3-7 of the hydrology manual to determine the intensity of the rainfall during the peak of the 100-year, 6-hr storm.

$$\mathbf{I = 7.44 \times P_6 \times Tc^{-0.645}}$$
$$\mathbf{I = 7.44 \times 3.6 \times 8.0^{-0.645}}$$

The peak discharge rate was determine using the Rational Method Formula.

$$\mathbf{Q = C \times I \times A}$$

Below is a summary of the input data for the 100-year, 6- hour storm.

Existing Rational Calculation Summary

Basin	Impervious %	C	Area (ac)
E-1	0	0.35	1.65
E-2	0	0.35	1.17
E-3	0	0.35	3.95
E-4	0	0.35	0.64
O-1	50	0.63	8.72
O-2	50	0.63	0.63
O-3	50	0.63	25.17
O-4	50	0.63	31.88

The peak flowrates determined for each basin were confluenced according to the junction equations from page 3-24 of the San Diego County Hydrology Manual.

Junction Equations:

$$T_1 < T_2 < T_3$$
$$Q_{T1} = Q_1 + \frac{T_1}{T_2} Q_2$$
$$Q_{T2} = Q_2 + \frac{I_1}{I_2} Q_1$$

The confluenced flowrate from all basins is 93.11 cfs

Proposed Rational Analysis

The proposed site was modeled as 11 separate basins. 7 onsite basins, and the same 4 offsite basins that were included in the existing analysis. The proposed basins are referred to as P-1.1, P-1.2, P-1.3, P-1.4, P-1.5, P-1.6 and P-2.1.

The average slope of the basins varies from 0.5% to 0.7%. Weighted runoff coefficients vary from 0.35 to 0.83 The initial time of concentration (Ti) and maximum overland flow length (Lm) were

determined using Table 3-2 of the Hydrology Manual. The total time of concentration was determined by adding the Ti value to the travel time (Tt). Tt was calculated by determining the flow velocity in the gutters and storm drains and dividing the travel length by the velocity.

The time of concentration, peak intensity and the peak flowrate were determined using the same formulas and methods as in the existing conditions. Below is a summary of the input data and resulting flowrates generated by each basin for the 100-year, 6-hr storm.

Proposed Rational Calculation Summary

Basin	Impervious %	C	Area (ac)
P-1.1	59	0.68	0.91
P-1.2	0	0.35	0.21
P-1.3	58	0.67	0.92
P-1.4	67	0.72	2.73
P-1.5	87	0.83	0.53
P-1.6	60	0.68	1.75
P-2.1	0	0.35	0.37
O-1	50	0.63	8.72
O-2	50	0.63	0.63
O-3	50	0.63	25.17
O-4	50	0.63	31.88

The peak flowrates determined for each basin were confluenced according to the junction equations from page 3-24 of the San Diego County Hydrology Manual.

Junction Equations:

$$T_1 < T_2 < T_3$$

$$Q_{T1} = Q_1 + \frac{T_1}{T_2} Q_2$$

$$Q_{T2} = Q_2 + \frac{I_1}{I_2} Q_1$$

The confluenced, unmitigated peak runoff at the discharge point is 107.40 cfs. This is an increase of 14.29 cfs over existing conditions.

Results and Conclusions

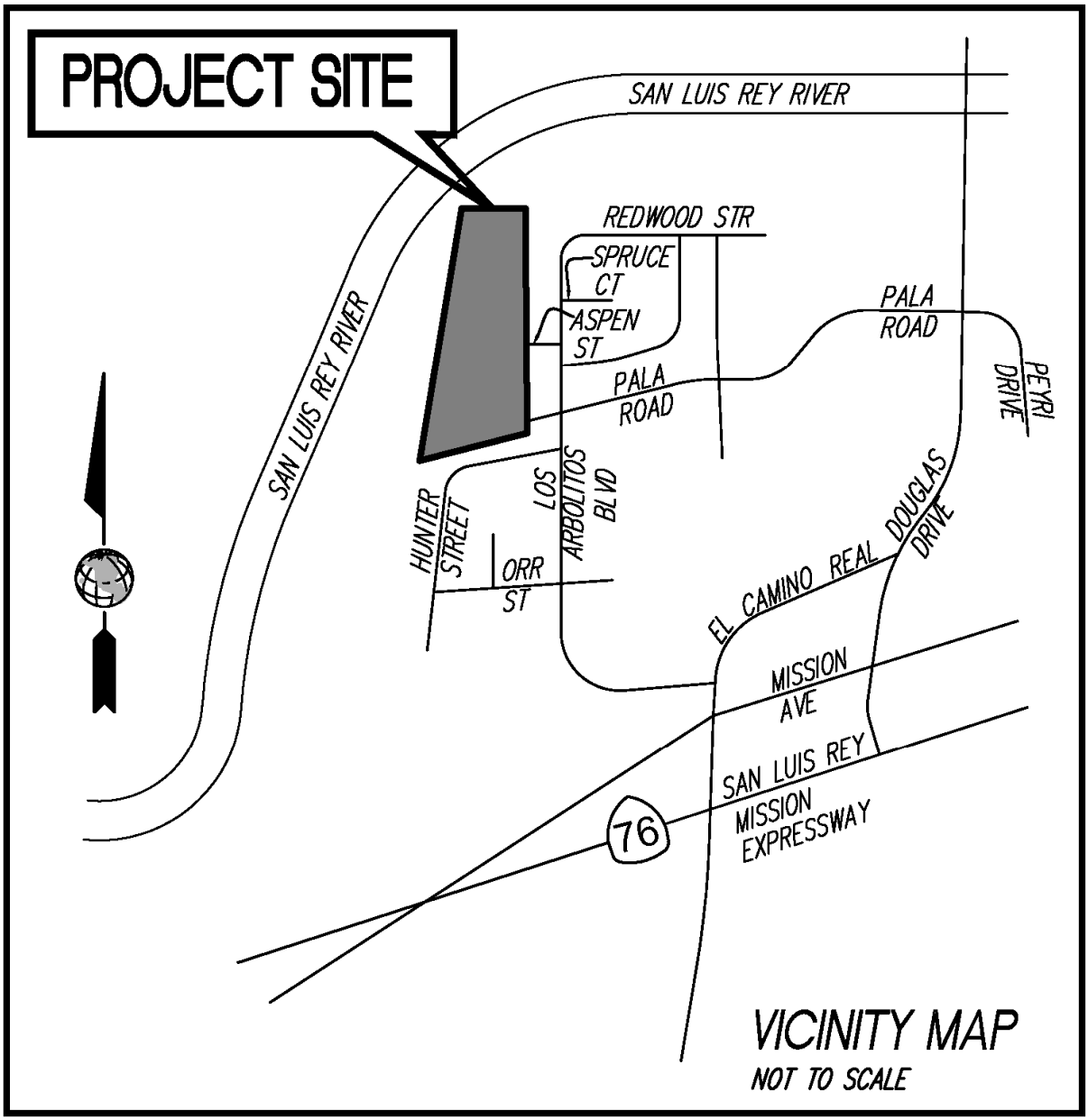
The proposed improvements result in an increase in the peak runoff flowrate generated by the area of analysis by approximately 15%.

This increase is not anticipated to create adverse downstream conditions, as all the proposed storm drains are designed with sufficient capacity to convey the flow to the outfall location.

No negative effects to downstream water ways are anticipated as a result of the increased flow during the peak of the 100 year storm. The outfall of the proposed 60" storm drain will have an invert that is below the 100-year flood elevation (per the FEMA Flood Profile for San Luis Rey River)

It is the opinion of Omega Engineering Consultants that the project will not cause flow related adverse effects to the downstream facilities or receiving waters during the peak of the 100-yr, 6-hr storm. A separate Storm Water Quality Management Plan has been prepared to discuss the water quality impacts for the proposed development.

Project Vicinity Map



O-1

O-2

O-3

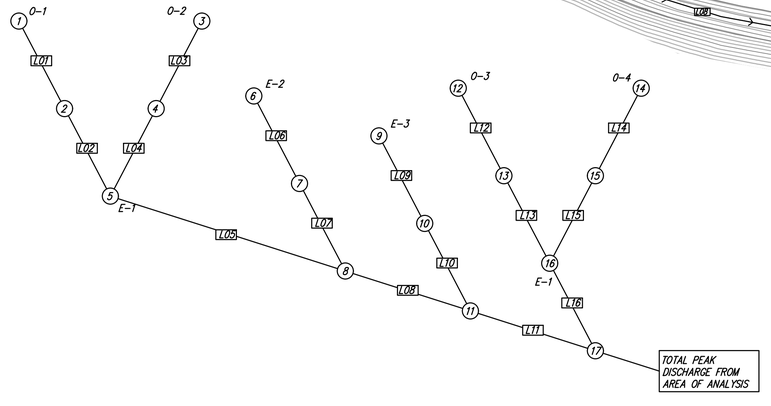
O-4

E-1

E-2

E-3

E-4



EXISTING BASIN AND CONVEYANCE SCHEMATIC

DRAINAGE BASIN DATA

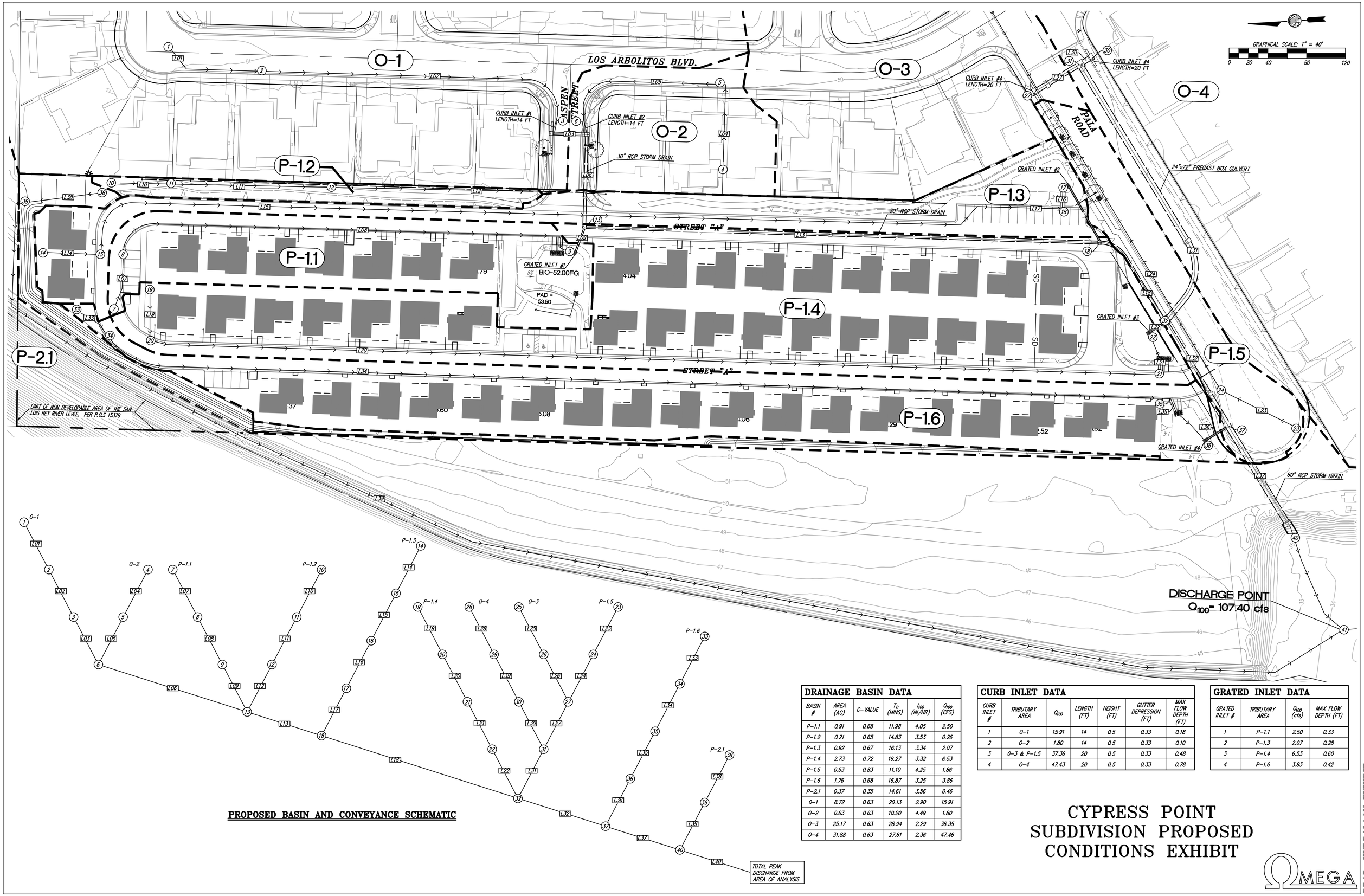
BASIN #	AREA (AC)	C-VALUE	T_C (MINS)	I_{100} (IN/HR)	Q_{100} (CFS)
E-1	1.65	0.35	24.50	2.55	16.52
E-2	1.17	0.35	16.68	3.27	1.34
E-3	3.95	0.35	14.67	3.55	4.91
E-4	0.64	0.35	32.71	2.12	76.60
O-1	8.72	0.63	20.13	2.90	15.91
O-2	0.63	0.63	10.20	4.49	1.80
O-3	25.17	0.63	28.94	2.29	36.35
O-4	31.88	0.63	27.61	2.36	47.46

PEAK DISCHARGE FOR AREA OF ANALYSIS Q_{100}=93.11 CFS

CYPRESS POINT SUBDIVISION EXISTING CONDITIONS EXHIBIT

OMEGA

EX. HYDROLOGY EXHIBIT



PROPOSED BASIN AND CONVEYANCE SCHEMATIC

DRAINAGE BASIN DATA

BASIN #	AREA (AC)	C-VALUE	T_C (MINS)	I_{100} (IN/HR)	Q_{100} (CFS)
P-1.1	0.91	0.68	11.98	4.05	2.50
P-1.2	0.21	0.65	14.83	3.53	0.26
P-1.3	0.92	0.67	16.13	3.34	2.07
P-1.4	2.73	0.72	16.27	3.32	6.53
P-1.5	0.53	0.83	11.10	4.25	1.86
P-1.6	1.76	0.68	16.87	3.25	3.86
P-2.1	0.37	0.35	14.61	3.56	0.46
O-1	8.72	0.63	20.13	2.90	15.91
O-2	0.63	0.63	10.20	4.49	1.80
O-3	25.17	0.63	28.94	2.29	36.35
O-4	31.88	0.63	27.61	2.36	47.46

CURB INLET DATA

CURB INLET #	TRIBUTARY AREA	Q_{100}	LENGTH (FT)	HEIGHT (FT)	GUTTER DEPRESSION (FT)	MAX FLOW DEPTH (FT)
1	O-1	15.91	14	0.5	0.33	0.18
2	O-2	1.80	14	0.5	0.33	0.10
3	O-3 & P-1.5	37.36	20	0.5	0.33	0.48
4	O-4	47.43	20	0.5	0.33	0.78

GRATED INLET DATA

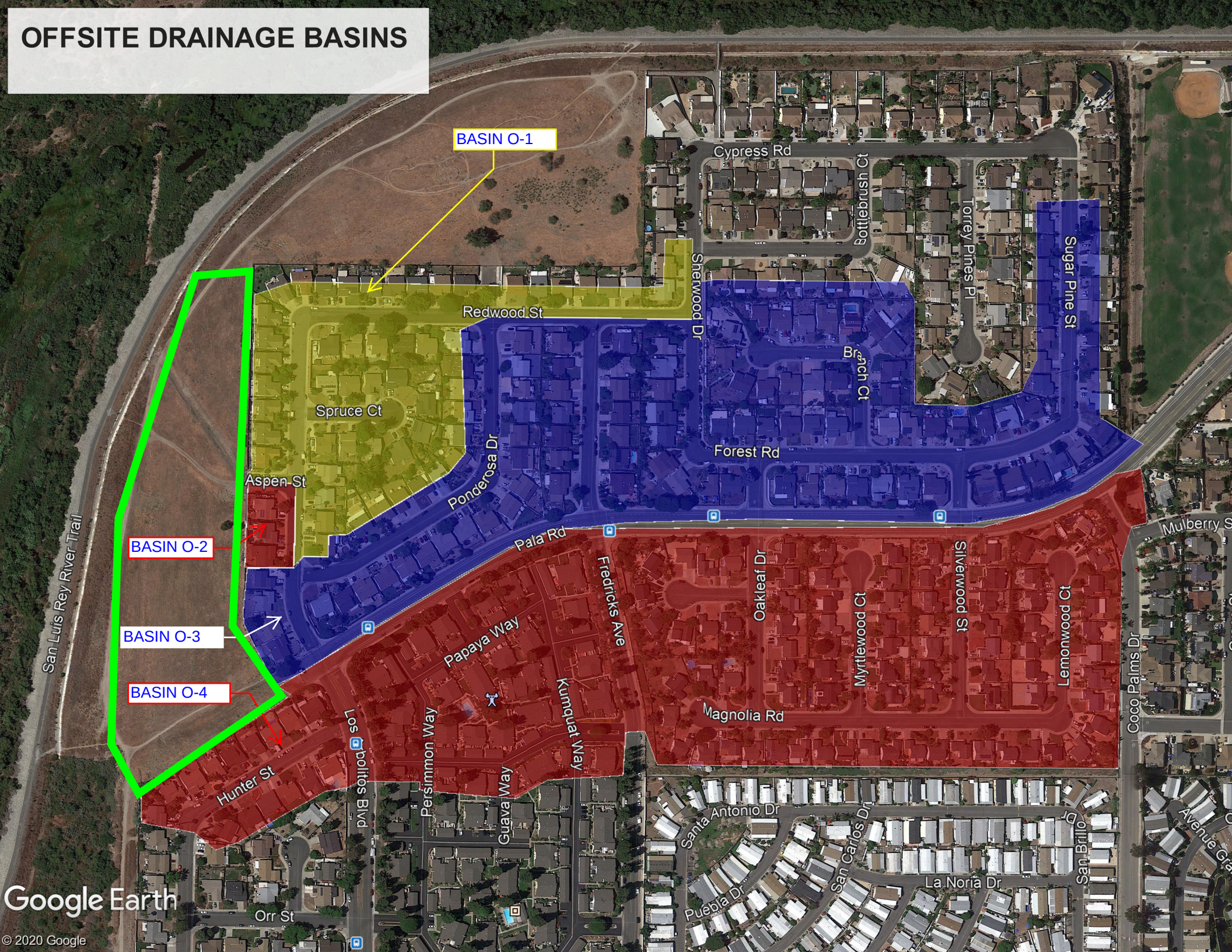
GRATED INLET #	TRIBUTARY AREA	Q_{100} (cfs)	MAX FLOW DEPTH (FT)
1	P-1.1	2.50	0.33
2	P-1.3	2.07	0.28
3	P-1.4	6.53	0.60
4	P-1.6	3.83	0.42

CYPRESS POINT SUBDIVISION PROPOSED CONDITIONS EXHIBIT

OMEGA

PROP. HYDROLOGY EXHIBIT

OFFSITE DRAINAGE BASINS



CYPRESS POINT SUBDIVISION 12/23/2020
EXISTING CONDITIONS

Sub-Basin	Upstream Node	Downstream Node	AREA Ac.	C	ΣA	CA	ΣCA	S(%) (avg.)	Ti mins	Tt mins	T_c mins	ΣT mins	I in/hr	Q cfs	Conduit V (fps)	Conduit L (ft)	Conduit T (mins)	NOTES 100-year, 6 hr storm P(6) 2.7
O-1	1	2							8.20									Link 01 - Overland flow
	2	5	8.72	0.63	8.72	5.49	5.49	0.5%		11.93	**20.13**	**20.13**	2.90	**15.91**				Link 02 - Gutter Flow
O-2	3	4							8.20									Link 03 - Overland flow
	4	5	0.63	0.63	0.63	0.40	0.40	0.5%		2.00	**10.20**	**10.20**	4.49	**1.80**				Link 04 - Gutter Flow
					9.35		5.89					20.13	2.90	**17.07**				Confluence at Node 5
E-1									0.00							Flow through basin, Tt and CA added to incoming flow. Tt per Kirpich		
	5	8	1.65	0.35	11.01	0.58	6.47	1.1%		4.37		**24.50**	2.55	**16.52**				
E-2	6	7							12.50									Link 06 - Overland flow
	7	8	1.17	0.35	1.17	0.41	0.41	1.0%		4.18	**16.68**	**16.68**	3.27	**1.34**				Link 07 - Kirpich Flow
					12.18		6.88					24.50	2.55	**17.56**				Confluence at Node 8
	8	11			12.18		6.88			7.50		32.00	2.15	**14.78**				Link 08 - Kirpich Flow
E-3	9	10							10.90									
	10	11	3.95	0.35	3.95	1.38	1.38	1.7%		3.77	**14.67**	**14.67**	3.55	**4.91**				
					16.13		8.26					32.00	2.15	**17.76**				Confluence at Node 11
	11	17			16.13		8.26			3.82		35.82	2.00	**16.51**				Link 08 - Kirpich Flow
O-3	3	4							8.20									Link 12 - Overland flow
	4	5	25.17	0.63	25.17	15.86	15.86	0.5%		20.74	**28.94**	**28.94**	2.29	**36.35**				Link 13- Gutter Flow
O-4	3	4							8.20									Link 14 - Overland flow
	4	5	31.88	0.63	31.88	20.08	20.08	0.5%		19.41	**27.61**	**27.61**	2.36	**47.46**				Link 15- Gutter Flow
					57.05		35.94					28.94	2.29	**82.39**				Confluence at Node 16

CYPRESS POINT SUBDIVISION
EXISTING CONDITIONS

12/23/2020

Sub-Basin	Upstream Node	Downstream Node	AREA Ac.	C	ΣA	CA	ΣCA	S(%) (avg.)	Ti mins	Tt mins	T_c mins	ΣT mins	I in/hr	Q cfs	Conduit V (fps)	Conduit L (ft)	Conduit T (mins)	NOTES 100-year, 6 hr storm	P(6)	2.7
E-4									0.00							Flow through basin, Tt and CA added to				
	16	17	0.64	0.35	57.40	0.23	36.17	1.7%		3.77		**32.71**	2.12	**76.60**		incoming flow. Tt per Kirpich				
					73.53		44.43					32.71	2.12	**93.11**				Confluence at Node 17		

CYPRESS POINT SUBDIVISION
PROPOSED CONDITIONS

3/22/2021

Sub-Basin	Upstream Node	Downstream Node	AREA Ac.	C	ΣA	CA	ΣCA	S(%) (avg.)	Ti mins	Tt mins	T_c mins	ΣT mins	I in/hr	Q cfs	Conduit V (fps)	Conduit L (ft)	Conduit T (mins)	NOTES 100-year, 6 hr storm P(6) 2.7
O-1	1	2							8.20									Link 01 - Overland flow
	2	3	8.72	0.63	8.72	5.49	5.49	0.5%		11.93	**20.13**	**20.13**	2.90	**15.91**				Link 02 - Gutter Flow
	3	6			8.72		5.49			0.11		20.23	2.89	**15.86**	4.97	32	0.11	Link 03 - 24" pipe
O-2	4	5							8.20									Link 04 - Overland flow
	5	6	0.63	0.63	0.63	0.40	0.40	0.5%		2.00	**10.20**	**10.20**	4.49	**1.80**				Link 05 - Gutter Flow
					9.35		5.89					20.23	2.89	**17.01**				Confluence at Node 7
	6	12			9.35		5.89			0.30		20.54	2.86	**16.85**	5.04	92	0.30	Link 06 - 24" pipe
P-1.1	7	8							8.20									Link 07 - Overland flow
	8	9	0.91	0.68	0.91	0.62	0.62	0.4%		3.78	**11.98**	**11.98**	4.05	**2.50**				Link 08 - Gutter Flow
	9	13			0.91		0.62			0.11		12.08	4.03	**2.49**	3.15	20	0.11	Link 09 - 18" pipe
P-1.2	10	11							8.20									Link 10 - Overland flow
	11	12	0.21	0.35	0.21	0.07	0.07	0.5%		6.63	**14.83**	**14.83**	3.53	**0.26**				Link 11- Kirpich Flow
	12	13			0.21		0.07			2.41		17.24	3.20	**0.23**	1.87	270	2.41	Link 12 - 8" pipe
					10.47		6.58					20.54	3.53	**18.80**				Confluence at Node 13
	13	18			10.47		6.58			1.49		22.03	2.73	**17.99**	5.14	461	1.49	Link 13 - 30" pipe
P-1.3	14	15							8.20									Link 14 - Overland flow
	15	16	0.92	0.67	0.92	0.62	0.62	0.5%		7.93	**16.13**	**16.13**	3.34	**2.07**				Link 15 - Gutter Flow
	16	17			0.92		0.62			0.07		16.19	3.33	**2.06**	3.03	12	0.07	Link 16 - 18" pipe
	17	18			0.92		0.62			0.28		16.47	3.30	**2.04**	3.03	50	0.28	Link 17 - 18" pipe
					11.40		7.20					22.03	3.33	**19.68**				Confluence at Node 18
	18	32			11.40		7.20			0.93		22.96	2.66	**19.16**	5.21	290	0.93	Link 18 - 30" pipe

CYPRESS POINT SUBDIVISION
PROPOSED CONDITIONS

3/22/2021

Sub-Basin	Upstream Node	Downstream Node	AREA Ac.	C	ΣA	CA	ΣCA	S(%) (avg.)	Ti mins	Tt mins	T_c mins	ΣT mins	I in/hr	Q cfs	Conduit V (fps)	Conduit L (ft)	Conduit T (mins)	NOTES 100-year, 6 hr storm P(6) 2.6
P-1.4	19	20							8.20									Link 19 - Overland flow
	20	21	2.73	0.72	2.73	1.97	1.97	0.5%		8.07	**16.27**	**16.27**	3.32	**6.53**				Link 20 - Gutter Flow
	21	22			2.73		1.97			0.08		16.36	3.31	**6.51**	4.05	20	0.08	Link 21 - 18" pipe
	22	32			2.73		1.97			0.12		16.48	3.30	**6.48**	4.04	30	0.12	Link 22 - 18" pipe
P-1.5	23	24							8.20									Link 23 - Overland flow
	24	27	0.53	0.83	0.53	0.44	0.44	0.5%		2.90	**11.10**	**11.10**	4.25	**1.86**				Link 24 - Gutter Flow
O-3	25	26							8.20									Link 25 - Overland flow
	26	27	25.17	0.63	25.17	15.86	15.86	0.5%		20.74	**28.94**	**28.94**	2.29	**36.35**				Link 26 - Gutter Flow
					25.70		16.30					28.94	2.29	**37.36**				Confluence at Node 27
	27	31			25.70		16.30			0.11		29.05	2.29	**37.26**	7.41	50	0.11	Link 27 - 24"x72" box
O-4	28	29							8.20									Link 28- Overland flow
	29	30	31.88	0.63	31.88	20.08	20.08	0.5%		19.41	**27.61**	**27.61**	2.36	**47.46**				Link 29 - Gutter Flow
	30	31			31.88		20.08			0.03		27.64	2.36	**47.43**	5.99	10	0.03	Link 30 - 24"x72" box
					57.58		36.38					27.64	2.36	**84.69**				Confluence at Node 31
	31	32			57.58		36.38			1.17		28.81	2.30	**83.64**	5.99	422	1.17	Link 32 - 60" box
					71.71		45.55					28.81	2.30	**104.71**				Confluence at Node 23
P-1.6	33	34							8.20									Link 33- Overland flow
	34	35	1.75	0.68	1.75	1.19	1.19	0.6%		8.67	**16.87**	**16.87**	3.25	**3.86**				Link 34 - Gutter Flow
	35	36			1.75		1.19			0.02		16.89	3.24	**3.86**	3.56	5	0.02	Link 35 - 18" pipe
	36	37			1.75		1.19			0.12		17.01	3.23	**3.84**	3.56	25	0.12	Link 36 - 18" pipe
					73.46		46.74					28.81	3.23	**106.98**				Confluence at Node 37

CYPRESS POINT SUBDIVISION
PROPOSED CONDITIONS

3/22/2021

Sub-Basin	Upstream Node	Downstream Node	AREA Ac.	C	ΣA	CA	ΣCA	S(%) (avg.)	Ti mins	Tt mins	T_c mins	ΣT mins	I in/hr	Q cfs	Conduit V (fps)	Conduit L (ft)	Conduit T (mins)	NOTES 100-year, 6 hr storm	P(6)	2.6
	37	40			73.46		46.74			0.56		29.37	2.27	**106.12**	3.56	120	0.56	Link 37 - 60" pipe		
P-2.1	38	39							8.20									Link 33- Overland flow		
	39	40	0.37	0.35	0.37	0.13	0.13	0.7%		14.61	**22.81**	**14.61**	3.56	**0.46**				Link 34 -Kirpich Flow		
					73.83		46.86					28.81	3.56	**107.40**				Confluence at Node 37		

Rectangular Channel Sizing Calculation

K'= Discharge Factor

n= Mannings coefficient

D=depth of water in channel

b=width of bottom of channel (ft)

Q= Discharge (cfs)

s=Pipe Slope (ft/ft)

n= 0.013

Rectangular Conduit

Q=(K'/n)*b^(8/3)*s^(0.5)

Q per conduit (cfs)	S (%)	Width (inches)	K'	D/b	Depth of water in conduit (inches)	Cross sectional area of flow (sf)	Velocity (ft/ sec)
37.36	0.30	72	0.0746	0.14	10.08	5.04	7.41
47.46	0.30	72	0.0948	0.22	15.84	7.92	5.99
84.69	0.30	72	0.1691	0.33	23.76	11.88	7.13

Table 7-11. Values of K' in Formula $Q = \frac{K'}{n} b^{8/3} s^{1/2}$ for

Trapezoidal Channels

D = depth of water b = bottom width of channel

$\frac{D}{b}$	Side slopes of channel, ratio of horizontal to vertical									
	Vertical	¼–1	½–1	¾–1	1–1	1½–1	2–1	2½–1	3–1	4–1
.01	.00068	00068	.00069	.00069	.00069	.00069	.00069	.00069	.00070	.00070
.02	.00213	00215	.00216	.00217	.00218	.00220	.00221	.00222	.00223	.00225
.03	.00414	00419	.00423	.00426	.00428	.00433	.00436	.00439	.00443	.00449
.04	.00660	00670	.00679	.00685	.00691	.00700	.00708	.00716	.00723	.00736
.05	.00946	00964	.00979	.00991	.01002	.01019	.01033	.01047	.01060	.01086
.06	.0127	0130	.0132	.0134	.0136	.0138	.0141	.0143	.0145	.0150
.07	.0162	0166	.0170	.0173	.0175	.0180	.0183	.0187	.0190	.0197
.08	.0200	0206	.0211	.0215	.0219	.0225	.0231	.0236	.0240	.0250
.09	.0241	0249	.0256	.0262	.0267	.0275	.0282	.0289	.0296	.0310
.10	.0284	0294	.0304	.0311	.0318	.0329	.0339	.0348	.0358	.0376
.11	.0329	0343	.0354	.0364	.0373	.0387	.0400	.0413	.0424	.0448
.12	.0376	0393	.0408	.0420	.0431	.0450	.0466	.0482	.0497	.0527
.13	.0425	0446	.0464	.0480	.0493	.0516	.0537	.0556	.0575	.0613
.14	.0476	0502	.0524	.0542	.0559	.0587	.0612	.0636	.0659	.0706
.15	.0528	0559	.0585	.0608	.0627	.0662	.0692	.0721	.0749	.0805
.16	.0582	0619	.0650	.0676	.0700	.0740	.0777	.0811	.0845	.0912
.17	.0638	0680	.0716	.0748	.0775	.0823	.0866	.0907	.0947	.1026
.18	.0695	0744	.0786	.0822	.0854	.0910	.0960	.1008	.1055	.1148
.19	.0753	0809	.0857	.0899	.0936	.1001	.1059	.1115	.1169	.1277
.20	.0812	0876	.0931	.0979	.1021	.1096	.1163	.1227	.1290	.1414
.21	.0873	0945	.101	.106	.111	.120	.127	.135	.142	.156
.22	.0934	1015	.109	.115	.120	.130	.139	.147	.155	.171
.23	.0997	1087	.117	.124	.130	.141	.150	.160	.169	.187
.24	.1061	1161	.125	.133	.140	.152	.163	.173	.184	.204
.25	.1125	1236	.133	.142	.150	.163	.176	.188	.199	.222
.26	.119	131	.142	.152	.160	.175	.189	.202	.215	.241
.27	.126	139	.151	.162	.171	.188	.203	.218	.232	.260
.28	.132	147	.160	.172	.182	.201	.217	.234	.249	.281
.29	.139	155	.170	.182	.194	.214	.232	.250	.268	.302
.30	.146	163	.179	.193	.205	.228	.248	.267	.287	.324
.31	.153	172	.189	.204	.218	.242	.264	.285	.306	.347
.32	.160	180	.199	.215	.230	.256	.281	.304	.327	.371
.33	.167	189	.209	.227	.243	.271	.298	.323	.348	.396
.34	.174	198	.219	.238	.256	.287	.316	.343	.370	.423
.35	.181	207	.230	.251	.269	.303	.334	.363	.392	.450
.36	.189	216	.241	.263	.283	.319	.353	.385	.416	.478
.37	.196	225	.252	.275	.297	.336	.372	.406	.440	.507
.38	.203	234	.263	.288	.312	.353	.392	.429	.465	.537
.39	.211	244	.274	.301	.326	.371	.413	.452	.491	.568
.40	.218	253	.286	.315	.341	.389	.434	.476	.518	.600
.41	.226	263	.297	.328	.357	.408	.456	.501	.546	.633
.42	.233	273	.309	.342	.373	.427	.478	.526	.574	.668
.43	.241	283	.321	.357	.389	.447	.501	.553	.603	.703
.44	.248	293	.334	.371	.405	.467	.525	.580	.633	.740
.45	.256	303	.346	.386	.422	.488	.549	.607	.664	.777

CONDUIT SIZING CALCULATIONS

The following chart details the sizing parameters and for conduits that convey runoff on the site.
Flow parameters from *Handbook of Hydraulics, King & Brater* were used, see following page.

K'= Discharge factor	=	$(Q*n)/(d^{8/3}*s^{1/2})$
n= Mannings coefficient	=	0.013 for PVC & HDPE
d=diameter of conduit (ft)	=	per chart
Q= Discharge	=	based off portions of basins tributary to outlet
s=Minimum Pipe Slope (ft/ft)	=	per chart
D=depth of flow	=	From table 7-4 of the *Handbook of Hydraulics, King & Brater* See right
C_a= Flow factor	=	From table 7-14 of the *Handbook of Hydraulics, King & Brater* See right
A=Cross sectional area of flow	=	C_a*d^2
V=Velocity	=	Q/A

Pipe Flow

Link	Q (cfs)	S (%)	d (in)	K'	D/d	C_a	A (sf)	V (fps)
3 to 6	15.91	0.3	30	0.328	0.62	0.512	3.200	4.97
6 to 12	17.01	0.3	30	0.351	0.65	0.54	3.375	5.04
9 to 13	2.50	0.3	18	0.201	0.46	0.3527	0.794	3.15
12 to 13	0.26	0.3	8	0.179	0.43	0.3229	0.144	1.78
13 to 18	18.86	0.3	30	0.389	0.70	0.587	3.669	5.14
16 to 17	2.07	0.3	18	0.167	0.41	0.3032	0.682	3.03
17 to 18	2.06	0.3	18	0.166	0.41	0.3032	0.682	3.03
18 to 27	19.68	0.3	30	0.406	0.72	0.605	3.781	5.21
21 to 22	6.53	0.3	24	0.244	0.51	0.403	1.612	4.05
22 to 23	6.51	0.3	24	0.243	0.51	0.403	1.612	4.04
23 to 37	24.40	0.3	30	0.495	0.90	0.745	4.656	5.24
35 to 36	3.86	0.3	18	0.306	0.59	0.482	1.085	3.56
36 to 37	3.86	0.3	18	0.306	0.59	0.482	1.085	3.56
37 to 38	107.80	0.3	60	0.344	0.64	0.531	13.275	8.12

Table 7-4. For Determining the Area a of the Cross Section of a Circular Conduit Flowing Part Full

Let $\frac{\text{depth of water}}{\text{diameter of channel}} = \frac{D}{d}$ and C_a = the tabulated value. Then $a = C_a d^2$.

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0013	.0037	.0069	.0105	.0147	.0192	.0242	.0294	.0350
.1	.0409	.0470	.0534	.0600	.0668	.0739	.0811	.0885	.0961	.1039
.2	.1118	.1199	.1281	.1365	.1449	.1535	.1623	.1711	.1800	.1890
.3	.1982	.2074	.2167	.2260	.2355	.2450	.2546	.2642	.2739	.2836
.4	.2934	.3032	.3130	.3229	.3328	.3428	.3527	.3627	.3727	.3827
.5	.393	.403	.413	.423	.433	.443	.453	.462	.472	.482
.6	.492	.502	.512	.521	.531	.540	.550	.559	.569	.578
.7	.587	.596	.605	.614	.623	.632	.640	.649	.657	.666
.8	.674	.681	.689	.697	.704	.712	.719	.725	.732	.738
.9	.745	.750	.756	.761	.766	.771	.775	.779	.782	.784

Table 7-14. Values of K' for Circular Channels in the Formula

$$Q = \frac{K'}{n} d^{8/3} s^{1/2}$$

D = depth of water d = diameter of channel

$\frac{D}{d}$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0		.00007	.00031	.00074	.00138	.00222	.00328	.00455	.00604	.00775
.1	.00967	.0118	.0142	.0167	.0195	.0225	.0257	.0291	.0327	.0366
.2	.0406	.0448	.0492	.0537	.0585	.0634	.0686	.0738	.0793	.0849
.3	.0907	.0966	.1027	.1089	.1153	.1218	.1284	.1352	.1420	.1490
.4	.1561	.1633	.1705	.1779	.1854	.1929	.2005	.2082	.2160	.2238
.5	.232	.239	.247	.255	.263	.271	.279	.287	.295	.303
.6	.311	.319	.327	.335	.343	.350	.358	.366	.373	.380
.7	.388	.395	.402	.409	.416	.422	.429	.435	.441	.447
.8	.453	.458	.463	.468	.473	.477	.481	.485	.488	.491
.9	.494	.496	.497	.498	.498	.498	.496	.494	.489	.483
1.0	.463									

3.2.2.4 Grated Inlets in Sag

A grated inlet in a sag location operates as a weir at shallower depths and as an orifice at larger depths. The designer shall estimate the capacity of the inlet under both weir flow and orifice flow conditions, then adopt a design capacity equal to the smaller of the two results. Figure 3–5 provides a nomograph for calculating the capacity of grated inlets in sag locations.

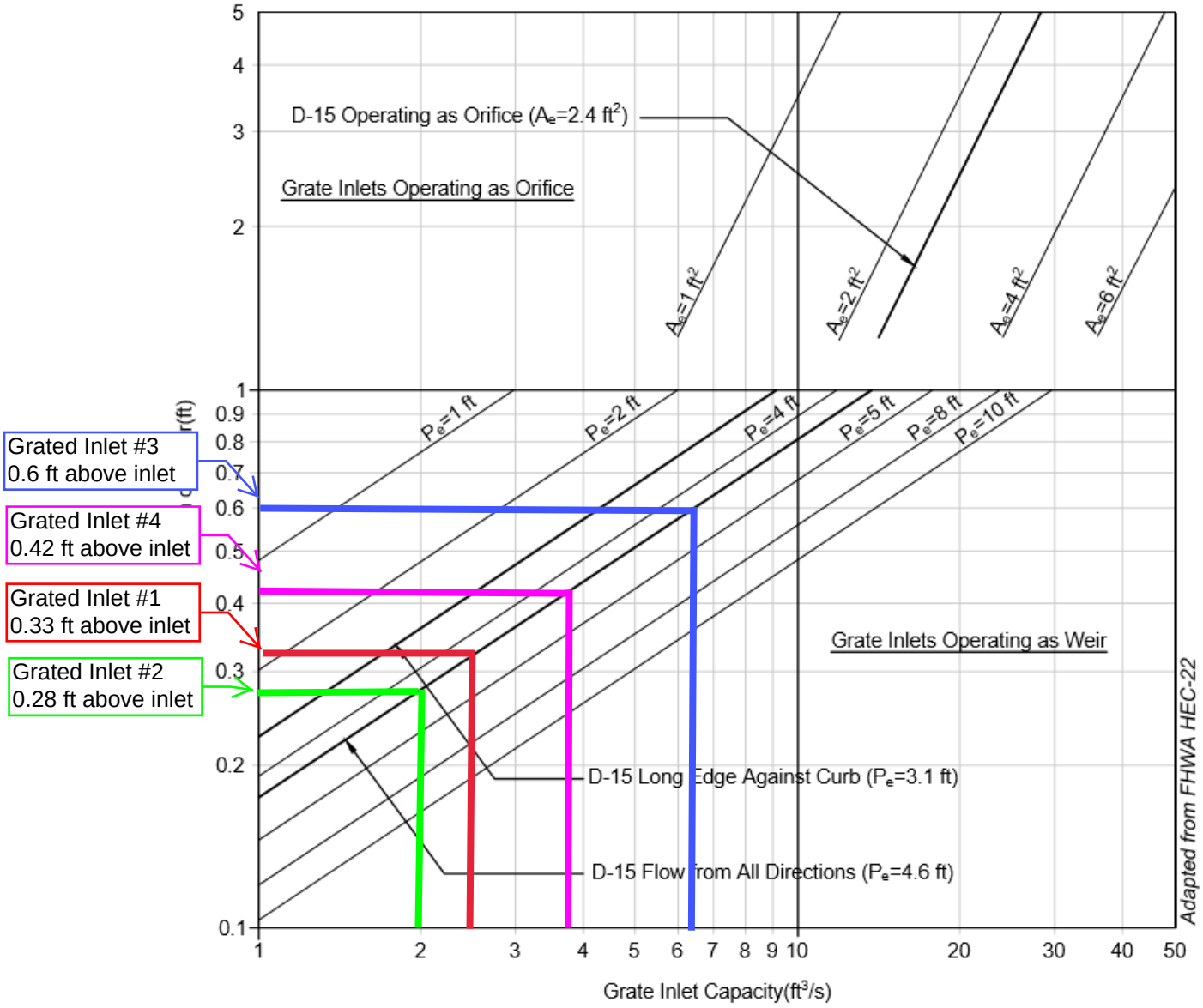


Figure 3-5. Capacity of Grate Inlets in Sag Locations

Step 1. Calculate the capacity of a grate inlet operating as a weir using the weir equation (Equation 3–10) with a length equivalent to perimeter of the grate. When the grate is located next to a curb, disregard the length of the grate against the curb.

Curb Inlet Sizing

	Opening Length (ft)	Opening Height (ft)	Q_{100}	Depth (ft)
Inlet #1	14	0.5	15.91	0.179
Inlet #2	14	0.5	1.80	0.002
Inlet #3	20	0.5	37.36	0.483
Inlet #4	20	0.5	47.43	0.778

$$Q = 0.67hL(2gd_o)^{1/2}$$

where:

Q	=	inlet capacity (ft^3/s)
h	=	curb opening height (ft)
L	=	curb opening length (ft)
g	=	gravitational acceleration (32.2 ft/s^2)
d_o	=	effective depth of flow at curb face (ft)

Appendix 1

County of San Diego Hydrology Manual

Soil Hydrologic Groups

Orange County

Riverside County

Imperial County

Mexico

Pacific Ocean

PROJECT SITE
GROUP 'D'

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'

33°30' 33°15' 33°00' 32°45' 32°30'

Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

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3 0 3 Miles

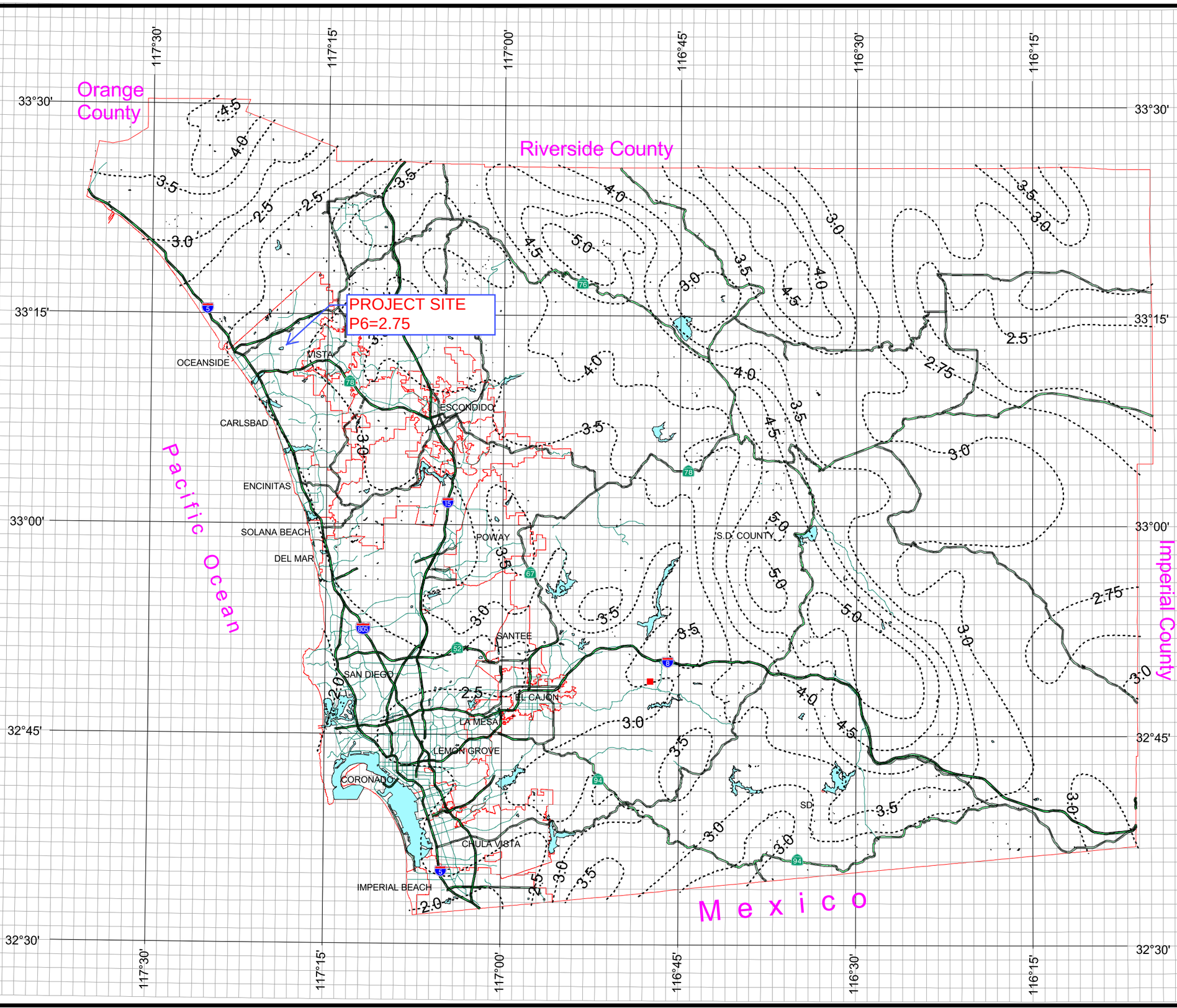
Appendix 2

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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Appendix 3

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

PROJECT SITE
P_{24}=5.2"

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

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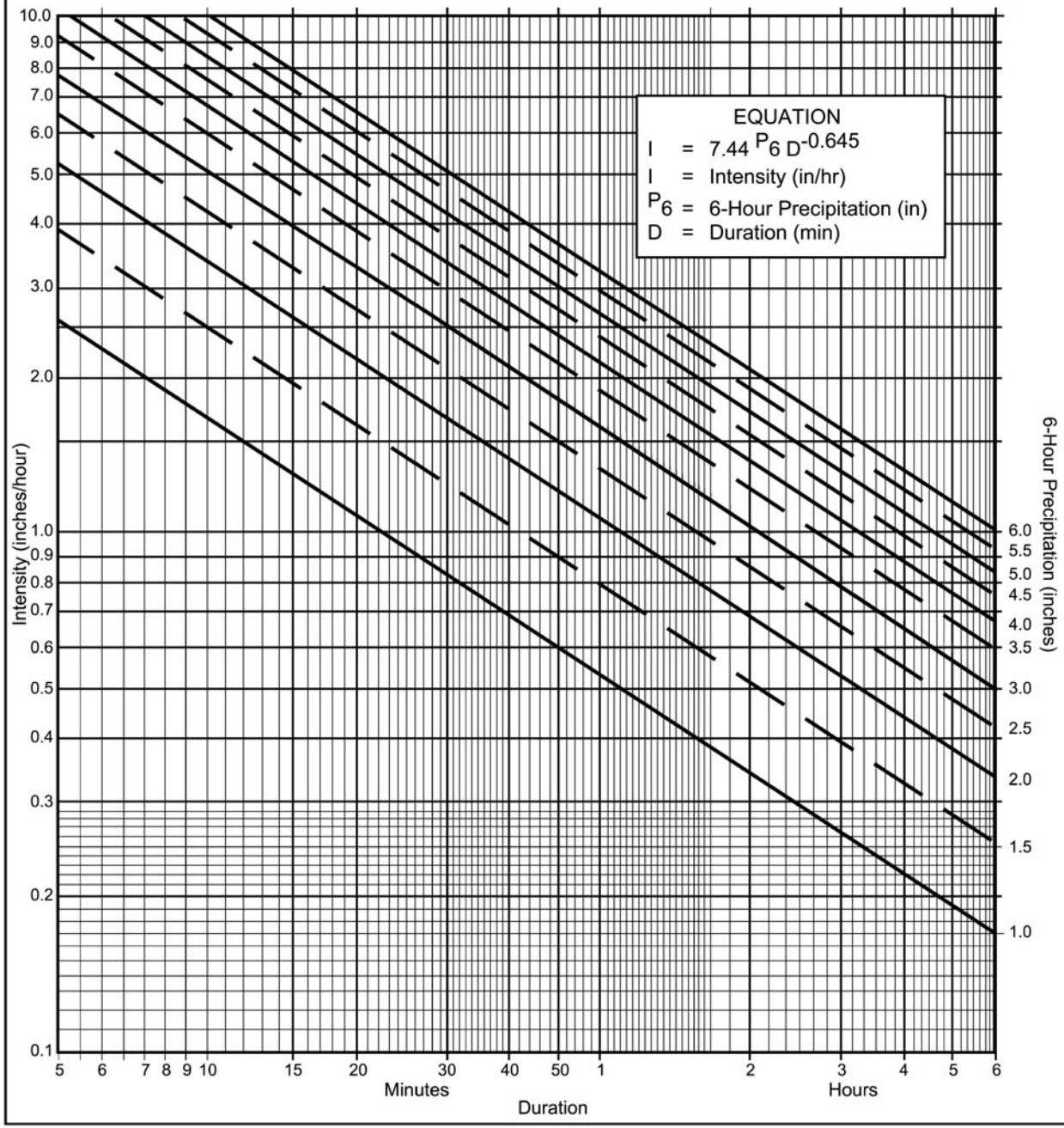
APPENDIX 3.0

Appendix 4



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.7 in., P_{24} = 5.3, $\frac{P_6}{P_{24}}$ = 51 %(2)

(c) Adjusted P_6(2) = n/a in.

(d) t_x = _____ min. **T & I per Rational**

(e) I = _____ in./hr. **Calc sheet**

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

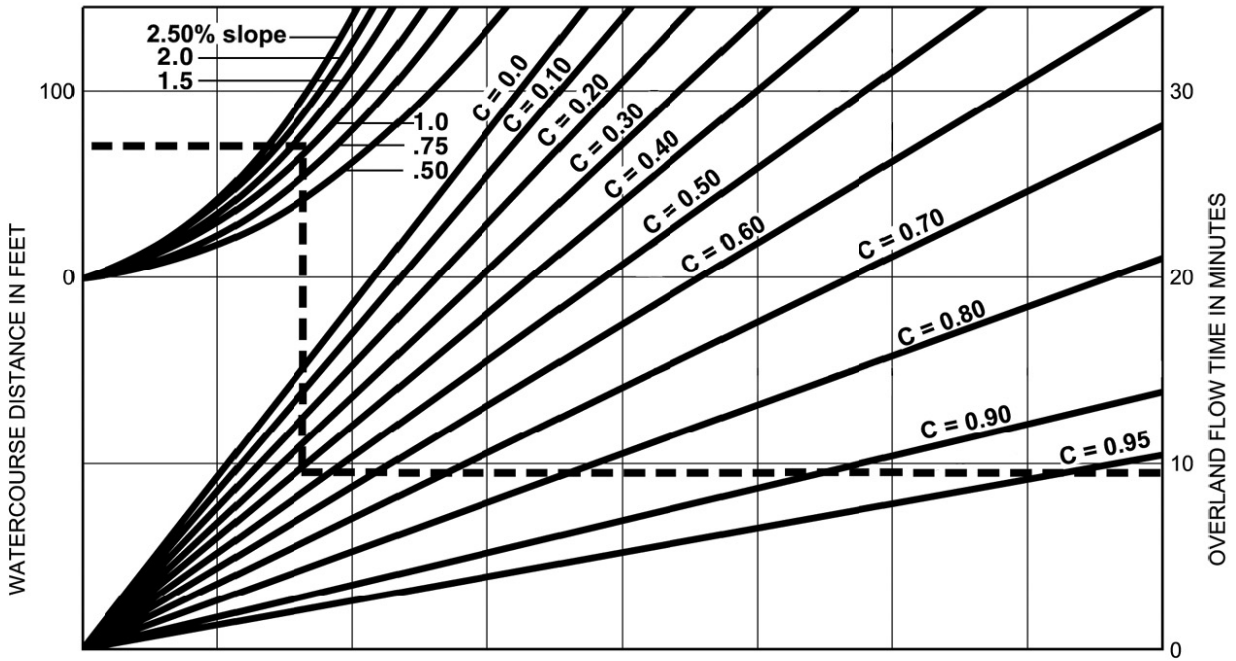
Appendix 5

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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

Appendix 6



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

Rational Formula - Overland Time of Flow Nomograph

FIGURE 3-3

Appendix 7

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

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

Table 3-2

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

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

*See Table 3-1 for more detailed description

ATTACHMENT 6
Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 6.

GEOTECHNICAL INVESTIGATION, CONCORDIA AT LOS ARBOLITOS APN: 158-301-46-00 OCEANSIDE, CALIFORNIA

Prepared for:

Concordia Homes
380 Stevens Avenue, Suite 307
Solana Beach, California 92075

Project No. 12807.002

October 16, 2020

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

October 16, 2020

Project No. 12807.002

Concordia Homes
380 Stevens Avenue, Suite 307
Solana Beach, California 92075

Attention: Mr. Jeb Hall

Subject: Geotechnical Investigation
Concordia at Los Arbolitos, APN: 158-301-46-00
Aspen Street, Oceanside, California

In accordance with your request and authorization, we have conducted a geotechnical investigation of the property for the design and construction of the proposed residential development project.

Based on the results of our study, it is our professional opinion that the site is suitable to receive the proposed improvements. The accompanying report presents a summary of our investigation and provides geotechnical conclusions and recommendations relative to the proposed site development.

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

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Mike D. Jensen, CEG 2457
Associate Geologist

William D. Olson, RCE 45283
Associate Engineer

Distribution: (1) Addressee

TABLE OF CONTENTS

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Leighton

Tables

FIGURES

APPENDICES

1.0 INTRODUCTION

We recommend that all individuals utilizing this report read the preceding information sheet prepared by ASFE (the Association of Engineering Firms Practicing in the Geosciences) and the Limitations, Section 7.0, located at the end of this report.

1.1 Purpose and Scope

This report presents the results of our geotechnical investigation for the site located in the City of Oceanside, California (Figure 1). The intent of this report is to provide specific geotechnical conclusions and recommendations for the currently proposed project.

1.2 Site Location and Description

The site is located east of San Luis Rey drainage in Oceanside, California (Figure 1). The site is currently largely undeveloped, with isolated culverts and dirt pedestrian pathways throughout.

The site is roughly rectangular shaped with the long axis oriented north-south and encompassing a footprint of approximately 7.4 acres. Specifically, the property is bounded on the north and west by the San Luis Rey River, and on the south and east by existing residential properties. Site elevations vary between 48 feet above mean sea level (msl) and 50 feet msl with topography across the site gently sloping from the northeast to the southwest.

Site Latitude and Longitude
33.236379º N
117.339162º W

1.3 Proposed Development

While precise grading plans were not available for our review, we understand that the project will consist of construction of a single familymulti-building residential project. Specifically, construction is currently proposed to consist of a 53 single family units, associated utilities, roadways, landscape and hardscape. We also understand Pala Road will be extended west ward up to San Luis Rey River as part of the development.

2.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

2.1 Current Site Investigation

Our subsurface exploration of the site was performed on July 21 and September 18, 2020, and consisting of excavating twelve (12) exploratory test pits and (4) cone penetration tests (CTPs). The exploratory test pits (TP-1 through TP-12) were advanced with rubber tire backhoe to characterize the onsite soils, including those likely to be encountered at and below the proposed foundation elevations for this project. The four Cone Penetration Tests (CPT's) were also advanced to further characterize the onsite soils for the purpose of evaluating liquefaction potential. A geologist from our firm visually logged the soil types encountered in accordance to ASTM D2488. Select soil samples were obtained for laboratory testing. The approximate locations of the test pits and CPTs are presented on the Geotechnical Exploration Map (Figure 2) and the test pit logs and CPT profiles are presented in Appendix B.

2.2 San Luis Rey Project

As part of this study, we performed a limited review of the various As-built Plans related to the San Luis Rey River flood control project by the United States Army Corps of Engineers (1994, 1999). Improvements related to the project consisted of construction of a grouted stone lined levee embankment, including placement of completed fill, aggregate base and asphaltic concrete pavement. The levee construction consisted of removing upper 5 feet of alluvial material and placing compacted fill at 92% relative compaction for levee 2:1 fill slopes.

2.3 Laboratory Testing

Laboratory testing was performed on selected soil samples to evaluate particle size and distribution, maximum bulk density and optimum moisture content, and expansion index. A discussion of the laboratory tests performed and a summary of the laboratory test results are presented in Appendix C.

3.0 SUMMARY OF GEOTECHNICAL CONDITIONS

3.1 Regional Geologic Setting

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

3.2 Site-Specific Geology

Based on our subsurface exploration and review of geologic literature and maps (Appendix A), the geologic units underlying the site consist of localized undocumented artificial fill overlying surficial alluvial floodplain deposits (Quaternary-aged Young Alluvial Floodplain Deposits) (Figure 3). A brief description of the geologic units encountered on the site is presented below.

3.2.1 Undocumented Fill – (Afu)

During our subsurface exploration, undocumented artificial fill soil on the order of up to approximately 3 feet was encountered at the exploration locations. The fill was apparently placed during the site's initial construction (possibly in association with levee construction) and deeper fills may exist that were not observed during our exploration. An as-graded report was not available for our review, and it is assumed that no engineering observations of these fill soils were provided at the time of grading. As encountered, the fill soils generally consisted of light gray, dry to moist, loose to medium dense, silty sand with gravels. Older fill to the west of the site were placed during construction of the San Luis Rey River Flood Control project. Based on our review, these fills were properly compacted up to the top of the levee.

3.2.2 Quaternary Young Alluvial Deposits (Qya)

Quaternary-aged Young Alluvial Deposits were observed to underlie the site. As encountered, young alluvial flood-plain deposits underlay the fill and consist of materials that range from silts and clays to sands and gravels. The materials are generally unconsolidated, loose to medium dense and soft to firm. The young alluvium generally consists of interbedded layers of medium to dark gray, friable, loose to medium dense, sandy silts to silty sands and silty clays

3.3 Surface and Ground Water

No indication of surface water or evidence of surface ponding was encountered within the limits of the proposed development during our geotechnical investigation performed at the site. In addition, surface water may drain as sheet flow across the site during rainy periods.

Ground water was not observed in the recent test pit explorations at the site. It should however be noted that perched ground water levels may develop and fluctuate during periods of precipitation.

Based on our experience in the site area, the recent and previous subsurface investigations along with measurements of two previously completed piezometers at the site, we anticipate the static ground water to be at a depth of roughly 17 feet below the existing ground surface (bgs), or an elevation of 31 feet msl. Therefore, we anticipate the lowest site foundations and utilities will be above the existing static ground water table at the site.

3.4 Engineering Characteristics of On-site Soils

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

3.4.1 Expansion Potential

Based on our visual observations performed during our site reconnaissance, subsurface investigation, laboratory testing, and similar projects in the site vicinity, we anticipate the near surface soils to have a

generally very low to low expansion potential. However, soils with greater expansion potential may be encountered during grading and additional testing may be warranted. Nevertheless, expansive soils are not anticipated to impact the proposed site development.

3.4.2 Compressible Soils

Based on the results of our subsurface explorations at the site, and review of other projects in the area, we expect that the upper 8 feet of the site is underlain by undocumented fill or alluvial deposits which are considered compressible. These soils are not considered suitable for support of foundation loads in their present condition. Recommendations for remedial grading of these soils are provided in Section 6 of this report.

3.4.3 Soil Corrosivity

A preliminary corrosive soil screening for the on-site materials was completed to evaluate their potential effect on concrete and ferrous metals. The corrosion potential was evaluated using the results of laboratory testing on one representative soil sample obtained during our subsurface evaluation.

Laboratory testing was performed to evaluate pH, minimum electrical resistivity, and chloride and soluble sulfate content. The sample tested had measured pH value of 7.7, and a measured minimum electrical resistivity of 4,400 ohm-cm. Test results also indicated that the sample had a chloride content of zero parts per million (ppm), and a soluble sulfate content of less than 0.0150 percent by weight in soil.

3.4.4 Excavation Characteristics

The site is underlain by undocumented fill and Quaternary Young Alluvial Deposits generally consisting of silty sands to sandy silts with trace gravels. With regards to the proposed project, it is anticipated these on-site soils can be excavated with conventional heavy-duty construction equipment. Oversize cobble material, if encountered, should be placed in non-structural areas or hauled off-site. Friable sands should be anticipated within the alluvial material and may require special consideration during utility excavations.

4.0 SEISMIC AND GEOLOGIC HAZARDS

4.1 Regional Tectonic Setting and Seismicity

The site is considered to lie within a seismically active region, as can all of Southern California. During the late Pliocene, several new faults developed in Southern California, creating a new tectonic regime superposed on the flat-lying section of Tertiary and late Cretaceous rocks in the San Diego region.

The principal known onshore faults which collectively account for the majority of seismic hazard in southernmost California are the San Andreas, San Jacinto, Elsinore, Imperial and Rose Canyon faults. The balance of seismic hazard is taken by the offshore zone of faults which include the Coronado Bank, San Diego Trough, and San Clemente faults off of the San Diego. Most of the offshore faults coalesce south of the international border, where they come onshore as the Agua Blanca fault which transects the Baja California peninsula south of Ensenada (Jennings, 2010).

The primary seismic hazard for San Diego is the Rose Canyon fault zone which is located approximately 7.5 miles west of the site and is the ‘active’ seismogenic fault considered having the most significant effect at the site from a design standpoint.

4.2 Local Faulting

Our review of available geologic literature (Appendix A) indicates that there are no known active or potentially active faults transecting, or projecting toward the site. The nearest active fault is the Rose Canyon fault zone located approximately 7.5 miles west of the site.

4.3 Seismic Hazards

Severe ground shaking is most likely to occur during an earthquake on one of the regional active faults in Southern California that are mentioned above. The effect of seismic shaking may be mitigated by adhering to the California Building Code or state-of-the-art seismic design parameters of the Structural Engineers Association of California.

4.3.1 Shallow Ground Rupture

As previously discussed, no faults are mapped transecting or projecting toward the site. Therefore, surface rupture hazard due to faulting is considered very low. Ground cracking due to shaking from a seismic event is not considered a significant hazard either, since the site is not located near slopes.

4.3.2 Mapped Seismic Hazard Zones

The site is not located within a State mapped Earthquake Fault Zone (EFZ). However, the site is mapped within a County of San Diego liquefaction zone. The results of our analysis regarding secondary seismic hazards at the site are summarized in Section 4.4 below.

4.3.3 Site Class

The onsite soils are considered to be liquefiable under a California Building Code design level earthquake. Liquefiable sites are to be classified as Site Class F, requiring a site-specific response analysis. However, per Section 20.3.1 of ASCE 7-16, for structures having fundamental periods of vibration less than 0.5s, Site Class may be determined in accordance to Section 20.3. It is understood that the proposed structures will have a fundamental period less than 0.5 s; therefore, we have utilized a Site Class D for determining spectral acceleration parameters. If it is determined by the structural engineer that the proposed structure has a fundamental period of vibration greater than 0.5 s, a site-specific response analysis will be required.

4.3.4 Building Code Mapped Spectral Acceleration Parameters

The effect of seismic shaking may be mitigated by adhering to the California Building Code and state-of-the-art seismic design practices of the Structural Engineers Association of California. Provided below in Table 1 are the spectral acceleration parameters for the project determined in accordance with the 2019 CBC (CBSC, 2019) and the SEA/OSHPD Web Application. Since the site has an S_1 value greater than 0.2g a ground motion hazard analysis was also performed according to ASCE 7-16 Section 11.4.8.

Table 1 2019 CBC Mapped Spectral Acceleration Parameters			
Site Class	D		
Site Coefficients	F_a	=	1.122
	F_v	=	null
Mapped MCE Spectral Accelerations	S_S	=	0.946g
	S_1	=	0.35g
Site Modified MCE Spectral Accelerations	S_{MS}	=	1.061g
	S_{M1}	=	null
Design Spectral Accelerations	S_{DS}	=	0.707g
	S_{D1}	=	null
Transitional Period	F_v	=	1.950g
	S_{M1*}	=	0.683g
	S_{D1*}	=	0.455g
	$T_s = S_{D1}/S_{DS}$	=	0.628s

*Site-specific ground motion hazard analysis is required for determination of S_{M1} and S_{D1} for use in seismic design. Values of S_{M1} and S_{D1} presented are only for the purposes of determining T_S as per Supplement 1 to ASCE 7-16 (ASCE, 2018).

Utilizing ASCE Standard 7-16, in accordance with Sections 11.8.2 and 11.8.3, the following additional parameters for the peak horizontal ground acceleration are associated with the Geometric Mean Maximum Considered Earthquake (MCE_G). The mapped MCE_G peak ground acceleration (PGA) is 0.41g for the site. For a Site Class D, the F_{pga} is 1.19 and the mapped peak ground acceleration adjusted for Site Class effects (PGA_M) is 0.488g for the site.

Since the mapped spectral response at 1-second period is less than 0.75g, then all structures subject to the criteria in Section 1613.2.5 of the 2019 CBC are assigned Seismic Design Category D.

4.4 Secondary Seismic Hazards

In general, secondary seismic hazards can include soil liquefaction, seismically-induced settlement, lateral displacement, surface manifestations of liquefaction,

landsliding, seiches, and tsunamis. The potential for secondary seismic hazards at the subject site is discussed below.

4.4.1 Liquefaction and Dynamic Settlement

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Granular soils tend to densify when subjected to shear strains induced by ground shaking during earthquakes. Research and historical data indicate that loose granular soils underlain by a near surface ground water table are most susceptible to liquefaction, while the clay-rich materials are not susceptible to liquefaction. Liquefaction is characterized by a loss of shear strength in the affected soil layer, thereby causing the soil to behave as a viscous liquid. This effect may be manifested at the ground surface by settlement and, possibly, sand boils where insufficient confining overburden is present over liquefied layers. Where sloping ground conditions are present, liquefaction-induced lateral instability can result.

In our preliminary liquefaction analysis utilizing the computer program CLiq Version 3.0.3.2, we used a deaggregation of the Maximum Considered Earthquake event with a magnitude M6.9 (i.e., associated with the Design Earthquake Ground Motion). The peak horizontal ground acceleration associated with the Maximum Considered Earthquake (MCE) Ground Motion is 0.49g. The MCE was obtained utilizing USGS Unified Hazard Tool. Based on the results of the liquefaction analysis, several discontinuous and variable thickness layers of saturated alluvial materials are located between a depth of approximately 17 to 52 feet bgs. As encountered in the CPT explorations, these layers are considered susceptible to liquefaction at the design earthquake ground motion.

Total dynamic settlement at the site as a result of the Design Earthquake Ground Motion is roughly estimated at between approximately 1.3 to 3.1 inches. Differential dynamic settlement at the site is anticipated to be on the order of 1.5 inches or less within 50 feet considering the depth and discontinuous nature of the liquefied zones. Summary plots showing idealized profile, relevant CPT data, calculated cyclic stress and resistance ratio, factor of safety, and liquefaction-induced settlement are provided in Appendix D.

A summary plot showing idealized profile, relevant CPT data, calculated cyclic stress and resistance ratio, factor of safety, and liquefaction-induced settlement is provided in Appendix D.

4.4.2 Lateral Spread

Empirical relationships have been derived (Youd et al., 1999) to estimate the magnitude of lateral spread due to liquefaction. These relationships include parameters such as earthquake magnitude, distance of the earthquake from the site, slope height and angle, the thickness of liquefiable soil, and gradation characteristics of the soil.

The susceptibility to earthquake-induced lateral spread is considered to be low for the site because of the generally discontinuous nature of the underlying liquefiable layers, construction method of the fortified levee at the San Luis Rey River, and the nearest distance to an open slope face (approximately 150 feet to the San Luis Rey river).

4.4.3 Tsunamis and Seiches

Based on a site elevation of approximately 50 feet msl, the distance of the site from the Pacific coastline, and the CGS Tsunami Inundation Map of the area (CalEMA, 2009) the potential for flood damage to occur at the site from a tsunami or seiche is considered nil.

4.5 Landslides

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

No landslides or indications of deep-seated landsliding were indicated at the site during our field exploration or our review of available geologic literature, topographic maps, and stereoscopic aerial photographs. Furthermore, our field reconnaissance and the local geologic maps indicate the site is generally underlain by favorable oriented geologic structure, consisting of massively bedded silty to

clayey sands and sandy to silty clays, and flat lying topographic conditions. Therefore, the potential for significant landslides or large-scale slope instability at the site is considered nil.

4.6 Flood Hazard

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2012); the majority of the site is located within a Zone X floodplain, and the southwestern portion of the site is located in Zone AO (100-year) floodplain, see Figure 5. However, based on this review and our site reconnaissance, the potential for flooding of the site is considered low since the adjacent portion of the San Luis Rey River has been channelized.

5.0 CONCLUSIONS

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

- Generally loose surficial soils consisting of fill and alluvium having depths of up to approximately 8 feet locally underlie the site and are considered compressible. Therefore, in their present condition, these soils are not considered suitable for the support of structural loads or the support of engineered fill soils and site improvements. Section 6.1.2 of this report provides specific recommendations regarding mitigation of these soil materials.
- Based on the results of our subsurface explorations and available geologic references, ground water is not anticipated to be a constraint during site construction, and we do not anticipate that temporary dewatering will be necessary. Ground water was encountered at an elevation of approximately 17 feet below the ground surface across the site (elevation of 31 feet msl).
- The underlying alluvial deposits are subject to localized liquefaction or seismic settlement. Differential dynamic settlement at the site is anticipated to be on the order of 1.5 inches or less across 50 feet considering the depth and discontinuous nature of the liquefied zones.
- Based on the results of our subsurface investigation, we anticipate that the onsite materials should be generally rippable with conventional heavy-duty earthwork equipment. Although, localized areas of gravels were encountered during our exploration, the existing onsite soils are suitable for reuse as engineered fill provided they are relatively free of organic material, debris, and rock fragments larger than 6 inches in maximum dimension. Loose caving friable sand should be anticipated during site excavations. In addition, unknown items such as buried concrete and debris left from previous fill placement should be anticipated.
- Based on visual classification, materials derived from the on-site soil materials possess a very low to medium expansion potential, although locally more expansive materials may be encountered.

- Although Leighton does not practice corrosion engineering, laboratory test results indicate the soils present on the site have a negligible potential for sulfate attack on normal concrete. The onsite soils are considered to be moderately corrosive to buried uncoated ferrous metals.

6.0 RECOMMENDATIONS

6.1 Earthwork

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

6.1.1 Site Preparation

Prior to grading, all areas to receive structural fill, engineered structures, or hardscape should be stripped of vegetation and cleared of surface and subsurface obstructions, including any existing debris and undocumented fill, loose, compressible, or unsuitable soils. Removed vegetation and debris should be properly disposed off site. All areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 8 inches, brought to optimum or above-optimum moisture conditions, and recompacted to at least 90 percent relative compaction based on ASTM Test Method D1557.

6.1.2 Removal of Compressible Soils

Potentially compressible undocumented fill and alluvial soils at the site may settle as a result of wetting or settle under the surcharge of engineered fill and/or structural loads supported on shallow foundations. These soils should be removed to undisturbed medium dense alluvium and replaced as moisture conditioned engineered fill. In general, removal depths will extend to 8 feet below the existing ground surface across the site. Additionally, removal depths should extend to a minimum of 3 feet below bottom of foundation footings or a depth equal to 2 times the foundation width, whichever is greater. The lateral limits of the removal bottom should extend at least 10 feet beyond the foundation limits where possible. The bottom of all removals should be evaluated by a Certified Engineering Geologist to confirm conditions are as anticipated.

In areas of proposed pavements, hardscape and landscaping features, removals should be performed to a depth of 4 feet below proposed subgrade elevation and extend at least 4 feet beyond the limits of the proposed improvements. The bottom of all removals should be evaluated by a Certified Engineering Geologist to confirm conditions are as anticipated.

In general, the soil that is removed may be reused and placed as engineered fill provided the material is moisture conditioned to above optimum moisture content, and then recompacted prior to additional fill placement or construction. Soil with an expansion index greater than 50 should not be used within 5 feet of finish grade in the building pad. The actual depth and extent of the required removals should be confirmed during grading operations by the geotechnical consultant.

6.1.3 Cut/Fill Transition Mitigation

Although final grading plans were not available at the time of drafting this report, the proposed site is situated in an area where generally flat topography is present. Therefore, we do not anticipate mitigation for cut/fill transitions will be necessary. However, should such conditions occur, to mitigate the impact of the underlying cut/fill transition condition beneath possible structures that are planned across existing or future cut/fill transitions, the cut portion should be over-excavated to at least 3 feet below the bottoms of proposed building foundations. The over-excavated material should be replaced with properly compacted fill. The overexcavation should laterally extend at least 5 feet beyond the building pad area and all associated settlement-sensitive structures. As an alternative to overexcavation of the cut portions, the pad grade may be raised following surficial soil preparation, to achieve similar results.

6.1.4 Excavations and Oversize Material

Excavations of the onsite materials may generally be accomplished with conventional heavy-duty earthwork equipment. Due to the generally friable nature of the fill and alluvium, temporary excavations, such as utility trenches with vertical sides, may slough over time.

In accordance with OSHA requirements, excavations deeper than 5 feet should be shored or be laid back if workers are to enter such excavations. Temporary sloping gradients should be determined in the field by a "competent person" as defined by OSHA. For preliminary planning, sloping of fill soils at 1:1 (horizontal to vertical) may be assumed. Excavations supporting structures or greater than 20 feet in height will require an alternative sloping plan or shoring plan prepared by a California registered civil engineer.

6.1.5 Engineered Fill

In areas proposed to receive engineered fill, the existing upper 8 inches of subgrade soils should be scarified then moisture conditioned to moisture content at or above the optimum content and compacted to 90 percent or more relative to the maximum laboratory dry density, as evaluated by ASTM D 1557. Soil materials utilized as fill should be free of oversized rock, organic materials, and deleterious debris. Rocks greater than 6 inches in diameter should not be placed within 2 feet of finished grade. Fill should be moisture conditioned to at least 2 percent above the optimum moisture content and compacted to 90 percent or more relative to the maximum laboratory dry density, as evaluated by ASTM D 1557. Although the optimum lift thickness for fill soils will be dependent on the type of compaction equipment utilized, fill should generally be placed in uniform lifts not exceeding approximately 8 inches in loose thickness.

In vehicle pavement and trash enclosure areas the upper 12 inches of subgrade soils should be scarified then moisture conditioned to a moisture content above optimum content and compacted to 95 percent or more relative to the maximum laboratory dry density, as evaluated by ASTM D 1557.

Placement and compaction of fill should be performed in general accordance with current City of Oceanside grading ordinances, California Building Code, sound construction practice, these recommendations and the General Earthwork and Grading Specifications for Rough Grading presented in Appendix E.

6.1.6 Earthwork Shrinkage/Bulking

The volume change of excavated onsite materials upon recompaction as fill is expected to vary with material and location. Typically, the surficial soils vary significantly in natural and compacted density, and therefore, accurate earthwork shrinkage/bulking estimates cannot be determined. However, based on our experience, a 5 to 7 percent shrinkage factor is considered appropriate for the artificial fill and surficial alluvium at the site.

6.1.7 Import Soils

If import soils are necessary to bring the site up to the proposed grades, these soils should be granular in nature, environmentally clean, have an expansion index less than 50 (per ASTM Test Method D4829) and have a low corrosion impact to the proposed improvements. Import soils and/or the borrow site location should be evaluated by the geotechnical consultant prior to import.

6.1.8 Expansive Soils and Selective Grading

Based on our visual observations, we anticipate the onsite soil materials possess a very low to medium expansion potential. Although not anticipated, should an abundance of highly expansive materials be encountered, selective grading may need to be performed. In addition, to accommodate conventional foundation design, the upper 5 feet of materials within the building pad and 5 feet outside the limits of the building foundation should have a very low to low expansion potential (EI<50).

6.2 Foundation and Slab Considerations

At the time of drafting this report, building loads for were not known. However, based on our understanding of the project, the proposed buildings should be constructed with post-tension foundation due to the liquefaction potential. Foundations and slabs should be designed in accordance with structural considerations and the following recommendations. These recommendations assume that the soils encountered within 5 feet of pad grade have a low potential for expansion (EI<50). If more expansive materials are encountered and selective grading cannot be accomplished, revised foundation recommendations may be necessary. The foundation recommendations below assume that the all building

foundations will be underlain by properly compacted engineered fill in accordance to Section 6.1.5 of this report.

6.2.1 Post-Tension Foundation Recommendations

Due to liquefaction potential at the site we recommended post-tensioned foundations. We recommend that post-tensioned foundations be designed using the geotechnical parameters presented in table below and criteria of the 2019 California Building Code and the Third Edition of Post-Tension Institute Manual. A post-tensioned foundation system designed and constructed in accordance with these recommendations is expected to be structurally adequate for the support of the buildings planned at the site provided our recommendations for surface drainage and landscaping are carried out and maintained through the design life of the project. Based on an evaluation of the depths of fill beneath the building pads, the attached Table 2 presents the recommended post-tension foundation category for residential buildings on subject site.

Table 2
Post-Tensioned Foundation Design Recommendations

Design Criteria		
Edge Moisture Variation, e_m	Center Lift:	7.0 feet
	Edge Lift:	3.7 feet
Differential Swell, y_m	Center Lift:	1.09 inches
	Edge Lift:	1.99 inches
Perimeter Footing Depth:		30 inches
Allowable Bearing Capacity		2,000 psf

The post-tensioned (PT) foundation and slab should also be designed in accordance with structural considerations. For a ribbed PT foundation, the concrete slabs section should be at least 5 inches thick. Continuous footings (ribs or thickened edges) with a minimum width of 12 inches and a minimum depth of 12 inches below lowest adjacent soil grade may be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot. For a uniform thickness “mat” PT foundation, the perimeter cut off wall should be

at least 8 inches below the lowest adjacent grade. However, note that where a foundation footing or perimeter cut off wall is within 3 feet (horizontally) of adjacent drainage swales, the adjacent footing should be embedded a minimum depth of 12 inches below the swale flow line. The allowable bearing capacity may be increased by one-third for short-term loading. The slab subgrade soils should be presoaked in accordance with the recommendation presented in Table 4 prior to placement of the moisture barrier.

The slab should be underlain by a moisture barrier as discussed in Section 6.2.3 above. Note that moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slabs. We recommend that the floor covering installer test the moisture vapor flux rate prior to attempting applications of the flooring. "Breathable" floor coverings should be considered if the vapor flux rates are high. A slip-sheet or equivalent should be utilized above the concrete slab if crack-sensitive floor coverings (such as ceramic tiles, etc.) are to be placed directly on the concrete slab. Additional guidance is provided in ACI Publications 302.1R-04 Guide for Concrete Floor and Slab Construction and 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Floor Materials.

6.2.2 Foundation Setback

We recommend a minimum horizontal setback distance from retaining walls or slopes for all structural foundations, footings, and other settlement-sensitive structures as indicated on the Table 3 below. The minimum recommended setback distance from the most proximal foundation of retaining wall is equal to the height of the retaining wall. This distance is measured from the outside bottom edge of the structural footing, horizontally to the slope or retaining wall rear face, and is based on the slope or wall height. However, the foundation setback distance may be revised by the geotechnical consultant on a case-by-case basis if the geotechnical conditions are different than anticipated.

Table 3 Minimum Foundation Setback from Retaining walls	
Slope Height	Setback
less than 5 feet	5 feet
5 to 15 feet	7 feet

Please note that the soils within the structural setback area possess poor lateral stability, and improvements (such as retaining walls, sidewalks, fences, pavements, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement. Potential distress to such improvements may be mitigated by providing a deepened footing or a grade beam foundation system to support the improvement.

In addition, open or backfilled utility trenches that parallel or nearly parallel structure footings should not encroach within an imaginary 1:1 (horizontal to vertical) downward sloping line starting from the bottom edge of the footing and should also not be located closer than 18 inches from the face of the footing. Deepened footings should meet the setbacks as described above. Also, over-excavation should be accomplished such that deepening of footings to accomplish the setback will not introduce a cut/fill transition bearing condition.

Where pipes cross under footings, the footings should be specially designed. Pipe sleeves should be provided where pipes cross through footings or footing walls and sleeve clearances should provide for possible footing settlement, but not less than 1 inch around the pipe.

6.2.3 Settlement

The foundation the recommended allowable-bearing capacity is based on a maximum total and differential static settlement of 1-inch and 3/4-inch, respectively. Since settlements are a function of footing size and contact bearing pressures, some differential settlement can be expected where a large differential loading condition exists.

Differential dynamic settlement at the site is anticipated to be on the order of 1.5 inch or less within 50 feet considering the depth and discontinuous nature of the liquefied zones.

6.2.4 Moisture Conditioning

The slab subgrade soils underlying the foundation systems should be presoaked in accordance with the recommendations presented in Table 3 prior to placement of the moisture barrier and slab concrete. The subgrade soil moisture content should be checked by a representative of Leighton prior to slab construction.

Presoaking or moisture conditioning may be achieved in a number of ways. But based on our professional experience, we have found that minimizing the moisture loss on pads that has been completed (by periodic wetting to keep the upper portion of the pad from drying out) and/or berming the lot and flooding for a short period of time (days to a few weeks) are some of the more efficient ways to meet the presoaking recommendations. If flooding is performed, a couple of days to let the upper portion of the pad dry out and form a crust so equipment can be utilized should be anticipated.

Table 4
Presoaking Recommendations Based on Finish Grade Soil Expansion Potential

Expansion Potential	Presoaking Recommendations
Very Low	Near-optimum moisture content to a minimum depth of 6 inches
Low	120 percent of the optimum moisture content to a minimum depth of 12 inches below slab subgrade
Medium	130 percent of the optimum moisture content to a minimum depth of 18 inches below slab subgrade
High	130 percent of the optimum moisture content to a minimum depth of 24 inches below slab subgrade

6.3 Lateral Earth Pressures and Retaining Wall Design

Should retaining walls be added to the project, Table 5 presents the lateral earth pressure values for level or sloping backfill for walls backfilled with and bearing against fully drained soils of very low to low expansion potential (less than 50 per ASTM D4829). oils used to backfill retaining walls should be classified as one of the following types according to ASTM D 2487: GW, GP, GM, GC, SW, SP, or SM. These backfill soils should be used within horizontal distance behind the wall equal to one-half the wall height. Retaining wall footings should extend a minimum of 18 inches beneath the lowest adjacent soil grade. At these depths, footings may be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot (psf).

Table 5
Static Equivalent Fluid Weight (pcf)

Conditions	Level	2:1 Slope
Active	35	55
At-Rest	55	85
Passive	350 (Maximum of 3 ksf)	150 (sloping down)

Walls up to 10 feet in height should be designed for the applicable pressure values provided above. If conditions other than those covered herein are anticipated, the equivalent fluid pressure values should be provided on an individual case-by-case basis by the geotechnical engineer. A surcharge load for a restrained or unrestrained wall resulting from automobile traffic may be assumed to be equivalent to a uniform lateral pressure of 75 psf which is in addition to the equivalent fluid pressure given above. For other uniform surcharge loads, a uniform pressure equal to 0.35q should be applied to the wall. The wall pressures assume walls are backfilled with free draining materials and water is not allowed to accumulate behind walls. A typical drainage design is contained in Appendix E. Wall backfill should be compacted by mechanical methods to at least 90 percent relative compaction (based on ASTM D1557). If foundations are planned over the backfill, the backfill should be compacted to 95 percent. Wall footings should be designed in accordance with the foundation design recommendations and reinforced in accordance with structural considerations. For all retaining walls, we

recommend a minimum horizontal distance from the outside base of the footing to daylight as outlined in Section 6.2.2.

Lateral soil resistance developed against lateral structural movement can be obtained from the passive pressure value provided above. Further, for sliding resistance, the friction coefficient of 0.35 may be used at the concrete and soil interface. These values may be increased by one-third when considering loads of short duration including wind or seismic loads. The total resistance may be taken as the sum of the frictional and passive resistance provided that the passive portion does not exceed two-thirds of the total resistance.

To account for potential redistribution of forces during a seismic event, retaining walls providing lateral support where exterior grades on opposites sides differ by more than 6 feet fall under the requirements of 2019 CBC Section 1803.5.12 and/or ASCE 7-16 Section 15.6.1 and should also be analyzed for seismic loading. For that analysis, an additional uniform lateral seismic force of 8H should be considered for the design of the retaining walls with level backfill, where H is the height of the wall. This value should be increased by 150% for restrained walls.

6.4 Geochemical Considerations

Concrete in direct contact with soil or water that contains a high concentration of soluble sulfates can be subject to chemical deterioration commonly known as “sulfate attack.” Soluble sulfate results (Appendix C) indicated a negligible soluble sulfate content. We recommend that concrete in contact with earth materials be designed in accordance with Section 4 of ACI 318-14 (ACI, 2014). In addition, the electrical resistivity characteristics of the tested soil sample indicate a moderately corrosive site environment to ferrous materials in contact with earth materials. We recommend measures to mitigate corrosion be implemented during design and construction.

6.5 Concrete Flatwork

Concrete sidewalks and other flatwork (including construction joints) should be designed by the project civil engineer and should have a minimum thickness of 4 inches. For all concrete flatwork, the upper 12 inches of subgrade soils should be moisture conditioned to at least 2 percent above optimum moisture content and

compacted to at least 90 percent relative compaction based on ASTM Test Method D1557 prior to the concrete placement.

6.6 Preliminary Pavement Design

The pavement section design below is based on an assumed Traffic Index (TI), our visual classification of the subject site soils, and our limited laboratory testing (we have estimated an R-value of 15). The TI values were chosen based on our experience with similar projects. Actual pavement recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations across the site at the completion of the mass grading operations. Flexible pavement sections have been evaluated in general accordance with the Caltrans method for flexible pavement design. The recommended flexible pavement section for this condition is given in Table 6 below:

Table 6
Preliminary Pavement Sections

Assumed Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base (inches)
4.5	3.0	7.0
5.0	4.0	6.0
6.0	4.0	10.0

Flexible pavements should be constructed in accordance with current Caltrans Standard Specifications. Aggregate base should comply with the Caltrans Standard Specifications of Section 26. Aggregate base should be compacted to a minimum of 95 percent relative compaction based on ASTM Method D 1557.

For areas subject to regular truck loading (i.e., trash truck apron), we recommend a full depth of Portland Cement Concrete (P.C.C.) section of 8 inches with appropriate steel reinforcement and crack-control joints as designed by the project structural engineer. We recommend that sections be as nearly square as possible. A 3,500-psi mix that produces a 550-psi modulus of rupture should be utilized.

All pavement section materials conform to and be placed in accordance with the latest revision of the California Department of Transportation Standard Specifications (Caltrans) and American Concrete Institute (ACI) codes. The upper

12 inches of subgrade soil and all aggregate base should be compacted to a relative compaction of at least 95 percent (based on ASTM Test Method D1557).

If pavement areas are adjacent to heavily watered landscape areas, we recommend some measure of moisture control be taken to prevent the subgrade soils from becoming saturated. It is recommended that the concrete curing separating the landscaping area from the pavement extend below the aggregate base to help seal the ends of the sections where heavy landscape watering may have access to the aggregate base. Concrete swales should be designed in roadway or parking areas subject to concentrated surface runoff.

6.7 Infiltration Best Management Practices

Regarding Best Management Practices (BMP) and Low Impact Development (LID) measures, we are of the opinion that infiltration basins, and other on-site storm water retention and infiltration systems can potentially create adverse perched groundwater conditions, both on-site and off-site, when not installed using proper design recommendations (such as the use of liners) and infiltration design parameters. Due to the compressible nature of the underlying artificial fill and alluvium we anticipate infiltration across the site could cause significant settlement to the proposed residential buildings, the existing residences adjacent to the site, and existing onsite sewer and gas utilities. In addition, infiltration could create groundwater mounding due to geologic variability of the alluvial material. Lateral migration of stormwater infiltration could create seepage conditions of the existing levee fill slope west and north of the site. Therefore, infiltration at the site is **not** recommended due to the reason stated above.

6.8 Control of Ground Water and Surface Waters

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

Water should be transported off the site in approved drainage devices or unobstructed swales. We recommend a minimum flow gradient for unpaved drainage within 5 feet of structures of 2 percent sloping away.

The impact of heavy irrigation or inadequate runoff gradient can create perched water conditions, resulting in seepage or shallow ground water conditions where previously none existed. Maintaining adequate surface drainage and controlled irrigation will significantly reduce the potential for nuisance-type moisture problems. To reduce differential earth movements such as heaving and shrinkage due to the change in moisture content of foundation soils, which may cause distress to a structure and improvements, moisture content of the soils surrounding the structure should be kept as relatively constant as possible. Below grade planters should not be situated adjacent to structures or pavements unless provisions for drainage such as catch basins and drains are made.

All area drain inlets should be maintained and kept clear of debris in order to function properly. In addition, landscaping should not cause any obstruction to site drainage. Rerouting of drainage patterns and/or installation of area drains should be performed, if necessary, by a qualified civil engineer or a landscape architect.

6.9 Construction Observation

The recommendations provided in this report are based on preliminary design information and subsurface conditions disclosed by widely spaced excavations. The interpolated subsurface conditions should be checked by Leighton and Associates, Inc. in the field during construction. Construction observation of all onsite excavations and field density testing of all compacted fill should be performed by a representative of this office. We recommend that all excavations be mapped by the geotechnical consultant during grading to determine if any potentially adverse geologic conditions exist at the site.

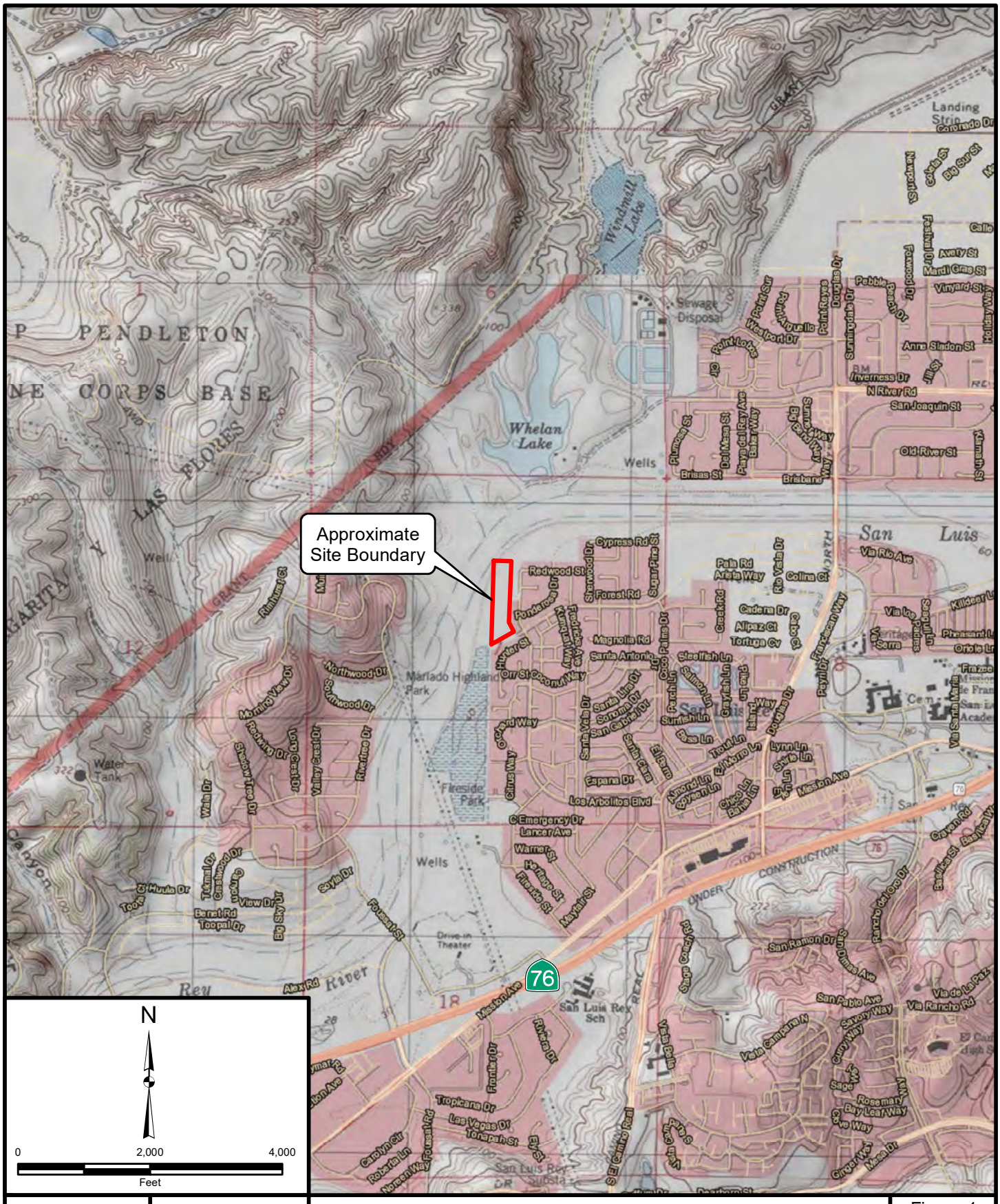
6.10 Plan Review

Final project grading and foundation plans should be reviewed by Leighton as part of the design development process to ensure that recommendations in this report are incorporated in project plans.

7.0 LIMITATIONS

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

Figures



Project: 12807.002	Eng/Geol: WDO/MDJ
Scale: 1 " = 2,000 '	Date: September 2020
Base Map: Bing Maps 2020 Author: (mmurphy)	

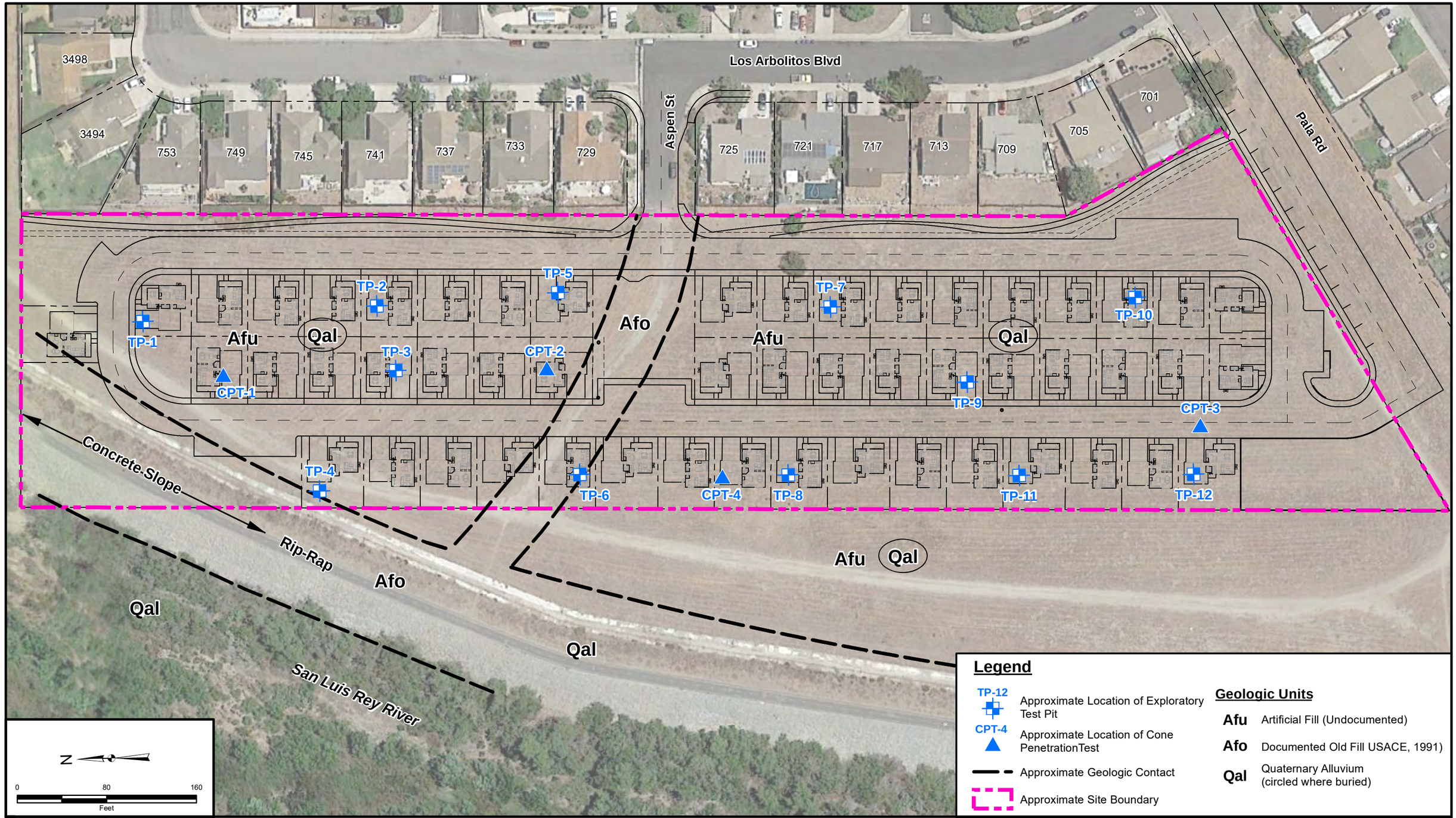
SITE LOCATION MAP

Concordia Geotechnical Investigation
Oceanside, California

Figure 1

Leighton

Map Saved as V:\Drafting\12807\002\Maps\12807-002_F01_SLM_2020-09-17.mxd on 9/18/2020 8:39:57 AM



Legend

- TP-12 — Approximate Location of Exploratory Test Pit
- CPT-4 — Approximate Location of Cone PenetrationTest
- Approximate Geologic Contact
- Approximate Site Boundary

Geologic Units

- **Afu** — Artificial Fill (Undocumented)
- **Afo** — Documented Old Fill USACE, 1991)
- **Qal** — Quaternary Alluvium (circled where buried)

Project: 12807.002	Eng/Geol: WDO/MDJ
Scale: 1 " = 81 '	Date: October 2020
Base Map: Google Earth and WHAT??	
Author: (mmurphy)	

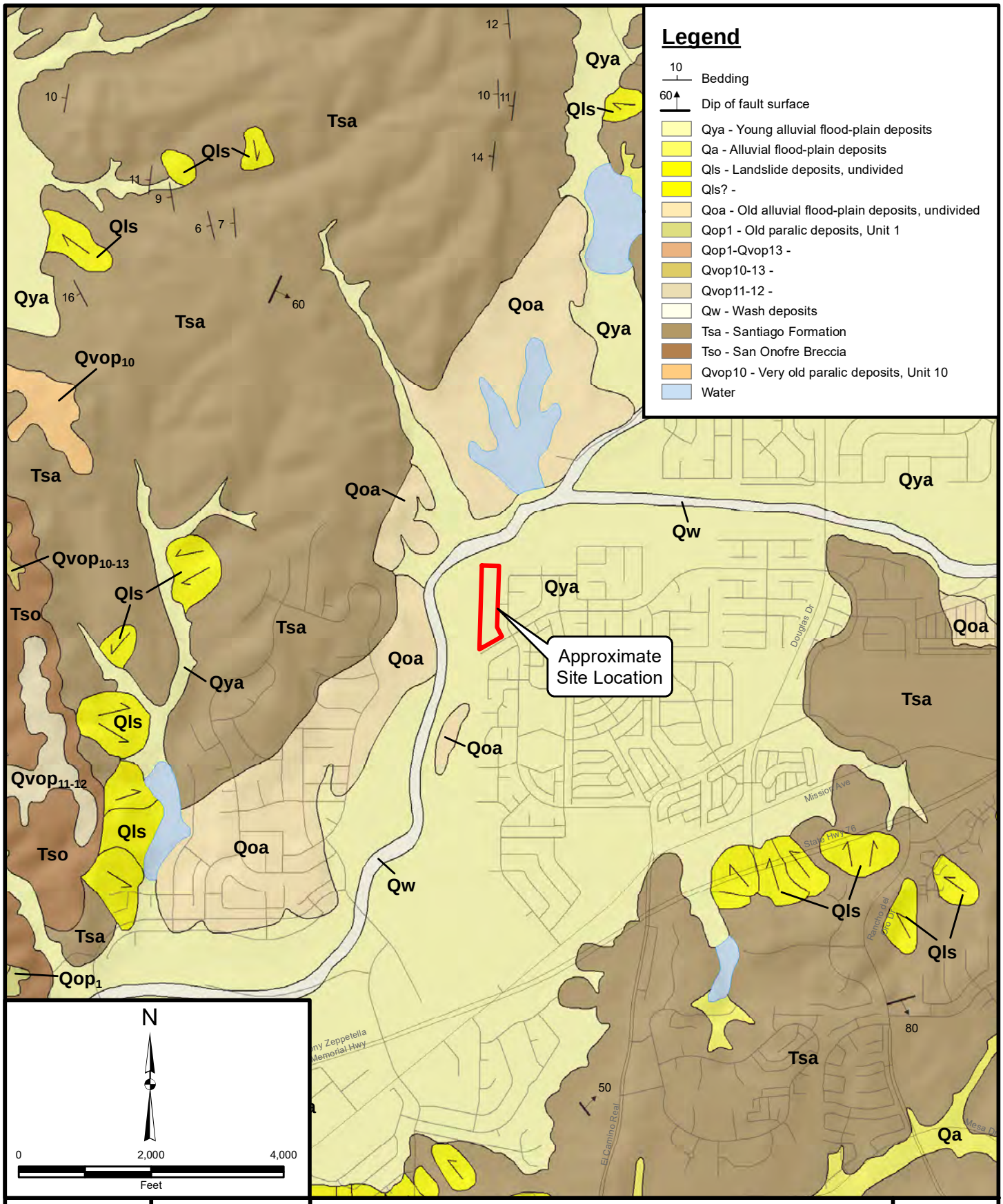
GEOTECHNICAL EXPLORATION MAP

Concordia Geotechnical Investigation
Oceanside, California

Figure 2

Leighton

Map Saved as V:\Drafting\12807\002\Maps\12807-002_F02_GEM_2020-09-17.mxd on 10/15/2020 3:42:59 PM



Project: 12807.002	Eng/Geol: WDO/MDJ
Scale: 1 " = 2,000 '	Date: September 2020

Geoogy map: Map of the Oceanside 30'x60' quadrangle, California, compiled by Michael P. Kennedy and Siang S. Tan, 2008

Author: mmurphy (mmurphy)

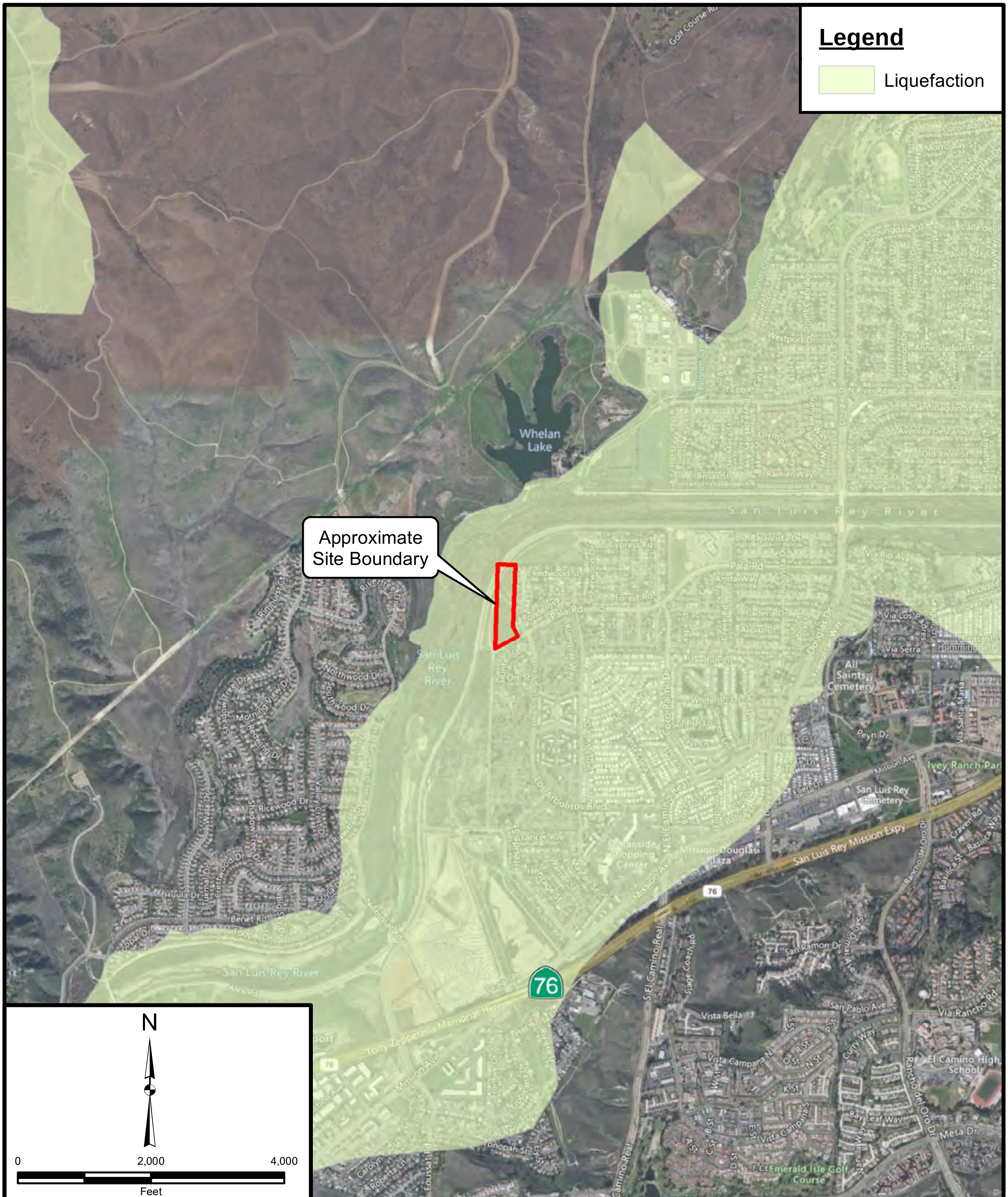
GEOLOGY MAP

Concordia Geotechnical Investigation
Oceanside, California

Figure 3

Leighton

Map Saved as V:\Drafting\12807\002\Maps\12807-002_F03_GM_2020-09-17.mxd on 9/18/2020 9:40:26 AM



Project: 12807.002	Eng/Geol: WDO/MDJ
Scale: 1 " = 2,000 '	Date: September 2020

Base Map: Bing Maps 2020

Author: (mmurphy)

LIQUEFACTION ZONE MAP

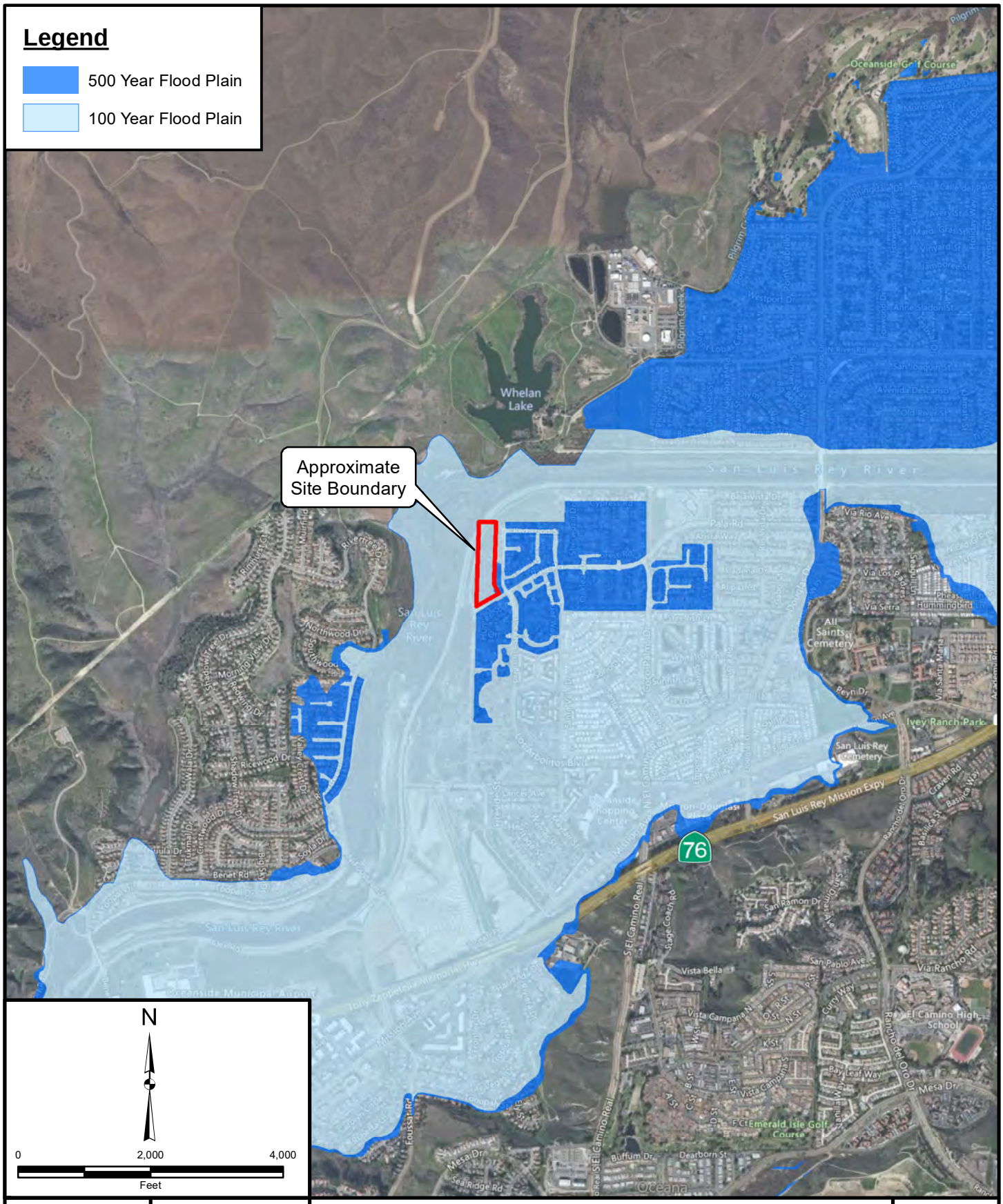
Concordia Geotechnical Investigation

Oceanside, California

Figure 4

Leighton

Map Saved as P:\Drafting\12807\002\Maps\12807-002_F04_LZM_2020-09-17.mxd on 9/18/2020 9:52:10 AM



Project: 12807.002	Eng/Geol: WDO/MDJ
Scale: 1 " = 2,000 '	Date: October 2020

Base Map: Bing Maps 2020
Flood data: SanGIS.

Author: (mmurphy)

FLOOD HAZARD ZONE MAP

Concordia Geotechnical Investigation
Oceanside, California

Figure 5

Leighton

Map Saved as V:\Drafting\12807\002\Maps\12807-002_F05_FHZM_2020-09-17.mxd on 10/13/2020 3:08:23 PM

Appendix A
References

APPENDIX A
REFERENCES

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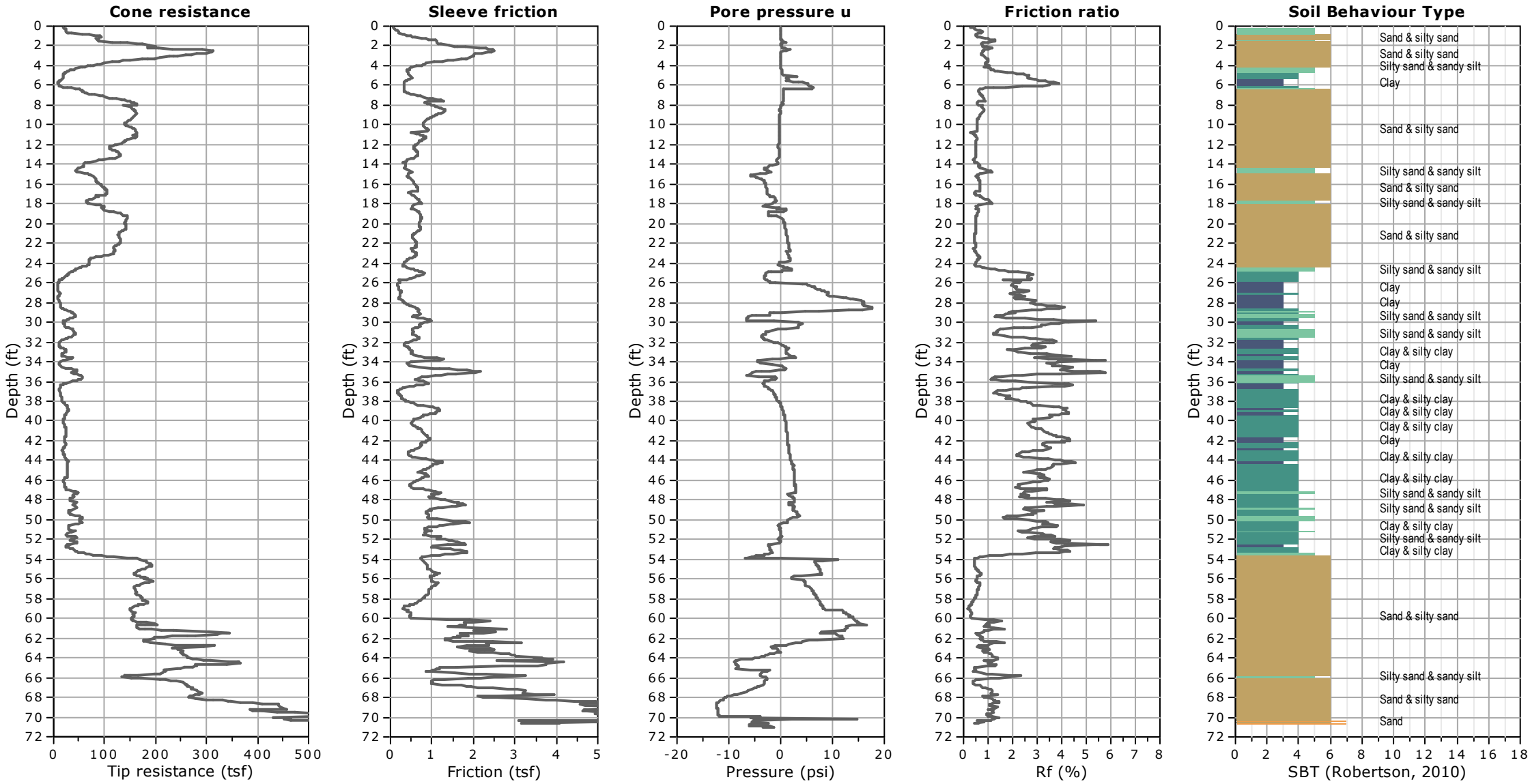
Appendix B
Trench and CPT Logs

Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Leighton & Associates / Concordia**
Location: **Oceanside, CA**

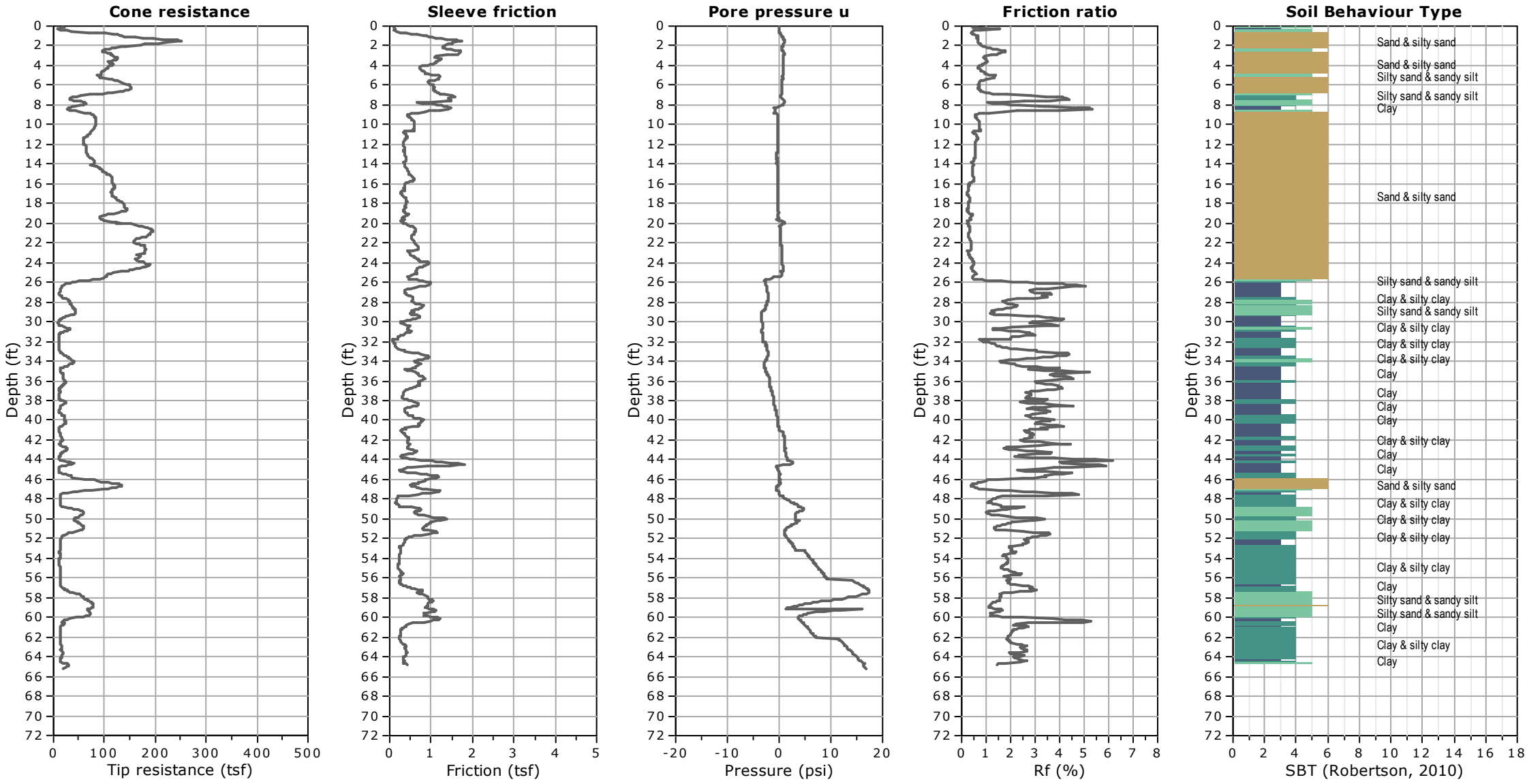
CPT-1
Total depth: 71.06 ft, Date: 7/21/2020



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Leighton & Associates / Concordia**
Location: **Oceanside, CA**

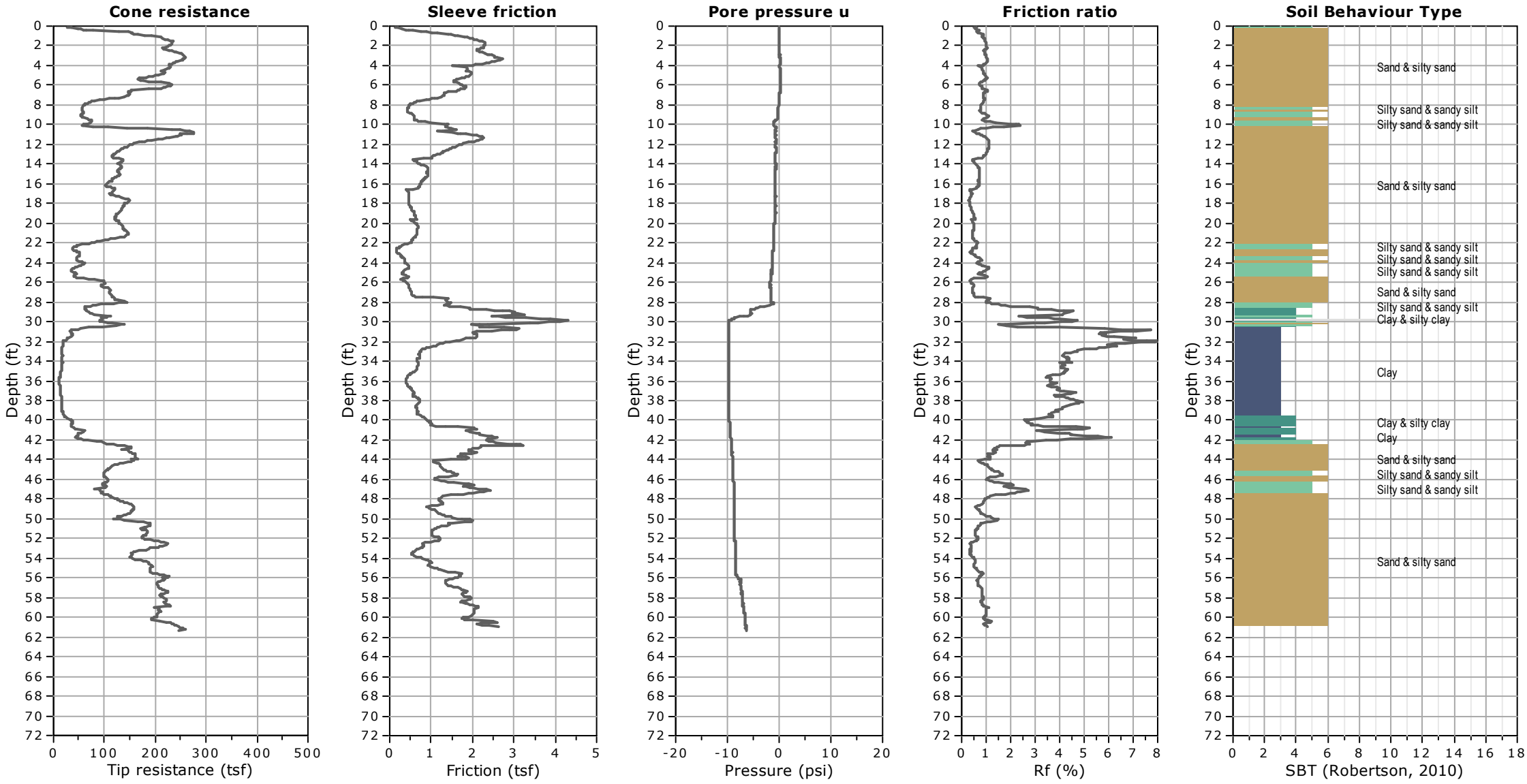
CPT-2
Total depth: 65.17 ft, Date: 7/21/2020



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Leighton & Associates / Concordia**
Location: **Oceanside, CA**

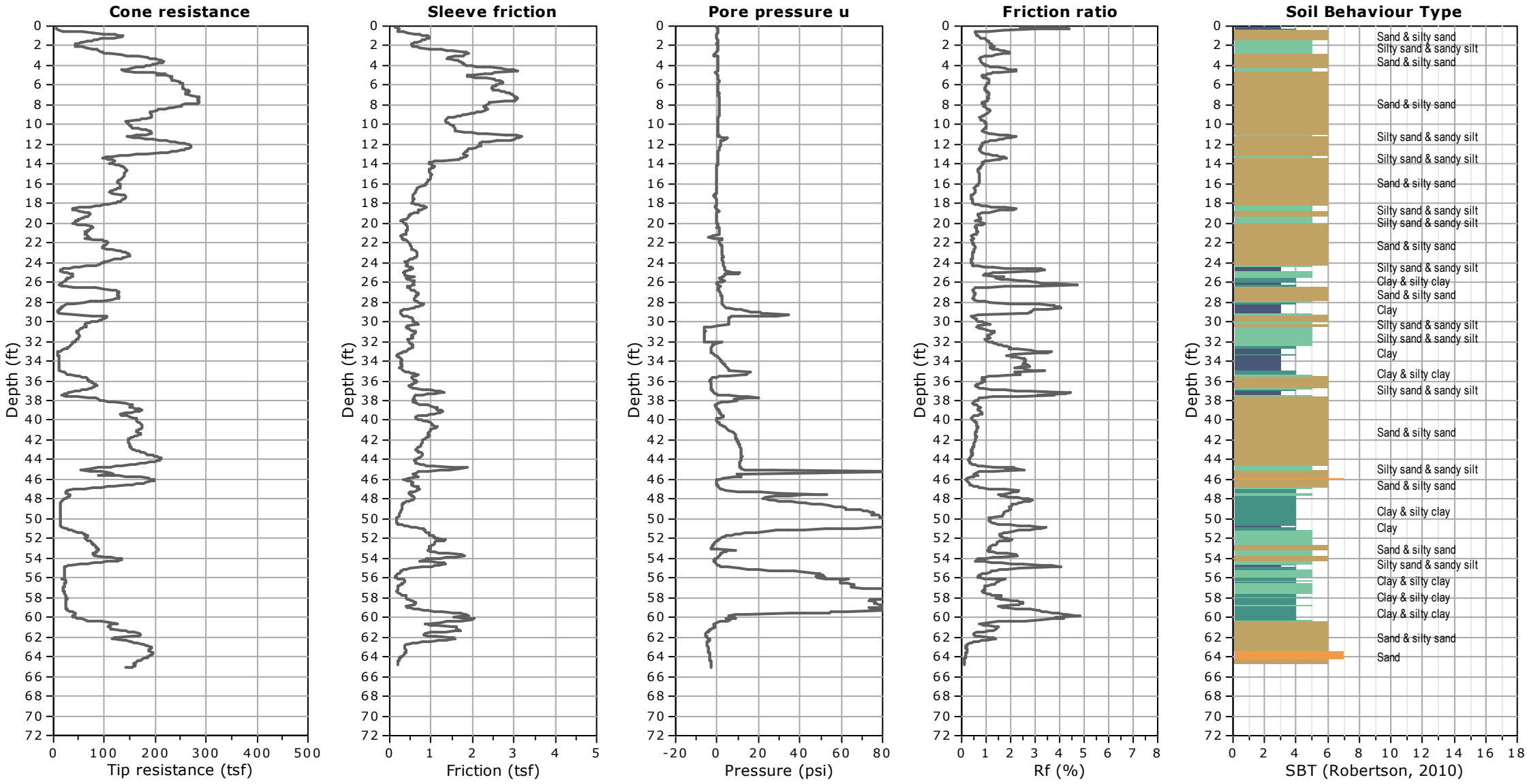
CPT-3
Total depth: 61.30 ft, Date: 7/21/2020



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Leighton & Associates / Concordia**
Location: **Oceanside, CA**

CPT-4
Total depth: 65.16 ft, Date: 7/21/2020



LOG OF TRENCH: T-1

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 50 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu) @ 0-3': Silty SAND, loose, light gray, dry, fine-grained, trace debris QUATERNARY YOUNG ALLUVIUM (Qya) @ 3'-8': Silty SAND, loose, dark gray, moist fine SAND, micaceous, friable, denser at depth	Afu Qya	SM	B-1 @ 0-3'		

GRAPHICAL REPRESENTATION: South SCALE: 1"-5' SURFACE SLOPE: TREND:

								Total Depth = 8 Feet **No Ground Water Encountered** **Backfilled: 9/18/2020**	

LOG OF TRENCH: T-2

Project Name: Concordia/Oceanside | Logged by: ERB

Project Number: 12807.002 | Elevation: 49.5 Feet

Equipment: Rubber Tire Backhoe | Location/Grid:

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES: USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2': Silty SAND, loose, light grayish-brown, dry, medium SAND, trace micas, trace debris		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2'-7': Silty SAND, loose, medium gray, moist, fine to medium SAND, trace micas, friable, caving		SM			
	@ 7'-10': Becomes fine, micaceous, dark gray to black, medium dense		SM			

GRAPHICAL REPRESENTATION: North SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 10 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-3

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 49.5 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2': Silty SAND, loose, light gray, dry, fine-grained, trace micas		SM	B-1 @ 2'-7'		
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2'-7': Poorly-graded SAND, loose, medium gray, moist, fine-grained, micaceous, friable		SP	B-2 @ 7'-9'		
	@ 7'-9': Silty SAND, loose to medium dense, dark gray, fine SAND, moist, micaceous, friable		SM			

GRAPHICAL REPRESENTATION: Southwest SCALE: 1"-5' SURFACE SLOPE: TREND:

								Total Depth = 9 Feet **No Ground Water Encountered** **Backfilled: 9/18/2020**	

LOG OF TRENCH: T-4

Project Name: Concordia/Oceanside | Logged by: ERB

Project Number: 12807.002 | Elevation: 49 Feet

Equipment: Rubber Tire Backhoe | Location/Grid:

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES: USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2': Silty SAND, loose, light gray, dry, fine to medium SAND, friable		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2'-6.5': Silty SAND, loose to medium dense, dark gray, moist, fine SAND, micaceous		SM			

GRAPHICAL REPRESENTATION: West SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 6.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-5

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 49 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-1.5': Silty SAND, loose, light gray, dry, fine-grained, trace micas, trace debris		SM	B-1 @ 0-6'		
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 1.5'-7': Silty SAND, medium dense, medium gray, moist, trace rounded 1"-2" gravel, fine-grained, micaceous, interbedded, light gray, poorly-graded SAND, loose, friable (approximately 6" layers)		SP-SM			
	@ 7'-9.5': Silty SAND, loose to medium dense, dark gray, moist, fine-grained, micaceous		SM			

GRAPHICAL REPRESENTATION: East SCALE: 1"-5' SURFACE SLOPE: TREND: N/A

Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-6

Project Name: Concordia/Oceanside | Logged by: ERB

Project Number: 12807.002 | Elevation: 48 Feet

Equipment: Rubber Tire Backhoe | Location/Grid:

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	ENGINEERING PROPERTIES: USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, dry, fine- to medium-grained, friable, rootlets and debris throughout		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-7': Silty SAND, loose to medium dense, medium to dark gray, fine SAND, moist, micaceous, interbedded with poorly-graded SAND, loose, light gray, medium to coarse SAND, friable, medium dense at 7'		SP-SM	B-1 @ 2.5'-7'		

GRAPHICAL REPRESENTATION: South SCALE: 1"-5' SURFACE SLOPE: TREND: N/A

Total Depth = 7 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-7

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 47 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, dry, fine to medium SAND, friable		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-9.5': Silty SAND, medium dense, dark gray, moist, fine SAND, interbedded with poorly graded SAND, loose, light gray, dry, friable, denser at 8'		SP-SM			

GRAPHICAL REPRESENTATION: Southwest SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-8

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 47 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, fine to medium SAND, friable		SM	B-1 @ 0-5'		
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-4': Silty SAND, medium dense, dark gray, moist, fine SAND, micaceous		SM-SP	B-2 @ 5'-9.5'		
	@ 4'-6.5': Poorly-graded SAND, loose, light gray, dry, friable		SM			
	@ 6.5'-9.5': Silty SAND, medium dense, dark gray, moist, fine SAND, micaceous					

GRAPHICAL REPRESENTATION: SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-9

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 47 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, dry, fine to medium SAND		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-9.5': Silty SAND, loose to medium dense, dark gray, moist, fine SAND, micaceous, denser at 8 Feet		SM			

GRAPHICAL REPRESENTATION: West SCALE: 1"-5' SURFACE SLOPE: TREND:

								Total Depth = 9.5 Feet **No Ground Water Encountered** **Backfilled: 9/18/2020**	

LOG OF TRENCH: T-10

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 46.5 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, dry, fine to medium SAND		SM	B-1 @ 5-12'		
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-6': Silty SAND, loose, medium gray, moist, fine to medium SAND, friable, interbedded poorly-graded SAND, loose, light gray, friable		SP-SM			
	@ 6'-12': Silty SAND, medium dense, dark gray-black, moist, fine SAND, micaceous		SM			

GRAPHICAL REPRESENTATION: Southwest SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 12 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-11

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 47 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, light gray, loose, dry, trace micas, rootlets, debris		SM	B-1 @ 0-9'		
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-9.5': Silty SAND, medium dense, gray, moist, fine SAND, micaceous, interbedded with poorly-graded SAND, loose, light gray, medium to coarse SAND, friable		SM			

GRAPHICAL REPRESENTATION: East SCALE: 1"-5' SURFACE SLOPE: TREND:

Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: T-12

Project Name: Concordia/Oceanside	Logged by: ERB	ENGINEERING PROPERTIES			
Project Number: 12807.002	Elevation: 46.5 Feet				
Equipment: Rubber Tire Backhoe	Location/Grid:				

GEOLOGIC ATTITUDES	DATE: 9/18/2020 DESCRIPTION:	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	ARTIFICIAL FILL (Afu)	Afu				
	@ 0-2.5': Silty SAND, loose, light gray, dry, medium to coarse SAND, friable		SM			
	QUATERNARY YOUNG ALLUVIUM (Qya)	Qya				
	@ 2.5'-11': Silty SAND, medium dense, dark gray, moist, fine SAND, interbedded with poorly-graded SAND, loose to medium dense, light gray, dry, medium SAND, friable		SP-SM			

GRAPHICAL REPRESENTATION: `West SCALE: 1"-5' SURFACE SLOPE: TREND:

								Total Depth = 11 Feet **No Ground Water Encountered** **Backfilled: 9/18/2020**	

Appendix C
Laboratory Testing Procedures and Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

Moisture and Density Determination Tests: Moisture content and dry density determinations were performed on relatively undisturbed samples obtained from the soil borings. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from disturbed samples.

Maximum Dry Density and Optimum Moisture Content Tests: The maximum dry density and optimum moisture content of a selected representative soil sample was evaluated in general accordance with ASTM D 1557. The test results are presented on the attached figures.

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with Caltrans Test Method CT643. The results are presented in the table below:

Sample Location	Sample Description	pH	Minimum Resistivity (ohms-cm)
TP-10 @ 5'-10'	Brown Silty SAND	7.7	4,400

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

Sample Location	Sample Description	Chloride Content, ppm
TP-10 @ 5'-10'	Brown Silty SAND	0

APPENDIX C (continued)

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

Sample Location	Sample Description	Sulfate Content (%)	Potential Degree of Sulfate Attack*
TP-10 @ 5'-10'	Brown Silty SAND	Less than 0.0150	Not Applicable

* Based on the 2011 edition of American Concrete Institute (ACI) Committee 318R, Table No. 4.2.1.

Particle/Grain Size Analysis: Particle size analysis was performed by mechanical sieving, wash sieving, and hydrometer methods according to ASTM D422, D 1140, and D6913. The percent fine particles from these analyses are summarized below. Plots of the sieve and hydrometer results are provided on the figures at the end of this Appendix.

Appendix D
Liquefaction Analysis

Leighton
San Diego
Ocean

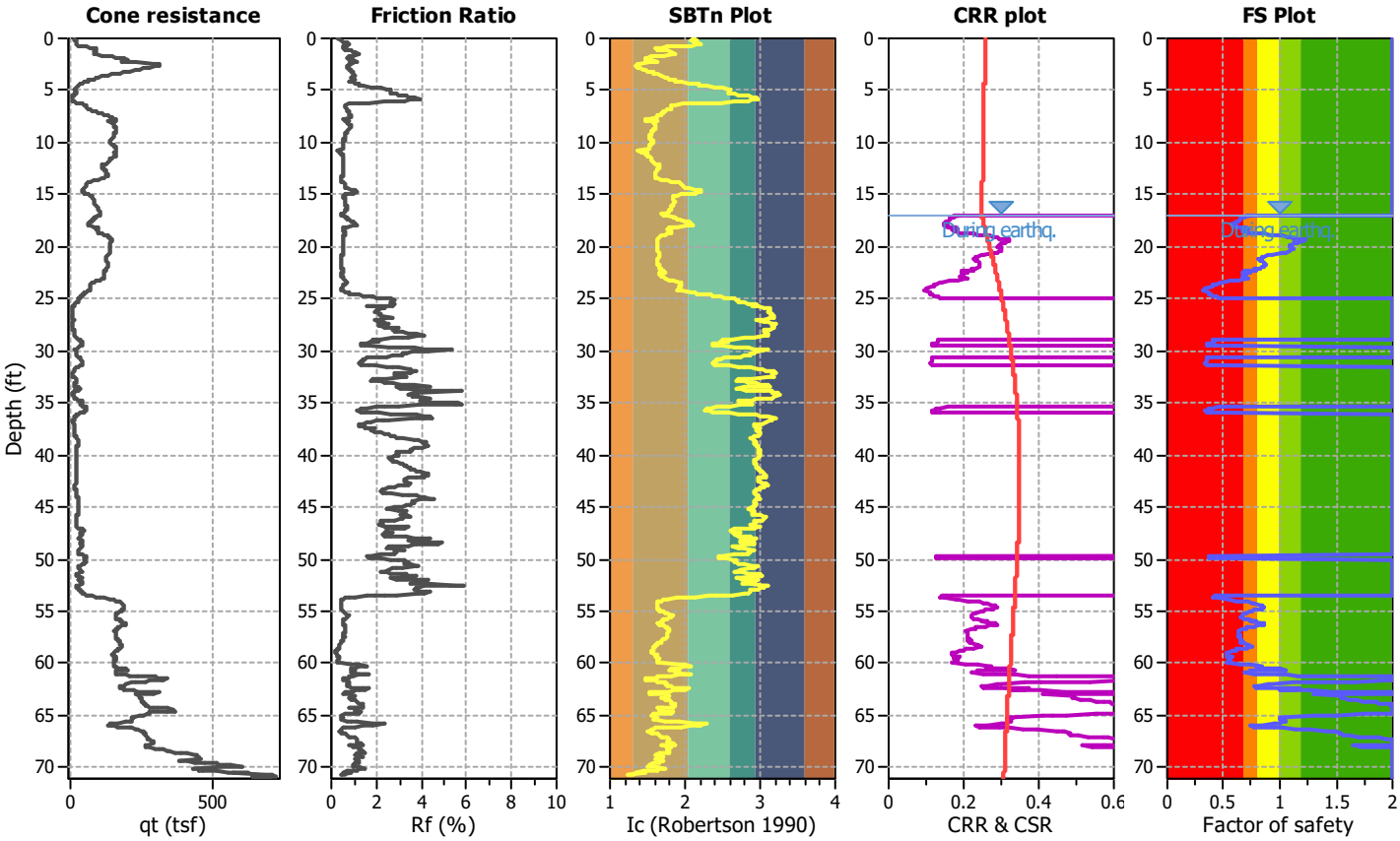
LIQUEFACTION ANALYSIS REPORT

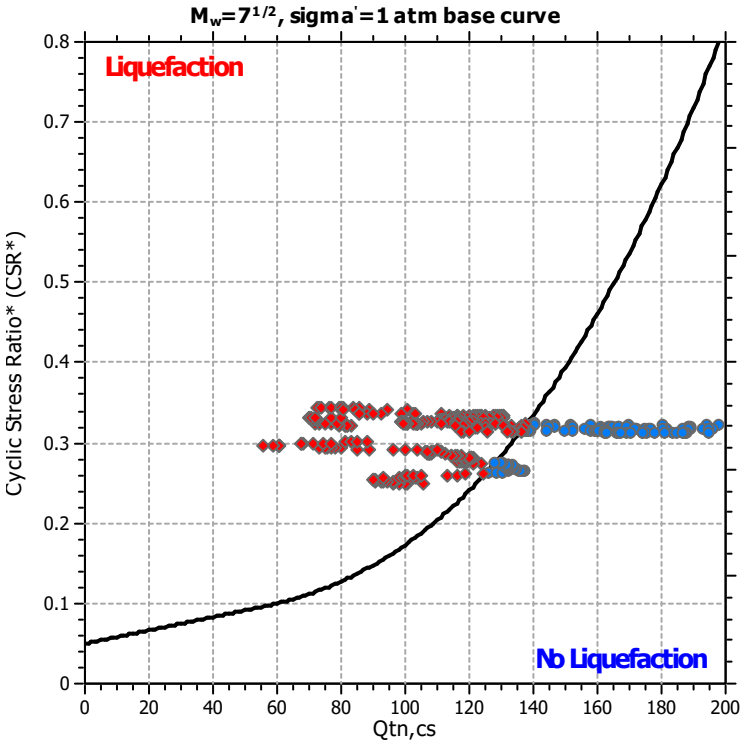
Project title : 12807.002 Concordia at Los Arbolitos/Geotech **Location : Oceanside, CA**

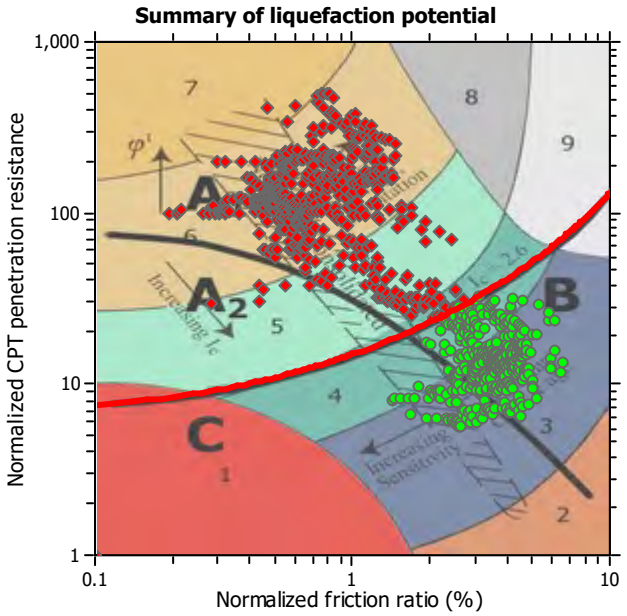
CPT file : CPT-1

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	16.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	17.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.49	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

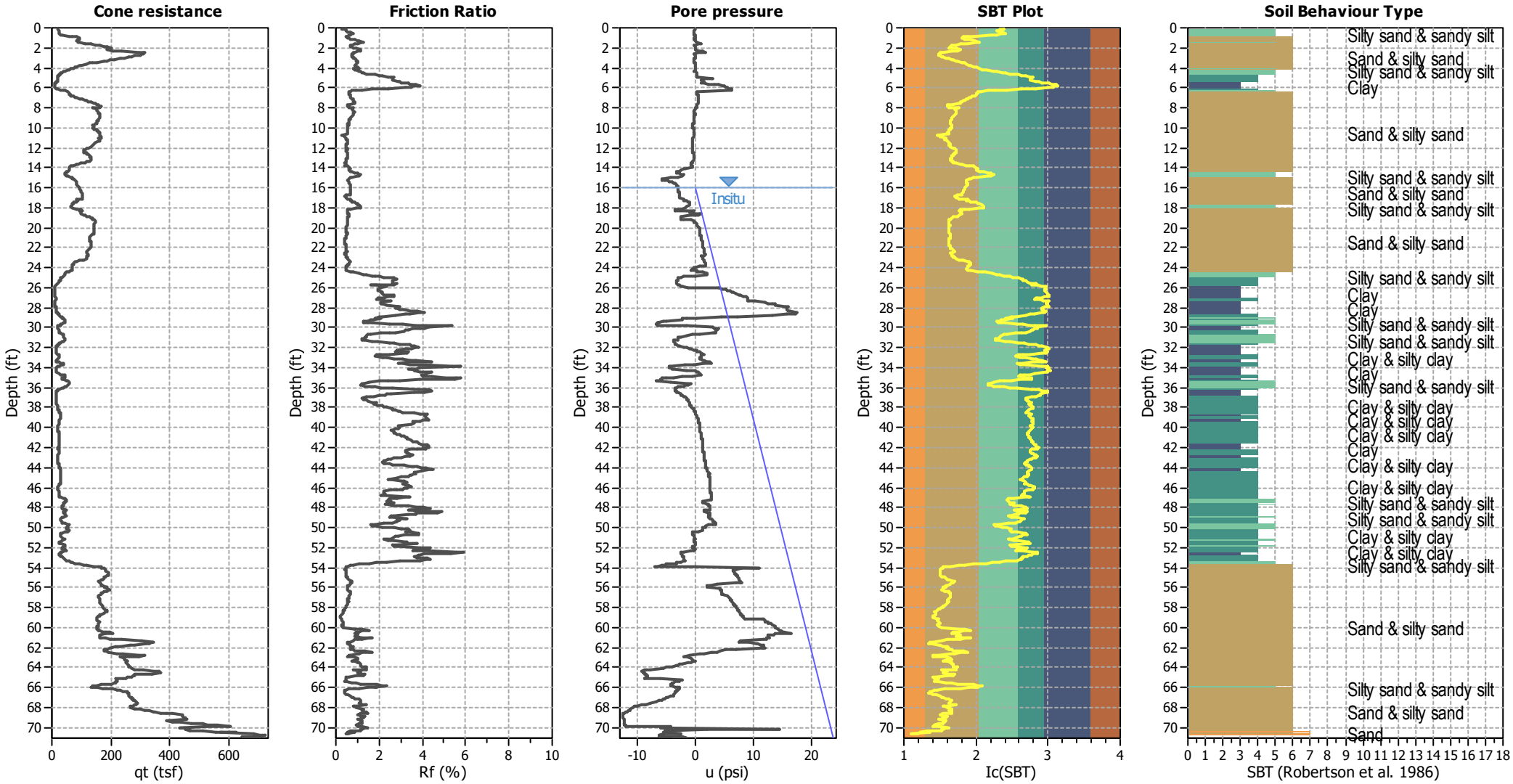






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



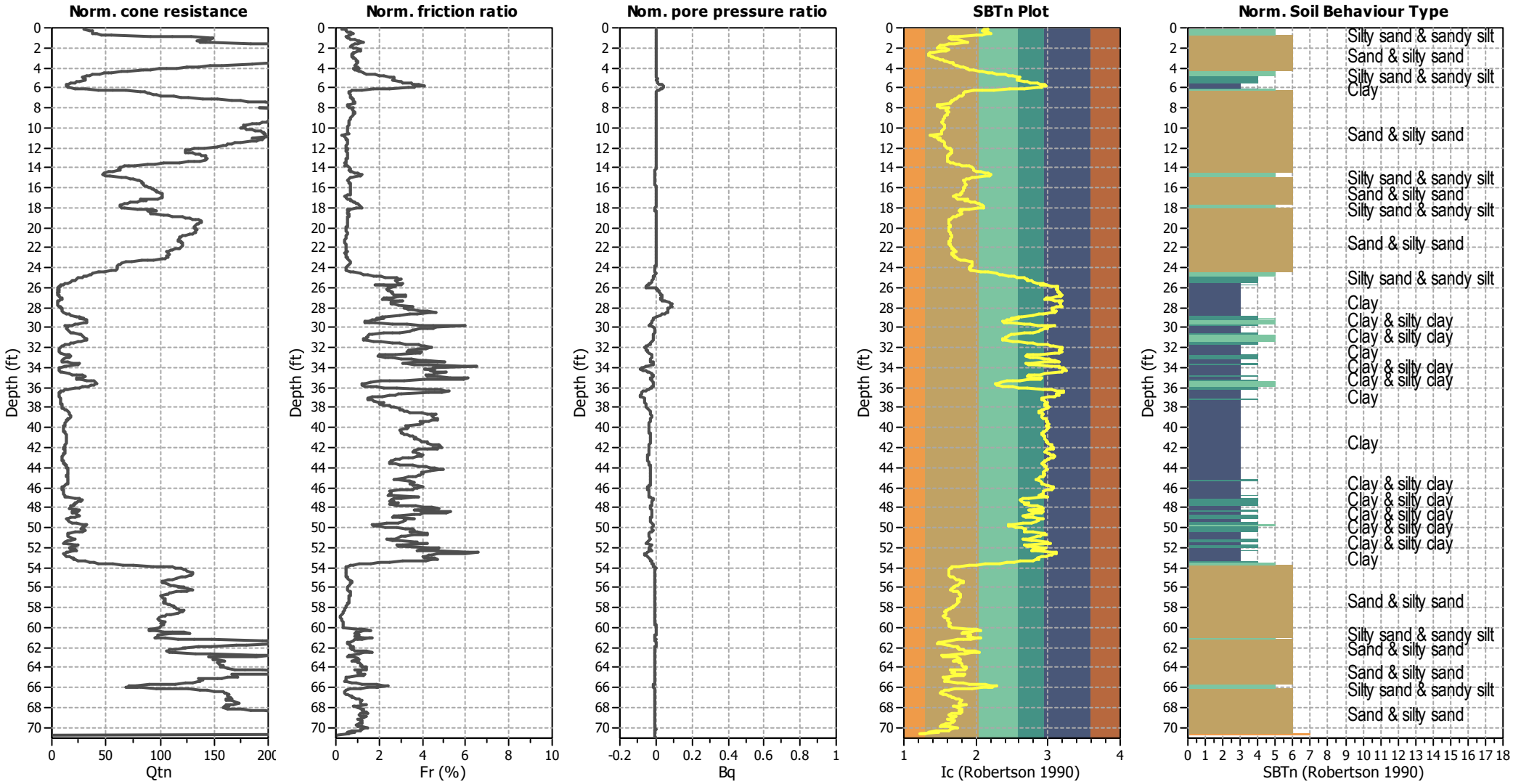
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



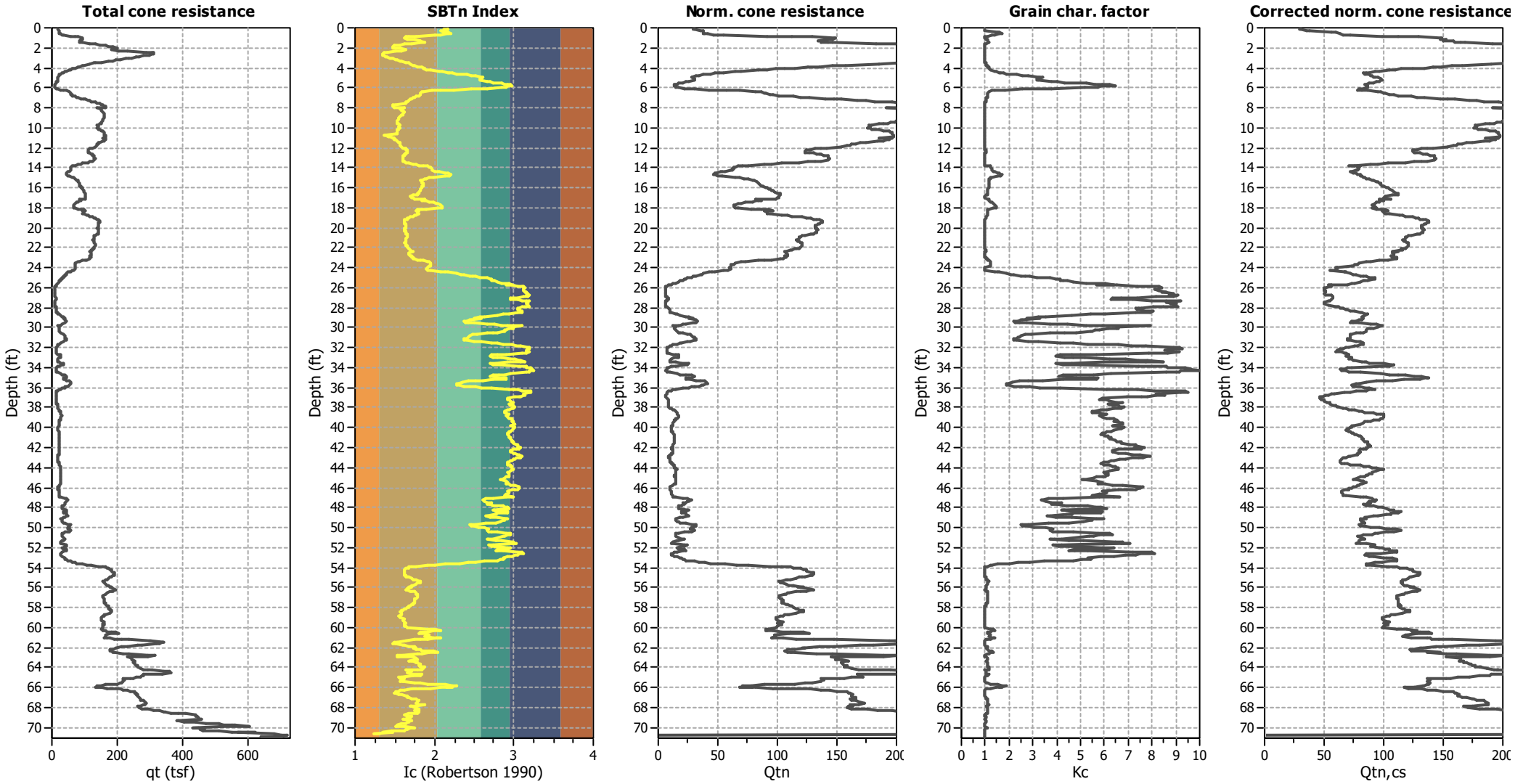
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

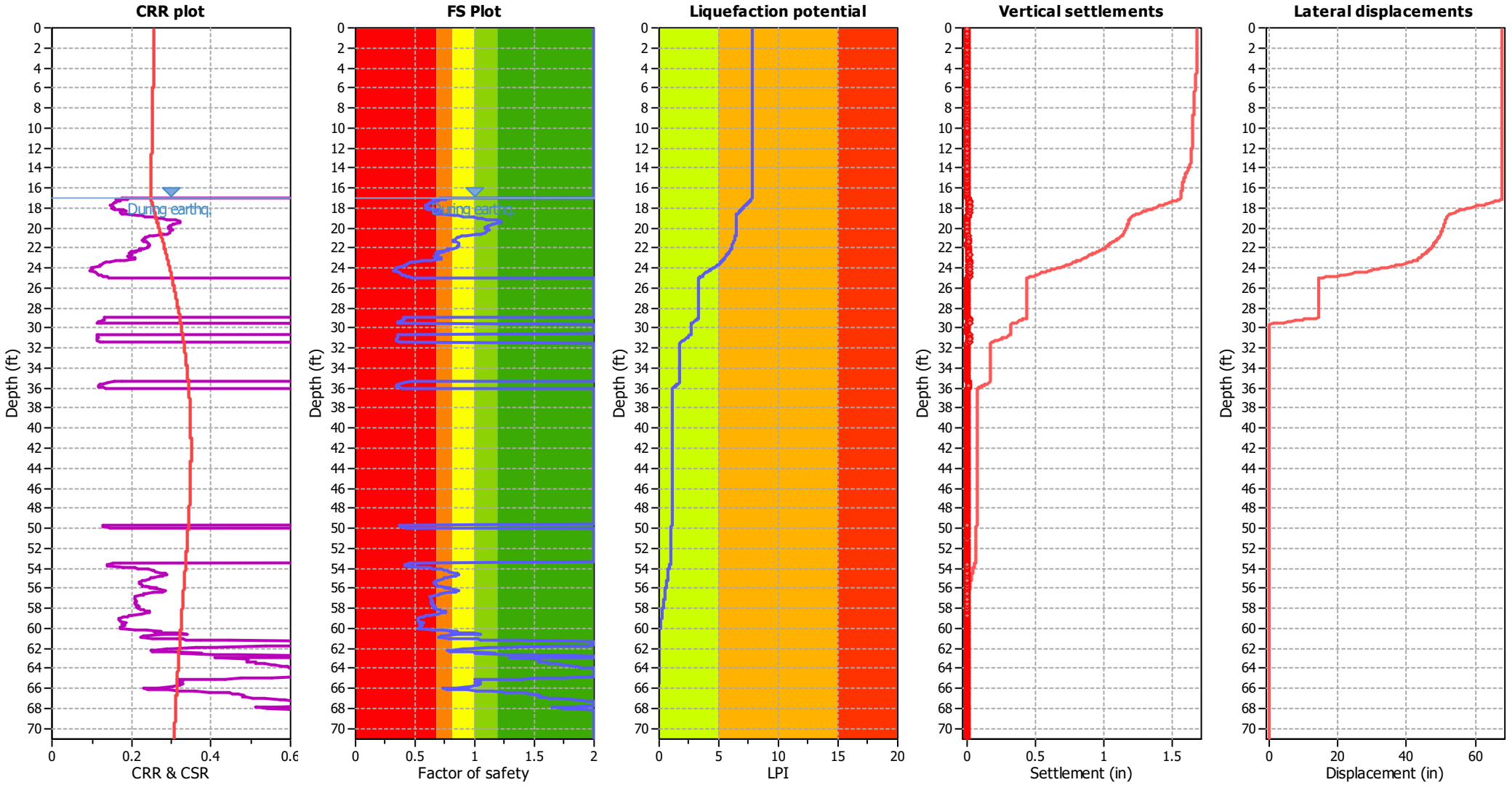
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

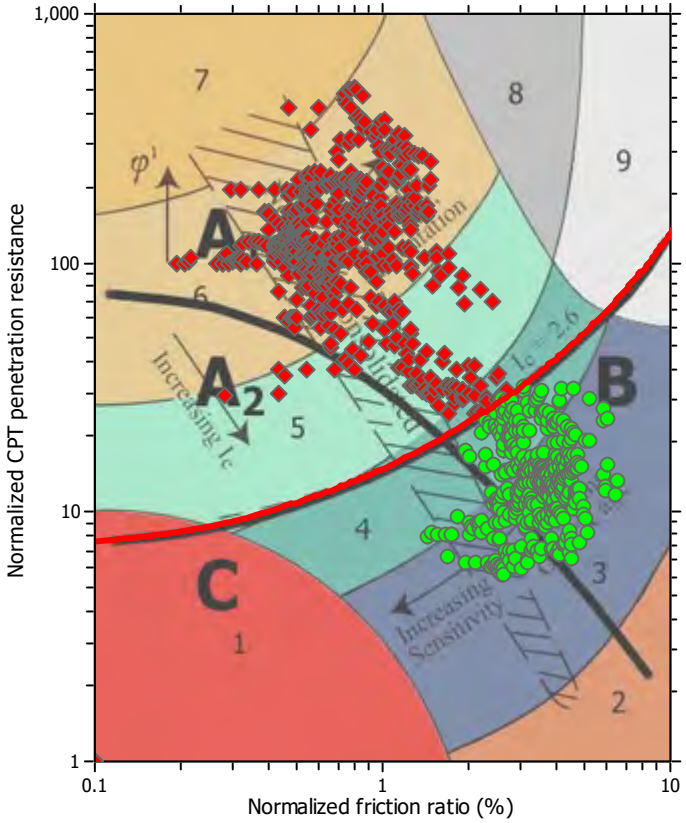
F.S. color scheme

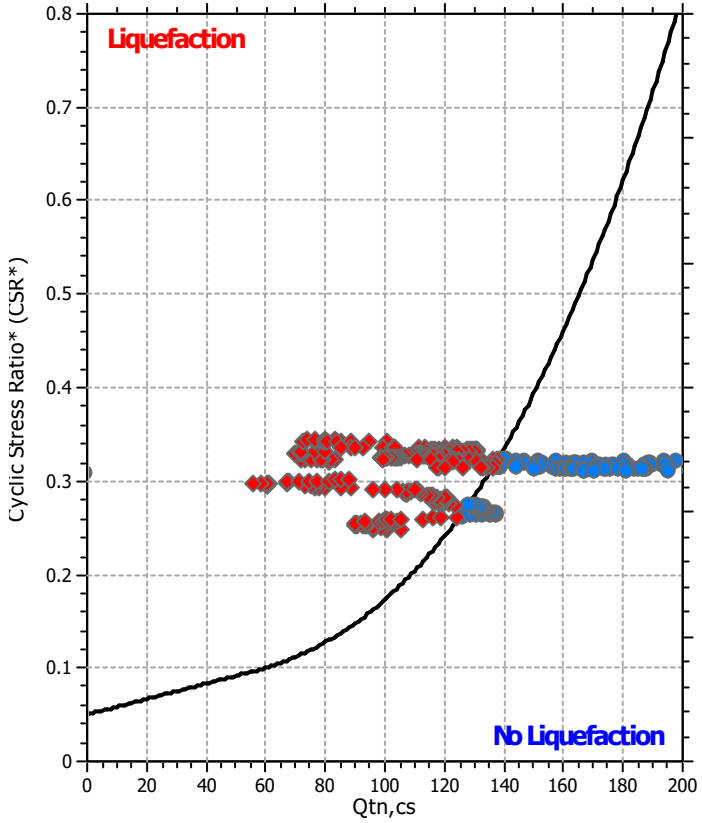
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

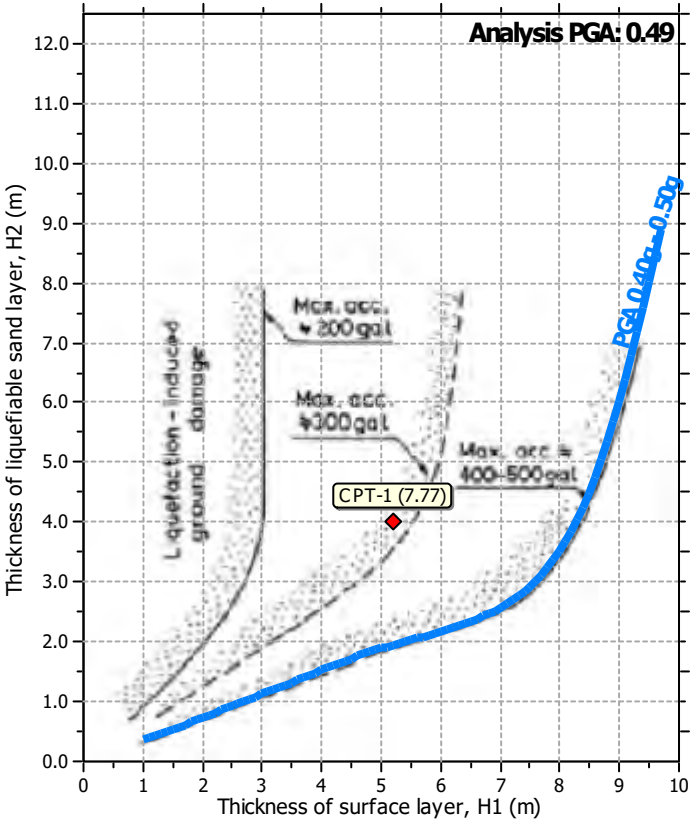
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



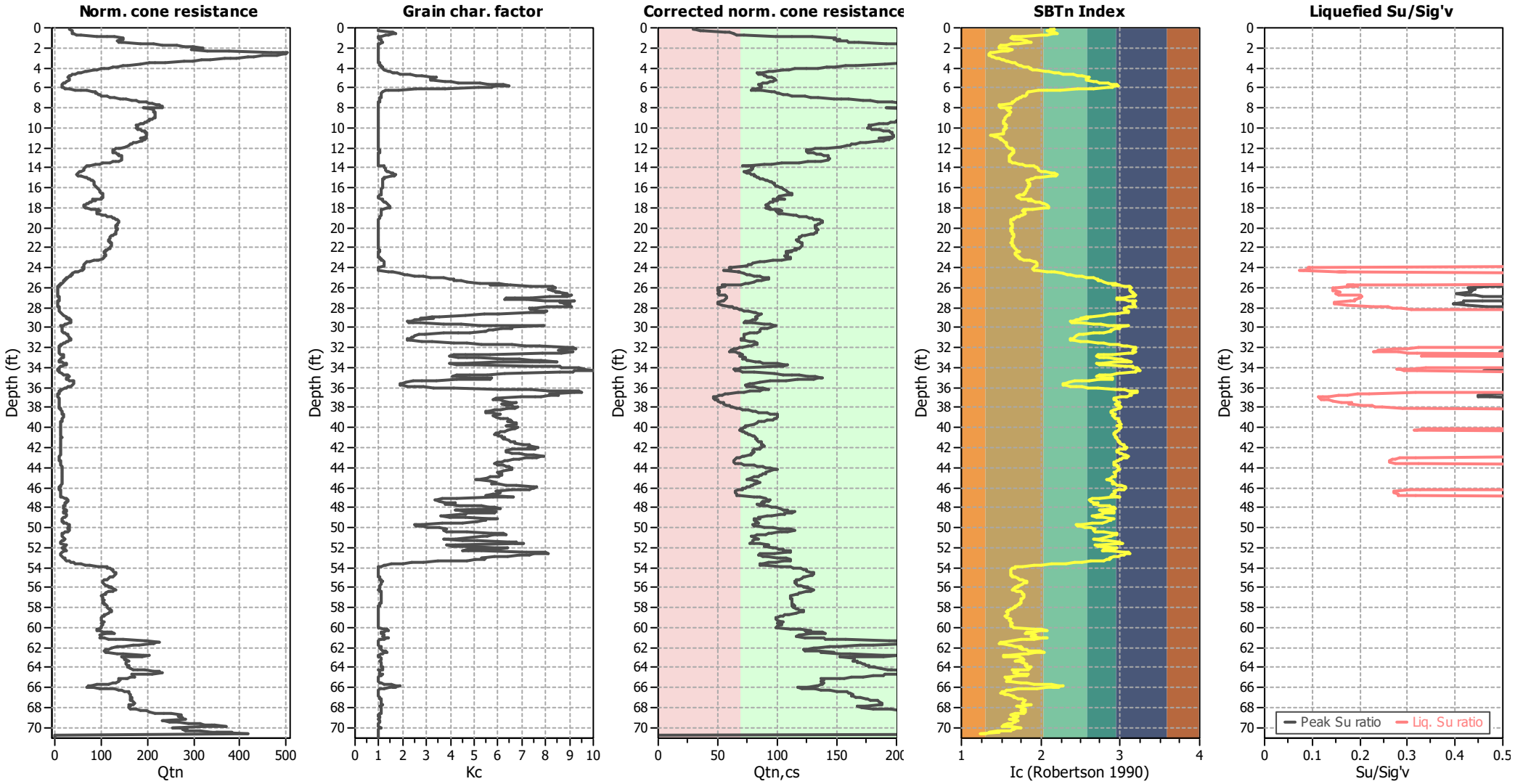




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

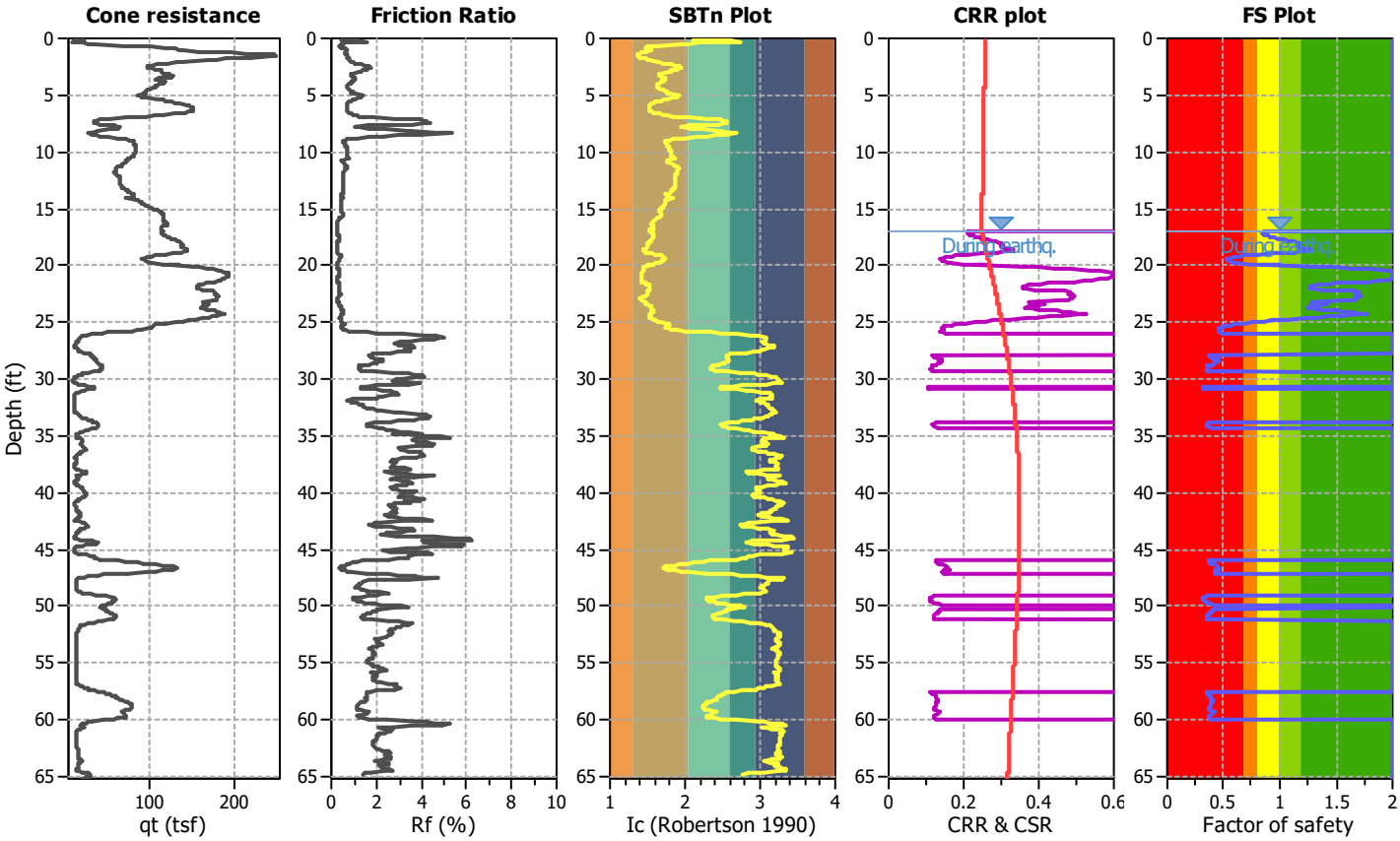
LIQUEFACTION ANALYSIS REPORT

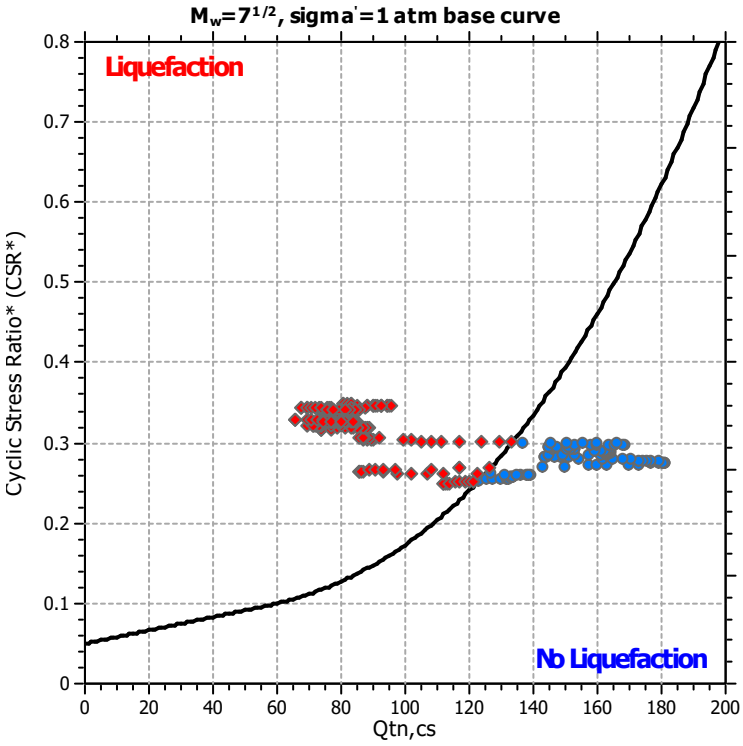
Project title : 12807.002 Concordia at Los Arbolitos/Geotech **Location : Oceanside, CA**

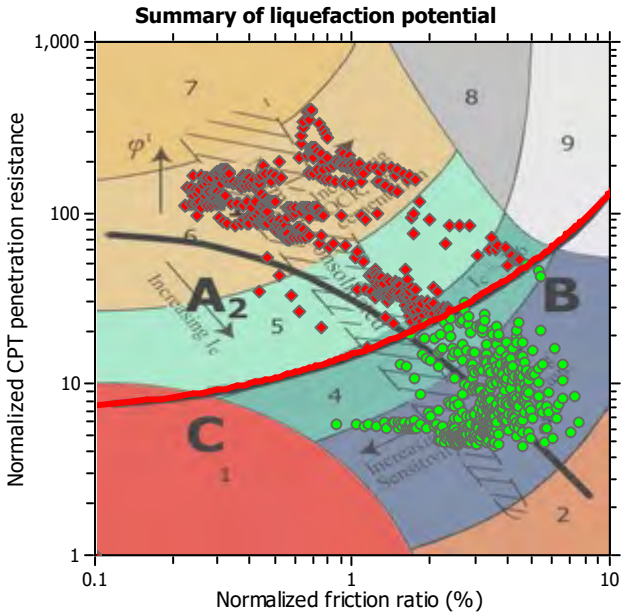
CPT file : CPT-2

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	16.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	17.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.49	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

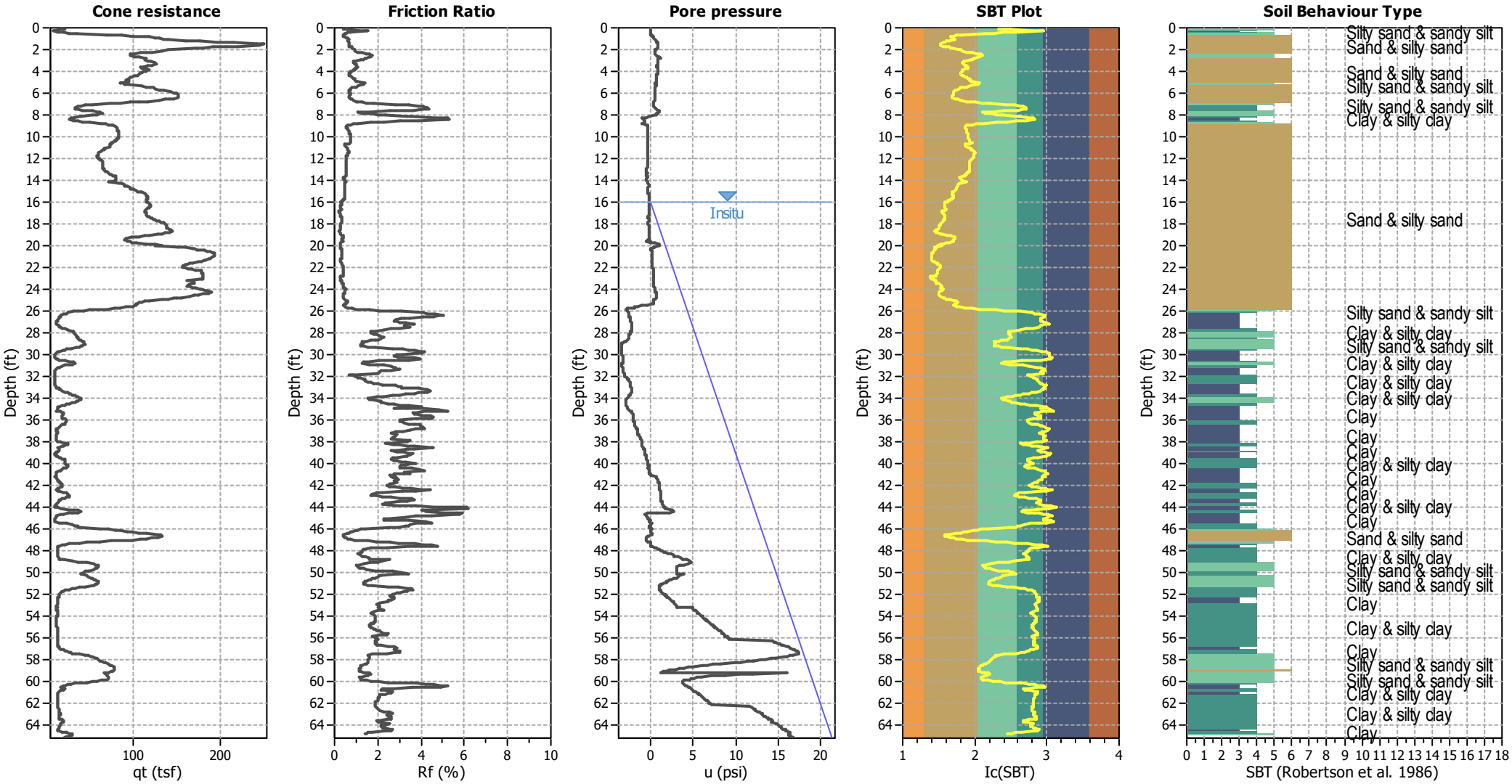






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



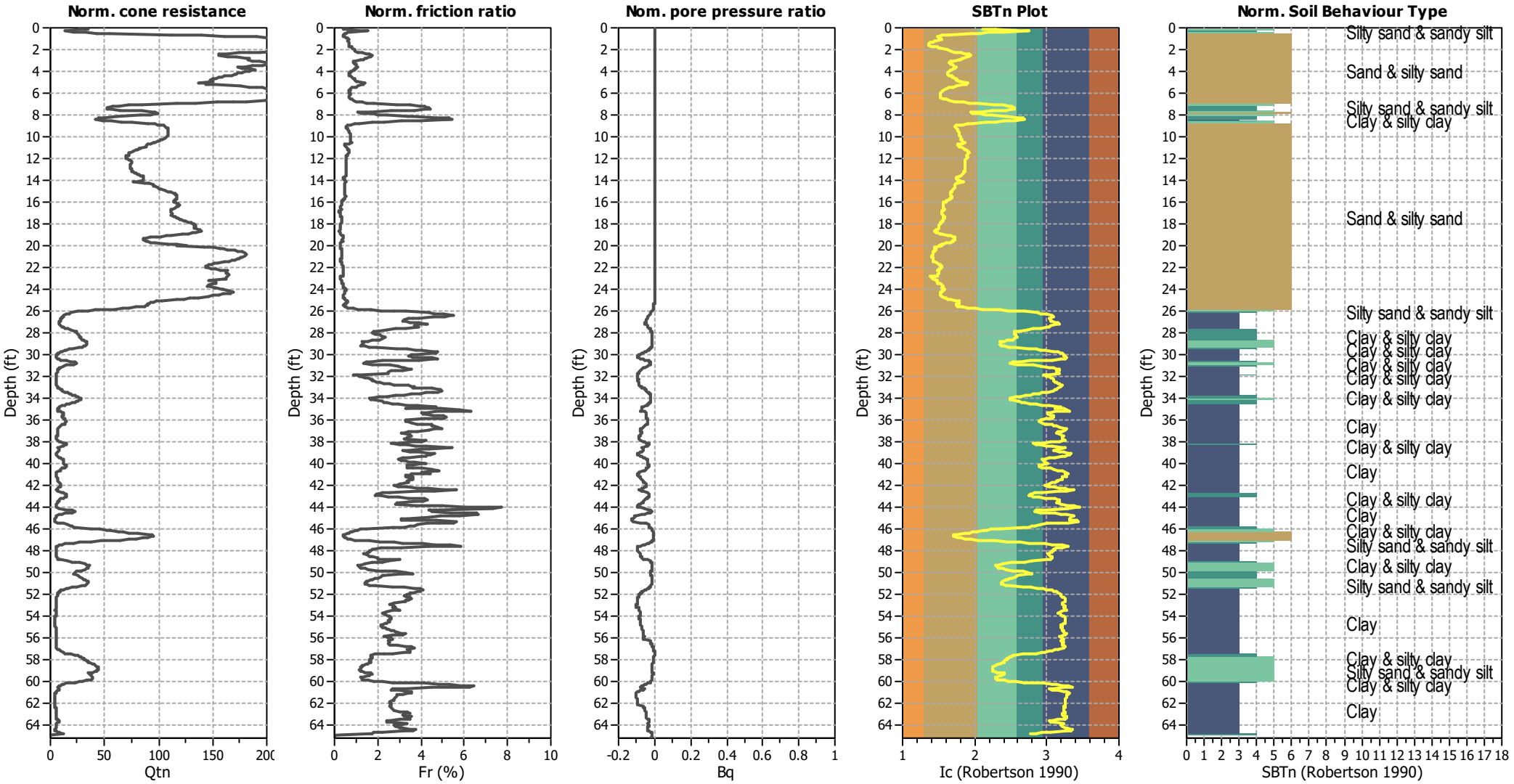
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



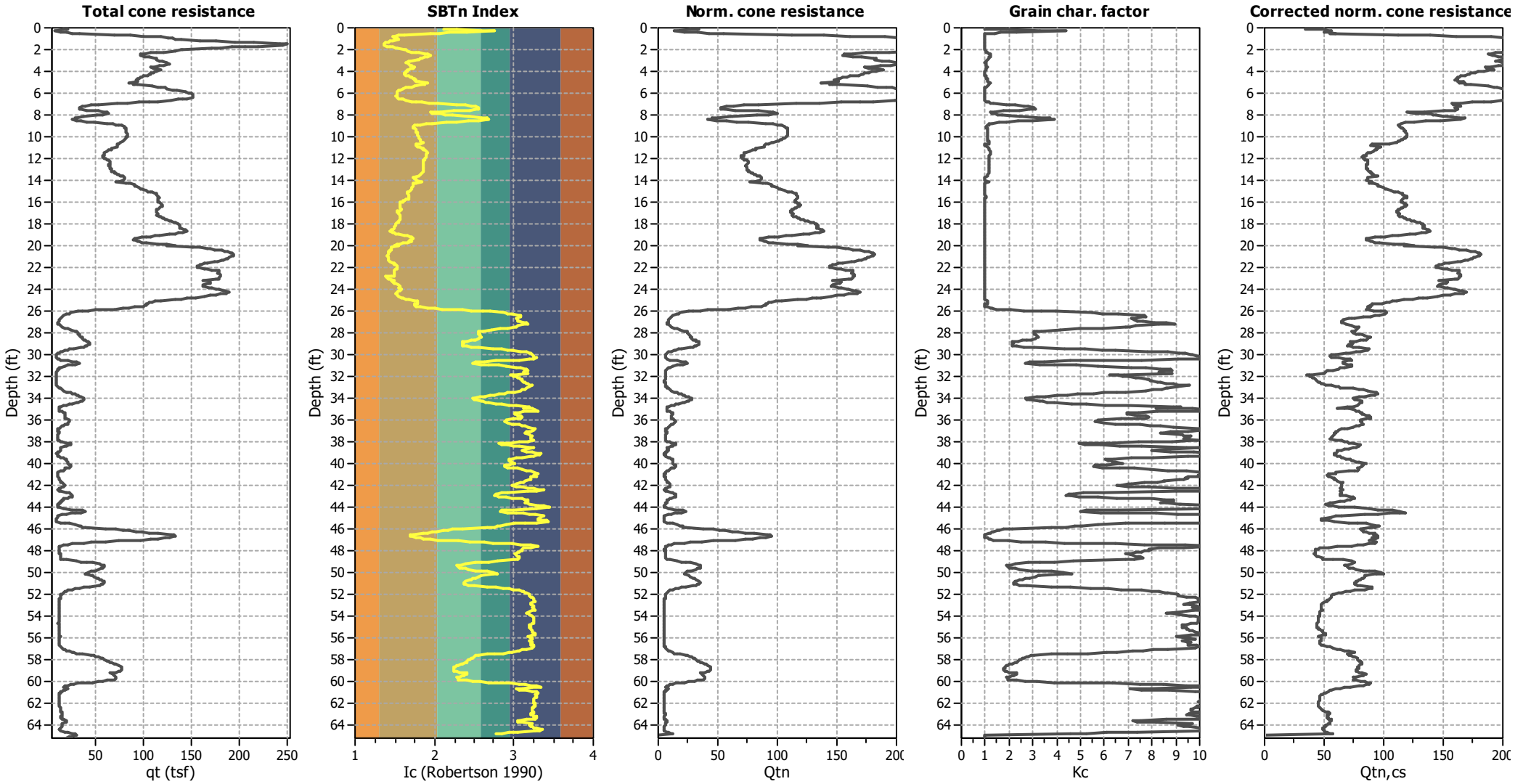
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

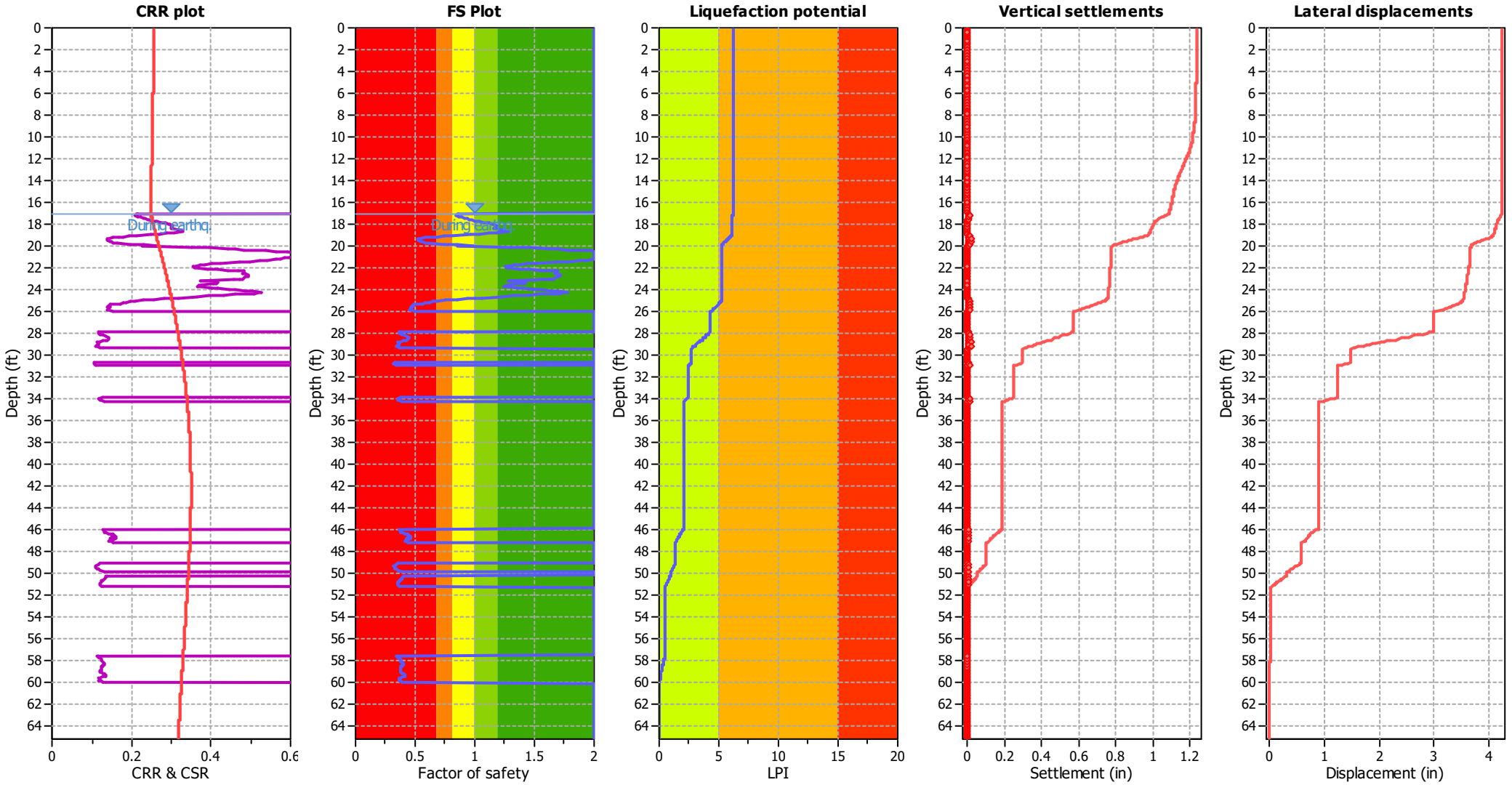
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

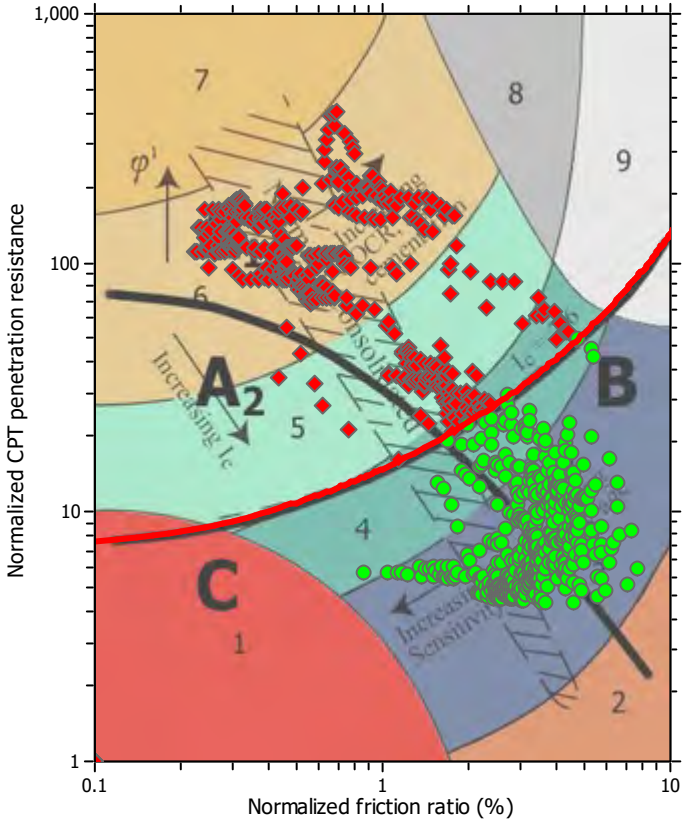
F.S. color scheme

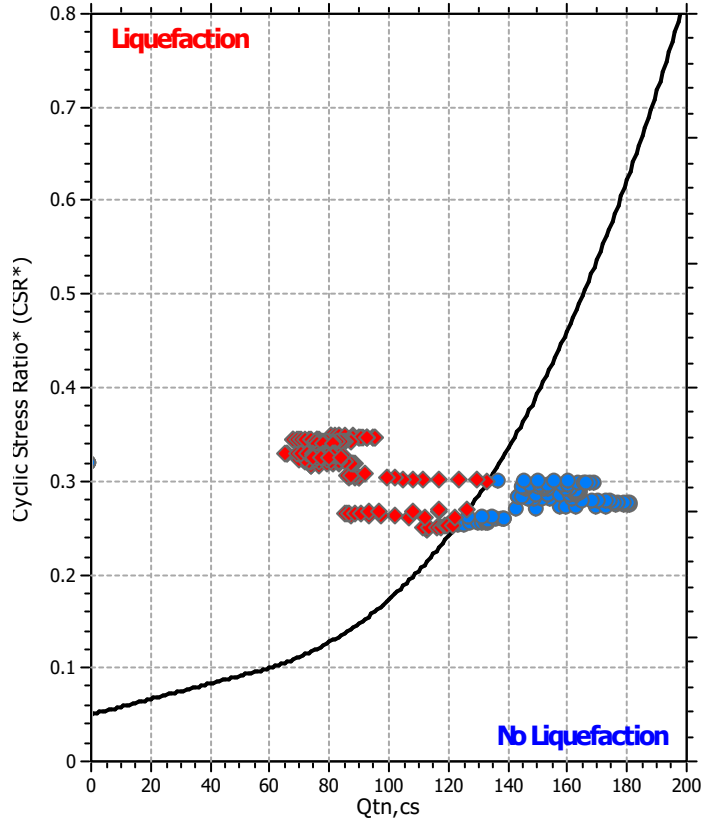
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

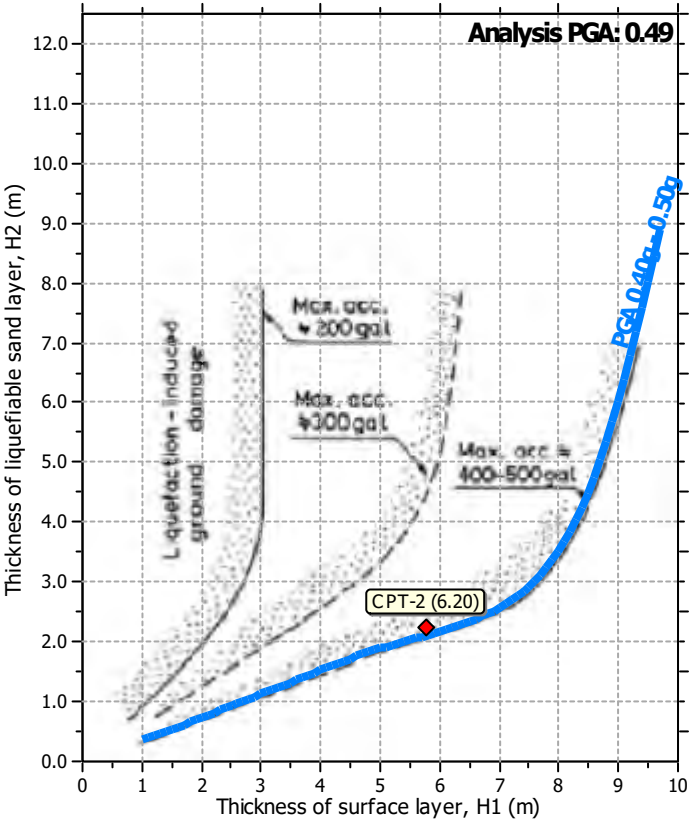
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



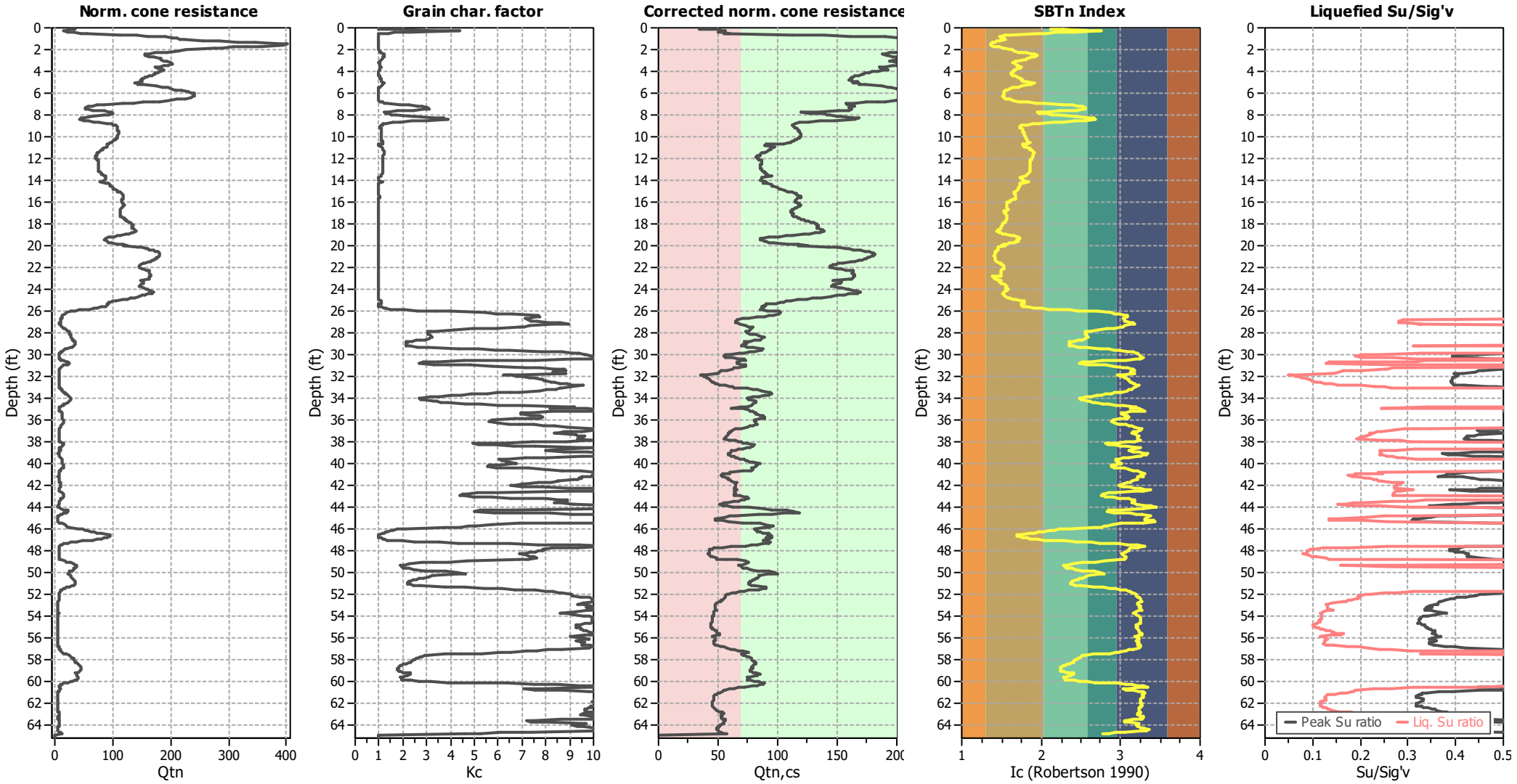




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	16.00 ft	Fill height:	N/A	Limit depth:	N/A

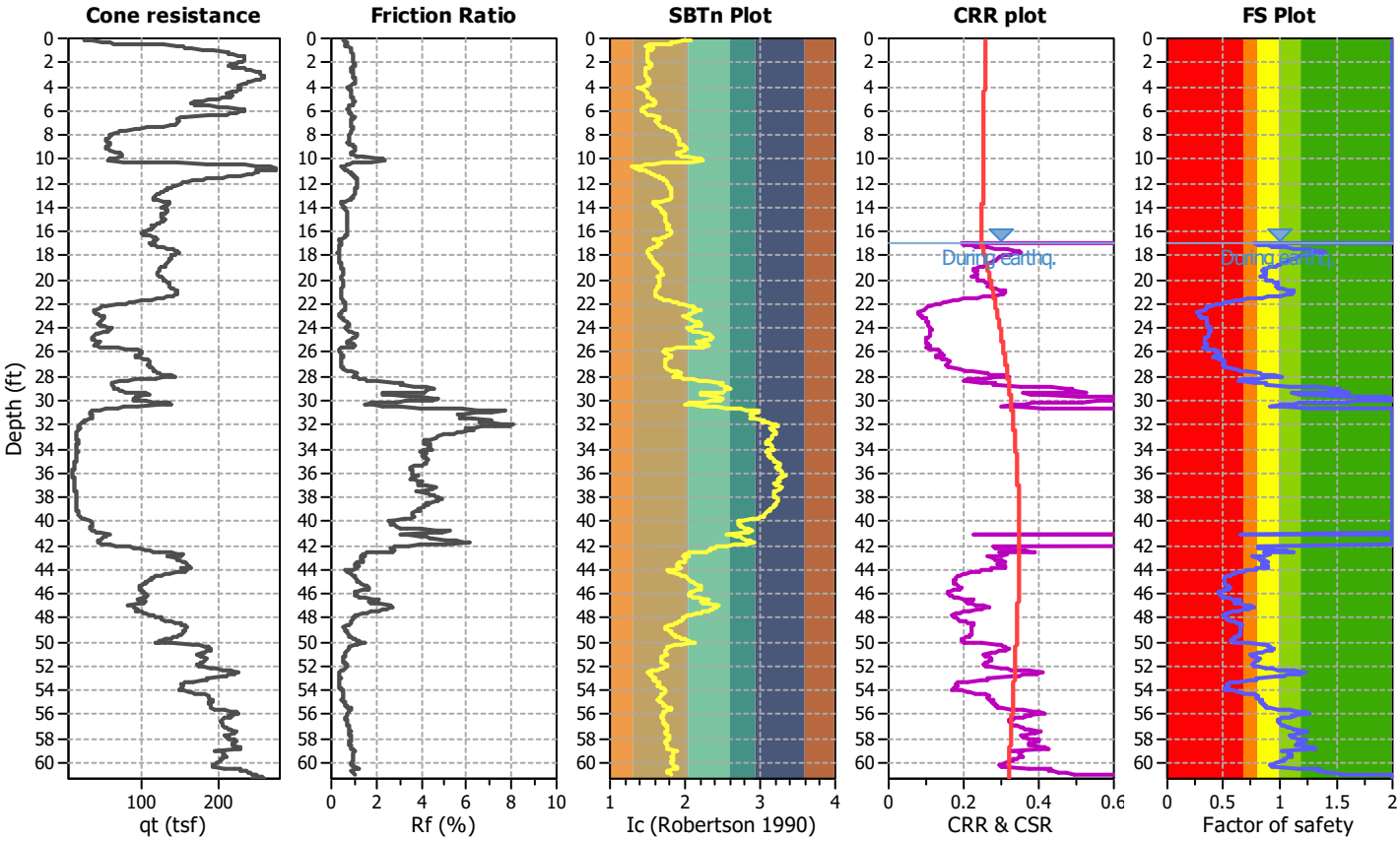
LIQUEFACTION ANALYSIS REPORT

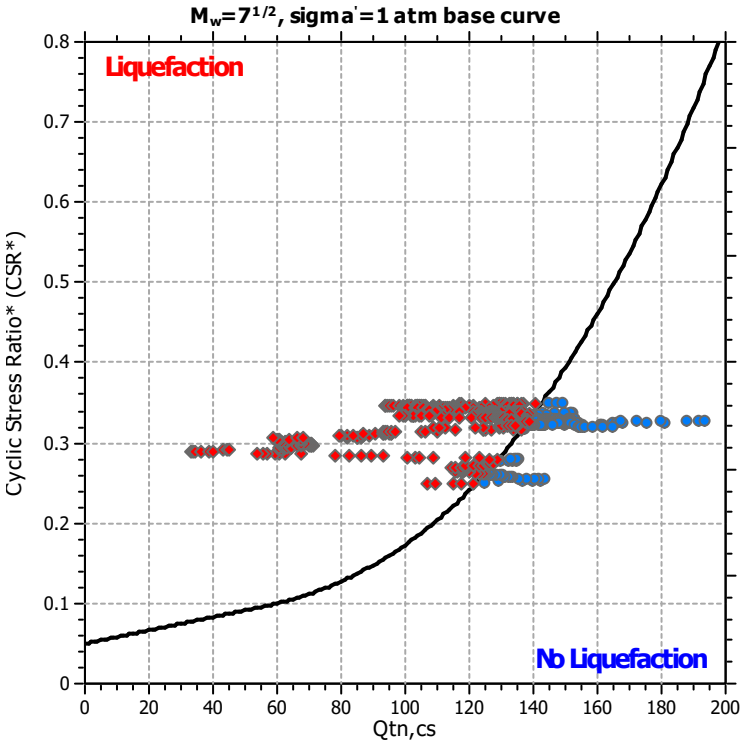
Project title : 12807.002 Concordia at Los Arbolitos/Geotech **Location : Oceanside, CA**

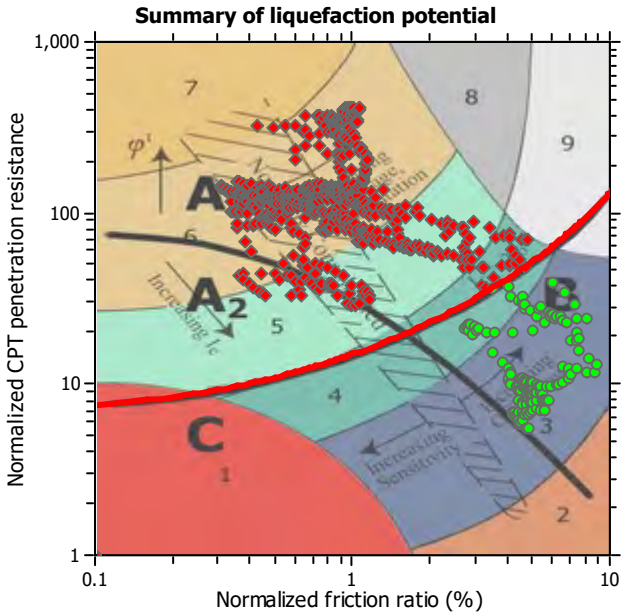
CPT file : CPT-3

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	15.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	17.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	1	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.49	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

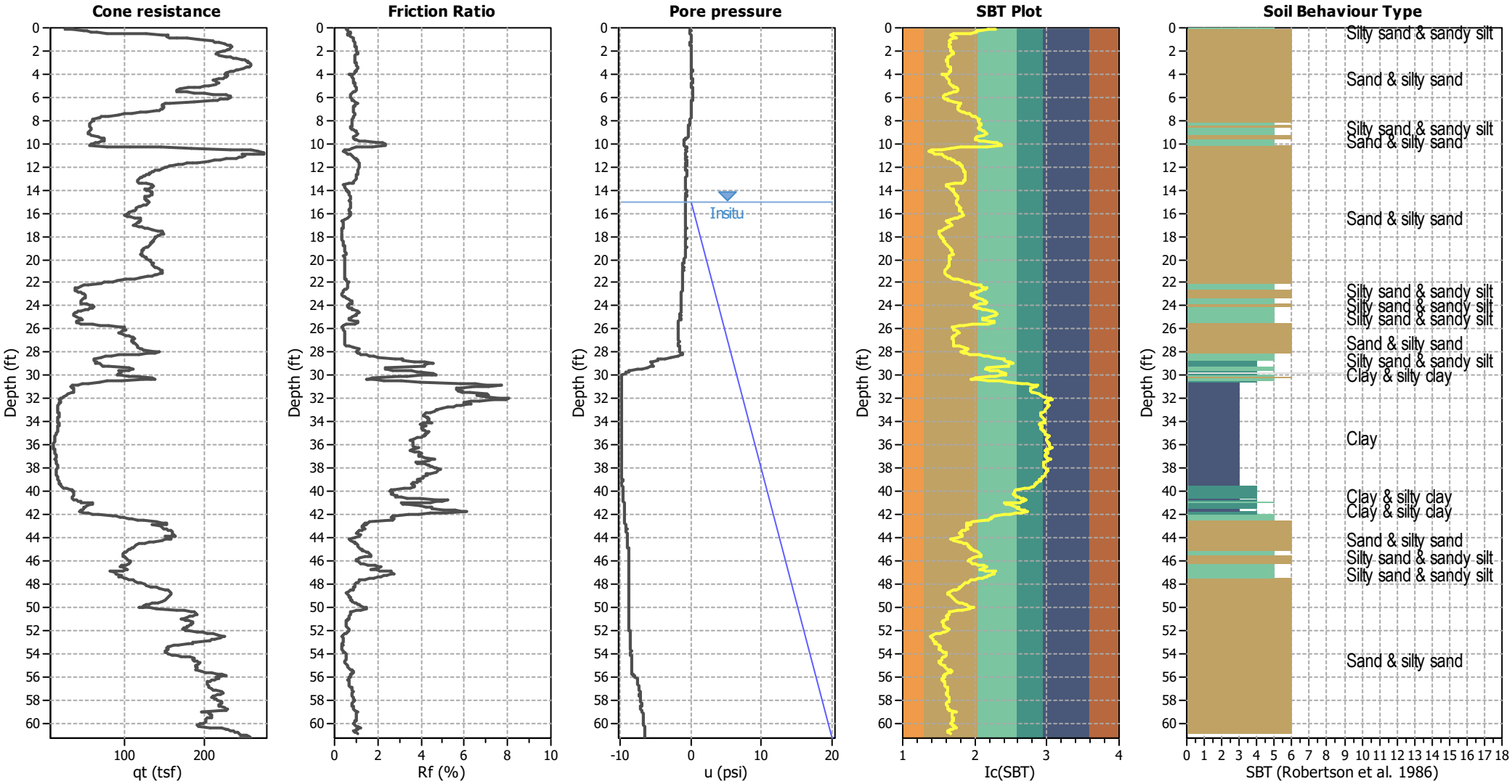






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



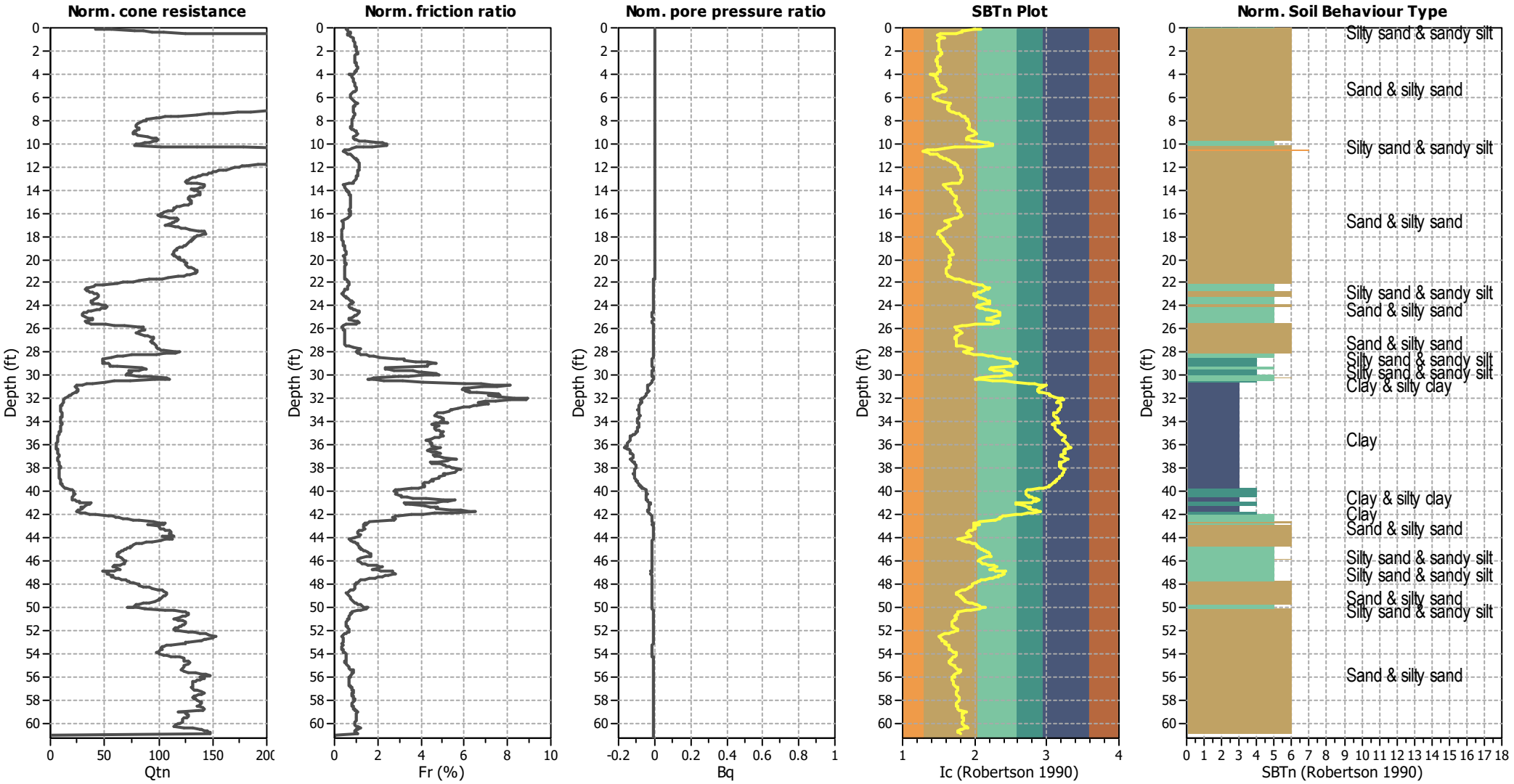
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



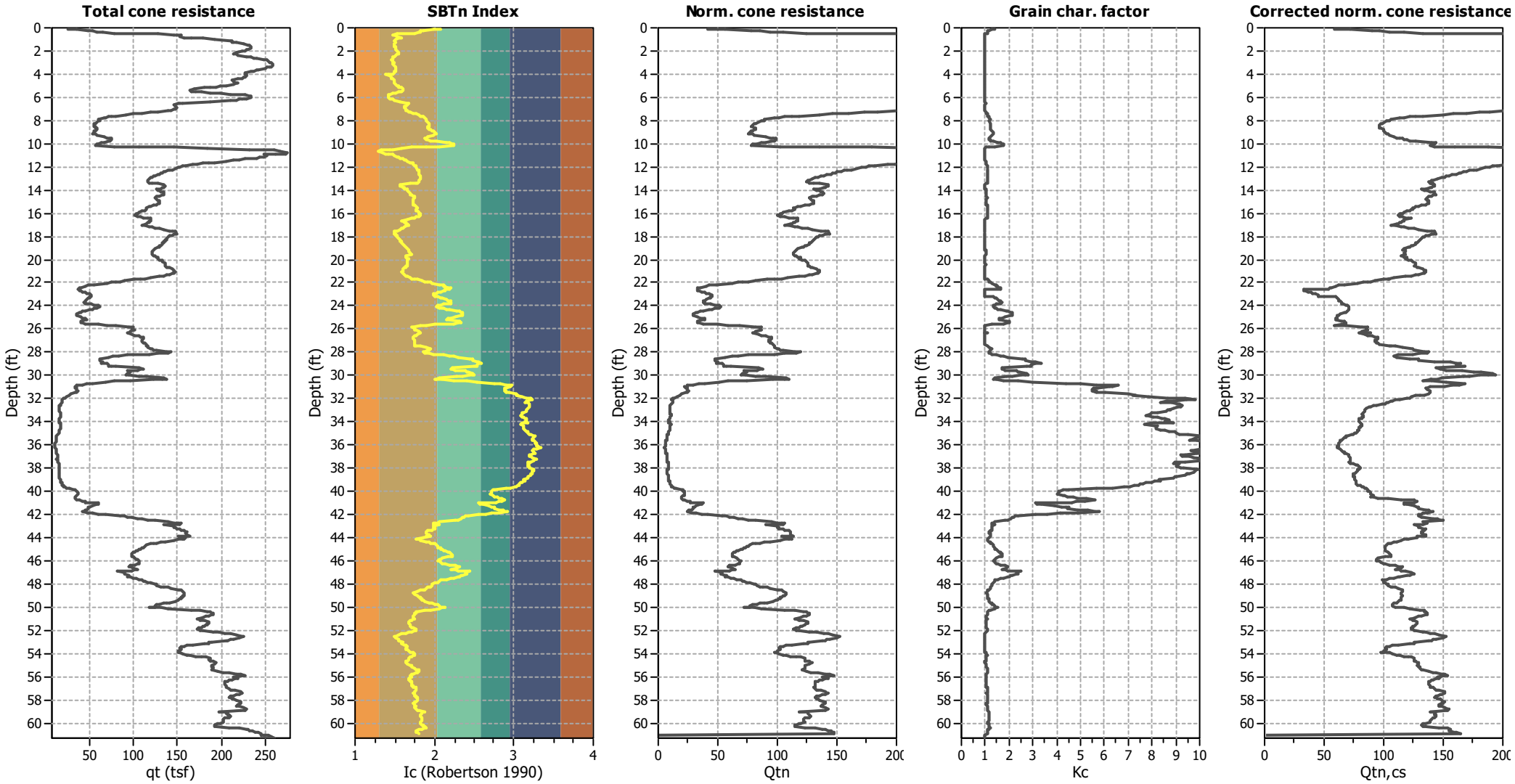
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

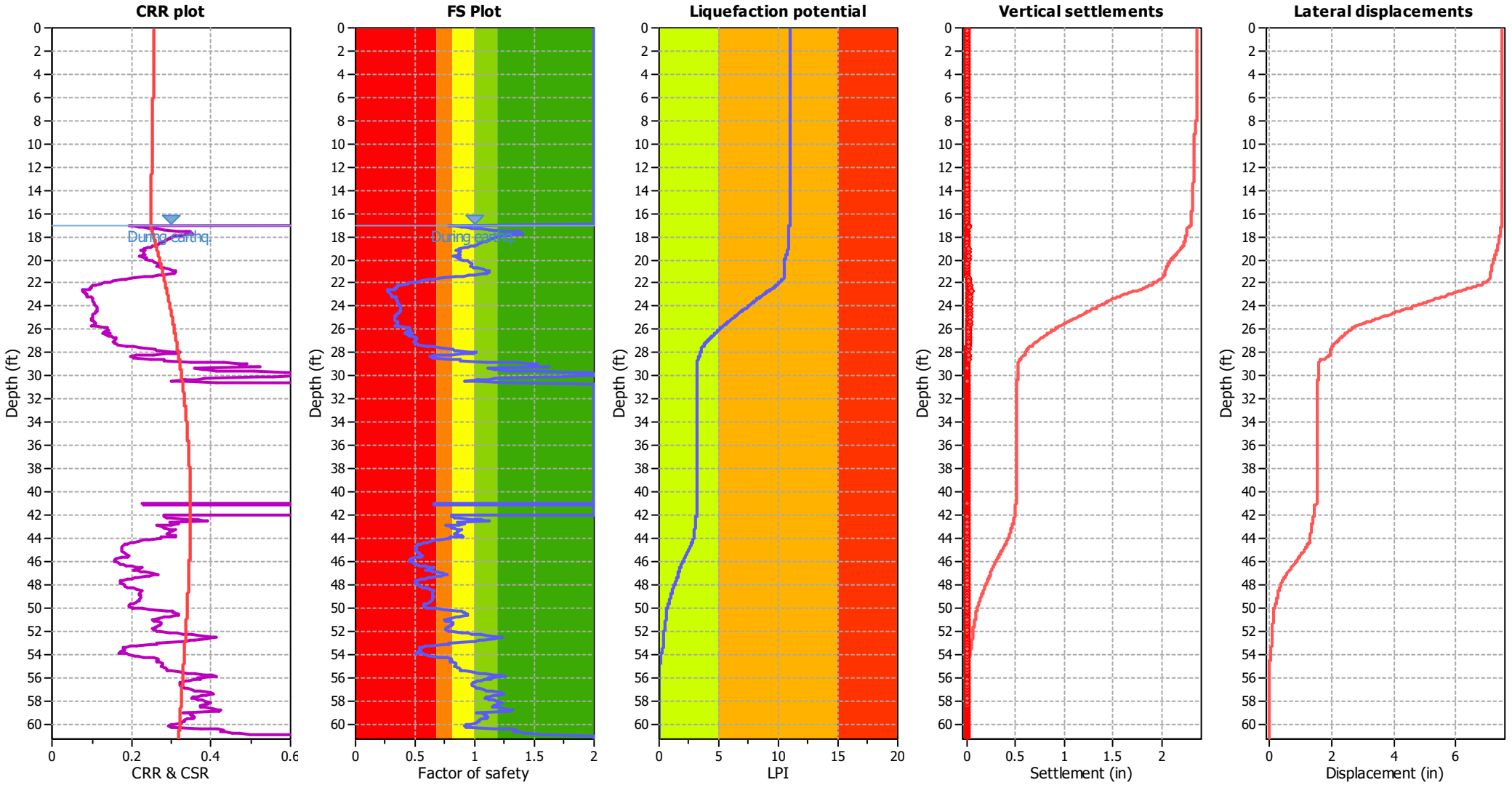
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

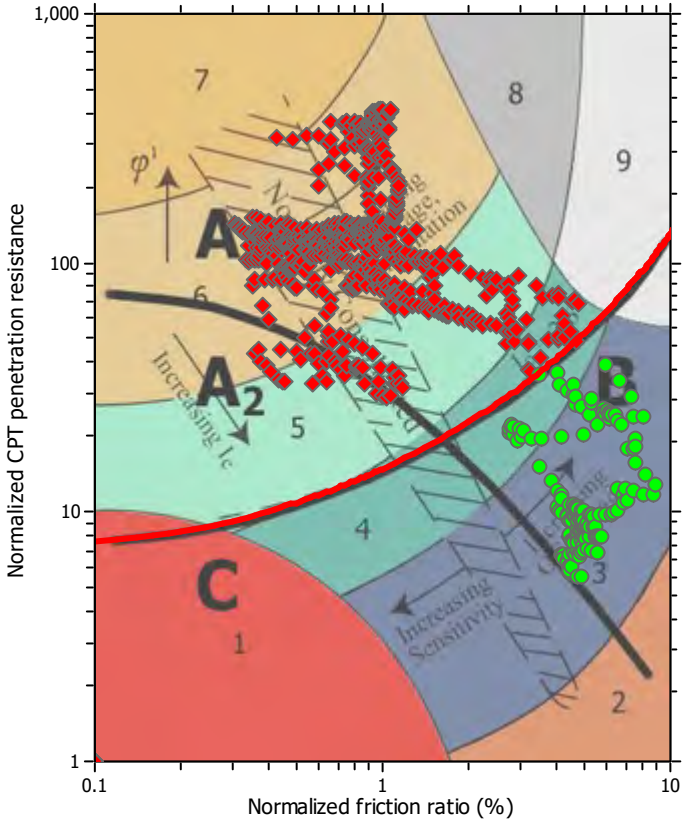
F.S. color scheme

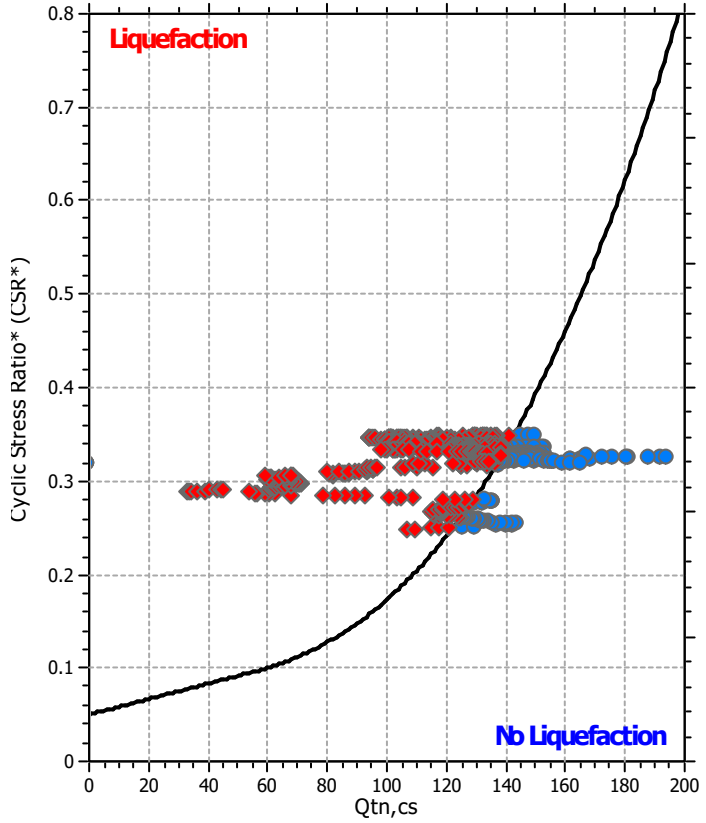
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

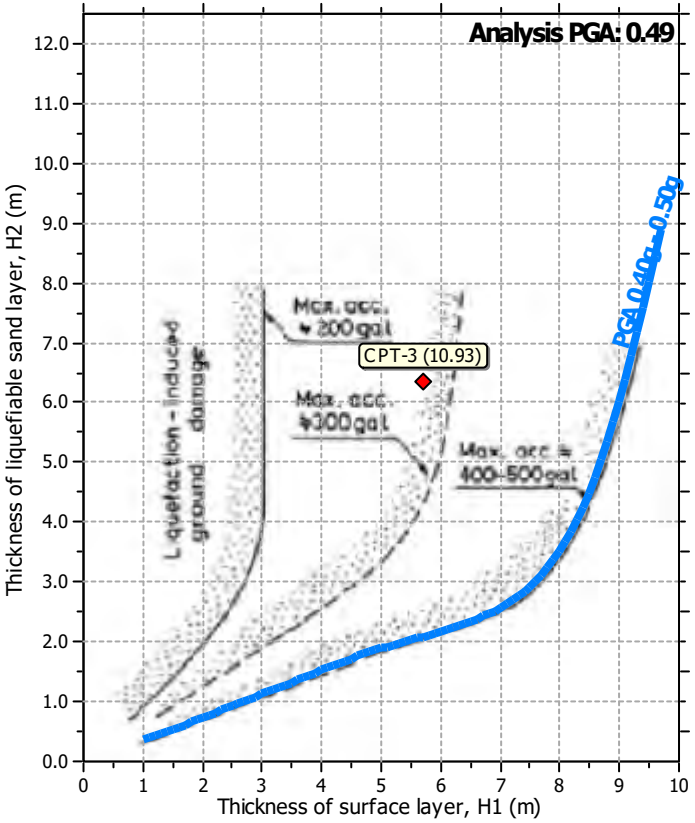
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



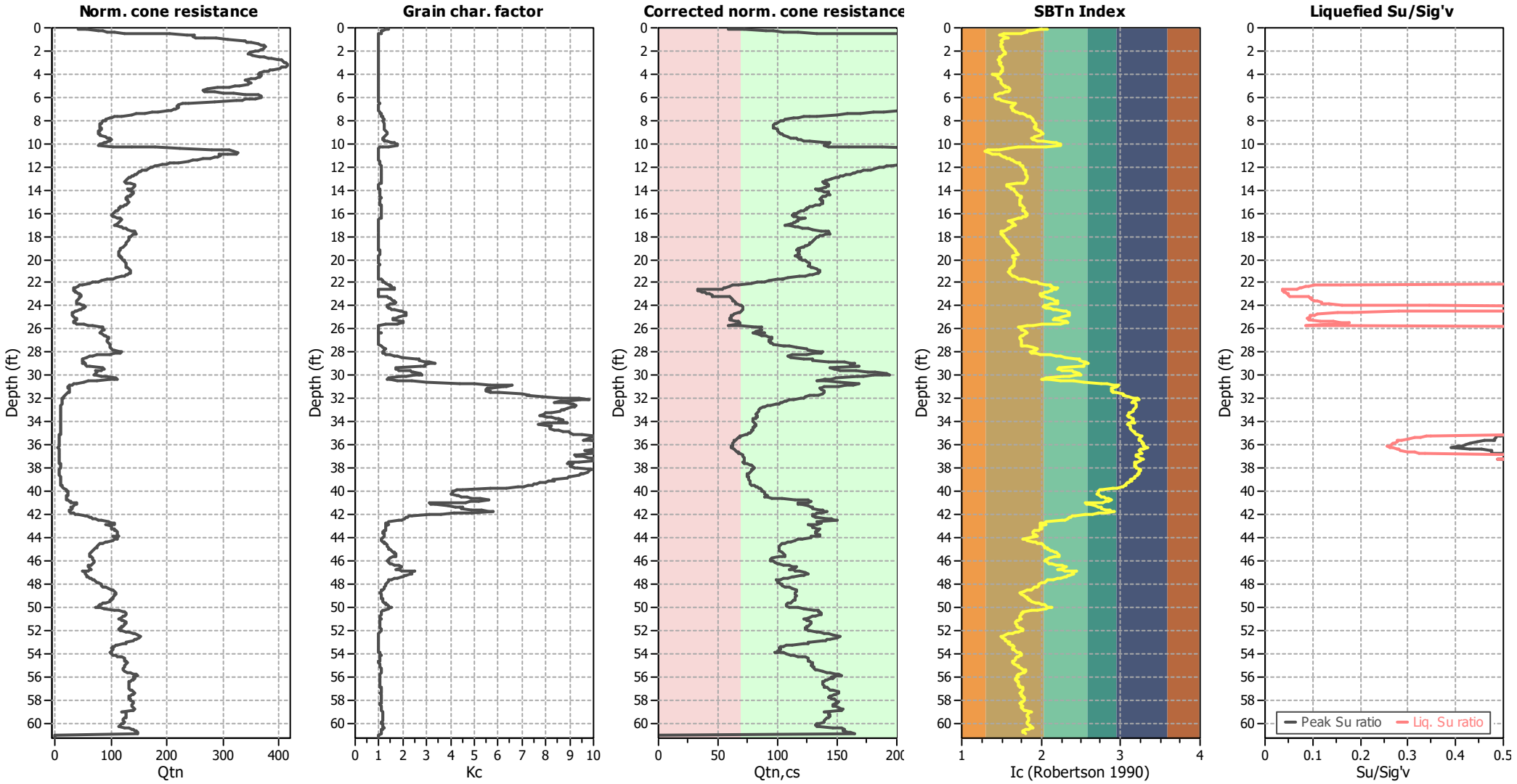




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

LIQUEFACTION ANALYSIS REPORT

Project title : 12807.002 Concordia at Los Arbolitos/Geotech **Location : Oceanside, CA**

CPT file : CPT-4

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	15.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	17.00 ft	Fill height:	N/A	Limit depth applied:	No
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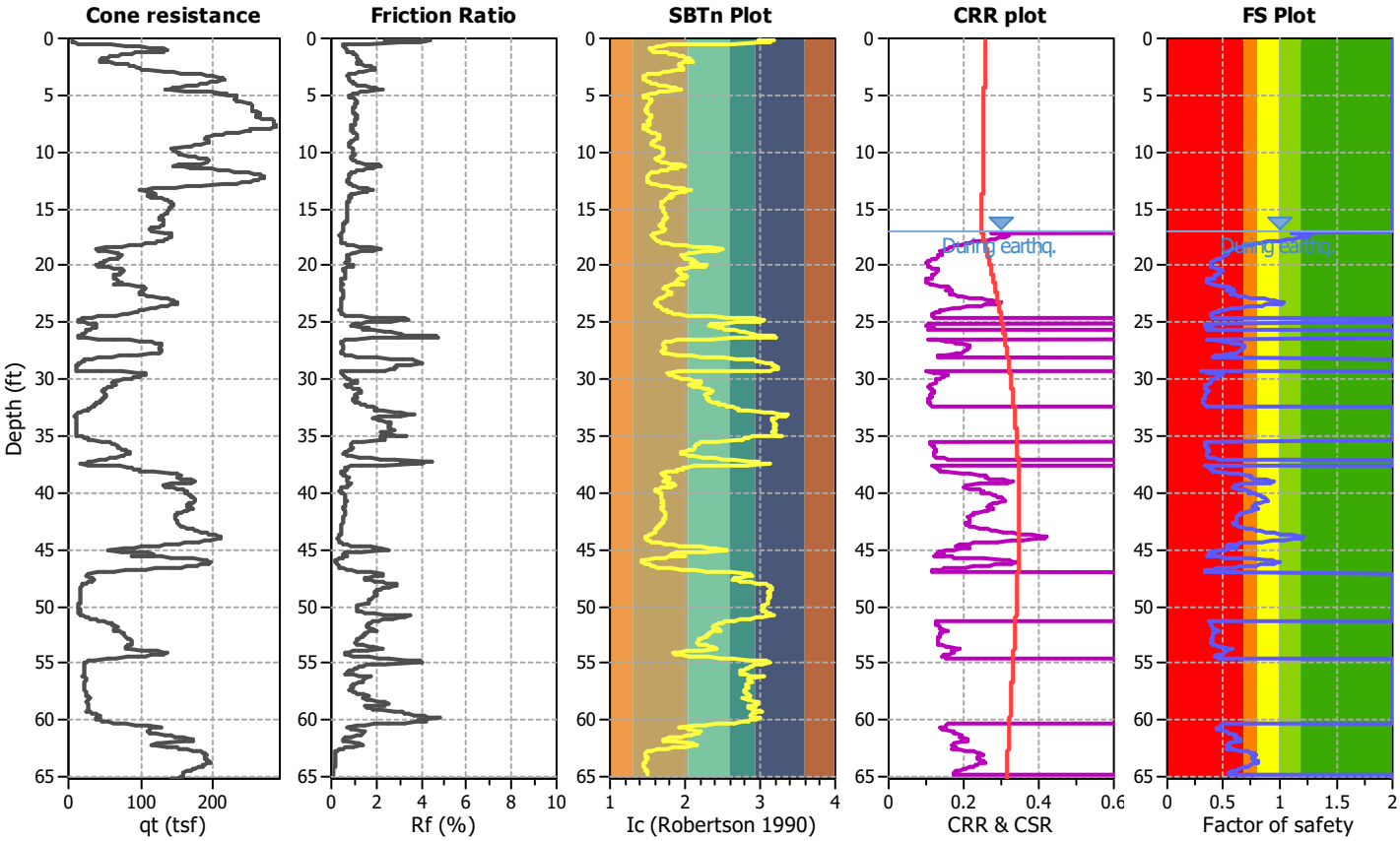
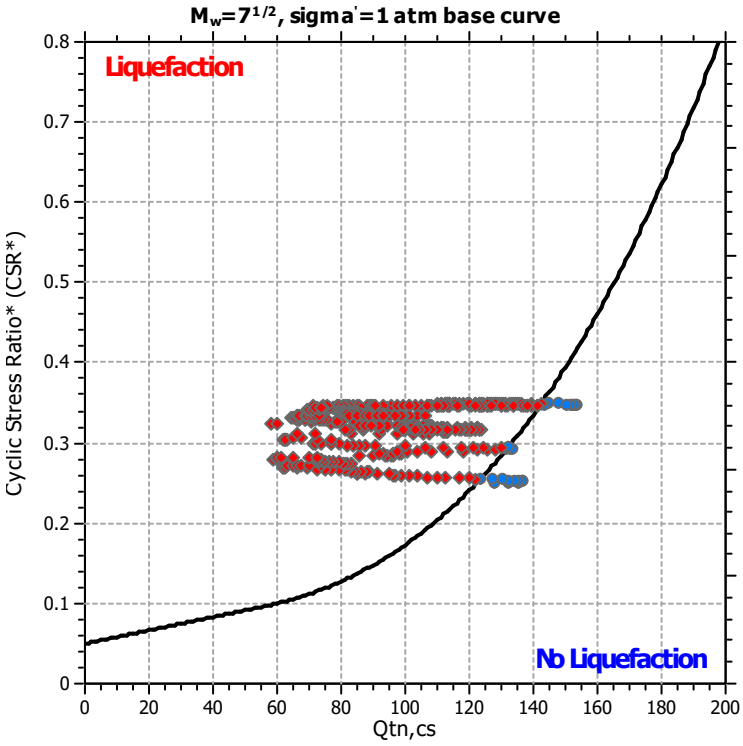
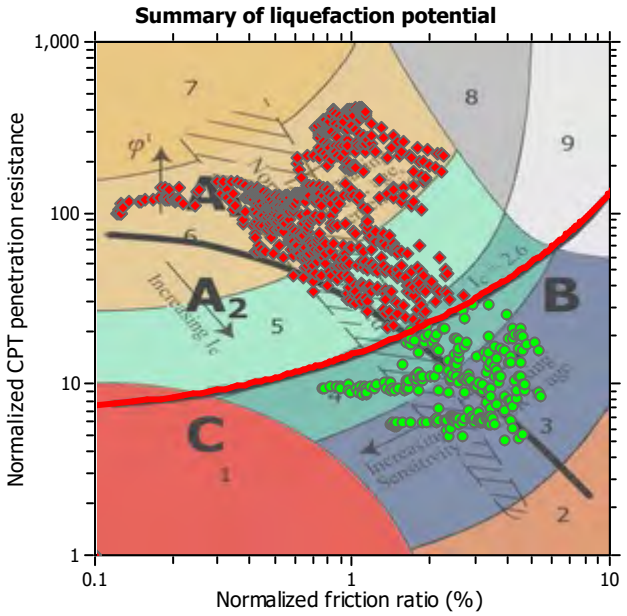
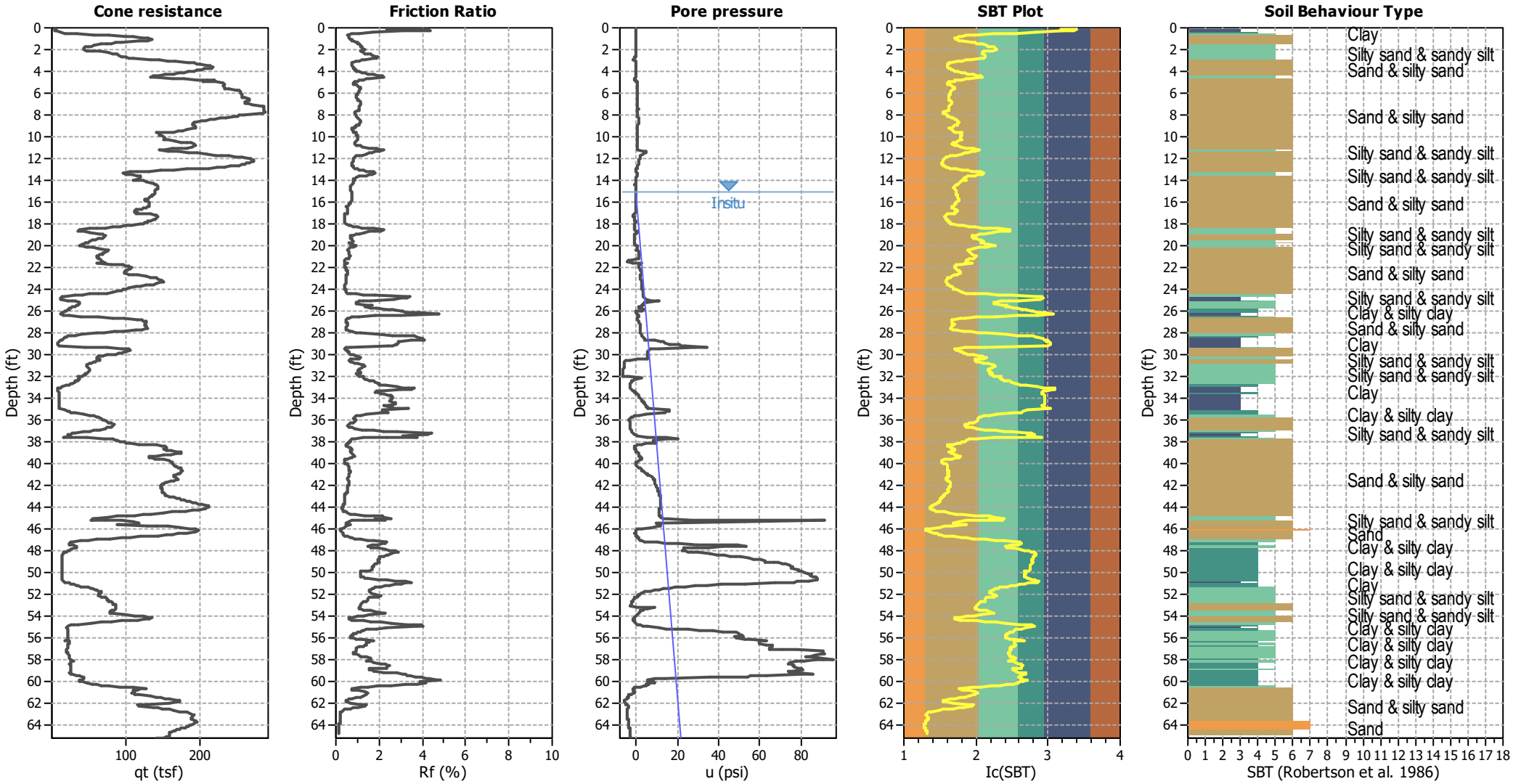






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



Input parameters and analysis data

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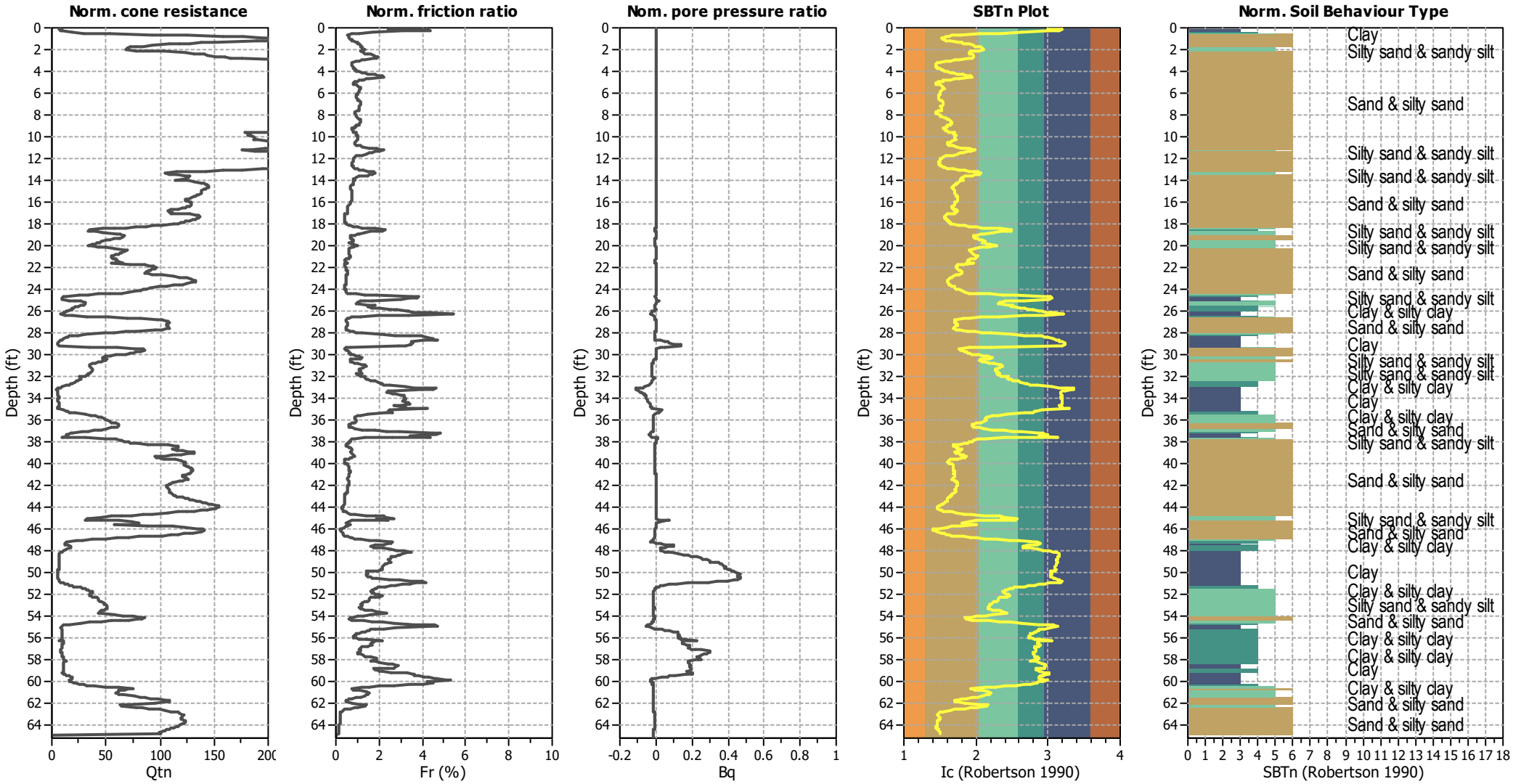
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

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4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
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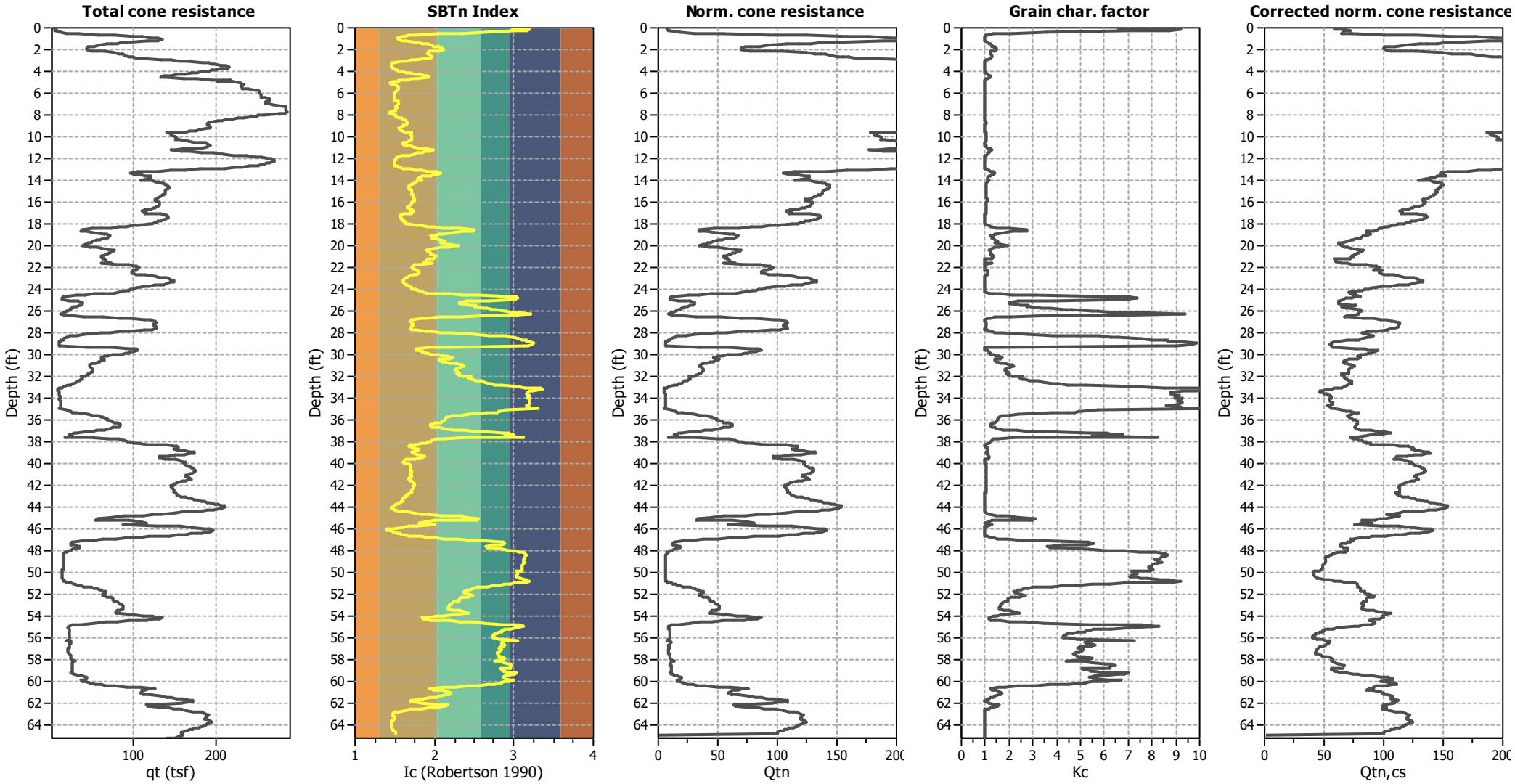
9. Very stiff fine grained

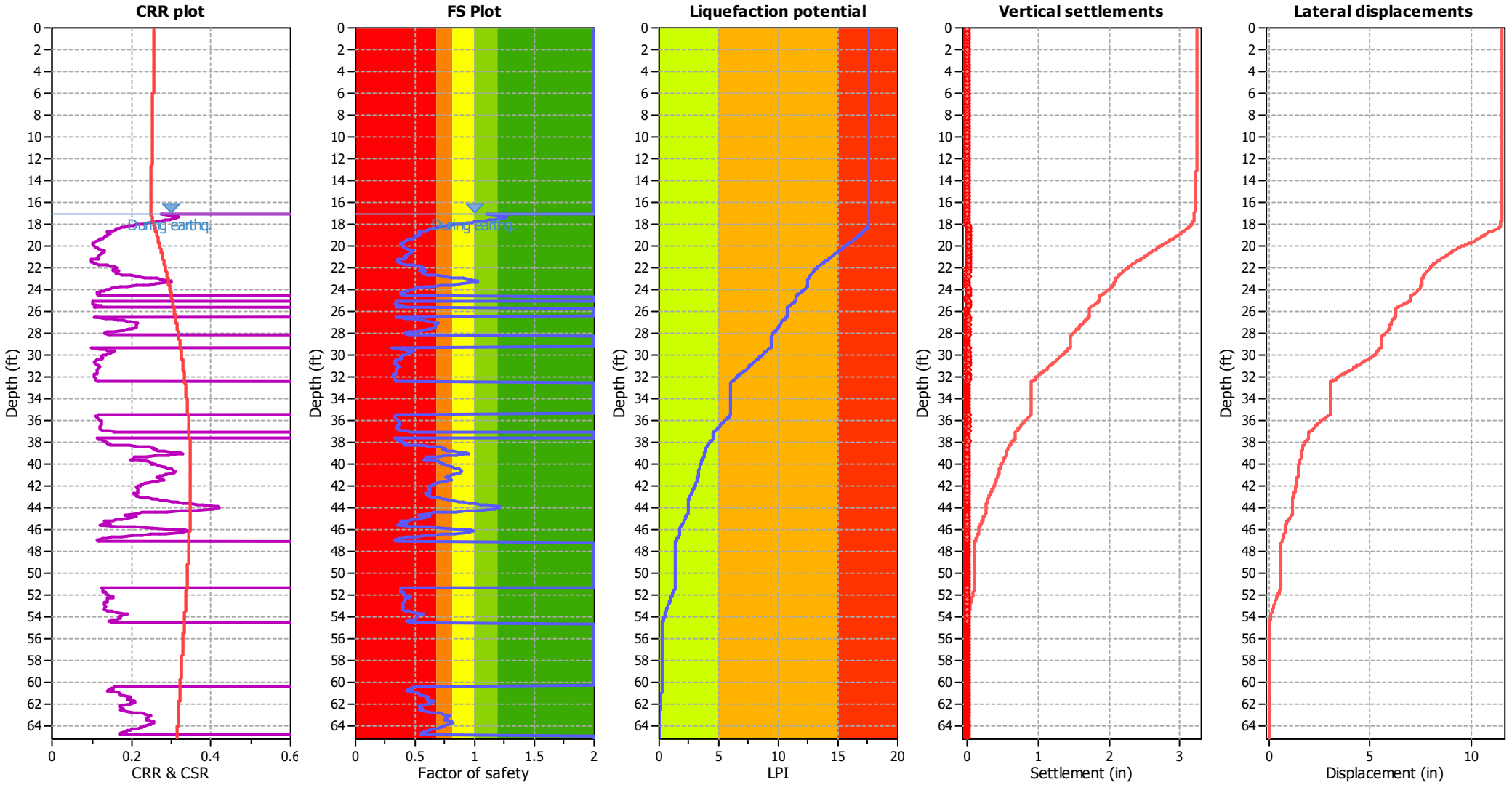
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

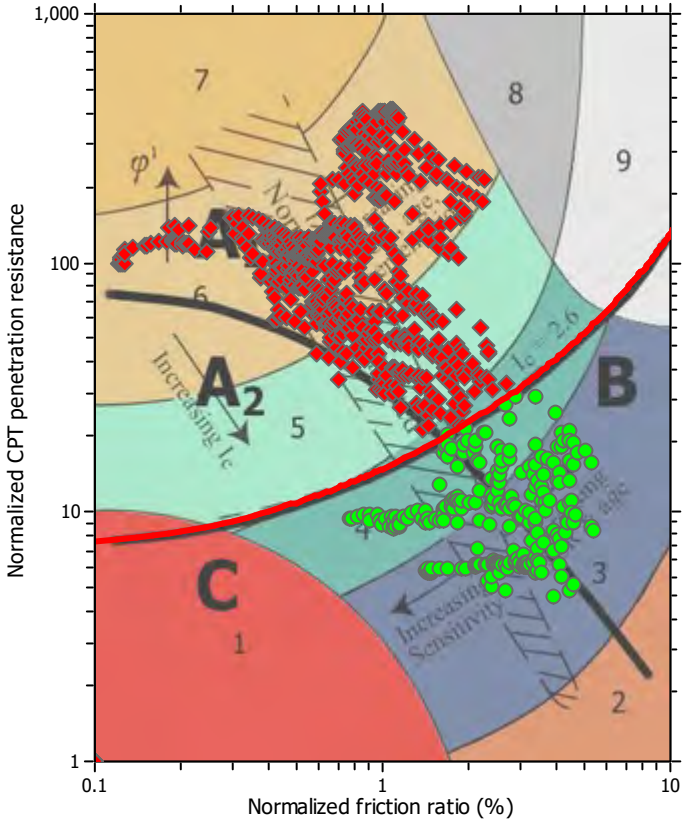
F.S. color scheme

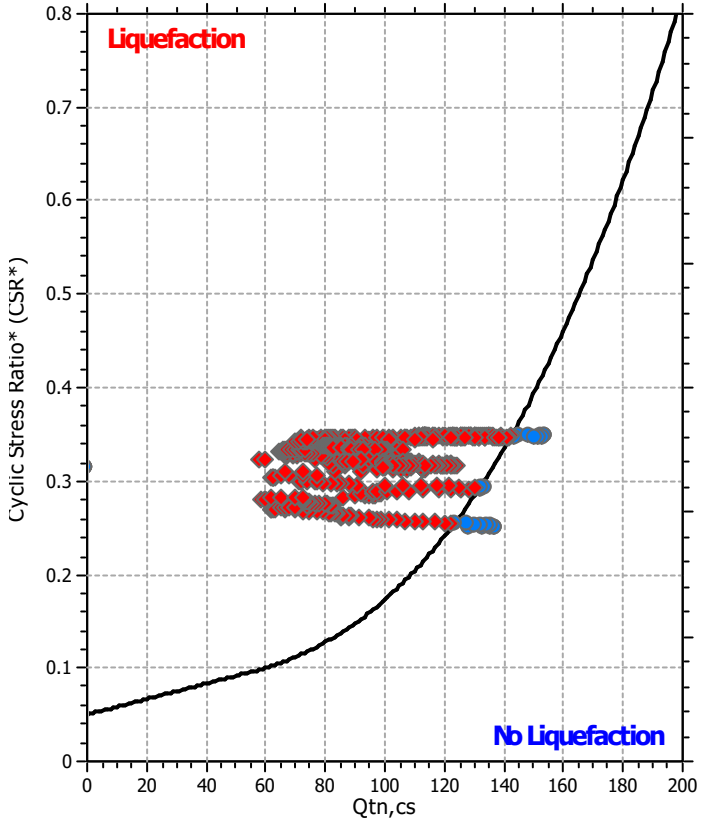
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

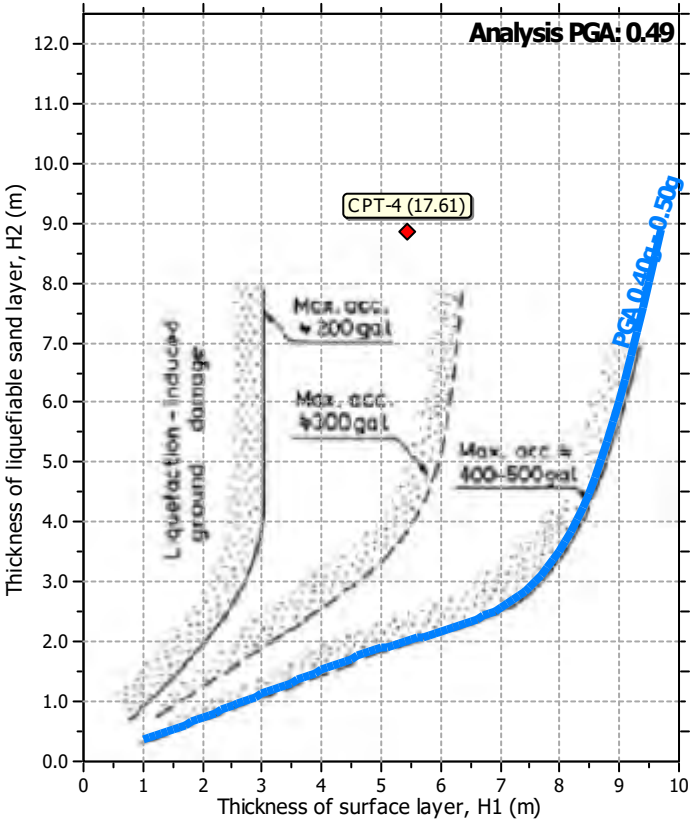
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



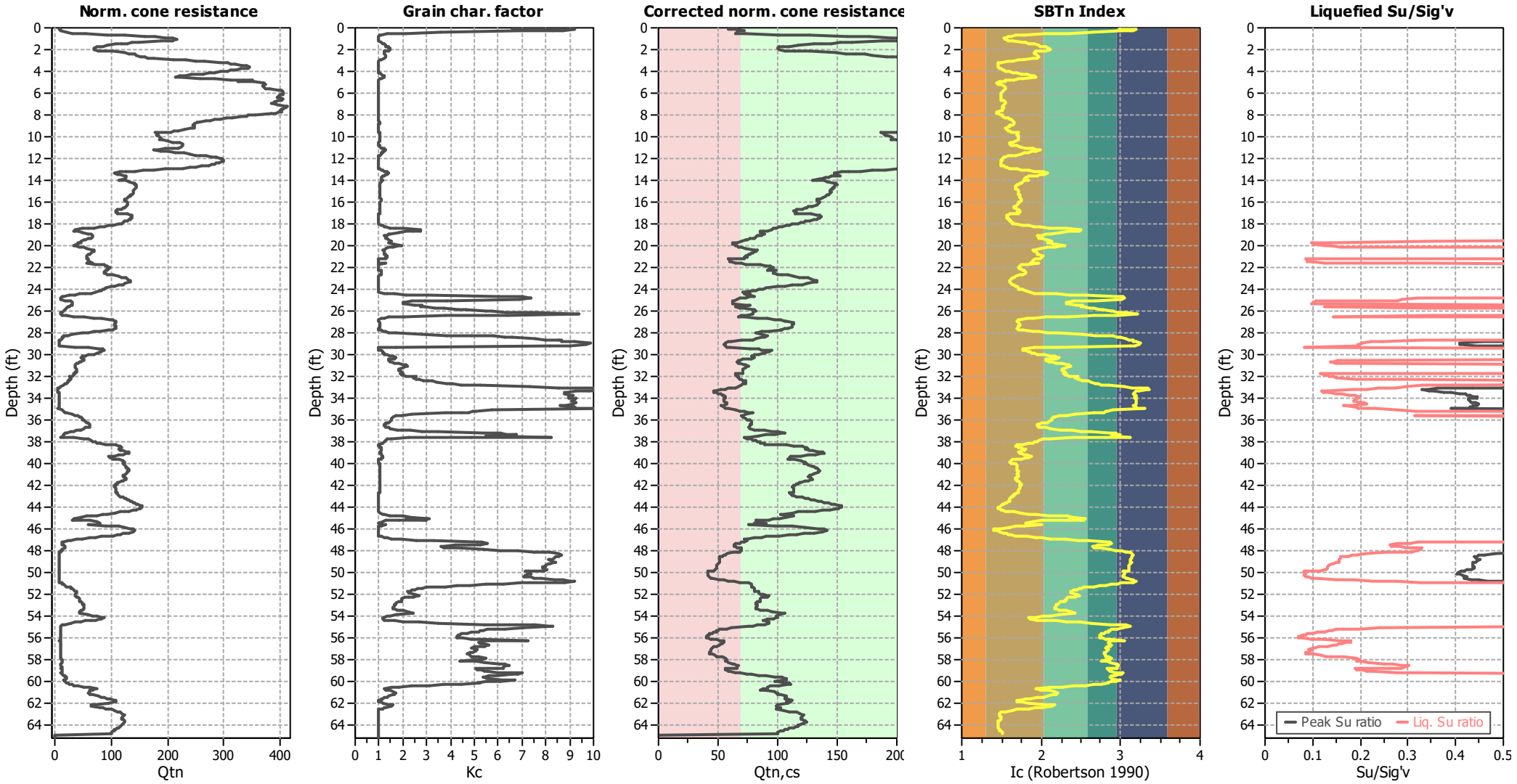




Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	17.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	1	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.49	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 ft	Fill height:	N/A	Limit depth:	N/A

Appendix E
General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

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

1.2 The Geotechnical Consultant of Record

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

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

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

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

1.3 The Earthwork Contractor

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

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

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

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

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

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

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

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

2.2 Processing

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

2.3 Overexcavation

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

2.4 Benching

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

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

2.5 Evaluation/Acceptance of Fill Areas

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

3.0 Fill Material

3.1 General

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

3.2 Oversize

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

3.3 Import

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

4.0 Fill Placement and Compaction

4.1 Fill Layers

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

4.2 Fill Moisture Conditioning

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

4.3 Compaction of Fill

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

4.4 Compaction of Fill Slopes

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

4.5 Compaction Testing

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

inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

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

4.7 Compaction Test Locations

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

5.0 Subdrain Installation

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

6.0 Excavation

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

7.0 Trench Backfills

7.1 Safety

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

7.2 Bedding and Backfill

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

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

7.3 Lift Thickness

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

7.4 Observation and Testing

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

ATTACHMENT 7
Storm Water Quality Assessment Form

This is the cover sheet for Attachment 7.

City of Oceanside – Engineering Division – Clean Water Program

STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

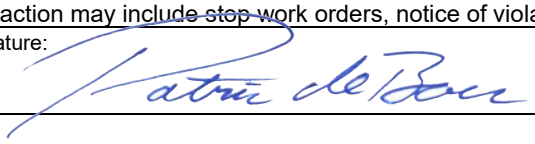
All applications for Planning, Engineering, or Building Division permits are required to complete this assessment form and include it as part of the initial permit application submittal. Staff will review the permit application content to determine the applicability of State and City storm water requirements. Please note a storm water assessment cannot be provided without a complete permit application package.

Section 1 – Project Information	
Applicant Name: Patric de Boer	Phone Number: (760) 672-3505
Project Name: Cypress Point Subdivision	Project Site Address: Terminus of Pala Rd., Oceanside, CA 92058
Permit Applications Number(s): T21-00001	Assessor Parcel Number(s): 158-301-46-00
Project Description: Development of a 54 single family home subdivision	Project Disturbed Area (square feet): 326,912
Existing Impervious Area (square feet): 0	Created or Replaced Impervious Area (square feet): 195,166

Section 2 – Identify Applicable Priority Development Project Categories (Check All Boxes that Apply)	
☒	**New Development Project** – A project that creates 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
☐	**Redevelopment Project** – A project that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
☐	**Restaurants** – Category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812); where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Hillside Development** – Category includes development on any natural slope that is twenty-five percent or greater; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Parking Lots** – Category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Streets, Roads, Highways, Freeways, and Driveways** – Category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Water Quality Environmentally Sensitive Area** – New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharge directly to a Water Quality Environmentally Sensitive Area (WQESA). "Discharge directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the WQESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).
☐	**Automotive Repair Shop** – Category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Retail Gasoline Outlet (RGOs)** – Category includes RGOs that meet the following criteria (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day; where new or redevelopment projects create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Development Projects greater than one acre** – New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.

STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

Section 3 – Identify Projects Not Subject to Permanent Stormwater Requirements (Check All Boxes that Apply)	
☐	The project consists of work entirely within an existing structure.
☐	The project consists of construction of overhead or underground utilities (no new impervious surfaces).
☐	The project consists of routine maintenance.
☐	The project consists of less than 50 yards of grading and presents no opportunities to improve water quality.
Section 4 – Project Category Determination	
☒	**Priority Development Project**: If any item in Section 2 is applicable, the project is a Priority Development Project. **Please prepare a PDP SWQMP for the project.**
☐	**Standard Development Project**: If none of the items in Section 2 or 3 are applicable, the project is a Standard Development Project. **Please prepare an SDP SWQMP.**
☐	**Project Not Subject to Permanent Stormwater Requirements:** If any item in Section 3 is applicable, the project is not subject to Permanent Stormwater Requirements. **Please submit the project plans with this form.** **Note:** Projects in this category are subject to typical pollution prevention measures outlined by the pollution prevention checklist on the following page.

Section 5 – Applicant Certification	
Name of Responsible Party: Omega Engineering Consultants	Title: Project Engineer
Email Address (optional) patric@omega-consultants.com	Phone Number: (619) 488-6924
I understand and acknowledge the City of Oceanside has adopted minimum requirements, as mandated by the San Diego Regional Water Quality Control Board – Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (NPDES NO. CAS0109266) for mitigating impacts associated with urban runoff, including storm water from construction and land development activities. I certify this assessment has been accurately completed to the best of my knowledge and is consistent with the proposed project. I acknowledge that non-compliance with the City Best Management Practice (BMP) Design Manual, Grading Ordinance, and Erosion Control Ordinance may result in enforcement action by the City, the California State Water Resources Control Board, and/or the San Diego Regional Water Quality Control Board. Enforcement action may include stop work orders, notice of violation, fines, or other actions.	
Applicant Signature: 	Date: 03/17/2021

Stormwater Pollution Prevention Measures for Projects Not Subject to Permanent Stormwater Requirements

Project Activity	Yes	No	Required Pollution Prevention
Trash & Waste Generation *****REQUIRED FOR ALL PROJECTS*****	☒	☐	• Train/inform all employees of pollution prevention requirements • Collect and contain all construction trash, waste, and debris • Promptly contain and clean any spill on site • Routinely inspect site, remove loose trash and prevent spills • Properly dispose of any hazardous materials • Do not wash down surfaces unless water is collected or directed to landscape • Permanent trash collection areas require full structure/enclosure
Digging of Dirt – excavation, trenching, or grading	☒	☐	• Do not allow dirt to migrate into street, sidewalk, or storm drain • Preserve existing vegetation where feasible • Perimeter site controls such as silt fence or straw wattles • Cover exposed dirt using mulch, tarps, or erosion control devices • Install and secure tarps over dirt piles • Routinely sweep site to remove dirt
Landscaping and Irrigation Systems	☒	☐	• Do not store landscape materials in street • Do not allow dirt to migrate into street, sidewalk, or storm drain • Test irrigation system and prevent runoff/overspray • Install and secure tarps over piles of mulch or soil • Routinely sweep site to remove mulch or soil • Do not wash down surfaces unless water is collected or directed to landscape
Concrete, Paint, Mortar, or Stucco Work	☒	☐	• Contain wet mixing areas within confined area • Do not allow material to travel into site soil, street, or storm drain • Properly dispose of waste material
Temporary Storage of Materials Outside	☒	☐	• Elevate material off ground where possible, such as on pallets • Install and secure tarps over materials
Demolition of Structures	☐	☒	• Follow Required Pollution Prevention for “Digging of Dirt”
New Structure – house addition, shed, etc.	☒	☐	• Follow Required Pollution Prevention for “Digging of Dirt” • Direct downspouts to landscape, where feasible • Consider rainwater harvesting • Preserve existing vegetation and drainage patterns, where feasible
Patio, Driveway, or Sidewalk	☒	☐	• Consider use of pervious pavers or pervious concrete (refer to Section 3 of page 4 for routine maintenance information) • Direct runoff to landscape areas, where feasible
Re-Roofing	☐	☒	• Contain removed roof debris in waste containers • Follow Required Pollution Prevention for “Temporary Storage of Materials Outside”
Washing of Material, Equipment, or Surface	☒	☐	• Do not wash down surfaces unless water is collected or directed to landscape
Draining of Water Heater, Pool, or Spa	☐	☒	• Direct drain water to landscape areas where possible • Contact Stormwater Division if considering draining to sanitary system cleanout or storm drain system (760-643-2804)
Storm Drain at Industrial or Commercial Property	☐	☒	• Install “No Dumping” or similar signage at each storm drain inlet

Completion Guidance

Please note – the Applicant is required to complete and submit this form as part of the project application. For definitions and additional information, please refer to the City of Oceanside BMP Design Manual. For assistance, please contact Development Services Staff at (760) 435-4373.

Section 1 – Project Information

1. Applicant Name – provide name of Individual completing form, i.e. Owner or Owner Representative
2. Phone Number – provide phone number of Individual completing form, i.e. Owner or Owner Representative
3. Project Name – provide project name (consistent with project application)
4. Project Site Address – provide a physical address for the proposed project, or nearest cross street
5. Permit Application Number(s) – provide all applicable permit application numbers
6. Assessor Parcel Number(s) – provide Assessor Parcel Number(s); refer to title documents or contact City Staff for assistance
7. Project Description – provide a brief project description (e.g. single-family dwelling, retail business, repair shop, etc)
8. Project Disturbed Area – provide the disturbed area for the entire project, including onsite and offsite work
9. Existing Impervious Area – provide the total existing impervious area within the property and project boundary
10. Created or Replaced Impervious Area – provide the total area of all newly created or replaced impervious surfaces within the project area

Section 2 – Identify Applicable Priority Development Project Categories

1. Review each category and check the appropriate boxes that apply to your project.
2. General identification of Automotive Repair Shop SIC (Standard Industrial Classifications) as follows:
   5013 – Motor vehicle supplies and new parts, 5014 – Tires and tubes, 5541 – Gasoline service stations, 7532 – Top and body repair, and paint shops, 7533 – Auto exhaust system repair shops, 7534 – Tire retreading and repair shops, 7536 – Automotive glass replacement shops, 7537 – Automotive transmission repair shops, 7538 – General automotive repair shops, 7539 – Automotive repair shops-not elsewhere classified
3. Contact Staff for assistance in determining applicability of the Water Quality Environmentally Sensitive Area (WQESA) category

Section 3 – Identify Projects Not Subject to Permanent Stormwater Requirements

1. Please refer to Page 1-6 of the City of Oceanside BMP Design Manual for a complete list of routine maintenance activities.
2. Activities that expose native subgrade in the process of replacing impervious surfaces, are not considered routine maintenance.

Section 4 – Project Category Determination

1. PDP SWQMP – Priority Development Project Stormwater Quality Management Plan
2. SDP SWQMP – Standard Development Project Stormwater Quality Management Plan
3. Contact Staff for assistance in determining the Project Category

Section 5 – Applicant Certification

1. Name of Responsible Party – provide name of Owner
2. Title of Responsible Party – provide responsible party's title, if applicable
3. Phone Number – provide phone number of Owner
4. Email Address (Optional) – provide email address
5. Applicant Signature – provide signature of Individual completing form, i.e. Owner or Owner Representative
6. Date – provide date current date