APPENDIX L

Priority Development Project Stormwater Quality Management Plan (January 2021)

Priority Development Project (PDP)
Storm Water Quality Management Plan (SWQMP)

El Camino Real Assisted Living Facility

DIGITAL PTS-0675732

[Insert Drawing Number (if applicable) and Internal Order Number (if applicable)]

☐ **Check if electing for offsite alternative compliance**

Engineer of Work:

_____

John D Leppert
Provide Wet Signature and Stamp Above Line

Prepared For:

PMB Carmel Valley, LLC

3394 Carmel Mountain Road Ste 200

San Diego CA 92121

858-794-1900

Prepared By:

Leppert Engineering Corporation
5190 Governor DR #205
San Diego CA 92122
858-597-2001

Date:

JANUARY 2021

Approved by: City of San Diego Date

The City of SAN DIEGO

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

Table of Contents

- Attachment 3: Structural BMP Maintenance Plan
    - Maintenance Agreement (Form DS-3247) (when applicable)
- Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs
- Attachment 5: Project's Drainage Report
- Attachment 6: Project's Geotechnical and Groundwater Investigation Report

Acronyms

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Certification Page

Project Name:
Permit Application

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

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

Engineer of Work's Signature

RCE 25283 — PE#

03-31-2022 — Expiration Date

John D. Leppert

Print Name

Leppert Engineering Corporation

Company

Date

Engineer's Stamp

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

Submittal Record

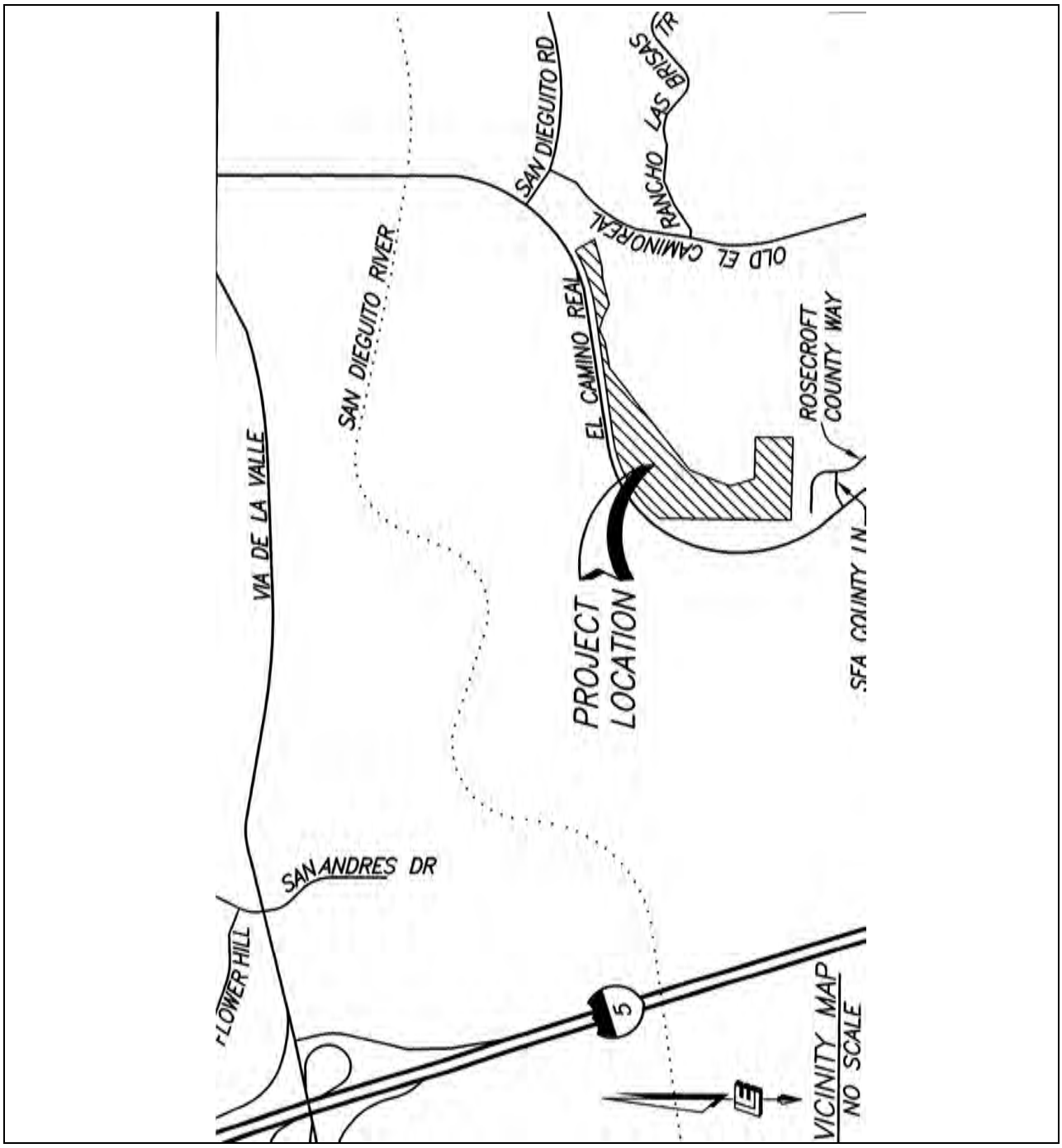
Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck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

Submittal Number	Date	Project Status	Changes
1	09/2020	☑ **Preliminary Design/Planning/CEQA** ☐ **Final Design**	**Initial Submittal**
2	01/2021	☑ **Preliminary Design/Planning/CEQA** ☐ **Final Design**	Resubmittal
3		☐ **Preliminary Design/Planning/CEQA** ☐ **Final Design**	
4		☐ **Preliminary Design/Planning/CEQA** ☐ **Final Design**	

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Vicinity Map

Project Name: El Camino Real Assisted Living Facility
Permit Application DIGITAL PTS-0675732



THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

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

Storm Water Requirements Applicability Checklist

FORM
DS-560
November 2018

Project Address: 13860 El Camino Real	Project Number: Digital PTS-0675732

SECTION 1. Construction Storm Water BMP Requirements:

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

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with Construction Activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

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

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

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

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as pipeline/utility replacement)

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

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

- Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
- Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
- Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

☐ Yes; no document required

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

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

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3, **a WPCP is REQUIRED.** If the project proposes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

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

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

PART B: Determine Construction Site Priority

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**

a. Projects located in the ASBS watershed.

2. ☑ **High Priority**

a. Projects that qualify as Risk Level 2 or Risk Level 3 per the Construction General Permit (CGP) and not located in the ASBS watershed.

b. Projects that qualify as LUP Type 2 or LUP Type 3 per the CGP and not located in the ASBS watershed.

3. ☐ **Medium Priority**

a. Projects that are not located in an ASBS watershed or designated as a High priority site.

b. Projects that qualify as Risk Level 1 or LUP Type 1 per the CGP and not located in an ASBS watershed.

c. WPCP projects (>5,000sf of ground disturbance) located within the Los Penasquitos watershed management area.

4. ☐ **Low Priority**

a. Projects not subject to a Medium or High site priority designation and are not located in an ASBS watershed.

SECTION 2. Permanent Storm Water BMP Requirements.

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

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

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

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

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	☐ Yes	☑ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	☐ Yes	☑ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes	☑ No

PART D: PDP Exempt Requirements.

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

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

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

1. **Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:**
   - **Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;**
   - **Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;**
   - **Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?**

   ❑ Yes; PDP exempt requirements apply ☑ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

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

PART E: Determine if Project is a Priority Development Project (PDP).

Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

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

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

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☑ Yes ❑ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces**. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	❑ Yes ☑ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	❑ Yes ☑ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	❑ Yes ☑ No
5.	**New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	❑ Yes ☑ No
6.	**New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	❑ Yes ☑ No

7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). ☐ Yes ☑ No

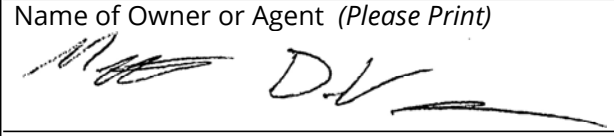
8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day. ☐ Yes ☑ No

9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539. ☐ Yes ☑ No

10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☑ No

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

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

Matthew DeVincenzo	Agent for Owner
Name of Owner or Agent *(Please Print)*	Title
	07/09/2020
Signature	Date

Project Name: El Camino Real Assisted Living Facility

Applicability of Permanent, Post-Construction Storm Water BMP Requirements	Form I-1
Project Identification	
Project Name: El Camino Real Assisted Living Facility	
Permit Application Number: DIGITAL PTS-0675732	Date: August 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 (Part 1 of Storm Water Standards) for guidance.	☑ Yes	Go to **Step 2**.
	☐ No	**Stop**. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, PDP, or PDP Exempt? To answer this item, see Section 1.4 of the manual in its entirety for guidance AND complete Form DS-560, Storm Water Requirements Applicability Checklist.	☐ Standard Project	**Stop.** Standard Project requirements apply
	☑ PDP	PDP requirements apply, including PDP SWQMP. Go to **Step 3**.
	☐ PDP Exempt	**Stop.** Standard Project requirements apply. Provide discussion and list any additional requirements below.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Project Name: El Camino Real Assisted Living Facility

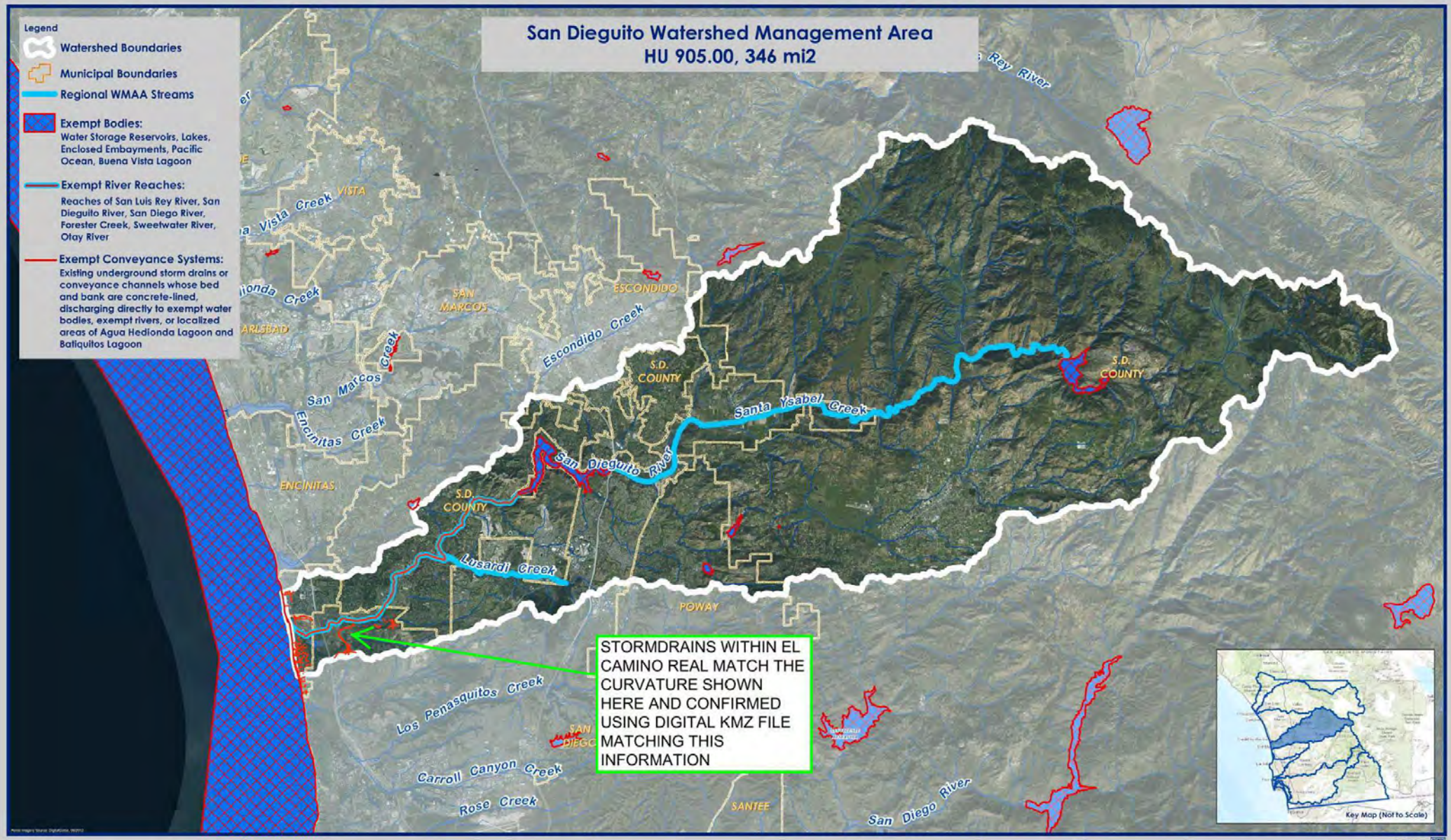
Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to **Step 4**.
	☑ No	BMP Design Manual PDP requirements apply. Go to **Step 4**.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to **Step 5**.
	☑ No	**Stop**. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: The project site in both the existing and proposed conditions drains into the San Dieguito River flood way, with the outfall elevation below the 100 year base flood elevation.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). **Stop**.
	☑ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. **Stop**.
Discussion / justification if protection of critical coarse sediment yield areas does not apply: There is no CCSYA within the project drainage area, and the project is HMP exempt so it is not subject to this requirement.		

HMP Exemption Exhibit

Attach a HMP Exemption Exhibit that shows direct storm water runoff discharge from the project site to HMP exempt area. Include project area, applicable underground storm drain line and/or concrete lined channels, outfall information and exempt waterbody.
Reference applicable drawing number(s).

Exhibit must be provided on 11"x17" or larger paper.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

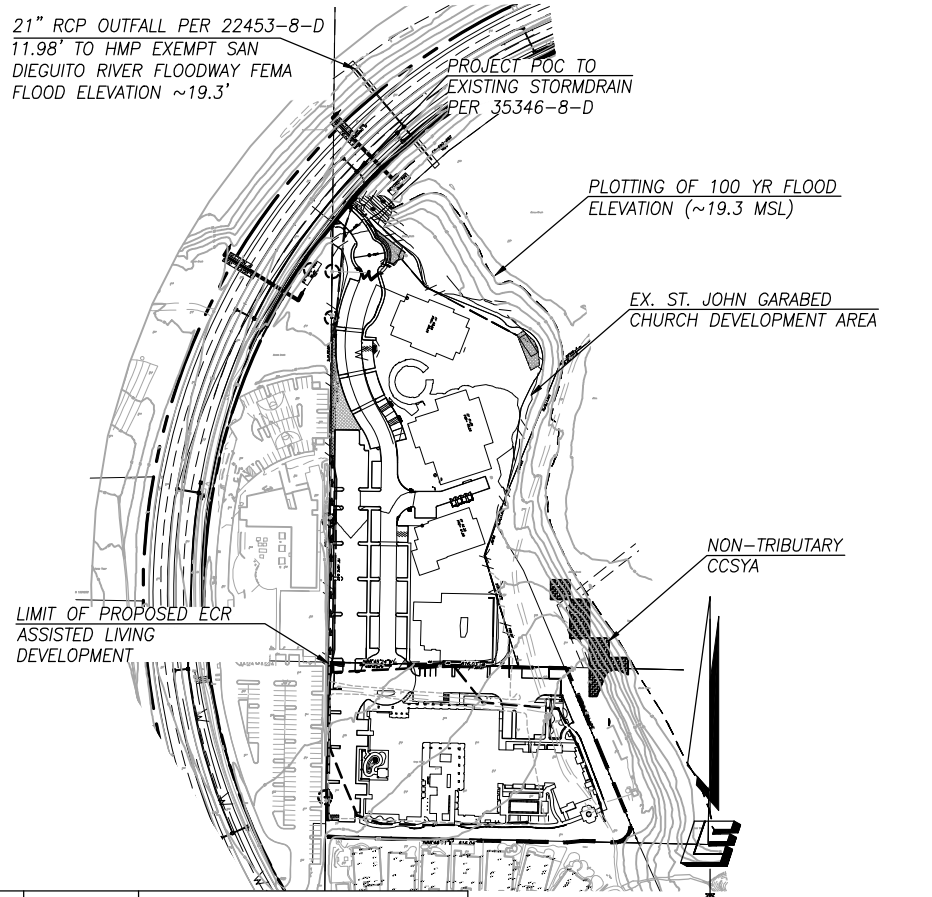


Receiving Waters and Conveyance Systems Exempt from Hydromodification Management Requirements

Exhibit Date: Sept. 8, 2014

Geosyntec consultants

RICK Engineering Company



200 0 200 400

SCALE: 1"= 200'

NO.	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	09/15/20	MFD	ORIGINAL

APPROVED BY ENGINEER OF WORK

REGISTRATION R C E 26283

FILE CODE SDR 05.01-09.16

DATE

PREPARATION AND REVISION LOG

Leppert Engineering
CORPORATION
5190 Governor Drive, Suite 205, San Diego, Ca. 92122-2848
Phone: (858) 597-2001 Fax: (858) 597-2009

HMP EXEMPTION/CCSYA EXHIBIT
SHEET 1 OF 1
ECR ASSISTED LIVING

Project Name: El Camino Real Assisted Living Facility

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	El Camino Real Assisted Living Facility
Project Address	13860 El Camino Real San Diego CA 92130
Assessor's Parcel Number(s) (APN(s))	304-650-37-00
Permit Application Number	DIGITAL PTS-0675732
Project Watershed	Select One: ☑ San Dieguito River ☐ Penasquitos ☐ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Rancho Santa Fe 905.11
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	3.97 Acres (172,933 Square Feet)
Area to be disturbed by the project (Project Footprint)	2.8 Acres (122,403 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	2.1 Acres (90,157 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.7 Acres (32,247 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	52 %

Form I-3B Page 2 of 11

Description of Existing Site Condition and Drainage Patterns

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

☐ Existing development
☑ Previously graded but not built out
☑ Agricultural or other non-impervious use
☑ Vacant, undeveloped/natural

Description / Additional Information:

The project site was being cultivated until the start of the St John Garabed Church project adjacent to this site, and is now covered in some sparse weed cover with ~ 30% of the site existing in a native or natural condition.

Existing Land Cover Includes (select all that apply):

☑ Vegetative Cover
☑ Non-Vegetated Pervious Areas
☐ Impervious Areas

Description / Additional Information:

The project site is currently being cultivated and consists of both cultivated plant material as well as some sparse weed cover in the un-cultivated area. ~ 30% of the site exists in a native or natural condition.

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

Existing Natural Hydrologic Features (select all that apply):

☑ Watercourses
☐ Seeps
☐ Springs
☑ Wetlands
☐ None

Description / Additional Information:

The San Dieguito flood plain extends across the easterly portion of the site which allows for wetland habitat to exist within that area.

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage

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

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

Descriptions/Additional Information

1. Existing drainage is primarily natural, with some slight modifications due to the prior cultivation and grading activities to the site and adjacent areas.

2. No offsite run-on is experienced across the parcel as the adjacent developments have all graded their site to drain away from the parcel and into their own drainage systems.

3. The development project area sheet flows to the north and west, where it is collected via an existing 18" HDPE installed as part of the Church development to the north. From there the runoff is conveyed under El Camino Real and discharges to the San Dieguito River floodway.

4. The basin area draining to the north west represents ~2.8 acres which exits the site via a0 18" pipe with a design capacity of 9.1 CFS, of which the existing site accounts for 3.3 CFS.

Attachment 5 contains drainage calculations and basin maps for the site.

Form I-3B Page 4 of 11

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project proposes a total of one Intermediate Care Facility providing 105 units of assisted and memory care living for seniors. Supporting hardscape and landscape improvements include gardens, courtyards and pet relief area as well as a surface parking lot.

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

The project site impervious area includes building, an onsite parking lot, sidewalks and various hardscape areas to provide for pedestrian circulation and some incidental imperviousness due to onsite ammenity areas.

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

Onsite areas included within the project footprint will consist of mostly ornamental plantings in between the building and parking areas, as well as parking lot planters. Partial retention areas on the west side of the property have been proposed for treatment of stormwater runoff. The remaining lot area represents the floodplain to the east and will remain entirely pervious as a mitigation area.

Does the project include grading and changes to site topography?

☑ Yes

☐ No

Description / Additional Information:

The entirety of the development footprint will be excavated to a depth of ~5-20’ for removal of previously placed undocumented fill and colluvium, and the finish grades will provide for a cut depth of ~1'-12’ total. Existing drainage patterns and general site topographic relationship will be maintained.

Form I-3B Page 5 of 11

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

☑ Yes

☐ No

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

Description / Additional Information:

Proposed drainage will consist of onsite areas sheet flowing into various inlets and partial retention areas. Run-off will be discharged to a proposed Modular Wetland System for treatment prior to leaving the site.

The project stormdrain will leave the site and connect to the existing system on the west edge of the adjacent St John Garabed Armenian Church project. Those co-mingled treated site flows will drain to the public stormdrain within El Camino Real. The total combined drainage design level flow leaving the sites is 14.0 CFS.

Form I-3B Page 6 of 11

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

- [x] Onsite storm drain inlets
- [ ] Interior floor drains and elevator shaft sump pumps
- [ ] Interior parking garages
- [ ] Need for future indoor & structural pest control
- [x] Landscape/outdoor pesticide use
- [x] Pools, spas, ponds, decorative fountains, and other water features
- [ ] Food service
- [x] Refuse areas
- [ ] Industrial processes
- [ ] Outdoor storage of equipment or materials
- [ ] Vehicle and equipment cleaning
- [ ] Vehicle/equipment repair and maintenance
- [ ] Fuel dispensing areas
- [ ] Loading docks
- [x] Fire sprinkler test water
- [ ] Miscellaneous drain or wash water
- [x] Plazas, sidewalks, and parking lots

Description/Additional Information:

Form I-3B Page 7 of 11

Identification and Narrative of Receiving Water

Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)

The project site is located southeasterly of El Camino Real, between San Dieguito Road and Sea Lane, in the City of San Diego, situated within the San Dieguito Watershed. Storm water generated on-site will sheet flow into partial retention tree wells, where it is collected by the proposed private storm drain and treated by a Modular Wetland System. The site will drain via the stormdrain for the adjacent St John Garabed Church before discharging into the existing storm drain system in El Camino Real and subsequent outfalls as seen on 22453-D. The drainage will drain within the San Dieguito River floodplain for ~0.4 miles before reaching the San Dieguito River itself. From there an additional 1.9 miles downstream, the water will discharge to the Pacific Ocean.

Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations

San Dieguito River - AGR, BIOL, COLD, IND, MUN, PROC, RARE, REC1, REC2 WARM, WILD

Pacific Ocean Shoreline, San Dieguito HU, at San Dieguito Lagoon Mouth at San Dieguito River Beach - AQUA, BIOL, COMM, IND, MAR, MIGR, NAV, RARE, REC1, REC2, SHELL, SPWN, WILD

Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations

There are no ASBS downstream of the project site.

Provide distance from project outfall location to impaired or sensitive receiving waters

Basin No. 905.11 is included in the most recent list of Clean Water Act Section 303(d) List of Water Quality Segments. The project site indirectly discharges 0.4 miles from the project site to San Dieguito River, which is impaired for Enterococcus, Fecal coliform, Nitrogen, Phosphorus, Total Dissolved Solids & Toxicity. The San Dieguito River discharges to Pacific Ocean Shoreline, San Dieguito HU, at San Dieguito Lagoon Mouth, which is impaired with Total Coliform.

Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands

The project site is directly adjacent to the MHPA, however all stormwater collected onsite is collected and discharged to existing conveyances draining multiple drainage areas.

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body (Refer to Appendix K)	Pollutant(s)/Stressor(s) (Refer to Appendix K)	TMDLs/WQIP Highest Priority Pollutant (Refer to Table 1-4 in Chapter 1)
San Dieguito River	Enterrococcus	2021/Indicator Bacteria
San Dieguito River	Fecal Coliform	2021/Indicator Bacteria
San Dieguito River	Nitrogen	2021/Nutrient
San Dieguito River	Phosphorus	2021/Nutrient
San Dieguito River	Total Dissolved Solids	2021
San Dieguito River	Toxicity	2021
Pacific Ocean Shoreline, San Dieguito HU, at San Dieguito Lagoon Mouth at San Dieguito River Beach	Total Coliform	2010/Indicator Bacteria

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see Appendix B.6):

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

Form I-3B Page 9 of 11

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6)?

☐ 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):

The San Dieguito River has been identified as an HMP exempt reach per the current WMAA. Additionally the outfall within the San Dieguito Floodway is below the 100 year base flood elevation and is HMP exempt.

Note: If "No" answer has been selected the SWQMP must include an exhibit that shows the storm water conveyance system from the project site to an exempt water body. The exhibit should include details about the conveyance system and the outfall to the exempt water body.

Critical Coarse Sediment Yield Areas*
*This Section only required if hydromodification management requirements apply

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

☐ Yes

☑ No

Discussion / Additional Information:

Adjacent CCSYA are not upstream or hydraulically connected to the project site.

Project Name: El Camino Real Assisted Living Facility

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.
Has a geomorphic assessment been performed for the receiving channel(s)?   ☐No, the low flow threshold is $0.1Q_2$ (default low flow threshold)   ☐Yes, the result is the low flow threshold is $0.1Q_2$ ☐Yes, the result is the low flow threshold is $0.3Q_2$ ☐Yes, the result is the low flow threshold is $0.5Q_2$ If a geomorphic assessment has been performed, provide title, date, and preparer:
Discussion / Additional Information: (optional)

Form I-3B Page 11 of 11

Other Site Requirements and Constraints

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

The site is previously disturbed however the area to the east is within the flood way and is MHPA, as such all potential design options have been constrained to preserve the habitat value of these areas.

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.

Project Name: El Camino Real Assisted Living Facility

Source Control BMP Checklist for PDPs	Form I-4B

Source Control BMPs

All development projects must implement source control BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

Source Control Requirement	Applied?		
4.2.1 Prevention of Illicit Discharges into the MS4	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.4 not implemented:			
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.5 not implemented:			

Project Name: El Camino Real Assisted Living Facility

Form I-4B Page 2 of 2			
Source Control Requirement	**Applied?**		
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	☑ Yes	☐ No	☐ N/A
Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☑ N/A
Interior parking garages	☐ Yes	☐ No	☑ N/A
Need for future indoor & structural pest control	☐ Yes	☐ No	☑ N/A
Landscape/Outdoor Pesticide Use	☑ Yes	☐ No	☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☑ Yes	☐ No	☐ N/A
Food service	☐ Yes	☐ No	☑ N/A
Refuse areas	☑ Yes	☐ No	☐ N/A
Industrial processes	☐ Yes	☐ No	☑ N/A
Outdoor storage of equipment or materials	☐ Yes	☐ No	☑ N/A
Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☑ N/A
Fuel Dispensing Areas	☐ Yes	☐ No	☑ N/A
Loading Docks	☐ Yes	☐ No	☑ N/A
Fire Sprinkler Test Water	☑ Yes	☐ No	☐ N/A
Miscellaneous Drain or Wash Water	☑ Yes	☐ No	☐ N/A
Plazas, sidewalks, and parking lots	☑ Yes	☐ No	☐ N/A
SC-6A: Large Trash Generating Facilities	☐ Yes	☐ No	☑ N/A
SC-6B: Animal Facilities	☐ Yes	☐ No	☑ N/A
SC-6C: Plant Nurseries and Garden Centers	☐ Yes	☐ No	☑ N/A
SC-6D: Automotive Facilities	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.			

Project Name: El Camino Real Assisted Living Facility

Site Design BMP Checklist for PDPs	Form I-5B

Site Design BMPs

All development projects must implement site design BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

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

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.1 not implemented:			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	☑ Yes	☐ No	☐ N/A
1-2 Are trees implemented? If yes, are they shown on the site map?	☑ Yes	☐ No	☐ N/A
1-3 Implemented trees meet the design criteria in 4.3.1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☑ Yes	☐ No	☐ N/A
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☑ Yes	☐ No	☐ N/A
4.3.2 Have natural areas, soils and vegetation been conserved?	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.2 not implemented:			

Project Name: El Camino Real Assisted Living Facility

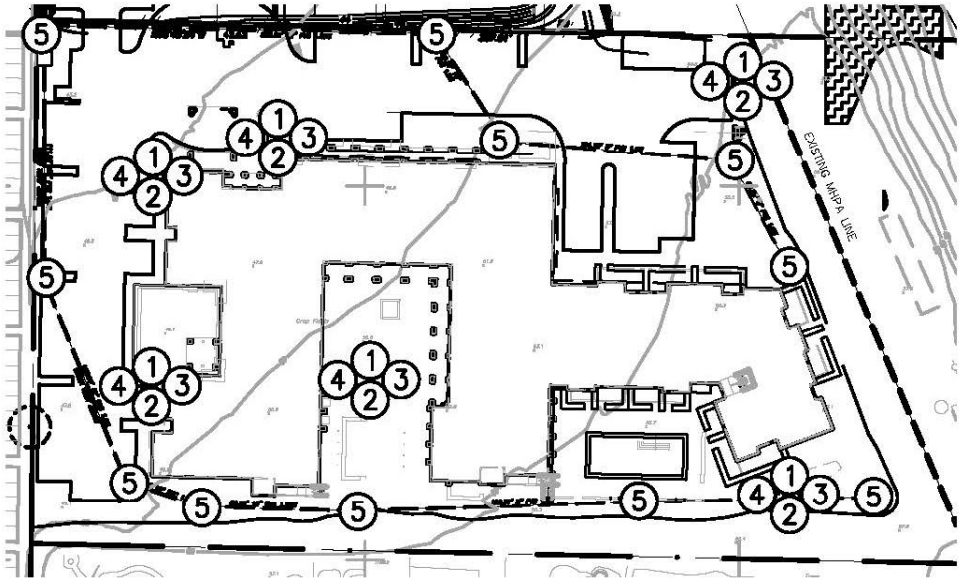
Form I-5B Page 2 of 4			
Site Design Requirement	**Applied?**		
4.3.3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.3.5 not implemented:			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☐ Yes	☐ No	☑ N/A
5-2 Does the pervious area satisfy the design criteria in 4.3.5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☐ Yes	☐ No	☑ N/A
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and 4.3.5 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A

Project Name: El Camino Real Assisted Living Facility

Form I-5B Page 3 of 4			
Site Design Requirement	**Applied?**		
4.3.6 Runoff Collection	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.3.6 not implemented:			
6a-1 Are green roofs implemented in accordance with design criteria in 4.3.6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
6a-2 Is the green roof credit volume calculated using Appendix B.2.1.2 and 4.3.6A Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in 4.3.6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
6b-2 Is the permeable pavement credit volume calculated using Appendix B.2.1.3 and 4.3.6B Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
4.3.7 Landscaping with Native or Drought Tolerant Species	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvest and Use Precipitation	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.3.8 not implemented:			
8-1 Are rain barrels implemented in accordance with design criteria in 4.3.8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
8-2 Is the rain barrel credit volume calculated using Appendix B.2.2.2 and 4.3.8 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A

Project Name: El Camino Real Assisted Living Facility

Form I-5B Page 4 of 4
Insert Site Map with all site design BMPs identified:



IV. STANDARD/PRIORITY PERMANENT BEST MANAGEMENT PRACTICES (BMP'S)

LOW IMPACT DESIGN (LID) BMP'S:

① MINIMIZE IMPERVIOUS FOOTPRINT THROUGH EFFICIENT DESIGN, INCORPORATING SHARED DRIVEWAYS AND MINIMUM WIDTHS ON IMPERVIOUS SURFACES

② MINIMIZE SOIL COMPACTION/LANDSCAPE AREAS TO BE MULCHED

③ DRAIN SIDEWALKS/HARDSCAPE TO ADJACENT LANDSCAPING (IMPERVIOUS DISPERSION)

④ USE OF PEST RESISTANT AND DROUGHT TOLERANT LANDSCAPING

SOURCE CONTROL BMP'S:

⑤ STENCIL OR STAMP ALL STORM DRAIN INLETS WITH WARNINGS TO DISCOURAGE "ILLEGAL" DUMPING OR DISCHARGE INTO THE STORM DRAIN SYSTEM

Project Name: El Camino Real Assisted Living Facility

Summary of PDP Structural BMPs	Form I-6

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

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

DMA-1

Step 1: Evaluate at DMA Scale
- There is one DMAs onsite to account for, see Attachment 4.
Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs is not "Self-mitigating" or "De Minimis" or "Self-retaining"
Step 1B: Adjust runoff factor to account for site design BMPs and estimate DCV
- DCV calculation performed using Worksheet B.2-1, see Attachment 1e.
Step 2: Is Harvest and Use Feasible
- No, Harvest and Use is not feasible, see calculations in Attachment 1c, based on Worksheet B.3-.1
Step 3: Step 3: Is Infiltration Feasible?
- No; infiltration is infeasible due to geotechnical hazards, see Attachment 1d & 6.
Step 3 A&B: No Infiltration Condition
- Proceed to Step 3C
Step 3C: Compute Sizing Requirement
- Proprietary Biofiltration (BF-3) are selected BMP
- Volume based treatment sizing performed. (Modelling using SDHM at 92%)
Step 4: Can the BMP be designed for the remaining DCV?
- Yes, the design can incorporate Proprietary Bio-filtration BMP that meet the full volume treatment.
Step 4A:
- The biofiltration facilities have been sized to required volume.
Step 6 & 7: The project is "Compliant with Pollutant Control BMP Sizing Requirements"

(Continue on page 2 as necessary.)

Project Name: El Camino Real Assisted Living Facility

Form I-6 Page 2 of 4

(Continued from page 1)

Project Name: El Camino Real Assisted Living Facility

Form I-6 Page 3 of 4 (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. M-1	
Construction Plan Sheet No. C-1.2	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ 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 form DS-563	EOR John D. Leppert 5190 Governor Dr #205 858-597-2001
Who will be the final owner of this BMP?	Property Owner
Who will maintain this BMP into perpetuity?	Property Owner
What is the funding mechanism for maintenance?	Private O&M funds

Form I-6 Page 4 of 4 (Copy as many as needed)
Structural BMP ID No. M-1
Construction Plan Sheet No. C-1.2
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): MWS are a Proprietary Bio-Filtration device (BF-3), and meet the requirements for use in F.1. See I-10 in Attachment 1 for specific details. The sizing for the system was completed using a volume based criteria modeled within SDHM to demonstrate a 92% capture as outlined in B.5.2.2 for facilities downstream of a storage unit. While there are no specific site storage facilities proposed, the upstream drainage pipe network functions in the same manner as a storage facility.

Attachment 1
Backup For PDP Pollutant Control BMPs

This is the cover sheet for Attachment 1.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☑ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☑ Included on DMA Exhibit in Attachment 1a ☐ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☑ Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Infiltration Feasibility Information. Contents of Attachment 1d depend on the infiltration condition: • No Infiltration Condition: ○ Infiltration Feasibility Condition Letter (***Note: must be stamped and signed by licensed geotechnical engineer***) ○ Form I-8A (optional) ○ Form I-8B (optional) • Partial Infiltration Condition: ○ Infiltration Feasibility Condition Letter (***Note: must be stamped and signed by licensed geotechnical engineer***) ○ Form I-8A ○ Form I-8B • Full Infiltration Condition: ○ Form I-8A ○ Form I-8B ○ Worksheet C.4-3 ○ Form I-9 Refer to Appendices C and D of the BMP Design Manual for guidance.	☑ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☑ Included

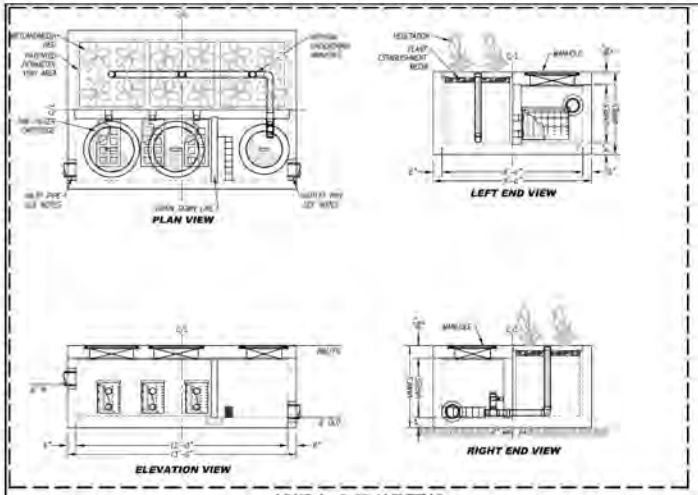
THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

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

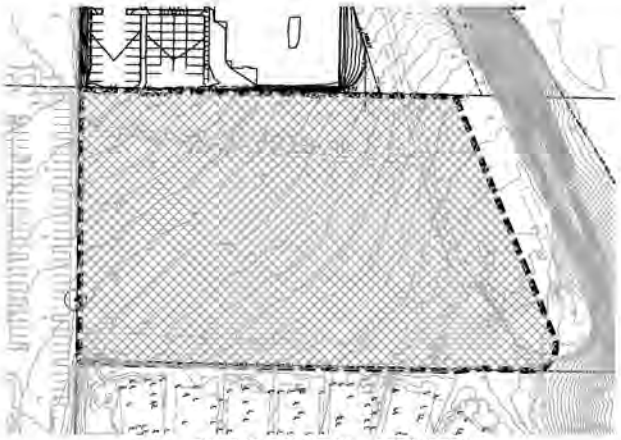
The DMA Exhibit must identify:

- [x] Underlying hydrologic soil group
- [x] Approximate depth to groundwater
- [ ] Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- [ ] Critical coarse sediment yield areas to be protected
- [x] Existing topography and impervious areas
- [x] Existing and proposed site drainage network and connections to drainage offsite
- [x] Proposed grading
- [x] Proposed impervious features
- [x] Proposed design features and surface treatments used to minimize imperviousness
- [x] 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)
- [x] Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- [x] Structural BMPs (identify location, type of BMP, size/detail, and include cross-section)

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



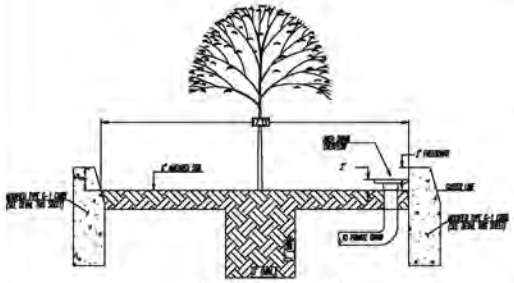
MWS-L-8-12-V DETAIL



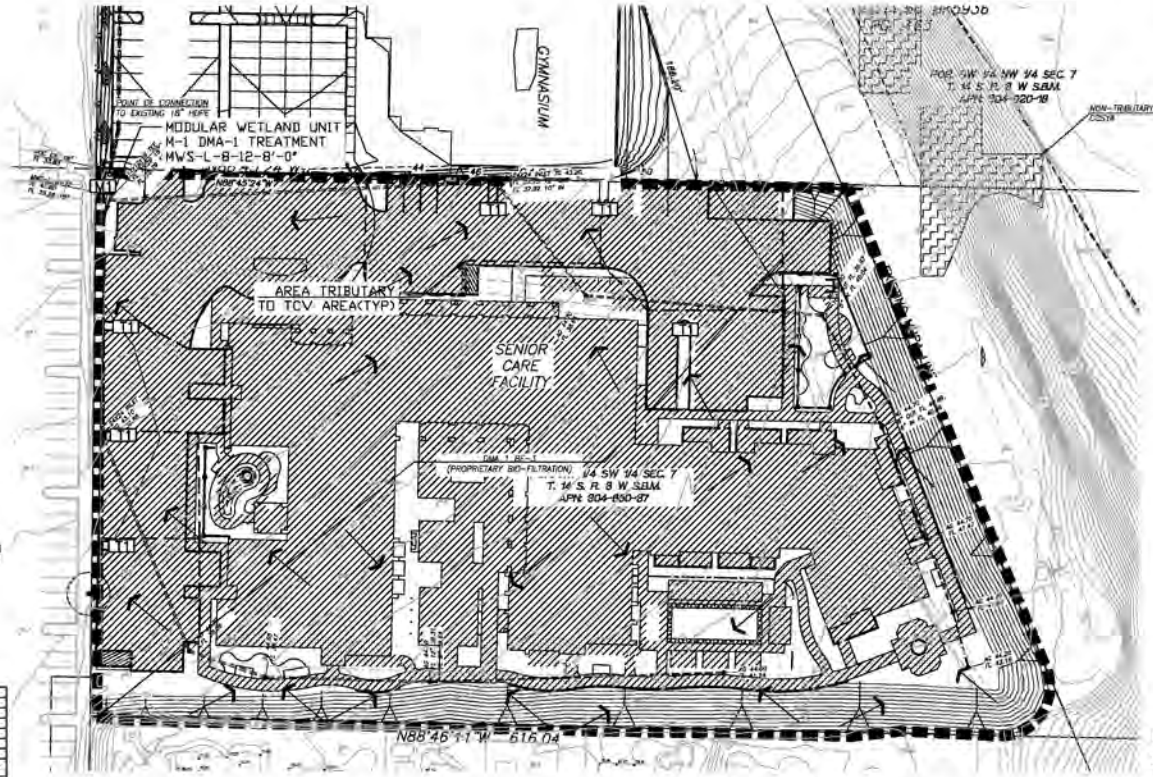
EXISTING CONDITION - PER/IMPERV

GROUNDWATER WAS NOT ENCOUNTERED DURING GEOTECHNICAL INVESTIGATION; HOWEVER GROUNDWATER IS ANTICIPATED TO BE 5'-7' BELOW GRADE DUE TO TIDAL INFLUENCE.

MODIFIED TYPE G-1 CURB (PVT)
(NO SCALE)



DETAIL: TREE WELL
IMPERVIOUS AREA DISPERSION BMP (PVT)
(NO SCALE)



PROPOSED CONDITION

LEGEND

- SUBDIVISION BOUNDARY
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EX. PERVIOUS
- CCSYA
- IMPERVIOUS
- BMP NUMBER — M1

8				12						
7				11						
6				10						
5				9						
4	04/2021	MTD	ORIGINAL	8						
3	04/2020	MTD	ORIGINAL	7						
NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION			

Leppert Engineering CORPORATION
1961 Kettner Blvd., Suite 205, San Diego, CA 92101-2048
Phone: (858) 571-1601 Fax: (858) 571-1601

APPROVED BY ENGINEER OF WORK | REGISTRATION # C 0 | 26283
FILE NAME: SDR 03.01-03.16 | DATE:

PREPARATION AND REVISION LOG

DMA EXHIBIT- PERV/IMPERV. TOTAL
SHEET 1 OF 1
ECR ASSISTED LIVING

Project Name: El Camino Real Assisted Living Facility

Tabular Summary of DMAs								Worksheet B-1	
DMA Unique Identifier	Area (acres)	Impervious Area (acres)	% Imp	HSG	Area Weighted Runoff Coefficient	DCV (cubic feet)	Treated By (BMP ID)	Pollutant Control Type	Drains to (POC ID)
DMA-1	2.8	2.1	74	D	0.69	3445	M-1	BIOFILTRATION	POC-1

Summary of DMA Information (Must match project description and SWQMP Narrative)									
No. of DMAs	Total DMA Area (acres)	Total Impervious Area (acres)	% Imp		Area Weighted Runoff Coefficient	Total DCV (cubic feet)	Total Area Treated (acres)		No. of POCs
1	2.8	2.1	74		0.69	3445	2.8		1

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV= Design Capture Volume; BMP = Best Management Practice; POC = Point of Compliance; ID = identifier; No. = Number

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Worksheet B.2-1: DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.49	inches
2	Area tributary to BMP (s)	A=	2.8	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.69	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	91.8	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	3,345	cubic-feet

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Harvest and Use Feasibility Checklist	Worksheet B.3-1 : 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.
[Provide a summary of calculations here]

Total site SF = 2.8 Ac
1) Population 43.7 Pop/NetAc (Per Sewer Design Guide Table 1-1 for 'Commercial')
2) Total population = 43.7 pop/NetAc * 2.8 Ac = 122.36 pop
3) Total 24 hr demand = 122.36 pop * 9.3 gal/pop = 1,138 gal = 152 CF
4) 36 hr demand = 152 CF * 1.5 = 228 CF
5) Demand = 228 CF / 3,345 CF = 0.07

3. Calculate the DCV using worksheet B-2.1.
DCV = 3,345 (cubic feet)
[Provide a summary of calculations here]
DCV = (3630 * 0.69* 0.49 * 2.8) = 3,445 - 91.8 CF TCV = 3,345 CF

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.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		**Project Phase:**
Location/limts of DMA undefined		Design Phase
Criteria 1: Infiltration Rate Screening		
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☒ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).	
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☒ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.	
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☒ No; full infiltration is not required. Answer "No" to Criteria 1 Result.	
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.	

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

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

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions	Worksheet C.4-1:Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
1F	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result. Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.	
Site specific infiltration testing was performed on an immediately adjacent site, see GSI (2017) and yielded an average infiltration rate of 0.28 inches per hour.	

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐Yes	☐No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐Yes	☐No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐Yes	☐No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation**. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐Yes	☐No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
2B-3	**Liquefaction.** If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐Yes	☐No
2B-4	**Slope Stability.** If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐Yes	☐No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐Yes	☐No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐Yes	☐No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐Yes	☐No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result - Full Infiltration Geotechnical Screening[12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full Infiltration Condition ☒ Complete Part 2

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

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions	Worksheet C.4-1:Form I-8A[10]
Part 2 - Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	**Project Phase:**
Location/limits of DMA undefined	Design Phase

Criteria 3: Infiltration Rate Screening	
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).	

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐Yes	☐No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐Yes	☐No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐Yes	☐No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation**. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐Yes	☐No
4B-2	**Expansive Soils**. Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
4B-3	**Liquefaction.** If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐Yes	☐No
4B-4	**Slope Stability.** If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐Yes	☐No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐Yes	☐No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐Yes	☐No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 4 result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐Yes	☐No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 2 Result - Partial Infiltration Geotechnical Screening[13]	Result
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

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

Tree Credit Calculation

TCV WILL BE THE LOWER OF TRIBUTARY AREA DCV OR AVAILABLE CREDIT FROM 0.3 * INSTALLED SOIL VOLUME (NO UNDERDRAIN PROPOSED)

DCV AVAILABLE FROM IPERVIOUS TRIBUTARY AREA

SMALLEST ROOF AREA TRIBUTARY TO TCV IS 5,935 SF, OR 0.14 AC

DCV = 0.14AC * 0.49 IN * 0.9 * 3,630 = 224 CF

TCV AVAILABLE FROM INSTALLED SOIL VOLUME

- 24" BOX INSTALLED = 36" X 36" X 24" HOLE = 18 CF
- PLANTER ISLAND 66 SF SURFACE AREA AND 0.5' IN DEPTH. = 33 CF INSTALLED VOLUME

TCV = 0.3 * (18 CF+33 CF) = 15.3 CF

CREDIT PER TREE WILL BE 15.3 CF FOR ALL TREES SINCE TREE INSTALLED SOIL VOLUME IS THE LIMITING FACTOR.

SIX TREES PROPOSED RESULTS IN 6 * 15.3 = 91.8 CF IN TOTAL TCV

The City of SAN DIEGO	Project Name	ECR Assisted Living Facility	
	BMP ID	DMA-1	
Sizing Method for Volume Retention Criteria		Worksheet B.5-2	
1	Area draining to the BMP	122404	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.69	
3	85th percentile 24-hour rainfall depth	0.49	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	3449	cu. ft.
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	0	in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	79	cu. ft.

The City of SAN DIEGO	Project Name	ECR Assisted Living Facility
	BMP ID	DMA-1

Volume Retention for No Infiltration Condition							Worksheet B.5-6	
1	Area draining to the biofiltration BMP						122404	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)						0.69	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]						84459	sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]						2534	sq. ft.
5	Biofiltration BMP Footprint						0	sq. ft.
Landscape Area (must be identified on DS-3247)								
		Identification	**1**	**2**	**3**	**4**	**5**	
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)							
7	Impervious area draining to the landscape area (sq. ft.)							
8	Impervious to Pervious Area ratio [Line 7/Line 6]		0.00	0.00	0.00	0.00	0.00	
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]		0	0	0	0	0	
10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]					0		sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]					0		sq. ft.
Volume Retention Performance Standard								
12	Is Line 11 ≥ Line 4?			No, Proceed to Line 13				
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]					0		
14	Target Volume Retention [Line 10 from Worksheet B.5.2]					79		cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]					79.3208521		cu. ft.
Site Design BMP								
	Identification	**Site Design Type**				**Credit**		
16	**1**	TCV (6 trees 15.3 CF per tree)				91.8		cu. ft.
	2							cu. ft.
	3							cu. ft.
	4							cu. ft.
	5							cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.					91.8		cu. ft.
17	Is Line 16 ≥ Line 15?			Volume Retention Performance Standard is Met				

MWS 1 Mitigated

Facility Name MWS 1

	Outlet 1	Outlet 2	Outlet 3
Downstream Connections	0	0	0

Facility Type MWS

☐ Precipitation Applied to Facility

☑ Evaporation Applied to Facility

Quick Filter

MWS Model # MWS-L-8-12

Drawdown Time 24 Hours

Filter Volume (ft3) 7486.8 Pass

Water Quality Target Volume (ft3) 0

Media Filter Rate (in/hr) 25

Total Volume Filtrated (ac-ft)	68.684
Total Volume Through Riser (ac-ft)	4.601
Total Volume (ac-ft)	73.286
Percent Filtered	93.72

Filter Storage Volume at Riser Head (ac-ft) .082

Show Filter Table Open Table

For more information about MWS Linear products please visit their website:

http://www.biocleanenvironmental.com/stormwater-products/mws-linear/

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Compact (high rate) biofiltration BMPs have a media filtration rate greater than 5 in/hr. and a media surface area smaller than 3% of contributing area times adjusted runoff factor. Compact biofiltration BMPs are typically proprietary BMPs that may qualify as biofiltration.

A compact biofiltration BMP may satisfy the pollutant control requirements for a DMA onsite in some cases. This depends on the characteristics of the DMA **and** the performance certification/data of the BMP. If the pollutant control requirements for a DMA are met onsite, then the DMA is not required to participate in an offsite storm water alternative compliance program to meet its pollutant control obligations.

An applicant using a compact biofiltration BMP to meet the pollutant control requirements onsite must complete Section 1 of this form and include it in the PDP SWQMP. A separate form must be completed for each DMA. In instances where the City Engineer does not agree with the applicant's determination, Section 2 of this form will be completed by the City and returned to the applicant.

Section 1: Biofiltration Criteria Checklist (Appendix F)

Refer to Part 1 of the Storm Water Standards to complete this section. When separate forms/worksheets are referenced below, the applicant must also complete these separate forms/worksheets (as applicable) and include in the PDP SWQMP. The criteria numbers below correspond to the criteria numbers in Appendix F.

Criteria	Answer	Progression
Criteria 1 and 3: What is the infiltration condition of the DMA? Refer to Section 5.4.2 and Appendix C of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance. Applicant must complete and include the following in the PDP SWQMP submittal to support the feasibility determination: • Infiltration Feasibility Condition Letter; or • Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B. Applicant must complete and include all applicable sizing worksheets in the SWQMP submittal	○ Full Infiltration Condition	**Stop**. Compact biofiltration BMP is not allowed.
	○ Partial Infiltration Condition	Compact biofiltration BMP is only allowed, if the target volume retention is met onsite (Refer to Table B.5-1 in Appendix B.5). Use Worksheet B.5-2 in Appendix B.5 to estimate the target volume retention (Note: retention in this context means reduction). If the required volume reduction is achieved **proceed to Criteria 2**. If the required volume reduction is not achieved, compact biofiltration BMP is not allowed. **Stop**.
	⊙ No Infiltration Condition	Compact biofiltration BMP is allowed if volume retention criteria in Table B.5-1 in Appendix B.5 for the no infiltration condition is met. Compliance with this criterion must be documented in the PDP SWQMP. If the criteria in Table B.5-1 is met **proceed to Criteria 2**. If the criteria in Table B.5-1 is not met, compact biofiltration BMP is not allowed. **Stop**.

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Provide basis for Criteria 1 and 3:

Feasibility Analysis:

Summarize findings and include either infiltration feasibility condition letter or Worksheet C.4-1: Form I-8A and Worksheet C.4-2: Form I-8B in the PDP SWQMP submittal.

If Partial Infiltration Condition:

Provide documentation that target volume retention is met (include Worksheet B.5-2 in the PDP SWQMP submittal). Worksheet B.5-7 in Appendix B.5 can be used to estimate volume retention benefits from landscape areas.

If No Infiltration Condition:

Provide documentation that the volume retention performance standard is met (include Worksheet B.5-2 in the PDP SWQMP submittal) in the PDP SWQMP submittal. Worksheet B.5-6 in Appendix B.5 can be used to document that the performance standard is met.

a) The Modular Wetland System Linear (MWS Linear) is only being proposed on plans when retention via infiltration or reuse is proven infeasible. Conditions such as soils with little to no infiltration rate or sites in which insufficient landscaping warrant to successful implementation of reuse systems.
The MWS has been sized using continuous simulation modelling to meet the volume based criteria listed within B.5.2.2

Criteria	Answer	Progression
Criteria 2: Is the compact biofiltration BMP sized to meet the performance standard from the MS4 Permit? Refer to Appendix B.5 and Appendix F.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Meets Flow based Criteria	Use guidance from **Appendix F.2.2** to size the compact biofiltration BMP to meet the flow based criteria. Include the calculations in the PDP SWQMP. Use parameters for sizing consistent with manufacturer guidelines and conditions of its third party certifications (i.e. a BMP certified at a loading rate of 1 gpm/sq. ft. cannot be designed using a loading rate of 1.5 gpm/sq. ft.) **Proceed to Criteria 4.**
	◉ Meets Volume based Criteria	Provide documentation that the compact biofiltration BMP has a total static (i.e. non-routed) storage volume, including pore-spaces and pre-filter detention volume (Refer to Appendix B.5 for a schematic) of at least 0.75 times the portion of the DCV not reliably retained onsite. **Proceed to Criteria 4.**
	○ Does not Meet either criteria	**Stop**. Compact biofiltration BMP is not allowed.

Compact (high rate) Biofiltration BMP Checklist	Form I-10

Provide basis for Criteria 2:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., loading rate, etc., as applicable).

The standard to confirm treatment objectives are met using CSM software is a 92% treatment of all flows through the system. The provided MWS unit achieves a 92.96% treatment, which meets this standard.

Criteria	Answer	Progression
Criteria 4: Does the compact biofiltration BMP meet the pollutant treatment performance standard for the projects most significant pollutants of concern? Refer to Appendix B.6 and Appendix F.1 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	⊙ Yes, meets the TAPE certification.	Provide documentation that the compact BMP has an appropriate TAPE certification for the projects most significant pollutants of concern. **Proceed to Criteria 5.**
	○ Yes, through other third-party documentation	Acceptance of third-party documentation is at the discretion of the City Engineer. The City engineer will consider, (a) the data submitted; (b) representativeness of the data submitted; and (c) consistency of the BMP performance claims with pollutant control objectives in Table F.1-2 and Table F.1-1 while making this determination. If a compact biofiltration BMP is not accepted, a written explanation/ reason will be provided in Section 2. **Proceed to Criteria 5.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 4:

Provide documentation that identifies the projects most significant pollutants of concern and TAPE certification or other third party documentation that shows that the compact biofiltration BMP meets the pollutant treatment performance standard for the projects most significant pollutants of concern.

The MWS Linear has been tested under the Washington State TAPE protocol which is full scale field testing and has received General Use Level Designation under that protocol. Table F.1-1, as shown below, requires a biofiltration BMP to have Basic Treatment, Phosphorus Treatment, and Enhanced Treatment under this protocol. The MWS Linear has GULD approval for all three and therefore meets this minimum requirement 4. A copy of the TAPE approval has been attached to this document.

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
Criteria 5: Is the compact biofiltration BMP designed to promote appropriate biological activity to support and maintain treatment process? Refer to Appendix F of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	⊙ Yes	Provide documentation that the compact biofiltration BMP support appropriate biological activity. Refer to Appendix F for guidance. **Proceed to Criteria 6.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 5:

Provide documentation that appropriate biological activity is supported by the compact biofiltration BMP to maintain treatment process.

Soil organisms in the wetland chamber can break down a wide array of organic compounds into less toxic forms or completely break them down into carbon dioxide and water (Means and Hinchee 1994). Bacteria can also cause metals to precipitate out as salts, bind them within organic material, and accumulate metals in nodules within the cells. Finally, plant growth may metabolize many pollutants, sequester them or rendering them less toxic (Reeves and Baker 2000).

Criteria	Answer	Progression
Criteria 6: Is the compact biofiltration BMP designed with a hydraulic loading rate to prevent erosion, scour and channeling within the BMP?	⊙ Yes	Provide documentation that the compact biofiltration BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification. **Proceed to Criteria 7.**
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 6:

Provide documentation that the BMP meets the numeric criteria and is designed consistent with the manufacturer guidelines and conditions of its third-party certification (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).

The MWS Linear is a self-contained system with a pre-treatment chamber. Unlike other biofiltration BMPs erosion, scour, and channeling with in the BMP is not an issue. Following is a diagram of the BMP. The system pre-treatment chamber prevents any erosion or scour.

Compact (high rate) Biofiltration BMP Checklist		Form I-10
Criteria	**Answer**	**Progression**
Criteria 7: Is the compact biofiltration BMP maintenance plan consistent with manufacturer guidelines and conditions of its third-party certification (i.e., maintenance activities, frequencies)?	◉ Yes, and the compact BMP is privately owned, operated and not in the public right of way.	Submit a maintenance agreement that will also include a statement that the BMP will be maintained in accordance with manufacturer guidelines and conditions of third-party certification. **Stop**. The compact biofiltration BMP meets the required criteria.
	○ Yes, and the BMP is either owned or operated by the City or in the public right of way.	Approval is at the discretion of the City Engineer. The city engineer will consider maintenance requirements, cost of maintenance activities, relevant previous local experience with operation and maintenance of the BMP type, ability to continue to operate the system in event that the vending company is no longer operating as a business or other relevant factors while making the determination. **Stop**. Consult the City Engineer for a determination.
	○ No	**Stop**. Compact biofiltration BMP is not allowed.

Provide basis for Criteria 7:

Include copy of manufacturer guidelines and conditions of third-party certification in the maintenance agreement. PDP SWQMP must include a statement that the compact BMP will be maintained in accordance with manufacturer guidelines and conditions of third-party certification.

The MWS Linear provides activation along with the first year of maintenance and inspection free on all installation in the county of San Diego. Unlike other biofiltration BMPs the City and Co-permitees can be assured the system is being properly installed and maintained. The first year of inspections is used the gauge the amount of loading in the system and this information is used to set appropriate maintenance interval for subsequent years. Attached is a copy of the maintenance manual for the MWS Linear.

Compact (high rate) Biofiltration BMP Checklist	Form I-10
Section 2: Verification (For City Use Only)	
Is the proposed compact BMP accepted by the City Engineer for onsite pollutant control compliance for the DMA?	○ Yes ○ No, See explanation below
Explanation/reason if the compact BMP is not accepted by the City for onsite pollutant control compliance:	

WASHINGTON STATE DEPARTMENT OF ECOLOGY

July 2017

GENERAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, AND PHOSPHORUS TREATMENT

For the

MWS-Linear Modular Wetland

Ecology's Decision:

Based on Modular Wetland Systems, Inc. application submissions, including the Technical Evaluation Report, dated April 1, 2014, Ecology hereby issues the following use level designation:

1. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Basic treatment
    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
2. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Phosphorus treatment
    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
3. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Enhanced treatment
    - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

4. Ecology approves the MWS - Linear Modular Wetland Stormwater Treatment System units for Basic, Phosphorus, and Enhanced treatment at the hydraulic loading rate listed above. Designers shall calculate the water quality design flow rates using the following procedures:

   - Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
   - Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
   - Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

5. These use level designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.

Ecology's Conditions of Use:

Applicants shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the MWS – Linear Modular Wetland Stormwater Treatment System units, in accordance with Modular Wetland Systems, Inc. applicable manuals and documents and the Ecology Decision.
2. Each site plan must undergo Modular Wetland Systems, Inc. review and approval before site installation. This ensures that site grading and slope are appropriate for use of a MWS – Linear Modular Wetland Stormwater Treatment System unit.
3. MWS – Linear Modular Wetland Stormwater Treatment System media shall conform to the specifications submitted to, and approved by, Ecology.
4. The applicant tested the MWS – Linear Modular Wetland Stormwater Treatment System with an external bypass weir. This weir limited the depth of water flowing through the media, and therefore the active treatment area, to below the root zone of the plants. This GULD applies to MWS – Linear Modular Wetland Stormwater Treatment Systems whether plants are included in the final product or not.
5. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.

   - Typically, Modular Wetland Systems, Inc. designs MWS - Linear Modular Wetland systems for a target prefilter media life of 6 to 12 months.
   - Indications of the need for maintenance include effluent flow decreasing to below the design flow rate or decrease in treatment below required levels.
   - Owners/operators must inspect MWS - Linear Modular Wetland systems for a minimum of twelve months from the start of post-construction operation to determine site-specific

maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:
    - Standing water remains in the vault between rain events, or
    - Bypass occurs during storms smaller than the design storm.
    - If excessive floatables (trash and debris) are present (but no standing water or excessive sedimentation), perform a minor maintenance consisting of gross solids removal, not prefilter media replacement.
    - Additional data collection will be used to create a correlation between pretreatment chamber sediment depth and pre-filter clogging (see *Issues to be Addressed by the Company* section below)

6. Discharges from the MWS - Linear Modular Wetland Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant:	Modular Wetland Systems, Inc.
Applicant's Address:	*PO. Box 869* *Oceanside, CA 92054*

Application Documents:

- *Original Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., January 2011
- *Quality Assurance Project Plan*: Modular Wetland system – Linear Treatment System performance Monitoring Project, draft, January 2011.
- *Revised Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., May 2011
- *Memorandum: Modular Wetland System-Linear GULD Application Supplementary Data, April 2014*
- *Technical Evaluation Report: Modular Wetland System Stormwater Treatment System Performance Monitoring, April 2014.*

Applicant's Use Level Request:

General use level designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's Guidance for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) January 2011 Revision.

Applicant's Performance Claims:

- The MWS – Linear Modular wetland is capable of removing a minimum of 80-percent of TSS from stormwater with influent concentrations between 100 and 200 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 50-percent of Total Phosphorus from stormwater with influent concentrations between 0.1 and 0.5 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 30-percent of dissolved Copper from stormwater with influent concentrations between 0.005 and 0.020 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 60-percent of dissolved Zinc from stormwater with influent concentrations between 0.02 and 0.30 mg/l.

Ecology Recommendations:

- Modular Wetland Systems, Inc. has shown Ecology, through laboratory and field-testing, that the MWS - Linear Modular Wetland Stormwater Treatment System filter system is capable of attaining Ecology's Basic, Total phosphorus, and Enhanced treatment goals.

Findings of Fact:

Laboratory Testing

The MWS-Linear Modular wetland has the:

- Capability to remove 99 percent of total suspended solids (using Sil-Co-Sil 106) in a quarter-scale model with influent concentrations of 270 mg/L.
- Capability to remove 91 percent of total suspended solids (using Sil-Co-Sil 106) in laboratory conditions with influent concentrations of 84.6 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 93 percent of dissolved Copper in a quarter-scale model with influent concentrations of 0.757 mg/L.
- Capability to remove 79 percent of dissolved Copper in laboratory conditions with influent concentrations of 0.567 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 80.5-percent of dissolved Zinc in a quarter-scale model with influent concentrations of 0.95 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 78-percent of dissolved Zinc in laboratory conditions with influent concentrations of 0.75 mg/L at a flow rate of 3.0 gpm per square foot of media.

Field Testing

- Modular Wetland Systems, Inc. conducted monitoring of an MWS-Linear (Model # MWS-L-4-13) from April 2012 through May 2013, at a transportation maintenance facility in Portland, Oregon. The manufacturer collected flow-weighted composite samples of the system's influent and effluent during 28 separate storm events. The system treated approximately 75 percent of the runoff from 53.5 inches of rainfall during the monitoring period. The applicant sized the system at 1 gpm/sq ft. (wetland media) and 3gpm/sq ft. (prefilter).
- Influent TSS concentrations for qualifying sampled storm events ranged from 20 to 339 mg/L. Average TSS removal for influent concentrations greater than 100 mg/L (n=7) averaged 85 percent. For influent concentrations in the range of 20-100 mg/L (n=18), the upper 95 percent confidence interval about the mean effluent concentration was 12.8 mg/L.
- Total phosphorus removal for 17 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 65 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 58 percent.
- The lower 95 percent confidence limit of the mean percent removal was 60.5 percent for dissolved zinc for influent concentrations in the range of 0.02 to 0.3 mg/L (n=11). The lower 95 percent confidence limit of the mean percent removal was 32.5 percent for dissolved copper for influent concentrations in the range of 0.005 to 0.02 mg/L (n=14) at flow rates up to 28 gpm (design flow rate 41 gpm). Laboratory test data augmented the data set, showing dissolved copper removal at the design flow rate of 41 gpm (93 percent reduction in influent dissolved copper of 0.757 mg/L).

Issues to be addressed by the Company:

1. Modular Wetland Systems, Inc. should collect maintenance and inspection data for the first year on all installations in the Northwest in order to assess standard maintenance requirements for various land uses in the region. Modular Wetland Systems, Inc. should use these data to establish required maintenance cycles.
2. Modular Wetland Systems, Inc. should collect pre-treatment chamber sediment depth data for the first year of operation for all installations in the Northwest. Modular Wetland Systems, Inc. will use these data to create a correlation between sediment depth and pre-filter clogging.

Technology Description:
Download at http://www.modularwetlands.com/

Contact Information:
Applicant: Zach Kent
BioClean A Forterra Company.
398 Vi9a El Centro
Oceanside, CA 92058
zach.kent@forterrabp.com

Applicant website: http://www.modularwetlands.com/

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

Ecology: Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of Applicant
April 2014	Approved GULD designation for Basic, Phosphorus, and Enhanced treatment
December 2015	Updated GULD to document the acceptance of MWS-Linear Modular Wetland installations with or without the inclusion of plants
July 2017	Revised Manufacturer Contact Information (name, address, and email)

Attachment 2
Backup for PDP Hydromodification Control Measures

This is the cover sheet for Attachment 2.

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

Indicate which Items are Included:

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

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

The Hydromodification Management Exhibit must identify:

- [x] Underlying hydrologic soil group
- [x] Approximate depth to groundwater
- [ ] Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- [ ] Critical coarse sediment yield areas to be protected OR provide a separate map showing that the project site is outside of any critical coarse sediment yield areas
- [x] Existing topography
- [x] Existing and proposed site drainage network and connections to drainage offsite
- [x] Proposed grading
- [x] Proposed impervious features
- [x] Proposed design features and surface treatments used to minimize imperviousness
- [x] 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)
- [x] Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail).

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Attachment 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Project Name: El Camino Real Assisted Living Facility

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3	Maintenance Agreement (Form DS-3247) (when applicable)	☐ Included ☑ Not applicable

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3: For private entity operation and maintenance, Attachment 3 must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☐ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Attachment 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

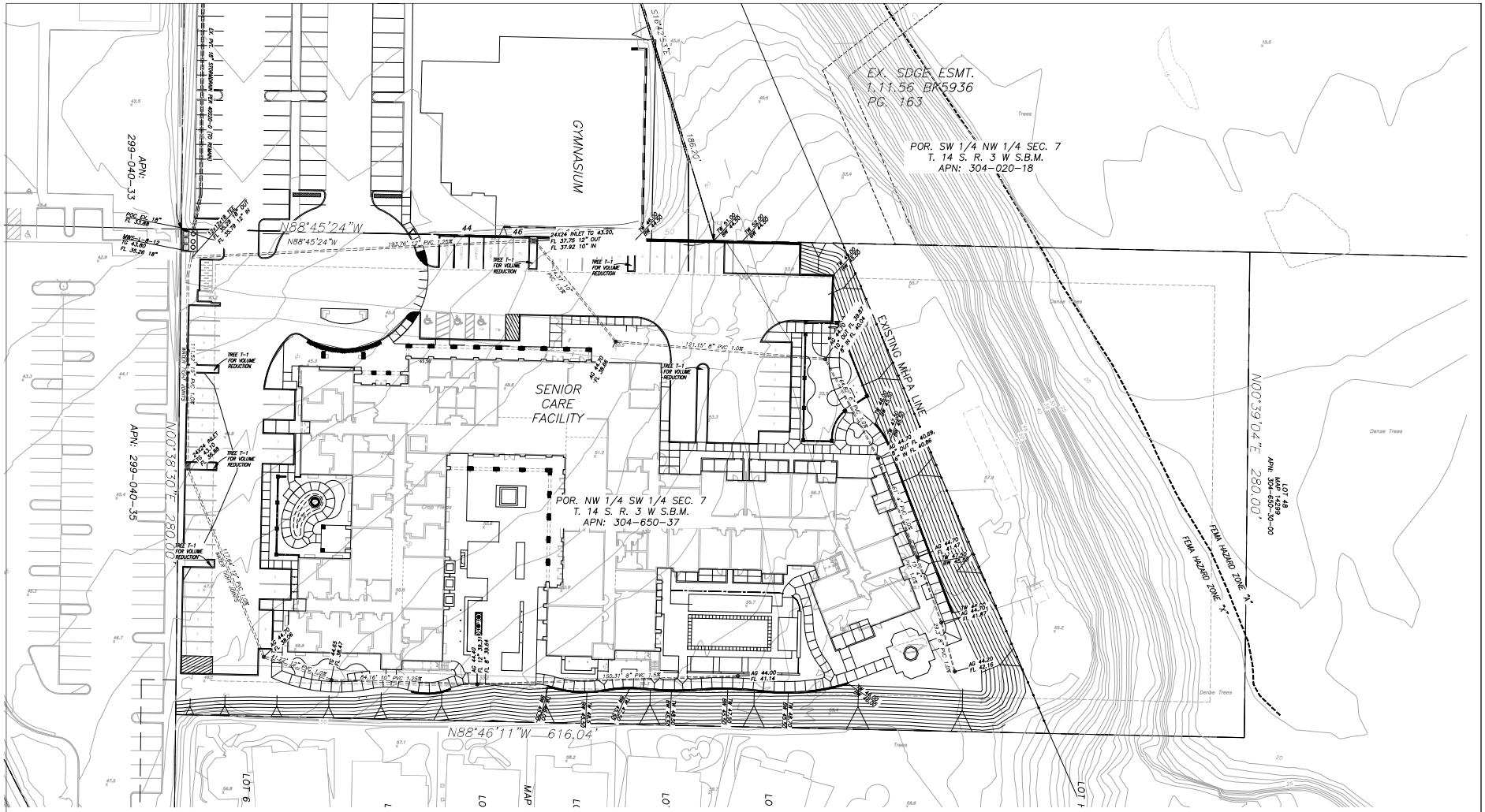
Project Name: El Camino Real Assisted Living Facility

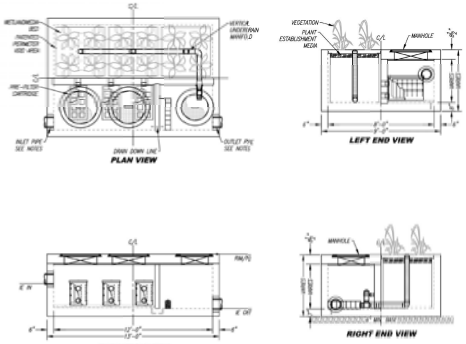
Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

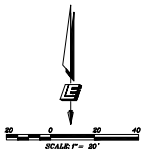
- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating 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. Broucher photocopies are not allowed.

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING



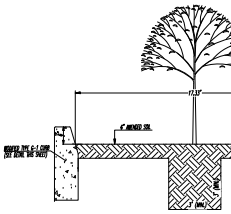


DETAIL: MWS-L-8-12-V
TREATMENT CONTROL BMP (PVT)



LEGEND

- TPM BOUNDARY
- EXISTING PARCEL LINE
- LIMIT OF MHPA/WATER QUALITY
- LIMIT OF 'A' FLOOD ZONE SENSITIVE AREAS
- EXISTING COUNTOURS
- PROPOSED CONTOURS
- PROPOSED CATCH BASIN
- PROPOSED CLEAN OUT
- PROPOSED CURB INLET
- PROPOSED HEADWALL
- PROPOSED PAD ELEVATION — PAD: 40.0'
- PROPOSED PRIVATE STORM DRAIN
- PROPOSED BUILDING RETAINING WALL
- PROPOSED PAVEMENT (SEE L.S. PLANS)



DETAIL: TREE WELL
IMPERVIOUS AREA DISPERSION BMP (PVT)
(NO SCALE)

MODIFIED TYPE G-1 CURB (PVT)
(NO SCALE)

GRADING TABULATION

1.	TOTAL AMOUNT OF SITE TO BE GRADED:	2.84 AC.±
2.	TOTAL AMOUNT OFFSITE TO BE GRADED (WITH LETTER OF PERMISSION):	0.00 AC.±
3.	PERCENT OF TOTAL SITE TO BE GRADED:	71%±
4.	AMOUNT OF CUT:	26,435 C.Y.±
5.	MAXIMUM DEPTH OF CUT:	12.4 FT.±
6.	AMOUNT OF FILL:	125 C.Y.±
7.	MAXIMUM DEPTH OF FILL:	1 FT.±
8.	MAXIMUM HEIGHT OF FILL SLOPE:	0 FT.±
9.	MAXIMUM HEIGHT OF CUT SLOPE:	12 FT.±
10.	CUT SLOPE RATIO:	2:1
11.	FILL SLOPE RATIO:	2:1
12.	AMOUNT OF IMPORT/EXPORT:	0 C.Y.±
13.	RETAINING WALLS:	LENGTH=30± L.F MAX HEIGHT=5.0± FT.

GRADING AND DRAINAGE

1. GRADING: IT IS PROPOSED THAT THE PROJECT BE GRADED AS SHOWN HEREON.
2. DRAINAGE: STORM WATER RUNOFF GENERATED ON-SITE WILL BE INTERCEPTED BY A PRIVATE STORM DRAIN SYSTEM AS SHOWN HEREON, AND DISCHARGED INTO SEPARATE OUTFALLS, BOTH OF WHICH EMPTY INTO THE SAN DIEGUITO RIVER VALLEY ON THE WESTERLY SIDE OF EL CAMINO REAL.
3. SITE DESIGN, SOURCE CONTROL AND TREATMENT CONTROL BMP'S WILL BE ADDRESSED IN THE PROJECT'S WATER QUALITY TECHNICAL REPORT.
4. THE PROPOSED PROJECT WILL COMPLY WITH ALL THE REQUIREMENTS OF THE CURRENT CITY OF SAN DIEGO STORM WATER STANDARDS MANUAL BEFORE A GRADING OR BUILDING PERMIT IS ISSUED. IT IS THE RESPONSIBILITY OF THE OWNER/DESIGNER/APPLICANT TO ENSURE THAT THE CURRENT STORM WATER PERMANENT BMP DESIGN STANDARDS ARE INCORPORATED INTO THE PROJECT.
5. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER.
6. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.

BASE FLOOD ELEVATION

PER FEMA FLOOD INSURANCE RATE MAP, PANEL 1326 OF 2375, THE PROPERTY IS SITUATED IN TWO SEPARATE HAZARD AREAS: ZONE A AND ZONE X, AS SUCH, NO BASE FLOOD ELEVATION FOR THIS PROPERTY IS DEFINED.

TOPOGRAPHY SOURCE:

PREPARED BY: ABBOTTCH MAPPING, INC.
29970 TECHNOLOGY DRIVE, S-220-C
MURRIETA, CA 92563
DATE: DECEMBER 5, 2016

BENCHMARK:

BP ON SELY COR BRIDGE OF EL CAMINO REAL AND SAN DIEGUITO RIVER BRIDGE.
N: 2968; E: 16997; ELEV: 26.205
DATUM: CITY OF SAN DIEGO VERTICAL CONTROL NGVD29 (MSL)
CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK (04 OCTOBER 2011)

TRUE NORTH — PLAN NORTH

NO.	DATE	BY	DESCRIPTION
1	05/01/09	LEE	ORIGINAL – COMPLIANCE CHECK

Leppert Engineering
5180 GOVERNOR DRIVE
Suite 205
San Diego, CA 92122
(858) 597-2001

APPROVED BY ENGINEER OF WORK
FILE CODE: SDR 5.01-09.16

IDENTIFICATION R.C.E. 26283
DATE

PREPARATION AND REVISION LOG

REGISTERED PROFESSIONAL ENGINEER — No. 26283 — Exp. 3/31/2013 — CIVIL — STATE OF CALIFORNIA

CALLISONRTKL

CallisonRTKL Inc.

Consultant

Client/Owner/Project Address

Issue Drawing Log

REV #	DATE (MM/DD/YY)	ISSUE NAME
	05/25/2021	PLANNING RESUBMITTAL
	04/14/2020	PLANNING SUBMISSION

Seal

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

Sheet Identification

GRADING/ DRAINAGE

C1.2

Attachment 5
Drainage Report

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

Drainage Study
for
El Camino Real Assisted Living Facility
PTS 675732

Date: January 2021
Job No.: SDR 05.01-09.16

Prepared By:
LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122
PHONE: (858) 597-2001

Prepared For:
PMB Carmel Valley, LLC
c/o Nolan Weinberg
3394 Carmel Mountain Road Ste. 200
San Diego, CA 92121

_____

By: John D. Leppert, RCE 26283
Exp. 3/31/22

Date: _____

Table of Contents

Exhibits

Appendices

Purpose

The purpose of this report is to examine the pre-development vs. post-development hydraulic characteristics and subsequent drainage improvements of the below mentioned site. Determinations made herein will be incorporated into the proposed site design.

Project Location

The proposed project is located east of Interstate 5, lying southeasterly of El Camino Real, bounded by Gonzales Canyon to the east, The "Evangelical Formosan Church"; 13885 El Camino Real) to the west and the "Villas at Stallions Crossing"; Map 14299) to the South. The parcel is an ~4 AC parcel lying south of the adjacent ~13 AC parcel which is currently being developed for the St John Armenian Apostolic Church. After approval of the CUP for the Church, the Church was successful in acquiring the subject property, adding 4.0 acres to the overall campus which is now being developed by PMB Carmel Valley LLC. The current site is completely disturbed, being used as late as 2008 as an equine boarding and training facility. Prior to this use, the land was cleared for farming activity. A location map of the project site is located in Exhibit A.

Project Description

The proposed development will include the construction of an Intermediate Care Facility with 105 Assisted Living and Memory Care units, along with associated support facilities for dining and recreation.

Method of Calculation

This study proposes to calculate the total runoff from the site using the guidelines set forth in the City of San Diego's Drainage Design Manual, dated January 2017 (See Appendix I). The specific method used is the Rational Formula for watersheds under 0.5 square miles.

Pre-Development Conditions (See Exhibit B, Pre-Development Basin Map)

The existing site consists of one basin leaving the site via an existing private 18" HDPE installed as part of the development of the St John Garabed Aremenian Church Campus to the north. This existing system connects to the public storm drain located in El Camino Real and subsequently discharges into the San Dieguito River Valley on the North Side of El Camino Real.

The existing Basin (B) is completely disturbed with minimal to no vegetation and is currently lying in a fallow state. According to the City of San Diego Drainage Design Manual, A rural lot configuration (greater than 0.5 acre) would be the most accurate classification with a runoff coefficient of C=0.45, see Appendix II, this value will be used in analyzing the pre-development runoff from this basin.

In order to be able to examine the runoff from the existing basin and compute the Q contribution to the public drain systems, a Time of Concentration was determined using

the City of San Diego's Drainage Design Manual (Time of Concentration *Appendix V*) time for overland flow using the equation provided $T_C=[1.8(1.1-C)\sqrt{D}]/(\sqrt[3]{s})$. From this, the intensity of the basin was determined using the City of San Diego's Drainage Design Manual (Rainfall Intensity Duration Frequency Curves *Appendix IV*), both are provided for reference in Appendix III.

For a 100-year storm event the below Tc and resultant flows were calculated:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Q_{100} (cfs)
B1	2.81	0.45	465	58.8	43.5	3.3%	16.97	3.3

Using the Rational Method, the Q_{100} for each basin was analyzed within SSA. Per the City of San Diego Drainage Design Manual section 1-102.2(3)(a), "For tributary areas under one square mile, the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites."

Post-Development Conditions (See Exhibit D, Post-Development Basin Map)

The proposed site creates 10 Basins (B-1 through B-10) out of the existing 1 Basin (B1). Basins B-1 through B-10 are collected via a series of on-site catch basins that will be routing all site runoff through the existing stormdrain facilities on the St John Garabed Armenian Church development before entering the public storm drain system in El Camino Real. The proposed land use for the site is assisted living which is not specifically identified within the City of San Diego Drainage Design Manual. A commercial land use would most closely apply and has a runoff coefficient of C=0.85, see Appendix II. Note number 2 as shown on Appendix II provides the deviation option should site design dictate. Our proposed imperviousness is ~2.1 Ac of the total ~2.8 acres being developed or ~74% impervious. With this data, we conclude a revised C value of 0.78.

This value will be used in analyzing the post-development runoff from the site. The Site Time of Concentration was recalculated based on the proposed grading and revised C and this value was input into SSA for analysis.

For a 100-year storm event the below Tc and resultant flows were calculated:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Q_{100} (cfs)
B1	0.24	0.78	465	58.8	44.5	3.1%	8.54	0.67
B2	0.41	0.78	465	58.8	44.5	3.1%	8.54	1.14
B3	0.13	0.78	465	58.8	44.5	3.1%	8.54	0.36
B4	0.37	0.78	465	58.8	44.5	3.1%	8.54	1.03
B5	0.24	0.78	465	58.8	44.5	3.1%	8.54	0.67
B6	0.48	0.78	465	58.8	44.5	3.1%	8.54	1.33
B7	0.10	0.78	465	58.8	44.5	3.1%	8.54	0.28
B8	0.20	0.78	465	58.8	44.5	3.1%	8.54	0.56
B9	0.37	0.78	465	58.8	44.5	3.1%	8.54	1.03
B10	0.28	0.78	465	58.8	44.5	3.1%	8.54	0.78

The 100-year frequency storm was again used to analyze site runoff to ensure flows will be conveyed from the site without damage to or flooding of adjacent existing buildings or potential building sites

Comparison of Pre-Development and Post Development Conditions

Pre-Development Runoff

Outfall 1 Q_{100} = 3.3 cfs

Post-Development Runoff

Outfall 1 Q_{100} = 7.0 cfs

Conclusion

Based on the above calculations, the development of the subject property as proposed results in an increase in runoff from 3.3 CFS to 7.0 CFS, which means the total increased runoff due to the proposed development is 3.7 CFS. As shown in the attached Post Development Storm and Sanitary Analysis (Exhibit E), said increase can be accommodated by the existing stormdrain associated with the adjacent St John Garabed Church project. It can be concluded that the proposed development will create minimal change to the existing downstream storm drain facilities and due to being within the floodway no negative downstream impact is anticipated and no increase potential for erosion or damage to downstream properties is anticipated. A 401/404 permit is not needed for the proposed development.

EXHIBIT “A” – Location Map

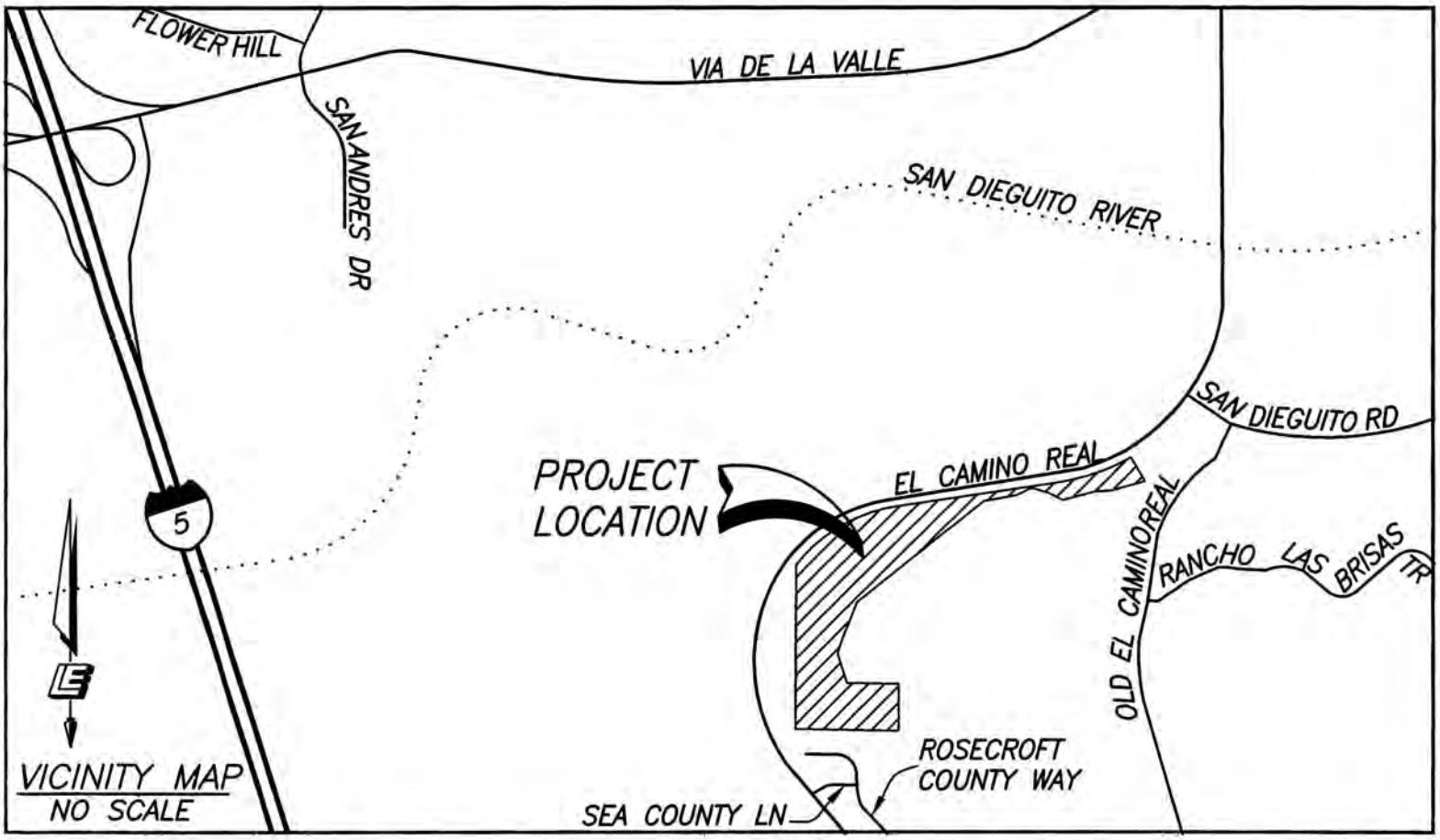

FLOWER HILL
VIA DE LA VALLE
SAN ANDRES DR
SAN DIEGUITO RIVER
SAN DIEGUITO RD
PROJECT LOCATION
EL CAMINO REAL
OLD EL CAMINO REAL
RANCHO LAS BRISAS TR
5
E
VICINITY MAP
NO SCALE
ROSECROFT COUNTY WAY
SEA COUNTY LN

EXHIBIT “B” – Existing Condition Drainage Basin Map

LEGEND

BASIN BOUNDARY

BASIN DESIGNATION — BASIN / AREA

PROPOSED DRAINAGE PATTERN

PROPERTY LINE

PROPOSED PRIVATE STORM DRAIN

PROPOSED CONTOUR

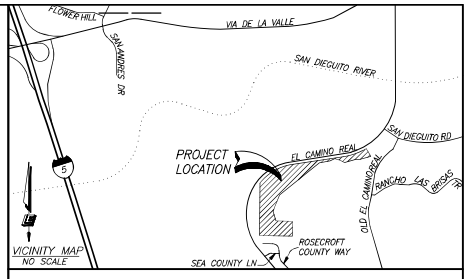
DAYLIGHT LINE

INLET NO.

JUNCTION NO.

40 0 40 80

SCALE: 1" = 40'



PREPARED BY:

NAME: LEPPERT ENGINEERING CORPORATION

ADDRESS: 5190 GOVERNOR DRIVE, S-205
SAN DIEGO, CA 92122

PHONE #: (858) 597-2001

PROJECT ADDRESS:
13860 EL CAMINO REAL
SAN DIEGO, CA 92131

PROJECT NAME:
EL CAMINO REAL ASSISTED LIVING FACILITY

SHEET TITLE:
DRAINAGE BASIN MAP
EXISTING CONDITION

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2: 04/08/2021
REVISION 1: 01/20/2021

ORIGINAL DATE: 09/15/2020

SHEET 1 OF 1

DEP #

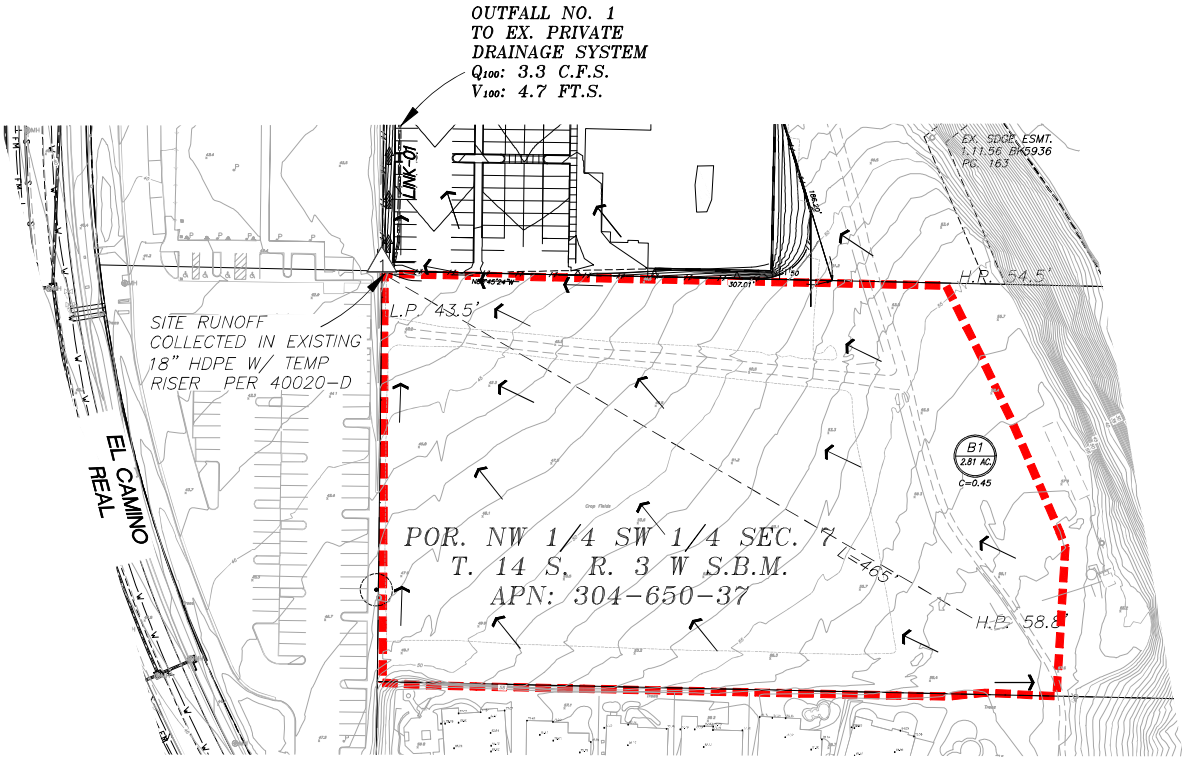


EXHIBIT “C” – Existing Condition SSA Calculations

Project Description

File Name	SSA Analysis - Ex.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 04, 2013	00:00:00
End Analysis On	Mar 05, 2013	00:00:00
Start Reporting On	Mar 04, 2013	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	1
Nodes	2
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	1
Storage Nodes	0
Links	1
Channels	0
Pipes	1
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Basin-B1	2.81	0.4500	0.76	0.34	0.96	3.38	0 00:16:58

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
Out-02	Outfall	31.40				3.33	32.03					

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
Link-01	Pipe	Inlet-01	Out-02	331.55	33.88	31.40	0.75	18.00	0.013	3.33	9.08	0.37	4.65	0.64	0.43	0.00	Calculated

Pipe Input

Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
Link-01	331.55	33.88	0.00	31.40	0.00	2.48	0.7500	CIRCULAR	18	0.0130	0.2000	0.5000	0.0000	0.00	No	1

Inlet Input

Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Grate Clogging Factor (%)
Inlet-01	On Sag	1	33.88	33.00	-0.88	50.00

Inlet Results

Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)
Inlet-01	3.38	3.38	N/A	N/A	N/A	36.43	1.55	0 00:17

EXHIBIT “D” – Proposed Condition Drainage Basin Map

LEGEND

BASIN BOUNDARY

BASIN DESIGNATION — BASIN / AREA

PROPOSED DRAINAGE PATTERN

PROPERTY LINE

PROPOSED PRIVATE STORM DRAIN

PROPOSED CONTOUR

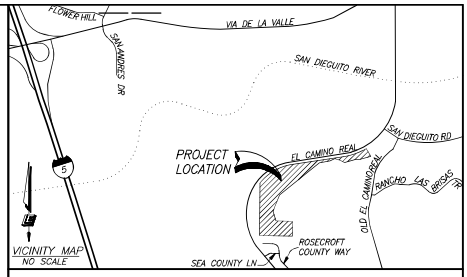
DAYLIGHT LINE

INLET NO. — 1

JUNCTION NO. — 1

40 0 40 80

SCALE: 1" = 40'



PREPARED BY:

NAME: LEPPERT ENGINEERING CORPORATION

ADDRESS: 5190 GOVERNOR DRIVE, S-205
SAN DIEGO, CA 92122

PHONE #: (858) 597-2001

PROJECT ADDRESS:
13860 EL CAMINO REAL
SAN DIEGO, CA 92131

PROJECT NAME:
EL CAMINO REAL ASSISTED LIVING FACILITY

SHEET TITLE:
DRAINAGE BASIN MAP
PROPOSED CONDITION

REVISION 14:
REVISION 13:
REVISION 12:
REVISION 11:
REVISION 10:
REVISION 9:
REVISION 8:
REVISION 7:
REVISION 6:
REVISION 5:
REVISION 4:
REVISION 3:
REVISION 2: 04/08/2021
REVISION 1: 01/20/2021

ORIGINAL DATE: 09/15/2020

SHEET 1 OF 1

DEP #

OUTFALL NO. 1
TO EX. PRIVATE
DRAINAGE SYSTEM
Q_{100}: 7.0 C.F.S.
V_{100}: 5.5 FT.S.

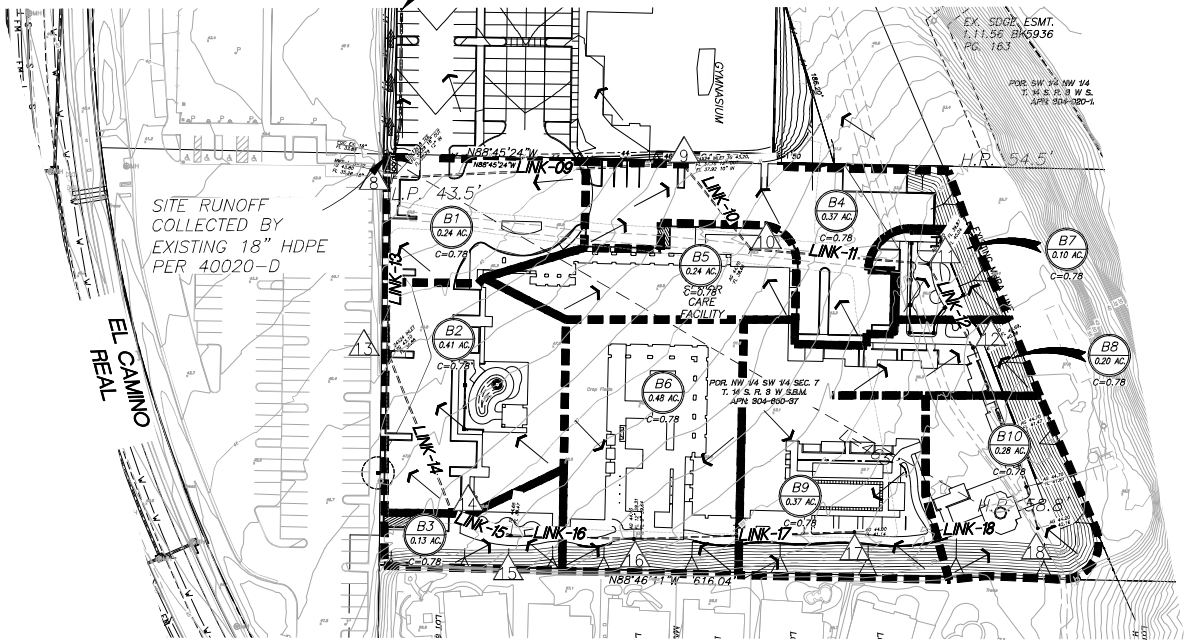


EXHIBIT “E” – Proposed Condition SSA Calculations

Project Description

File Name	SSA Analysis - Pro.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Mar 04, 2013	00:00:00
End Analysis On	Mar 05, 2013	00:00:00
Start Reporting On	Mar 04, 2013	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	10
Nodes	12
Junctions	0
Outfalls	1
Flow Diversions	0
Inlets	11
Storage Nodes	0
Links	11
Channels	0
Pipes	11
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	100 year(s)

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Basin-B01	0.24	0.7800	0.50	0.39	0.09	0.67	0 00:08:32
Basin-B02	0.41	0.7800	0.50	0.39	0.16	1.14	0 00:08:32
Basin-B03	0.13	0.7800	0.50	0.39	0.05	0.36	0 00:08:32
Basin-B04	0.37	0.7800	0.50	0.39	0.15	1.03	0 00:08:32
Basin-B05	0.24	0.7800	0.50	0.39	0.09	0.67	0 00:08:32
Basin-B06	0.48	0.7800	0.50	0.39	0.19	1.33	0 00:08:32
Basin-B07	0.10	0.7800	0.50	0.39	0.04	0.28	0 00:08:32
Basin-B08	0.20	0.7800	0.50	0.39	0.08	0.56	0 00:08:32
Basin-B09	0.37	0.7800	0.50	0.39	0.15	1.03	0 00:08:32
Basin-B10	0.28	0.7800	0.50	0.39	0.11	0.78	0 00:08:32

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
Out-01	Outfall	31.40				6.99	32.39					

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
Link-08	Pipe	Inlet-08	Out-01	331.55	33.88	31.40	0.75	18.00	0.013	6.99	9.08	0.77	5.51	1.01	0.68	0.00	Calculated
Link-09	Pipe	Inlet-09	Inlet-08	148.21	37.05	35.20	1.25	12.00	0.013	2.98	3.98	0.75	5.26	0.68	0.68	0.00	Calculated
Link-10	Pipe	Inlet-10	Inlet-09	69.20	38.26	37.22	1.50	10.00	0.013	2.07	2.69	0.77	4.97	0.59	0.71	0.00	Calculated
Link-11	Pipe	Inlet-11	Inlet-10	121.18	39.64	38.43	1.00	10.00	0.013	1.47	2.19	0.67	4.10	0.52	0.63	0.00	Calculated
Link-12	Pipe	Inlet-12	Inlet-11	64.83	40.46	39.81	1.00	8.00	0.013	1.23	1.21	1.01	3.73	0.60	0.89	0.00	> CAPACITY
Link-13	Pipe	Inlet-13	Inlet-08	111.50	36.06	34.95	1.00	12.00	0.013	3.47	3.55	0.98	4.89	0.87	0.87	0.00	Calculated
Link-14	Pipe	Inlet-14	Inlet-13	117.60	37.49	36.31	1.00	12.00	0.013	2.54	3.57	0.71	4.57	0.68	0.68	0.00	Calculated
Link-15	Pipe	Inlet-15	Inlet-14	41.20	37.90	37.49	1.00	12.00	0.013	2.54	3.55	0.71	4.21	0.72	0.72	0.00	Calculated
Link-16	Pipe	Inlet-16	Inlet-15	84.20	39.12	38.07	1.25	10.00	0.013	2.21	2.45	0.90	4.80	0.66	0.79	0.00	Calculated
Link-17	Pipe	Inlet-17	Inlet-16	150.30	41.54	39.29	1.50	8.00	0.013	0.99	1.48	0.67	3.92	0.46	0.69	0.00	Calculated
Link-18	Pipe	Inlet-18	Inlet-12	125.03	42.79	41.54	1.00	6.00	0.013	0.73	0.56	1.30	3.85	0.46	0.93	0.00	> CAPACITY

Pipe Input

Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
Link-08	331.55	33.88	0.00	31.40	0.00	2.48	0.7500	CIRCULAR	18	0.0130	0.2000	0.5000	0.0000	0.00	No	1
Link-09	148.21	37.05	0.00	35.20	1.32	1.85	1.2500	CIRCULAR	12	0.0130	0.2000	0.8000	0.0000	0.00	No	1
Link-10	69.20	38.26	0.00	37.22	0.17	1.04	1.5000	CIRCULAR	10	0.0130	0.2000	0.8000	0.0000	0.00	No	1
Link-11	121.18	39.64	0.00	38.43	0.17	1.21	1.0000	CIRCULAR	10	0.0130	0.2000	0.8000	0.0000	0.00	No	1
Link-12	64.83	40.46	0.00	39.81	0.17	0.65	1.0000	CIRCULAR	8	0.0130	0.2000	0.7000	0.0000	0.00	No	1
Link-13	111.50	36.06	0.00	34.95	1.07	1.11	1.0000	CIRCULAR	12	0.0130	0.2000	0.5000	0.0000	0.00	No	1
Link-14	117.60	37.49	0.00	36.31	0.25	1.18	1.0000	CIRCULAR	12	0.0130	0.2000	0.6000	0.0000	0.00	No	1
Link-15	41.20	37.90	0.00	37.49	0.00	0.41	1.0000	CIRCULAR	12	0.0130	0.2000	0.6000	0.0000	0.00	No	1
Link-16	84.20	39.12	0.00	38.07	0.17	1.05	1.2500	CIRCULAR	10	0.0130	0.2000	0.5000	0.0000	0.00	No	1
Link-17	150.30	41.54	0.00	39.29	0.17	2.25	1.5000	CIRCULAR	8	0.0130	0.2000	0.5000	0.0000	0.00	No	1
Link-18	125.03	42.79	0.00	41.54	1.08	1.25	1.0000	CIRCULAR	6	0.0130	0.2000	0.6000	0.0000	0.00	No	1

Inlet Input

Element ID	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Grate Clogging Factor (%)
Inlet-08	On Sag	2	33.88	44.50	10.62	50.00
Inlet-09	On Sag	1	37.05	43.60	6.55	50.00
Inlet-10	On Sag	1	38.26	44.70	6.44	50.00
Inlet-11	On Sag	1	39.64	44.70	5.06	50.00
Inlet-12	On Sag	1	40.46	44.70	4.24	50.00
Inlet-13	On Sag	1	36.06	43.70	7.64	50.00
Inlet-14	On Sag	1	37.49	44.70	7.21	50.00
Inlet-15	On Sag	1	37.90	44.65	6.75	50.00
Inlet-16	On Sag	1	39.12	44.40	5.28	50.00
Inlet-17	On Sag	1	41.54	44.00	2.46	50.00
Inlet-18	On Sag	1	42.79	44.20	1.41	50.00

Inlet Results

Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)
Inlet-08	0.67	0.67	N/A	N/A	N/A	44.76	0.26	0 00:10
Inlet-09	1.03	1.03	N/A	N/A	N/A	43.99	0.39	0 00:09
Inlet-10	0.67	0.67	N/A	N/A	N/A	45.06	0.36	0 00:09
Inlet-11	0.28	0.28	N/A	N/A	N/A	44.85	0.15	0 00:09
Inlet-12	0.55	0.55	N/A	N/A	N/A	45.00	0.30	0 00:09
Inlet-13	1.14	1.14	N/A	N/A	N/A	44.11	0.41	0 00:10
Inlet-14	0.00	0.00	N/A	N/A	N/A	44.70	0.00	0 00:09
Inlet-15	0.36	0.36	N/A	N/A	N/A	44.84	0.19	0 00:09
Inlet-16	1.33	1.33	N/A	N/A	N/A	45.23	0.83	0 00:09
Inlet-17	1.03	1.03	N/A	N/A	N/A	44.55	0.55	0 00:09
Inlet-18	0.78	0.78	N/A	N/A	N/A	44.62	0.42	0 00:08

APPENDIX I – Rational Method: City of San Diego Drainage Design Manual

Appendix A

Rational Method and Modified Rational Method

A.1. Rational Method (RM)

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and drainage structures. The RM is recommended for analyzing the runoff response from drainage areas for watersheds less than 0.5 square miles. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 0.5 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section A.2); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Appendix B).

A.1.1. Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed in Equation A-1.

Equation A-1. RM Formula Expression

$$Q = C\ I\ A$$

where:

Q	=	peak discharge, in cubic feet per second (cfs)
C	=	runoff coefficient expressed as that percentage of rainfall which becomes surface runoff (no units); Refer to Appendix A.1.2
I	=	average rainfall intensity for a storm duration equal to the time of concetrnatation (T_c) of the contributing draiange area, in inches per hour; Refer to Appendix A.1.3 and Appendix A.1.4
A	=	drainage area contributing to the design location, in acres

APPENDIX II – Design Runoff: City of San Diego Drainage Design Manual

2. For all drainage channels and storm water conveyance systems, which will convey drainage from a tributary area equal to or greater than one (1) square mile, the runoff criteria, shall be based upon a 100-year frequency storm.
3. For tributary areas under one (1) square mile:
    a. The storm water conveyance system shall be designed so that the combination of storm drain system capacity and overflow (streets and gutter) will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites.
    b. The runoff criteria for the underground storm drain system shall be based upon a 50-year frequency storm.

2.3. Soil Type

For storm drain, culverts, channels, and all associated structures, Type D soil shall be used for all areas.

2.4. Other Requirements

1. Design runoff for drainage and flood control facilities within the City shall be based upon full development of the watershed area in accordance with the land uses shown on the City of San Diego, Progress Guide and General Plan.
2. When determining criteria for floodplain management and flood proofing, design runoff within the City shall be based upon existing conditions in accordance with the City Floodplain Management Requirements and FEMA Regulations.
3. Under City requirements, the minimum elevation of the finished, first floor elevation of any building is 2 feet above the 100-year frequency flood elevation.

2.5. Water Quality Considerations

Requirements for hydrologic studies specific to the design of pollution prevention controls and hydromodification management controls are detailed in the Storm Water Standards. Where the Storm Water Standards specify modifications to the guidelines stated herein on discharge flow methods, design storm frequency, or soil type, the modifications shall supersede these but only for the purposes stated in the Storm Water Standards. Where the Storm Water Standards does not specify a modification, the guidance found here in Chapter 2 shall apply.

APPENDIX III – Runoff Coefficients: City of San Diego Drainage Design Manual

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_C for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_C calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

APPENDIX IV – Rainfall Intensity-Duration-Frequency Curves: City of San Diego Drainage Design Manual

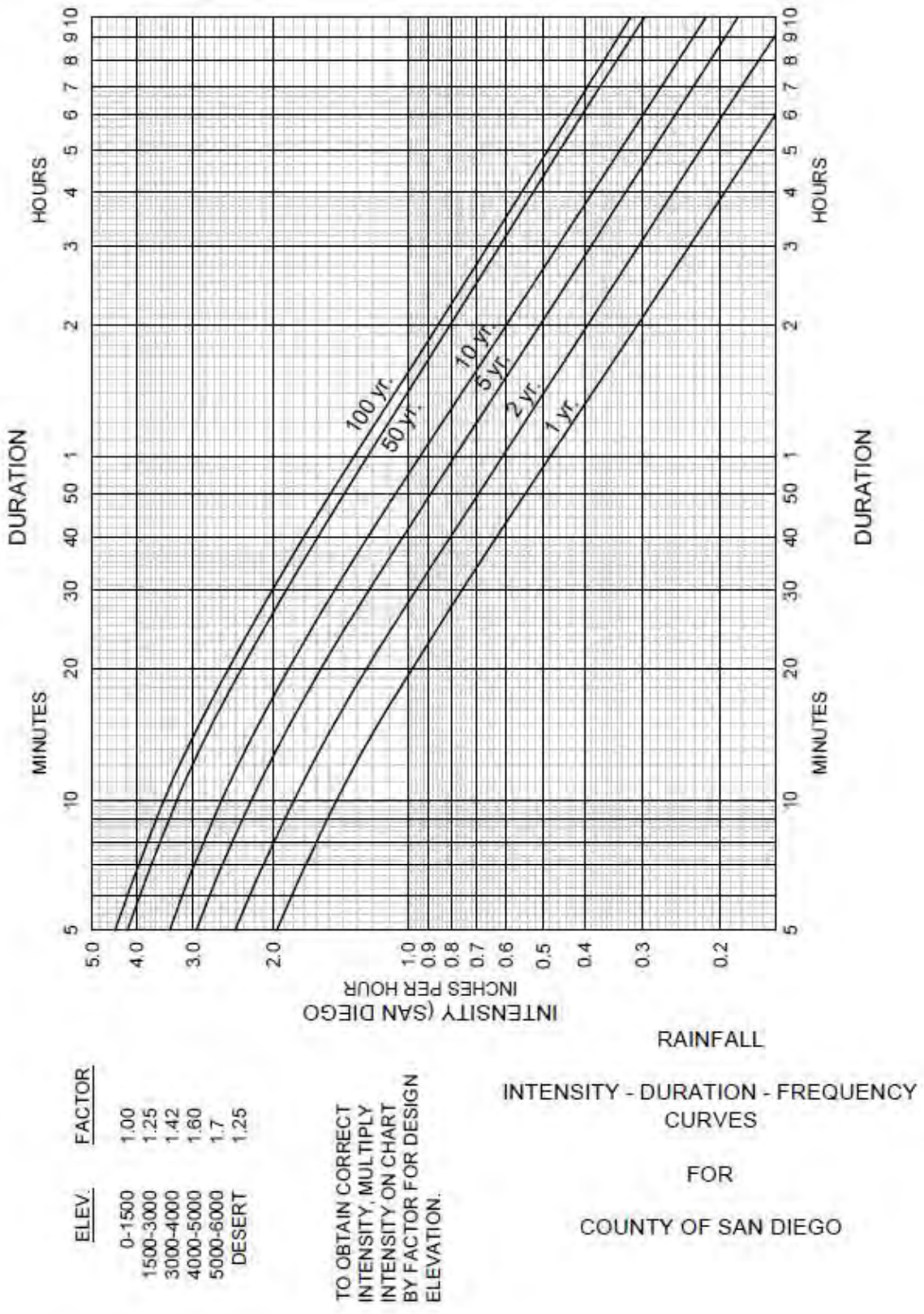


Figure A-1. Intensity-Duration-Frequency Design Chart

APPENDIX V – Time of Concentration: City of San Diego Drainage Design Manual

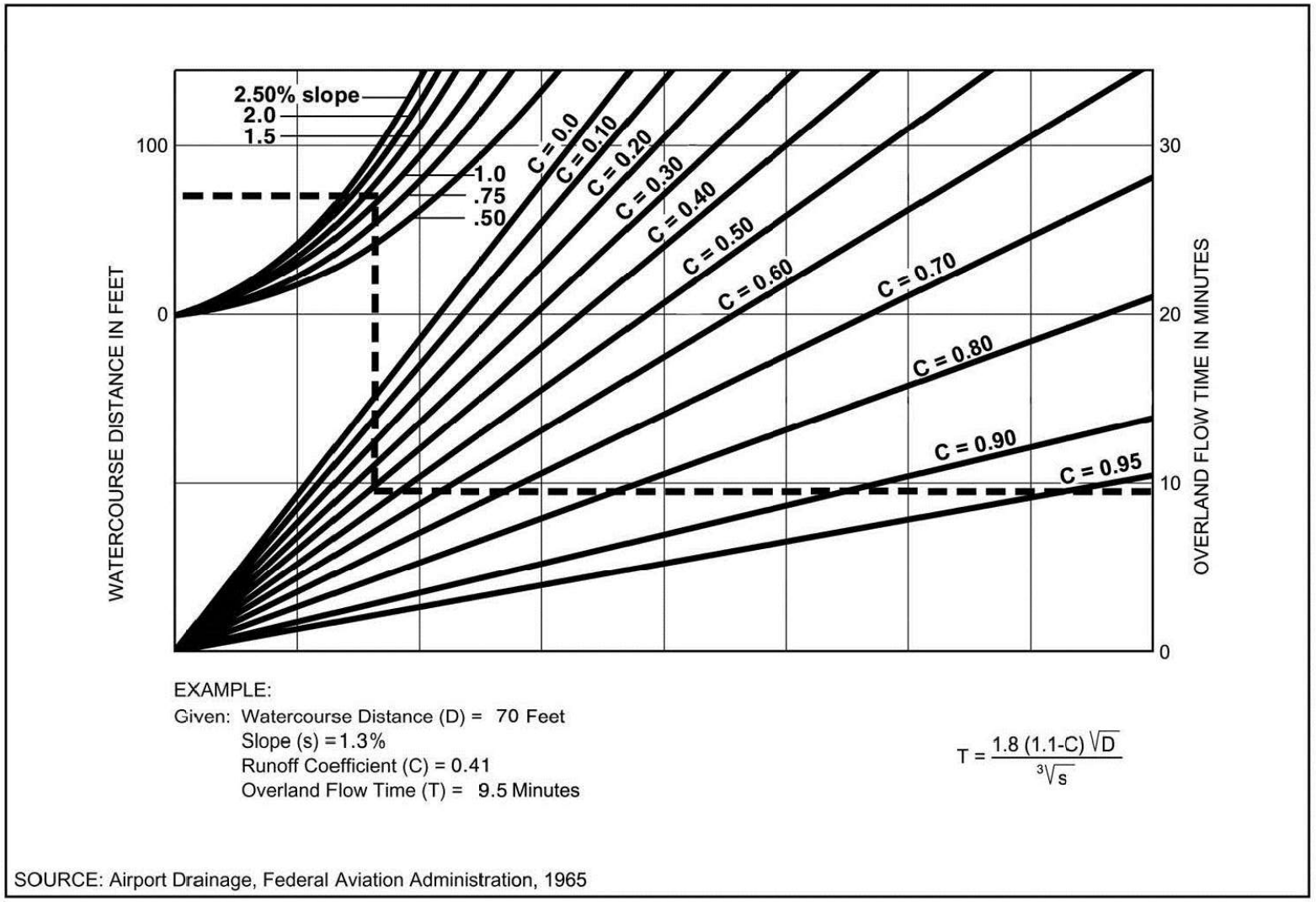


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

Attachment 6
Geotechnical and Groundwater Investigation Report

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

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

REVISED GEOTECHNICAL UPDATE
AND STORM WATER INFILTRATION STUDY
ASSISTED LIVING FACILITY
13860 EL CAMINO REAL
CITY OF SAN DIEGO, CALIFORNIA
APN 304-650-37-00

FOR

PMB LLC
3394 CARMEL MOUNTAIN ROAD, SUITE 200
SAN DIEGO, CALIFORNIA 92121

W.O. 7971-A-SC **SEPTEMBER 17, 2020**
REVISED APRIL 8, 2021

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

September 17, 2020
Revised April 8, 2021

W.O. 7971-A-SC

PMB LLC
3394 Carmel Mountain Road, Suite 200
San Diego, California 92121

Attention: Mr. Nolan Weinberg

Subject: Revised Geotechnical Update And Storm Water Infiltration Study Assisted Living Facility 13860 El Camino Real, City Of San Diego, California APN 304-650-37-00

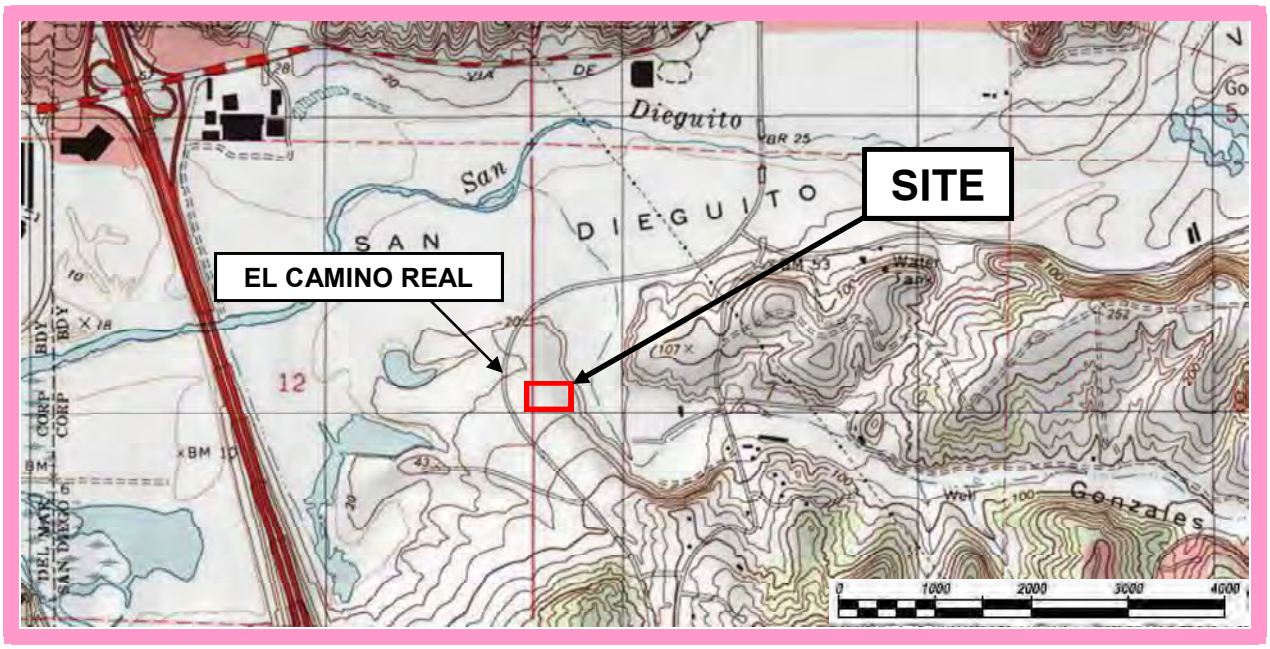
Dear Mr. Weinberg:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) has prepared the following update of our previous geotechnical work (GSI, 2011), with respect to the governing Building Code (2019 edition of the California Building Code [2019 CBC], California Building Standards Commission [CBSC], 2019a]) for this project. We note that the grading plans for the Assisted Living Facility have not been completed to date. GSI's scope of services included a review of the referenced report (see Appendix A), desktop infiltration study (Appendix C), engineering and geologic analyses, and preparation of this update report. This report is to be used as a supplement to the previous GSI preliminary investigation report (GSI, 2011).

Unless specifically superseded herein, the conclusions and recommendations provided in GSI (2011) remain valid and applicable. The additional conclusions and recommendations presented herein should be appropriately incorporated into project design and construction.

SITE DESCRIPTION/PROPOSED DEVELOPMENT

The roughly 4-acre trapezoid-shaped property consists of essentially vacant land, located at 13860 El Camino Real, City of San Diego, San Diego County, California. (see Figure 1, Site Location Map), and is the southern portion of a larger, 17 acre parcel that includes the property immediately to the north, where construction of the St. John Garabed Armenian Church Facility is currently underway. The site is bounded by existing residential development on the south, a church facility on the west, the aforementioned church facility currently under construction to the north, and relatively undeveloped open space to the east. Topographically, the majority of the site consists of a very gently northward sloping



Base Map: TOPO! Copyright 2003 National Geographic, USGS Del Mar Quadrangle, California -- San Diego Co., 7.5 Minute, dated 1967.

Base Map: Google Maps, Copyright 2016, Map Data Copyright 2016 Google

N

GeoSoils, Inc.

W.O.

7971-A-SC

SITE LOCATION MAP

Figure 1

area, referred to in this, and previous reports as a "mesa." Along the northeastern and eastern edges of the mesa, a natural slope was observed to descend eastward into alluviated areas located beyond the project area. The slope averaged approximately 40 feet in height, at gradients on the order of 2:1 to 3:1 (h:v) along the eastern edge of the mesa. Elevations within the project area vary from approximately 47 to 60 feet mean sea level ([MSL] south to north) within the mesa area, and are on the order of 18 to 21 feet mean sea level MSL within the alluviated areas of the site located beyond the planned improvement area. Surface drainage (sheet flow) generally appears to be directed offsite to the north and northwest.

It is our understanding that the planned development will be limited to the relatively flat-lying to very gently sloping mesa area of the site, while the existing east facing slope, descending from the east side of the "mesa" area and the alluviated area beyond the base of this slope will remain undisturbed and/or natural. Development will include site preparation for the construction of a 105-unit assisted living facility with a library, fitness area, kitchen, café, dining room, spa, salon, locker room, therapy room, offices, garden areas, parking/driveway areas, and associated landscape improvements. Typical cut and fill grading techniques are anticipated to be used to create the building pad. Based on current topography, cuts and fills on the order of 1 to 14 feet (or less) are estimated for the currently planned building area.

It is our understanding that the building proposed is a three-story structure, with slab-on-grade/continuous footings, utilizing wood-frame construction. Building loads are assumed to be typical for this type of construction. Sewage disposal is anticipated to be accommodated by tying into the regional system. The need for import soils is not anticipated at this time.

PREVIOUS WORK

A preliminary geotechnical evaluation (report) including the subject site was prepared by Geocon, Inc. ([Geocon], 2008). That evaluation included the excavation of seven (7) exploratory borings, of which two ([2] Borings B-3 & B-4) are located within the project boundary, as well as associated laboratory testing of samples collected. A geotechnical report, including findings, conclusions, and recommendations for a previous development concept, for the site was issued on July 17, 2008 (Geocon, 2008). An update geotechnical investigation, including the subject site, was prepared by GSI (2011) and included additional subsurface exploration (test pits), laboratory testing, and engineering analysis. This update included a review of readily available geologic literature for the site, including the previous geotechnical report for the project, geologic site reconnaissance, additional subsurface exploration, sampling, and mapping, an evaluation of site seismicity and seismic hazards, appropriate laboratory testing of representative soil samples, engineering and geologic evaluation of data collected, and report preparation. It should be noted that at that time, the subject site was proposed to consist of a sheet graded pad within the central and eastern portion of the site, with the western portion contour graded for drainage.

In 2012, GSI performed a review of the existing mesa and slope conditions regarding previous grading and improvements at the subject site (GSI, 2012), that encompassed a larger overall project to the north, northeast, and east of the mesa. While not completed specifically for the subject site, a storm water infiltration study was completed by GSI for the site immediately adjacent to the subject site (GSI, 2017) and characterized infiltration conditions for BMP desgn.

SITE EXPLORATION

Site exploration completed in preparation of this study consisted of completing three (3) hand auger borings and geologic reconnaissance mapping, performed on September 2, 2020. The approximate location of the hand auger borings are presented on the Geotechnical Map (see Plate 1) included in this report. A GSI engineering geologist observed the hand auger boring excavations, and collected representative samples of materials encountered for visual examination and subsequent laboratory testing.

Soils encountered in the hand auger borings were classified in general accordance with the Unified Soil Classification System (U.S.C.S.), as described in Appendix B. Logs of the hand auger borings (this study), as well as the logs of borings completed in preparation of Geocon report (2008), and a test pit completed in preparation of GSI (2011), are presented in Appendix B. The locations of all subsurface explorations completed onsite are depicted on Plate 1.

SITE GEOLOGIC UNITS

General

Geologic units encountered during our subsurface investigation and site reconnaissance included undocumented fill and Quaternary-age very old paralic deposits. A review of GSI (2011), and Geocon (2008) indicate that surficial deposits of colluvium (topsoil) older and Eocene-age sedimentary bedrock also occur either as thin surficial, or near surface deposits (colluvium), or at depth (bedrock). The earth materials encountered are generally described below from the youngest to oldest.

Undocumented Artificial Fill (Map Symbol - afu)

Existing, undocumented fill was observed within two (2) general areas of the site. The first area includes the westernmost two-thirds of the site, and appear to be associated with construction of the church site to the north, as the subject site was periodically used to stockpile soil. Where observed, existing fills in this area appear to consist of dry, silty to clayey sand, and appear to form a thin veneer, ranging from ±0.3 to 1 foot in thickness, from the eastern portion of the lot to the west end of the proposed construction,

respectively (see Plate 1). The second area includes a thin veneer of surficial fills that appear to have been pushed over the existing, east facing slope. These fills appear to have been placed as push fills over the existing slope resulting from previous agricultural work onsite and do not appear to be located in the vicinity of the planned improvements construction. Undocumented fills are considered potentially compressible in their existing state and therefore should be removed and recompacted, if settlement-sensitive improvements and/or planned fills are proposed within their influence.

Colluvium (Topsoil) (not Mapped)

Surficial deposits of colluvium (Topsoil per Geocon, 2008) were encountered in preparation of Geocon (2008) and GSI (2011). These deposits were not noted at the selected exploration sites during this study as they were likely removed, redistributed, or otherwise disturbed during earthwork associated with the church site to the north. While not encountered during this study, these deposits likely occur elsewhere across the planned improvement area.

As encountered in preparation of Geocon (2008) and GSI (2011) colluvial soils consist of a surficial, or near surface layer varying from a silty to clayey fine sand to a silty sand with clay. Where observed (Geocon, 2008; GSI, 2011), these soils were typically dark brown, dry to moist, loose and porous. Colluvium is considered potentially compressible in its existing state and therefore should be removed and recompacted, if settlement-sensitive improvements and/or planned fills are proposed within their influence.

Very Old Paralic Deposits (Map Symbol - Qvop)

Quaternary-age very old paralic deposits were encountered beneath surficial deposits of fill. Where observed, these deposits consist of predominately silty sand. These sediments are typically dark gray to reddish brown, dry, and very dense. Weathered very old paralic deposits are considered potentially compressible in their existing state, and therefore should be removed and recompacted if settlement-sensitive improvements and/or planned fills are proposed within its' influence. *Unweathered* very old paralic deposits are considered suitable for the support of settlement-sensitive improvements and/or planned fill in their existing state. Bedding structure was observed to be approximately sub-horizontal.

GROUNDWATER

Regional groundwater was encountered in preparation of Geocon (2008) within alluvial soils located offsite to the east and northeast (offsite) at an approximate elevation of 7 feet MSL, or about 36 feet below the lowest surface grade onsite. Water was not encountered during our investigation, nor within previous borings (Geocon, 2008) completed within, or adjacent to, the area planned for development, and should not significantly affect site

development. It should be noted that planned development is generally limited to areas of the site underlain with relatively dense terrace/paralic deposits.

Perched groundwater may occur in the fill or along zones of contrasting permeabilities (i.e., along fill lifts, bedrock joints/fractures, and/or bedding) due to migration from adjacent drainage areas, and during or after periods of above normal or heavy precipitation or irrigation. Thus, perched groundwater conditions may occur in the future, after development, and should be anticipated. Groundwater observations reflect site conditions at the time of this report and do not preclude changes in local groundwater conditions in the future. The potential for perched groundwater conditions should be disclosed to any interested or potentially affected parties. The performance of the site is, to a large degree, dependent on the proper control of irrigation, as discussed. As such, more rigorous slab design is necessary for any new slab-on-grade floor (State of California, 2011). Recommendations for reducing the amount of water and/or water vapor through slab-on-grade floors are provided in the "Soil Moisture Considerations" sections of this report.

GEOLOGIC HAZARDS

Landslide Susceptibility

According to regional landslide susceptibility mapping by Tan and Giffen (1995), the site is located within landslide susceptibility Area 3-1, which is characterized as being "generally susceptible" to landsliding. However, given the site's relative location to ascending or descending slopes, its gentle relief, the absence of adverse geologic structure, and the generally dense nature of the underlying formational sediments, the potential for landslides to affect the proposed site development is considered low.

Faulting

Our review indicates that there are no known active faults crossing this site, and the site is not within an Alquist-Priolo Earthquake Fault Zone (CGS, 2018). However, the site is situated in an area of active faulting. These include, but are not limited to: the San Andreas fault; the San Jacinto fault; the Elsinore fault; the Coronado Bank fault zone; and the Newport-Inglewood - Rose Canyon fault zone (NIRCFZ). location of these, and other major faults relative to the site, are indicated in Appendix C (California Fault Map). The possibility of ground acceleration, or shaking at the site, may be considered as approximately similar to the Southern California region as a whole. Major active fault zones that may have a significant affect on the site, should they experience activity, are listed in Appendix C (modified from Blake, 2000a).

Other Seismic/Fault Related Hazards

The following list includes other seismic related hazards that have been considered during

our evaluation of the site, and during our review of GSI (2011) and Geocon (2008). The hazards listed are considered negligible and/or completely mitigated as a result of site location, soil characteristics, and typical site development procedures:

- Dynamic Settlement
- Liquefaction
- Surface Fault Rupture
- Ground Lurching or Shallow Ground Rupture
- Seiche

City Seismic Safety Study

Based on our review of City of San Diego (2008), the site does not appear to be underlain by active, or potentially active, faults. The City has evaluated the planned improvement area of the site as belonging within "Geologic Hazard Category 52, gently sloping to steep terrain, favorable geologic structure, low risk."

LABORATORY TESTING

Laboratory tests were performed on representative samples of site earth materials in order to evaluate their physical characteristics. The results of our evaluation are summarized as follows:

Classification

Soils were classified with respect to the Unified Soil Classification System (USCS) in general accordance with ASTM D 2487 and ASTM D 2488.

Expansion Index

A representative sample of near-surface site soils was evaluated for expansion potential. Expansion index (E.I.) testing and expansion potential classification was performed in general accordance with ASTM Standard D 4829, the results of the expansion testing are presented in the following table.

SAMPLE LOCATION AND DEPTH (ft)	EXPANSION INDEX	EXPANSION POTENTIAL
HA-2 @ 2 (This Study)	16	Very Low
TP-3 @ 4 (GSI, 2011)	17	Very Low
B-3 @ 0-2 (Geocon, 2008)	75	Medium

Maximum Density Testing

The laboratory maximum dry density and optimum moisture content for the soil type encountered during the recent investigation was evaluated in general accordance with test method ASTM D 1557. The following table presents the results:

SOIL TYPE	MAXIMUM DENSITY (PCF)	MOISTURE CONTENT (PERCENT)
A - Dark Brown, Clayey Sand (HA-2 @2')	126.4	9.5

Direct Shear Tests (Remolded)

Strain-controlled remolded shear tests (displacement $\leq$0.005 inches per minute), were performed on a prepared sample in the formational material (bedrock) in general accordance with the ASTM D 3080 test method. The results of shear testing are summarized in the following table.

The shear testing results are shown below.

SAMPLE LOCATION AND DEPTH (ft)	WET UNIT WEIGHT (PCF)	PRIMARY		RESIDUAL	
		COHESION (PSF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	FRICTION ANGLE (DEGREES)
HA-2 @ 2 (remolded)	138.4	146	30.3	98	30.8

Particle-Size Analysis

A grain size evaluation was performed in preparation of Geocon (2008) on a selected soil sample obtained from Boring B3. The grain-size distribution curve for this sample indicates textural distribution consisting of about 52 percent sand and 48 percent fines (silt and clay).

Corrosivity Testing

Corrosivity testing, performed on a representative sample of onsite soil in preparation of GSI (2001) indicates a pH of 7.7 (which is considered relatively neutral, to slightly alkaline), a soluble sulfate content of 0.081 percent by weight (which is considered “S0” per Table 19.3.2.1 of ACI 318-14, a chloride content of 110 parts per million (ppm), and a saturated resistivity of 490 ohm-cm (which is considered corrosive to ferrous metals). Reinforced concrete mix design for foundations, slab-on-grade floors, and pavements

should minimally conform to “Exposure Classes S0, W0, and C1” in Table 19.3.1.1 of ACI 318R-14, as concrete would likely be exposed to moisture. It should be noted that GSI does not consult in the field of corrosion engineering. The client and project architect should agree on the level of corrosion protection required for the project and seek consultation from a qualified corrosion consultant as warranted. Conformation testing is recommended upon the completion of rough grading.

SEISMIC DESIGN

General

It is important to keep in perspective that in the event of an upper bound (maximum probable) or credible earthquake occurring on any of the nearby major faults, strong ground shaking would occur in the subject site's general area. Potential damage to any structure(s) would likely be greatest from the vibrations and impelling force caused by the inertia of a structure's mass than from those induced by the hazards listed above. This potential would be no greater than that for other existing structures and improvements in the immediate vicinity.

Seismic Shaking Parameters

The following table summarizes the reevaluated site-specific design criteria obtained from the 2019 CBC, Chapter 16 Structural Design, Section 1613, Earthquake Loads. The computer program Seismic Design Maps, provided by the California Office of Statewide Health Planning and Development (OSHPD, 2020) has now been utilized to aid in design (https://seismicmaps.org). A seismic “site class C” was assigned to this site based on average blow count data obtained from Geocon (2008). The short spectral response utilizes a period of 0.2 seconds.

2019 CBC SEISMIC DESIGN PARAMETERS		
PARAMETER	**VALUE**	**2019 CBC OR REFERENCE**
Risk Category	I, II, III	Table 1604.5
Site Class	C	Section 1613.2.2/Chap. 20 ASCE 7-16 (p. 203-204)
Spectral Response - (0.2 sec), S_s	1.098 g	Section 1613.2.1 Figure 1613.2.1(1)
Spectral Response - (1 sec), S_1	0.392 g	Section 1613.2.1 Figure 1613.2.1(2)
Site Coefficient, F_a	1.2	Table 1613.2.3(1)
Site Coefficient, F_v	1.5	Table 1613.2.3(2)

2019 CBC SEISMIC DESIGN PARAMETERS		
PARAMETER	**VALUE**	**2019 CBC OR REFERENCE**
Maximum Considered Earthquake Spectral Response Acceleration (0.2 sec), S_{MS}	1.318 g	Section 1613.2.3 (Eqn 16-36)
Maximum Considered Earthquake Spectral Response Acceleration (1 sec), S_{M1}	0.588	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (0.2 sec), S_{DS}	0.879 g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.392	Section 1613.2.4 (Eqn 16-39)
PGA_M - Probabilistic Vertical Ground Acceleration may be assumed as about 50% of these values.	0.586 g	ASCE 7-16 (Eqn 11.8.1)
Seismic Design Category	D	Section 1613.2.5/ASCE 7-16 (p. 85: Table 11.6-1 or 11.6-2)

GENERAL SEISMIC PARAMETERS	
PARAMETER	**VALUE**
Distance to Seismic Source (B fault)[1]	4.2 mi (6.8 km)[2]
Upper Bound Earthquake (Rose Canyon Fault)	$M_W = 7.2$ [1]
[1] - Cao, et al. (2003) [2] - Blake (2000)	

Conformance to the criteria above for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to eliminate all damage, since such design may be economically prohibitive. Cumulative effects of seismic events are not addressed in the 2019 CBC (CBSC, 2019a) and regular maintenance and repair following locally significant seismic events (i.e., M_w5.5) will likely be necessary, as is the case in all of Southern California. A summary of the seismic data is included in Appendix C.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on our current and previous field exploration, current and previous laboratory testing, and geotechnical engineering analysis, it is our opinion that the site appears suitable for the proposed development from a geotechnical engineering and geologic viewpoint. Unless specifically superceded in the following sections, the conclusions and recommendations presented in GSI (2011) remain valid and applicable.

SITE EARTHWORK

General

All grading should conform to the guidelines presented in the 2019 CBC (CBSC, 2019a), the City, and as recommended herein. When Code references are not in agreement, the more stringent code should be followed. During earthwork construction, all site preparation and the general grading procedures of the contractor should be observed and the fill selectively tested by a representative(s) of GSI. If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and, if warranted, modified and/or additional recommendations will be offered. All applicable requirements of local and national construction and general industry safety orders, the Occupational Safety and Health Act (OSHA), and the Construction Safety Act should be met. It is the onsite general contractor's and individual subcontractors' responsibility to provide a safe working environment for our field staff who are onsite. GSI does not consult in the area of safety engineering.

Demolition/Grubbing

1. Vegetation and any miscellaneous debris should be removed from the areas of proposed grading.

2. Any existing subsurface structures uncovered during the recommended removal should be observed by GSI so that appropriate remedial recommendations can be provided.

3. Cavities or loose soils remaining after demolition and site clearance should be cleaned out and observed by the soil engineer. The cavities should be replaced with fill materials that have been moisture conditioned to *at least* optimum moisture content and compacted to at least 90 percent of the laboratory standard.

4. Onsite septic systems (if encountered) should be removed in accordance with San Diego County Department of Environmental Health (DEH) standards/guidelines.

Treatment of Existing Ground/Remedial Earthwork

Removals

Due to the relatively loose/soft condition of the near surface undocumented fills, colluvium, and highly weathered paralic deposits (if encountered), these materials should be removed and recompacted in areas proposed for settlement-sensitive improvements or areas to receive compacted fill. Removal depths across the site are anticipated to be on the order of about 1 to 6 feet across a majority of the site, with deeper removals anticipated near the northern project boundary.

Removed fill soils may be reused as fill, provided that the soil is cleansed of any deleterious material, moisture conditioned, and compacted to a minimum 90 percent relative compaction per ASTM D 1557. Removals should be completed throughout the site, and minimally at least 5 feet beyond the limits of any settlement-sensitive improvement (including plan fill) area, or to a lateral distance equal to the depth of the removal beneath the improvement, whichever is greater.

Subsequent to the above removals, the exposed bottom(s) should be scarified to a depth of at least 8 inches, brought to *at least* optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard, prior to any fill placement.

Overexcavation

In order to provide for the uniform support of the building(s), the cut portion of any plan transition (i.e., cut/fill) should be overexcavated to provide a minimum 4-foot thick layer (cap) of compacted fill beneath the building(s), or two (2) feet beneath building foundations, whichever is deeper. Where the total thickness of plan fill plus remedial earthwork (i.e., removals) is less than the minimum fill cap thickness, that portion of the pad(s) shall also be undercut to provide the recommended minimum fill thickness.

Overexcavation should be minimally completed to at least 5 feet beyond the building(s) footprint (including any exterior isolated footing, etc.). Where the maximum fill thickness within a given pad area exceeds 12 feet (not anticipated), the cut portion, or portion of the pad with thinner fill, shall be undercut to maintain a maximum to minimum fill ratio of not more than 3:1 (maximum to minimum) completed below a 1:1 projection down and away from the edge of any settlement-sensitive improvements and/or limits of proposed fill, per the requirements of the 2019 CBC (CBSC, 2019a).

Subsequent to the above overexcavation, the exposed bottom(s) should be scarified to a depth of at least 8 inches, brought to *at least* optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard, prior to any fill placement.

Expansive Soils and Mitigation

Current laboratory testing indicates expansive soil conditions ranging from very low (expansion index [E.I.] range of 0-20), to medium expansive ($50 < E.I. < 90$) present onsite where tested. As such, some site soil meets the criteria of expansive soil as defined in Section 1803.5.2 of the 2016 CBC. Foundation systems constructed within the influence of expansive soils (i.e., $E.I. > 20$ and $P.I. \geq 15$) will require specific design to resist expansive soil effects per Sections 1808.6.1 or 1808.6.2 of the 2019 CBC, and should be reviewed by the project structural engineer, unless mitigated in the field during site grading.

Based on our site work, expansive soils appear to be associated with surficial and near surface deposits of colluvium, and highly weathered paralic deposits. In order to mitigate the potential effects of expansive soil, the expansive soils may be: 1) blended with less expansive site soil to reduce the overall expansion potential, 2) placed beyond (outside) the building footprint, or 3) placed in areas no closer than 7 feet vertically from finish pad grade.

Fill Placement

Subsequent to ground preparation, fill materials should be brought to *at least* optimum moisture content, placed in thin 6- to 8-inch lifts, and mechanically compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. Fill materials should be cleansed of major vegetation and debris prior to placement.

Fill Suitability

Onsite soils appear to vary from silty to clayey sands, and oversize material (12-inch plus) is not anticipated in any significant quantity. Existing site soils appear to vary from very low to medium expansive (expansion index [EI] range of 0 to 90). Any soil import should be evaluated by this office prior to importing in order to assure compatibility with the onsite site soils and the recommendations presented in this report. Import soils, if used, should be relatively sandy and very low expansive (i.e., E.I. less than 20).

Shrinkage/Bulking

Based on our experience, a preliminary value of 8 to 15 percent shrinkage for artificial fill, and highly weathered formation may be considered. Shallow cuts in formation may result in nominal shrinkage (ranging to ±5 percent).

Perimeter Conditions

It should be noted, that the 2019 CBC (CBSC, 2019a) indicates that removals of unsuitable soils be performed across all areas under the purview of the grading permit, not just within the influence of the proposed buildings. Relatively deep removals may also necessitate a special zone of consideration, on perimeter/confining areas.

Any proposed improvement or future homeowner improvements such as walls, swimming pools, house additions, etc. that are located above a 1:1 (h:v) projection up from the outermost limit of the remedial grading excavations will require deepened foundations that extend below this plane. Other site improvements, such as pavements, constructed above the aforementioned plane would retain some potential for settlement and associated distress, which may require increased maintenance/repair or replacement. This potential should be disclosed to all interested/affected parties should remedial grading excavations be constrained by property lines.

Graded Slope Construction

Based on site grades and the planned construction, graded fill and cut slope are anticipated to be on the order of 10 feet or less in height and are considered stable, assuming proper construction and maintenance.

Existing Slopes

The existing east-facing slope, located within the eastern portion of the site is located beyond the limits of planned improvements. While this slope appears to have performed adequately to date, a formal analysis of stability was not included in the scope of this study. This slope presently supports a growth of existing vegetation and irrigation is not recommended.

Temporary Slopes

Temporary slopes for excavations greater than 4 feet, but less than 20 feet in overall height should conform to CAL-OSHA and/or OSHA requirements for Type "B" soils. Temporary slopes, up to a maximum height of ±20 feet, may be excavated at a 1:1 (h:v) gradient, or flatter, provided groundwater and/or running sands are not exposed. Construction materials or soil stockpiles should not be placed within 'H' of any temporary slope where 'H' equals the height of the temporary slope. All temporary slopes should be observed by a licensed engineering geologist and/or geotechnical engineer prior to worker entry into the excavation.

Fill Sub-Drainage

Based on site grades and the planned construction, subdrainage is not anticipated, but may not be entirely precluded.

PRELIMINARY RECOMMENDATIONS - FOUNDATIONS

General

Preliminary recommendations for foundation design and construction are provided in the following sections. These preliminary recommendations have been developed from our understanding of the currently planned site development, site observations, subsurface exploration, laboratory testing, and engineering analyses. Foundation design should be re-evaluated at the conclusion of site grading/remedial earthwork for the as-graded soil conditions. Although not anticipated, revisions to these recommendations may be necessary. In the event that the information concerning the proposed development plan is not correct, or any changes in the design, location, or loading conditions of the proposed additions are made, the conclusions and recommendations contained in this

report shall be rendered invalid unless the changes are reviewed and conclusions of this report are modified or approved in writing by this office.

The information and recommendations presented in this section are not meant to supercede design by the project structural engineer or civil engineer specializing in structural design. Upon request, GSI could provide additional input/consultation regarding soil parameters, as related to foundation design.

The foundation design recommendations, included herein, are based on anticipated column loads of 5 to 50 kips, respectively. Maximum wall loads are anticipated to be on the order of 1.5-3 kips per linear foot. The slabs-on-grade are anticipated to have typical car and/or light loads on the order of 50 to 200 psf. It is unknown if equipment and elevator pit areas will be included in the design. GSI does not anticipate high vibratory equipment loads on the floor slabs. GSI also does not anticipate highly sensitive electrical equipment mounted on the floor slab.

The foundation design recommendation contained in this report may be modified once actual loading conditions have been provided for GSI review. All foundations should be designed using, at a minimum, the parameters and static settlements described herein. All foundations should be evaluated for seismic deformations described herein.

Expansive and Corrosive Soils

Current laboratory testing indicates that the onsite soils range from very low expansive (E.I. <21) to medium expansive (E.I. range of 51 to 90). As such, some site soils appear to meet the criteria of detrimentally expansive soils as defined in Section 1803.5.2 of the 2019 CBC (CBSC, 2019a). With adequate blending and placement of expansive sill soils, the overall expansive character of site soil is anticipated to exhibit an expansion index of E.I. 21, or an effective plasticity Index (PI) of 15, or less, within the upper 15 feet of the underlying soil column.

Previous testing completed in preparation of GSI (2011) indicates that site soils present a potentially negligible sulfate exposure (exposure class S0 per Table 19.3.2.1 of ACI 318-14) to concrete. However, reinforced concrete mix design for foundations, slab-on-grade floors, and pavements should also conform to "Exposure Class C1" in Table 19.3.2.1 of ACI 318-14, as concrete would likely be exposed to moisture. A chloride content of 110 parts per million (ppm), which is considered relatively non-corrosive per ACI (2014a) and Caltrans (2003), and a saturated resistivity of 490 ohm-cm (which is considered corrosive to ferrous metals) were also evaluated. While it is our understanding that typical structural ($f'c \geq 3{,}000$) concrete cover is generally sufficient mitigation for such conditions, GSI recommends consultation with a corrosion consultant. Corrosion test results evaluated during this study (including GSI, 2011) are in general agreement with those included in Geocon (2008) regarding soluble sulfates.

Concrete mix design should be designed to comply. Exposure classes S0, W0, and C1, per ACI 318-14, should be followed. GSI does not practice in the field of corrosion engineering. Accordingly, consultation from a qualified corrosion engineer may obtained based on the level of corrosion protection requirements by the project architect and structural engineer. Upon completion of grading, laboratory testing should be performed of site materials for corrosion to concrete and corrosion to steel. Additional guidance may be obtained from a qualified corrosion engineer at that time. It is assumed by the project architect that all steel will evaluate the need for epoxy-coated, or other, corrosion protection.

Foundation Design

General:

1. The foundation systems should be designed and constructed in accordance with guidelines presented in the 2019 CBC (CBSC, 2019a). All foundations should be embedded entirely into newly compacted or mitigated fill (90 percent of ASTM D 1557).

2. An allowable bearing value of 2,000 pounds per square foot (psf) may be used for design of footings that maintain a minimum width of 15 inches and a minimum depth of 24 inches, and founded in compacted fill. This value may be increased by 20 percent for each additional 12 inches in depth to a maximum value of 2,500 psf. In addition, this value may be increased by one-third when considering short duration wind or seismic loads. Isolated pad footings should have a minimum dimension of at least 24 inches square and minimum depth of 24 inches. Where not confined by slabs, isolated footings shall be connected in two directions back to the main portion of the foundation with grade beams.

3. Passive earth pressure may be computed as an equivalent fluid having a density of 250 pounds per cubic foot (pcf), with a maximum lateral earth pressure of 2,500 psf. Lateral passive pressures for shallow foundations within 2019 CBC setback zones should be reduced following a review by the geotechnical engineer unless proper setback can be established.

4. An allowable coefficient of friction between soil and concrete of 0.30 may be used with the dead load forces.

5. For the evaluation of total lateral resistance on the foundation and combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third. For effect of shrink-swell soils on hillside foundations, the geotechnical consultant should review foundation designs when available. The addition of creep loads on top-of-slope or mid-slope foundations should be considered.

Settlement:

For preliminary design purposes, foundations bearing into dense, engineered fill overlying formational soil, should be designed to minimally accommodate a static and dynamic total settlement of 2 inches and a differential settlement of 1 inch in 40 feet, respectively (angular distortion of 1/480). As grading plans become available, and based on the as-built configuration of the site, this value should be revisited. These static and dynamic (seismic) settlement estimates do not include periodic shrink/swell of expansive soils, or top-of-slope deformations.

Conventional Foundation Construction

The following foundation construction recommendations are presented as a minimum criteria from a soils engineering viewpoint. Recommendations by the project's design/structural engineer or architect, which may exceed the soils engineer's recommendations, should take precedence over the following minimum requirements.

1. Continuous footings should be founded at a minimum depth of 24 inches below the lowest adjacent ground surface bearing on very low expansive soils, for the planned three-story floor loads, respectively. All footings should be reinforced with a minimum of two No. 5 reinforcing bars at the top and two No. 5 reinforcing bars at the bottom (four bars total). Reinforcement of Isolated footings should be provided by the structural engineer. The depth of embedment is measured from the lowest adjacent grade, and does not include slab underlayment or the landscape zone.

2. A grade beam, reinforced as above, and at least 12 inches square, should be provided across any large entrance (garage, etc.). The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

3. Concrete slabs (including garage, if applicable) should be a minimum of 5 inches.

4. Concrete slabs, including large building entrance areas, should be minimally reinforced with No. 4 reinforcement bars placed on 18-inch centers, in two horizontally perpendicular directions (i.e., long axis and short axis). All slab reinforcement should be supported to ensure proper mid-slab height positioning during placement of the concrete. "Hooking" of reinforcement is not an acceptable method of positioning.

5. The slab and footing subgrade should be free of loose and uncompacted material prior to placing concrete.

6. Soils generated from footing excavations to be used onsite should be compacted to a minimum relative compaction 90 percent of the laboratory standard (ASTM D 1557), whether it is to be placed inside the foundation perimeter or in the

yard/right-of-way areas. This material must not alter positive drainage patterns that direct drainage away from the structural areas and toward the street.

7. Footings should maintain a horizontal distance, X, between any adjacent descending slope face and the bottom outer edge of the footing. The horizontal distance, X, may be calculated by using X = H/3, where "H" is the height of the slope. X should not be less than 7 feet, nor need not be greater than 40 feet. X may be maintained by deepening the footings. Setbacks should minimally conform to Section 1808.7.2, and 1808.7.3 of the 2019 CBC (CBSC, 2019a) guidelines as applicable, unless specifically superceded herein.

SOIL MOISTURE TRANSMISSION CONSIDERATIONS FOR FLOOR SLABS

GSI has evaluated the potential for vapor or water transmission through the concrete floor slab, in light of typical floor coverings and improvements. Please note that slab moisture emission rates range from about 2 to 27 lbs/24 hours/1,000 square feet from a typical slab (Kanare, 2005), while floor covering manufacturers generally recommend about 3 lbs/24 hours as an upper limit. The recommendations in this section are not intended to preclude the transmission of water or vapor through the foundation or slabs. Foundation systems and slabs shall not allow water or water vapor to enter into the structure so as to cause damage to another building component or to limit the installation of the type of flooring materials typically used for the particular application (State of California, 2020). These recommendations may be exceeded or supplemented by a water "proofing" specialist, project architect, or structural consultant. Thus, the client will need to evaluate the following in light of a cost versus benefit analysis (owner expectations and repairs/replacement), along with disclosure to all interested/affected parties. It should also be noted that vapor transmission will occur in new slab-on-grade floors as a result of chemical reactions taking place within the curing concrete. Vapor transmission through concrete floor slabs as a result of concrete curing has the potential to adversely affect sensitive floor coverings depending on the thickness of the concrete floor slab and the duration of time between the placement of concrete, and the floor covering. It is possible that a slab moisture sealant may be needed prior to the placement of sensitive floor coverings if a thick slab-on-grade floor is used and the time frame between concrete and floor covering placement is relatively short.

Considering the E.I. test results presented herein, and known soil conditions in the region, the anticipated typical water vapor transmission rates, floor coverings, and improvements (to be chosen by the Client and/or project architect) that can tolerate vapor transmission rates without significant distress, the following alternatives are provided:

- Concrete slabs should be increased in thickness from a minimum recommended thickness of 5 inches for a conventional slab (for non-expansive conditions)

- Concrete slab underlayment should consist of a 15-mil vapor retarder, or equivalent, with all laps sealed per the 2019 CBC and the manufacturer's recommendation. The vapor retarder should comply with the ASTM E 1745 - Class A criteria, and be installed in accordance with ACI 302.1R-04 and ASTM E 1643.

- The 15-mil vapor retarder (ASTM E 1745 - Class A) shall be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.).

- Concrete slabs, including the garage areas, shall be underlain by 2 inches of clean, washed sand (SE $\geq$ 30) above a 15-mil vapor retarder (ASTM E-1745 - Class A, per Engineering Bulletin 119 [Kanare, 2005]) installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.). The manufacturer shall provide instructions for lap sealing, including minimum width of lap, method of sealing, and either supply or specify suitable products for lap sealing (ASTM E 1745), and per Code.

  ACI 302.1R-04 (2004) states "If a cushion or sand layer is desired between the vapor retarder and the slab, care must be taken to protect the sand layer from taking on additional water from a source such as rain, curing, cutting, or cleaning. Wet cushion or sand layer has been directly linked in the past to significant lengthening of time required for a slab to reach an acceptable level of moisture transmission for floor covering applications." Therefore, additional observation and/or testing will be necessary for the cushion or sand layer for moisture content, and relatively uniform thicknesses, prior to the placement of concrete.

- The vapor retarder shall be underlain by 2 inches clean of sand (sand equivalent [S.E.] $\geq$ 30) placed directly on the prepared, moisture conditioned, subgrade and should be sealed to provide a continuous retarder under the entire slab, as discussed above.

- Concrete should have a maximum water/cement ratio of 0.50. This does not supercede Table 19.3.2.1 of Chapter 4 of the ACI (2014) for corrosion or other corrosive requirements. Additional concrete mix design recommendations should be provided by the structural consultant and/or waterproofing specialist. Concrete finishing and workablity should be addressed by the structural consultant and a waterproofing specialist.

- Where slab water/cement ratios are as indicated herein, and/or admixtures used, the structural consultant should also make changes to the concrete in the grade beams and footings in kind, so that the concrete used in the foundation and slabs are designed and/or treated for more uniform moisture protection.

- The owner(s) should be specifically advised which areas are suitable for tile flooring, vinyl flooring, or other types of water/vapor-sensitive flooring and which are not

suitable. In all planned floor areas, flooring shall be installed per the manufactures recommendations.

- Additional recommendations regarding water or vapor transmission should be provided by the architect/structural engineer/slab or foundation designer and should be consistent with the specified floor coverings indicated by the architect.

Regardless of the mitigation, some limited moisture/moisture vapor transmission through the slab should be anticipated. Construction crews may require special training for installation of certain product(s), as well as concrete finishing techniques. The use of specialized product(s) should be approved by the slab designer and water-proofing consultant. A technical representative of the flooring contractor should review the slab and moisture retarder plans and provide comment prior to the construction of the foundations or improvements. The vapor retarder contractor should have representatives onsite during the initial installation.

OTHER SITE IMPROVEMENTS

Preliminary recommendations for other site improvements, such as retaining walls, pavements, flatwork, top of slope fences/walls, and general development criteria (i.e., drainage, landscaping, etc.) are presented in GSI (2011).

STORM WATER INFILTRATION RATE EVALUATION AND DISCUSSION

USDA Study

A review of the United States Department of Agriculture database ([USDA]; 1973, 2019) indicates infiltration rates, between 0.00-0.06 inches per hour for the Las Flores loamy fine sand (5 to 7 percent slope, eroded) mapped on the site. The USDA study further indicates that site soils are classified as belonging to Hydrologic Soil Group D, which appears primarily due to a relatively shallow “depth to restrictive feature” estimated at more than “80 inches.” The infiltration rate of the site immediately north of the subject site yielded an average rate of 0.028 inches per hour GSI (2017).

Infiltration Feasibility

Infiltration feasibility for this site was evaluated. An evaluation of the soils infiltration characteristics and potential impact on site development was performed for this evaluation, using a “desk top” analysis. Based on our review, including; adjacent slopes, existing (or proposed) utility backfill, and/or existing moisture-sensitive improvements, such as pavements, and utility trench backfill, foundations, retaining walls, and below grade building walls, would likely be adversely affected by soil infiltration, including offsite improvements, causing settlement and distress.

In general accordance with the City BMP Manual (City, 2018), the "categorization of infiltration feasibility condition based on geotechnical conditions" was evaluated. A review of Work Sheet C.4-1, presented in Appendix D of this report categorizes this site as a no infiltration site and should be considered in BMP design.

The following geotechnical guidelines should be considered when designing onsite infiltration-runoff retention systems:

- Areas adjacent to, or within, the BMP that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- Impermeable liners used in conjunction with bioretention basins should consist of a 30-mil polyvinyl chloride (PVC) membrane that is covered by a minimum of 12 inches of clean soil, free from rocks and debris, with a maximum 4:1 (h:v) slope inclination, or flatter, and meets the following minimum specifications:

  Specific Gravity (ASTM D792): 1.2 (g/cc, min.); Tensile (ASTM D882): 73 (lb/in-width, min); Elongation at Break (ASTM D882): 380 (%, min); Modulus (ASTM D882): 32 (lb/in-width, min.); and Tear Strength (ASTM D1004): 8 (lb/in, min); Seam Shear Strength (ASTM D882) 58.4 (lb/in, min); Seam Peel Strength (ASTM D882) 15 (lb/in, min).

- Subdrains for basins should consist of at least 4-inch diameter Schedule 40 or SDR 35 drain pipe with perforations oriented down. The drain pipe should be sleeved with a filter sock.

- Utility backfill within BMP areas should consist of a two-sack mix of slurry.

OTHER DESIGN PROFESSIONALS/CONSULTANTS

The design civil engineer, structural engineer, post-tension designer, architect, landscape architect, wall designer, etc., should review the recommendations provided herein, incorporate those recommendations into all their respective plans, and by explicit reference, make this report part of their project plans. This report presents minimum design criteria for the design of slabs, foundations and other elements possibly applicable to the project. These criteria should not be considered as substitutes for actual designs by the structural engineer/designer. Please note that the recommendations contained herein are not intended to preclude the transmission of water or vapor through the slab or foundation. The structural engineer/foundation and/or slab designer should provide recommendations to not allow water or vapor to enter into the structure so as to cause damage to another building component, or so as to limit the installation of the type of flooring materials typically used for the particular application.

The structural engineer/designer should analyze actual soil-structure interaction and consider, as needed, bearing, expansive soil influence, and strength, stiffness and deflections in the various slab, foundation, and other elements in order to develop appropriate, design-specific details. As conditions dictate, it is possible that other influences will also have to be considered. The structural engineer/designer should consider all applicable codes and authoritative sources where needed. If analyses by the structural engineer/designer result in less critical details than are provided herein as minimums, the minimums presented herein should be adopted. It is considered likely that some, more restrictive details will be required.

If the structural engineer/designer has any questions or requires further assistance, they should not hesitate to call or otherwise transmit their requests to GSI. In order to mitigate potential distress, the foundation and/or improvement's designer should confirm to GSI and the governing agency, in writing, that the proposed foundations and/or improvements can tolerate the amount of differential settlement and/or expansion characteristics and other design criteria specified herein.

PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review, engineering analyses, and laboratory data, the conclusions and recommendations presented herein are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty is express or implied. Standards of practice are subject to change with time. This report has been prepared for the purpose of providing soil design parameters derived from testing of a soil sample received at our laboratory, and does not represent an evaluation of the overall stability, suitability, or performance of the property for the proposed development. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

The opportunity to be of service is greatly appreciated. If you have any questions concerning this report, or if we may be of further assistance, please do not hesitate to contact any of the undersigned.

Respectfully submitted,

GeoSoils, Inc.

Robert G. Crisman
Engineering Geologist, CEG

David W. Skelly
Civil Engineer, RCE 47857

RGC/DWS/JPF/mn

Attachments:
Figure 1 - Site Location Map
Appendix A - References
Appendix B - Hand Auger Boring Logs
Appendix C - Seismic Data
Appendix D - Infiltration Worksheet C.4-1
Plate 1 - Geotechnical Map

Distribution: (3) Addressee, (2 hard copies via USPS and email with PDF)

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

American Concrete Institute, 2014a, Building code requirements for structural concrete (ACI 318-14), and commentary (ACI 318R-14): reported by ACI Committee 318, dated September.

_____, 2014b, Building code requirements for concrete thin shells (ACI 318.2-14), and commentary (ACI 318.2R-14), dated September.

_____, 2004, Guide for concrete floor and slab construction: reported by ACI Committee 302; Designation ACI 302.1R-04, dated March 23.

American Society for Testing and Materials (ASTM), 1998, Standard practice for installation of water vapor retarder used in contact with earth or granular fill under concrete slabs, Designation: E 1643-98 (Reapproved 2005).

_____, 1997, Standard specification for plastic water vapor retarders used in contact with soil or granular fill under concrete slabs, Designation: E 1745-97 (Reapproved 2004).

American Society of Civil Engineers, 2018a, Supplement 1 to Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16), first printing, dated December 13.

_____, 2018b, Errata for Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16), by ASCE, dated July 9.

_____, 2017, Minimum design loads and associated criteria and other structures, ASCE Standard ASCE/SEI 7-16, published online June 19.

_____, 2010, Minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10.

Blake, Thomas F., 2000a, EQFAULT, A computer program for the estimation of peak horizontal acceleration from 3-D fault sources; Windows 95/98 version.

_____, 2000b, EQSEARCH, A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs; Updated through June, 2006, Windows 95/98 version.

Bozorgnia, Y., Campbell, K.W., and Niazi, M., 1999, Vertical ground motion: Characteristics, relationship with horizontal component, and building-code implications; Proceedings of the SMIP99 seminar on utilization of strong-motion data, September, 15, Oakland, pp. 23-49.

Building News, 1995, CAL-OSHA, State of California, Construction Safety Orders, Title 8, Chapter 4, Subchapter 4, amended October 1.

California Building Standards Commission, 2019a, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, based on the 2018 International Building Code, effective January 1, 2020.

_____, 2019b, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 1 of 2, Based on the 2018 International Building Code, effective January 1, 2020.

California Code Of Regulations, 2011, CAL-OSHA State of California Construction and Safety Orders, dated February.

California Department of Conservation, California Geological Survey (CGS), 2018, Earthquake fault zones, a guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: California Geological Survey Special Publication 42 (revised 2018), 93 p.

California Office of Statewide Health Planning and Development (OSHPD), 2020, Seismic design maps, https://seismicmaps.org/.

Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Willis, C.J., 2003, The revised 2002 California probalistic seismic hazard maps, dated June, http://www.conversation.ca.gov/cgs/rghm/psha/fault_parameters/pdf/documents/2002_ca_hazardmaps.pdf.

City of San Diego, 2018, Storm water standards, BMP design manual, October.

CTL Thompson, 2005, Controlling moisture-related problems associated with basement slabs-on-grade in new residential construction.

Geocon, 2008, Geotechnical investigation, River Park Equestrian Center, San Diego, California, Project No. 07921-42-01, dated July 17.

GeoSoils, Inc., 2018a, Addendum to the geotechnical update, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6306-A3-SC, dated November 15.

_____, 2018b, Infiltration Feasibility Study, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6063-A3-SC, dated July 10, 2018 (Revised July 20, 2018).

_____, 2018c, Update/Response to Cycle Issues L64-003A, St. John Garabed Church Grading, dated November 13, 2017, by the City of San Diego Development Services Department, revised April 9.

_____, 2017, Geotechnical Update and Storm Water Infiltration Evaluation, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6306-A3-SC, dated September 15.

_____, 2013, Geotechnical update evaluation and response to City of San Diego review comments, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6306-A2-SC, dated April 24.

_____, 2012, Review of existing mesa and slope conditions regarding previous grading and improvements, proposed St. John Garabed Armenian Church, 13901 El Camino Real, City of San Diego, California, W.O. 6306-A-SC, dated August 20.

_____, 2017, Geotechnical Update and Storm Water Infiltration Evaluation, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6306-A3-SC, dated September 15.

_____, 2012, Review of existing mesa and slope conditions regarding previous grading and improvements, proposed St. John Garabed Armenian Church, 13901 El Camino Real, City of San Diego, California, W.O. 6306-A-SC, dated August 20.

_____, 2011, Update geotechnical investigation, St. John Garabed Armenian Church, 13901⅓ El Camino Real, City of San Diego, California, W.O. 6306-A-SC, dated December 14.

Kanare, H.M., 2005, Concrete floors and moisture, Engineering Bulletin 119, Portland Cement Association.

Kennedy, M.P., 1975, Geology of the San Diego metropolitan area, California; California Division of Mines and Geology, Bulletin 200, Section A, Western San Diego Metropolitan Area, Del Mar, La Jolla, and Point Loma, 7½ minute quadrangles (Revised 2001).

Kennedy, M.P., and Tan, SS., 2008, Geologic map of the San Diego 30' by 60' quadrangle, California, Map no. 3, scale 1:100,000,California Geologic Survey and U.S. Geologic Survey.

Norris, R.M. and Webb, R.W., 1990, Geology of California, second edition, John Wiley & Sons, Inc.

San Diego, City of, 2016, Storm Water Standards, Part 1:BMP design manual, for permanent site design, storm water treatment and hydromodification management,

storm water requirements for development applications, with Appendices, dated January.

San Diego, City of, 2008, Seismic safety study, geologic hazards and faults, Grid Tile 34, 800 scale, Development Services Department, updated April 3.

Tan, S.S., and Giffen, D.G., 1995, Landslide hazards in the northern part of the San Diego Metropolitan area, San Diego County, California, Landslide hazard identification map no. 35, Plate E, Department of Conservation, Division of Mines and Geology, DMG Open File Report 95-04.

Tan, S.S., and Kennedy, Michael P., 1996, Geologic maps of the northwestern part of San Diego County, California: California Division of Mines and Geology, Open File Report 96-02.

Sowers and Sowers, 1979, Unified soil classification system (After U. S. Waterways Experiment Station and ASTM 02487-667) in Introductory soil mechanics, New York.

State of California, 2020, Civil Code, Sections 895 et seq.

United States Department of the Interior, Bureau of Reclamation, 1984, Drainage manual, a water resources technical publication, second printing, Denver, U.S. Department of the Interior, Bureau of Reclamation, 286 pp.

United States Department of Agriculture, Soil Conservation Service, 1973, Soil survey, San Diego area, California, Part I and Part II.

Van Hoorm, J.W., 1979, Determining hydraulic conductivity with the inversed auger hole and infiltrometer methods.

APPENDIX B

BORING AND TEST PIT LOGS
THIS STUDY, GSI (2011), AND GEOCON (2008)

GeoSoils, Inc.

BORING LOG

PROJECT: PMB, LLC
El Camino Real, San Diego

W.O. 7971-A-SC *BORING* HA-1 *SHEET* 1 *OF* 1

DATE EXCAVATED 9-2-20 *LOGGED BY:* TMP *APPROX. ELEV.:* 59' MSL

SAMPLE METHOD: 3½" Hand Auger

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**PARALIC DEPOSITS:**
								@ 0' SANDSTONE, reddish brown, dry, very dense.
								Practical Refusal at 1.5'
								No Groundwater or Caving Encounter
5								
10								
15								
20								
25								
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*

▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

BORING LOG

PROJECT: PMB, LLC
El Camino Real, San Diego

W.O. 7971-A-SC *BORING* HA-2 *SHEET* 1 *OF* 1

DATE EXCAVATED 9-2-20 *LOGGED BY:* TMP *APPROX. ELEV.:* 55' MSL

SAMPLE METHOD: 3½" Hand Auger

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0	■			SM/ SC				**FILL:**
	■			SM				@ 0' SILTY to CLAYEY SAND, gray brown, dry, very dense.
								PARALIC DEPOSITS:
								@ 1' SANDSTONE, red brown, dry, very dense.
								Hand Auger Terminated on Refusal at 2'
								No Groundwater or Caving Encountered
5								
10								
15								
20								
25								
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

BORING LOG

PROJECT: PMB, LLC
El Camino Real, San Diego

W.O. 7971-A-SC *BORING* HA-3 *SHEET* 1 *OF* 1

DATE EXCAVATED 9-2-20 *LOGGED BY:* TMP *APPROX. ELEV.:* 51' MSL

SAMPLE METHOD: 3½" Hand Auger

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM/ SC SM				**FILL:** @ 0' SILTY to CLAYEY SAND, gray/red brown, dry, very dense; occasional debris (plastic string).
								PARALIC DEPOSITS: @ ½' SANDSTONE, dark gray/reddish brown, dry, very dense; numerous rounded red pebbles.
5								Hand Auger Terminated on Refusal @ 1'
								No Groundwater or Caving Encountered
10								
15								
20								
25								
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

W.O. 6306-A-SC
St. John Garabed
Logged By: RGC
November 18, 2011

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
TP-3	56	0-1½	SM/SC				**COLLUVIUM:** SILTY SAND with CLAY, dark brown, moist, loose, porous; some organics; twine, plastic and wood debris in upper 8-12" indicate cultivation.
		1½-2½	SM				**TERRACE DEPOSITS:** SILTY SAND, brown, moist, medium dense.
		2½-4	CL/CH				CLAY, dark olive brown, moist, very stiff; randomly fractured with abundant caliche mottlings on fracture faces, caliche less abundant with depth.
		4-6	SM				SILTY SAND with CLAY, brown, moist, dense.
							Total Depth = 6' No Groundwater Encountered Backfilled 11-18-2011

PLATE B-5

PROJECT NO. 07921-42-01

BORING B 3

ELEV. (MSL.) 50 DATE COMPLETED 06-24-2008

EQUIPMENT HOLLOW STEM AUGER BY: T. REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	B3-1			SC/SM	**TOPSOIL** Loose, dry, dark brown, Clayey/Silty fine to medium SAND			
2					**TERRACE DEPOSITS** Very dense, damp, reddish brown, very Silty, fine to medium SAND with clay and charcoal flakes			
4								
	B3-2			SM		65	126.4	13.4
6								
8								
10	B3-3				-Becomes dense, dark reddish brown with less silt	47		
12								
14								
	B3-4				-Becomes very dense, reddish brown to light brown, silty and fine grained with abundant mica	75	110.5	13.0
16								
18								
20								
	B3-5			ML	-Becomes very stiff, moist, dark gray and orange, Clayey SILT with sand	39		
					Boring terminated at 21 feet No groundwater encountered Boring backfilled with 7 ft³ of bentonite			

07921-42-01.GPJ

Figure A-3,
Log of Boring B 3, Page 1 of 1

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 07921-42-01

BORING B 4

ELEV. (MSL.) 49 DATE COMPLETED 06-24-2008

EQUIPMENT HOLLOW STEM AUGER BY: T. REIST

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM/C	**TOPSOIL** Loose, dry to damp, dark brown, Silty/Clayey fine SAND with mulch			
2					**TERRACE DEPOSITS** Dense, damp, dark reddish brown, Silty fine to medium SAND with clay, charcoal flakes and mica			
4								
6	B4-1			SM		43	120.6	15.1
8								
10	B4-2				-Becomes less silty with clay and charcoal flakes are absent	46		
					Boring terminated at 11 feet No groundwater encountered			

07921-42-01.GPJ

Figure A-4,
Log of Boring B 4, Page 1 of 1

SAMPLE SYMBOLS: ... SAMPLING UNSUCCESSFUL; ... STANDARD PENETRATION TEST; ... DRIVE SAMPLE (UNDISTURBED); ... DISTURBED OR BAG SAMPLE; ... CHUNK SAMPLE; ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PLATE B-7

APPENDIX C

SEISMIC DATA

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

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 7971-A-SC

DATE: 09-03-2020

JOB NAME: PMB LLC

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 32.9705
SITE LONGITUDE: 117.2381

SEARCH RADIUS: 62.2 mi

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): S Number of Sigmas: 1.0
DISTANCE MEASURE: cdist
SCOND: 1
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
ROSE CANYON	4.2(6.8)	7.2	0.677	XI
NEWPORT-INGLEWOOD (Offshore)	17.0(27.4)	7.1	0.242	IX
CORONADO BANK	17.5(28.2)	7.6	0.323	IX
ELSINORE (JULIAN)	30.3(48.8)	7.1	0.136	VIII
ELSINORE (TEMECULA)	31.0(49.9)	6.8	0.108	VII
EARTHQUAKE VALLEY	40.8(65.7)	6.5	0.066	VI
PALOS VERDES	46.1(74.2)	7.3	0.101	VII
ELSINORE (GLEN IVY)	46.9(75.5)	6.8	0.070	VI
SAN JOAQUIN HILLS	48.7(78.4)	6.6	0.084	VII
ELSINORE (COYOTE MOUNTAIN)	50.8(81.8)	6.8	0.064	VI
SAN JACINTO-ANZA	52.9(85.2)	7.2	0.082	VII
SAN JACINTO-COYOTE CREEK	54.1(87.0)	6.6	0.053	VI
SAN JACINTO-SAN JACINTO VALLEY	56.4(90.7)	6.9	0.062	VI
NEWPORT-INGLEWOOD (L.A.Basin)	59.3(95.4)	7.1	0.067	VI
CHINO-CENTRAL AVE. (Elsinore)	61.7(99.3)	6.7	0.069	VI

****

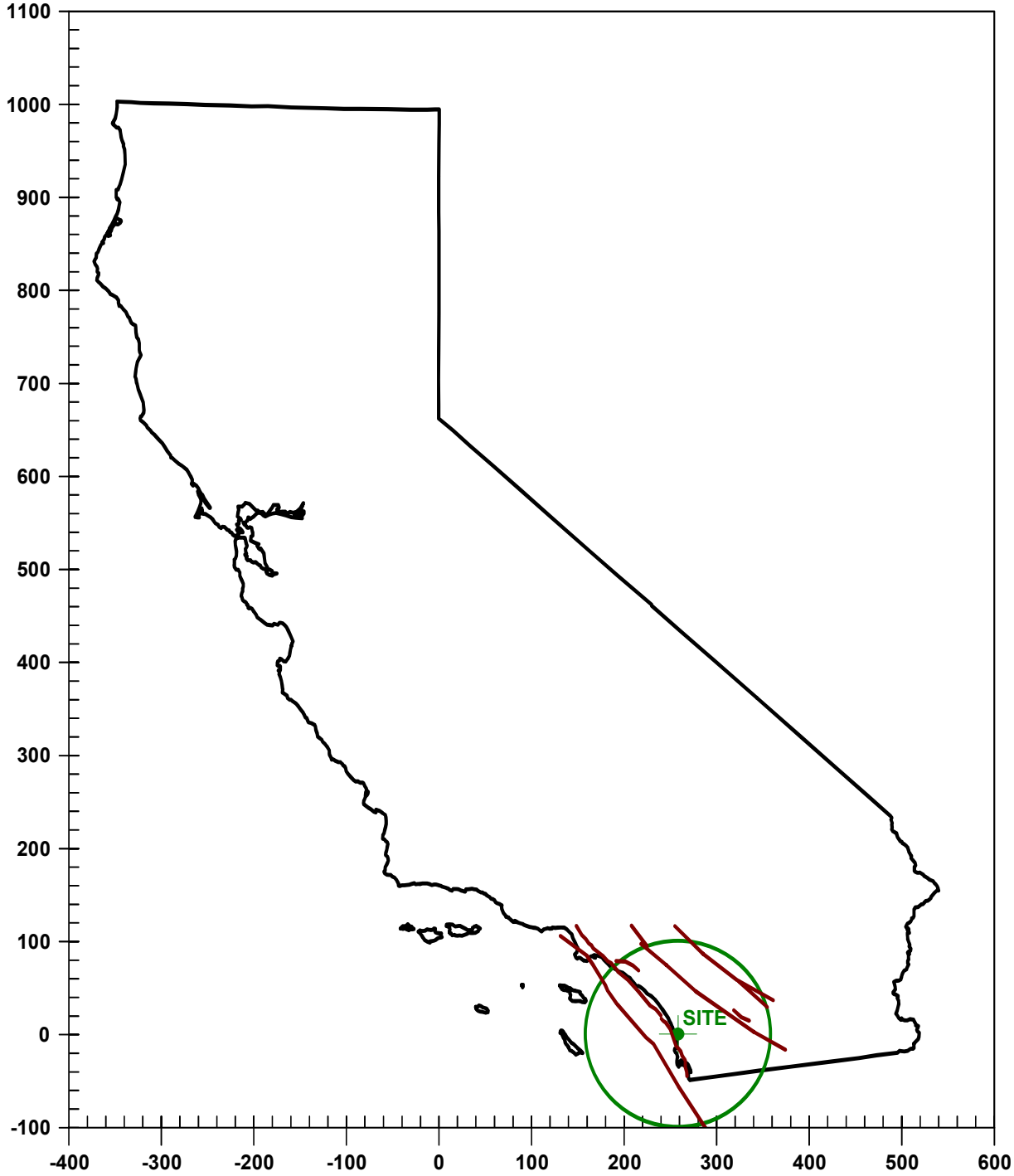
-END OF SEARCH- 15 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 4.2 MILES (6.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.6771 g

CALIFORNIA FAULT MAP

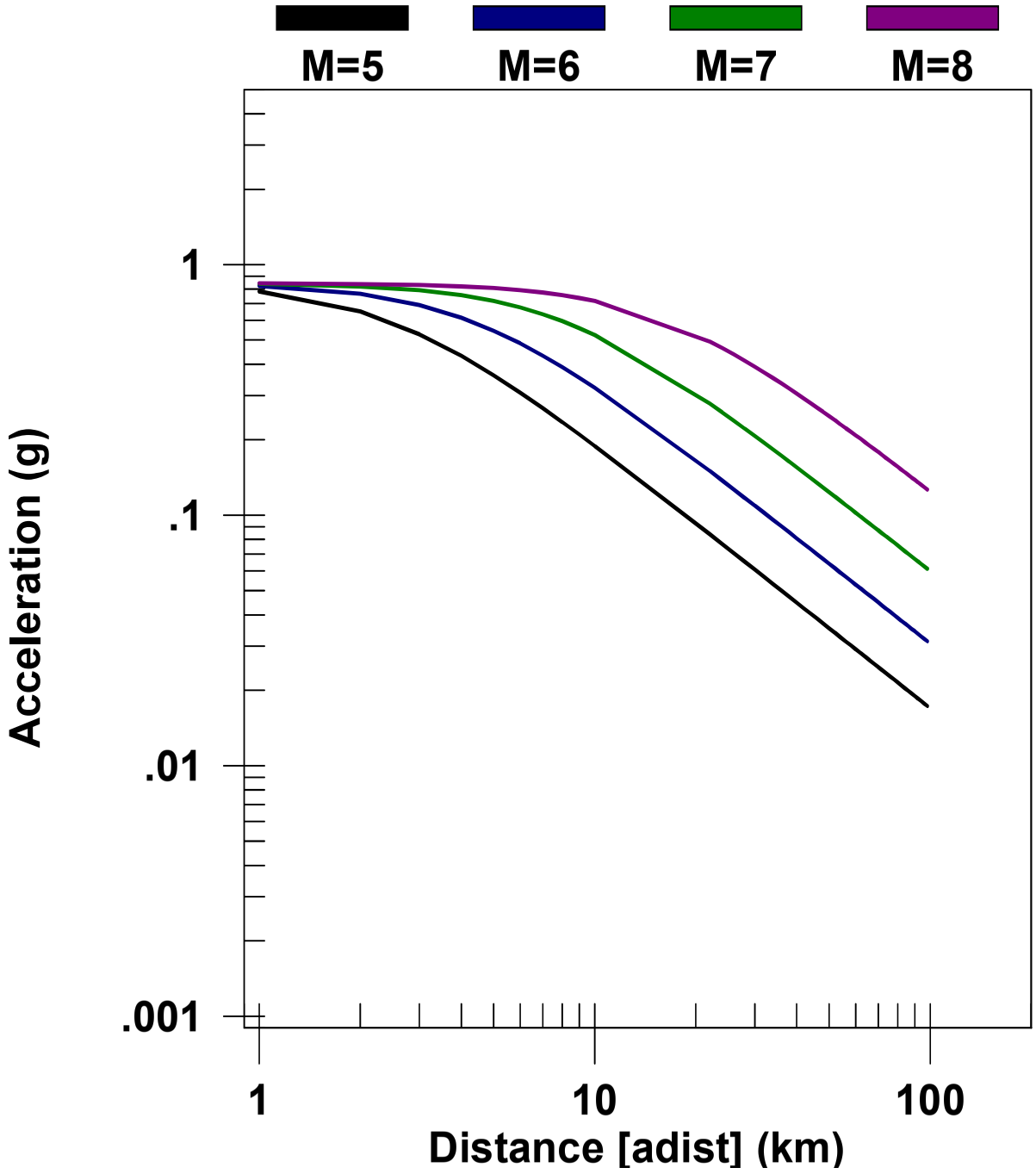
PMB LLC



W.O. 7971-A-SC
PLATE C-3

STRIKE-SLIP FAULTS

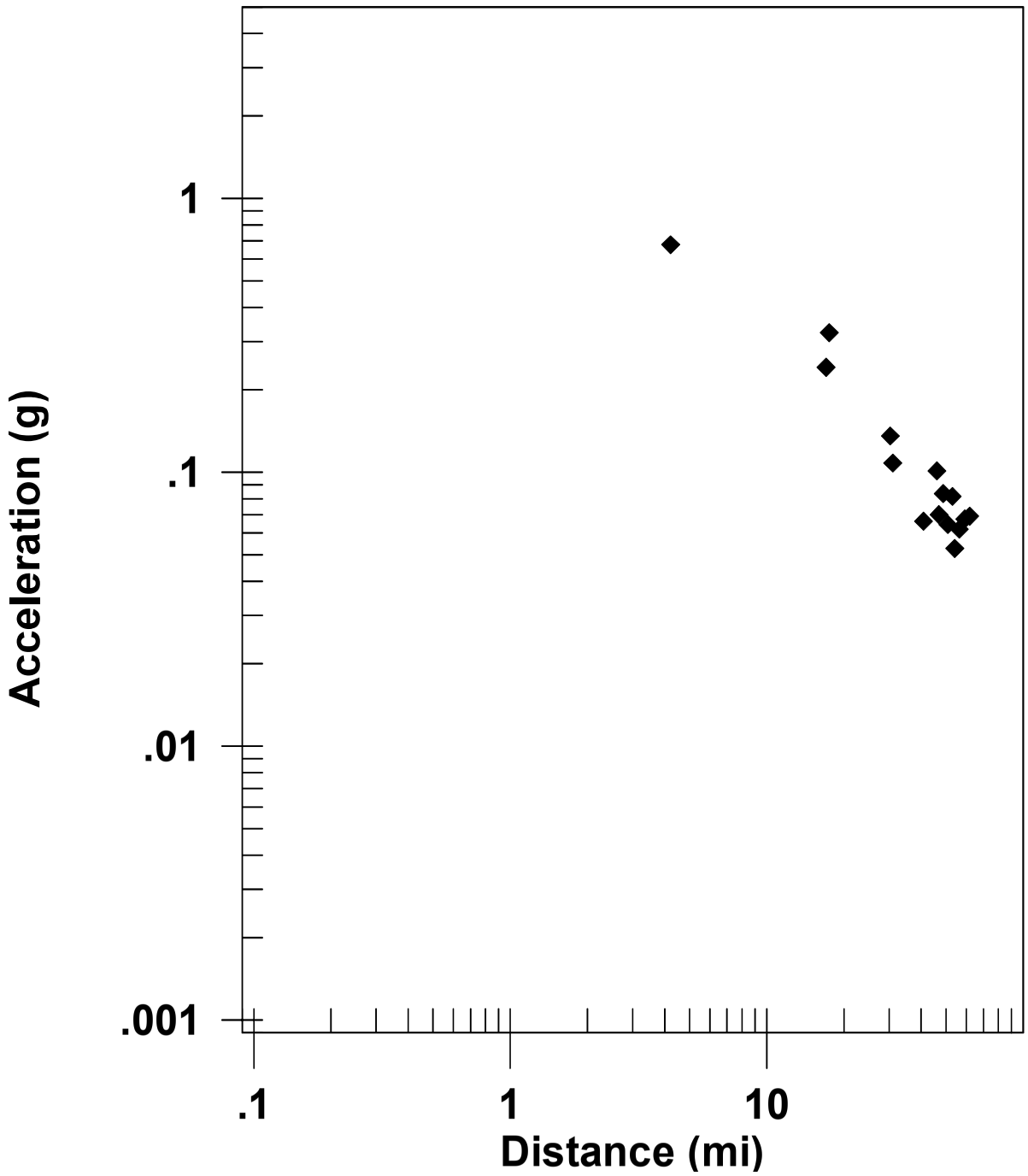
11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



W.O. 7971-A-SC
PLATE C-4

MAXIMUM EARTHQUAKES

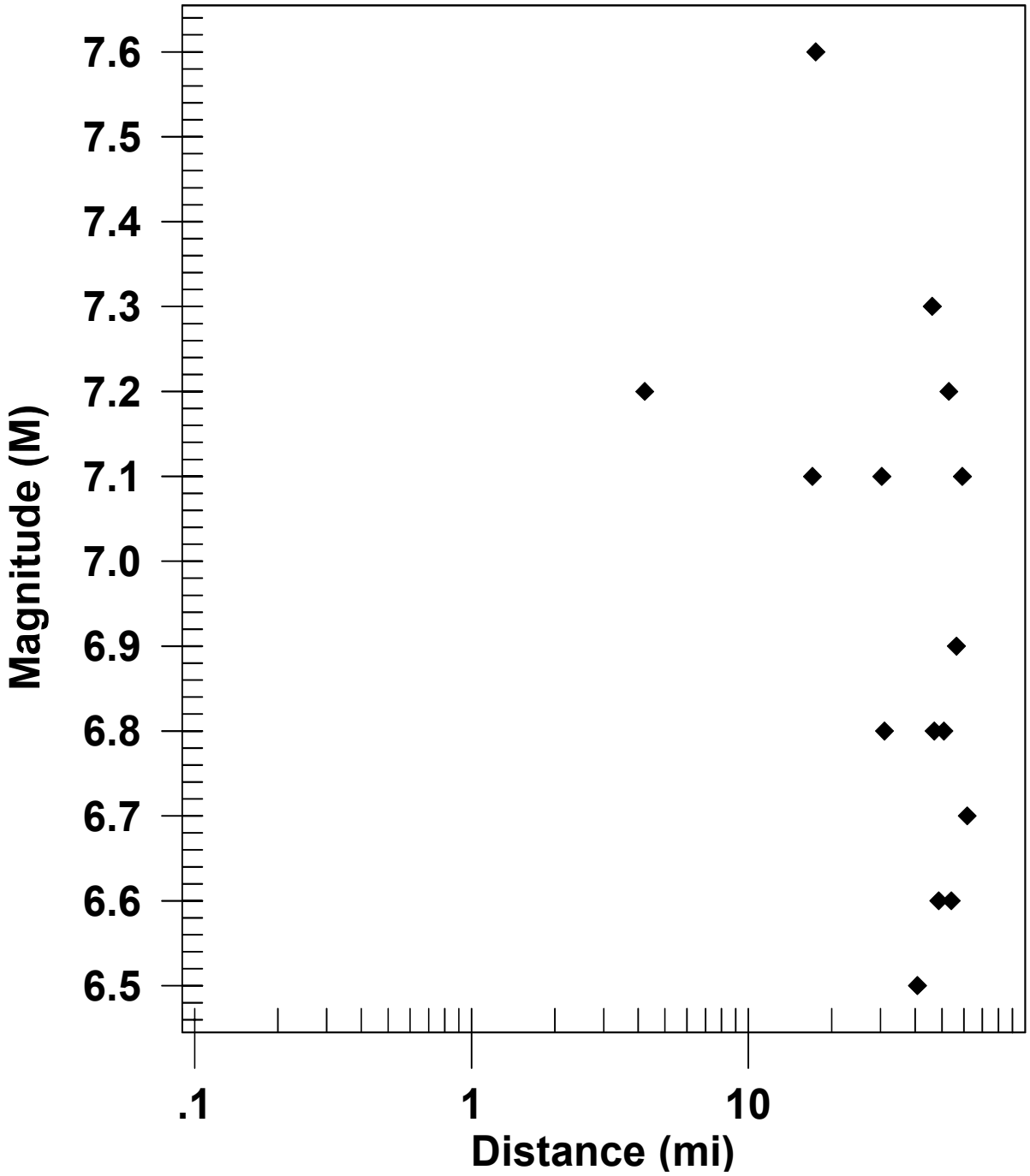
PMB LLC



W.O. 7971-A-SC
PLATE C-5

EARTHQUAKE MAGNITUDES & DISTANCES

PMB LLC



W.O. 7971-A-SC
PLATE C-6

```
**************************
*                        *
*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
**************************

      ESTIMATION OF
  PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 7971-A-SC
                                                DATE: 09-03-2020

JOB NAME: PMB LLC

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT


SITE COORDINATES:
   SITE LATITUDE:  32.9705
   SITE LONGITUDE:  117.2381

SEARCH DATES:
           START DATE:   1800
           END DATE:   1999

SEARCH RADIUS:
           62.2 mi
           100.1 km

ATTENUATION RELATION:  11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  SS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   1  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0
```

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.522	X	4.1(6.6)
MGI	33.0000	117.0000	09/21/1856	730 0.0	0.0	5.00	0.078	VII	13.9(22.4)
MGI	32.8000	117.1000	05/25/1803	0 0 0.0	0.0	5.00	0.077	VII	14.2(22.9)
DMG	32.7000	117.2000	05/27/1862	20 0 0.0	0.0	5.90	0.101	VII	18.8(30.3)
T-A	32.6700	117.1700	12/00/1856	0 0 0.0	0.0	5.00	0.052	VI	21.1(34.0)
T-A	32.6700	117.1700	10/21/1862	0 0 0.0	0.0	5.00	0.052	VI	21.1(34.0)
T-A	32.6700	117.1700	05/24/1865	0 0 0.0	0.0	5.00	0.052	VI	21.1(34.0)
DMG	32.8000	116.8000	10/23/1894	23 3 0.0	0.0	5.70	0.059	VI	28.0(45.0)
DMG	33.2000	116.7000	01/01/1920	235 0.0	0.0	5.00	0.031	V	34.9(56.2)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.035	V	36.6(58.9)
MGI	33.2000	116.6000	10/12/1920	1748 0.0	0.0	5.30	0.032	V	40.2(64.6)
DMG	33.0000	116.4330	06/04/1940	1035 8.3	0.0	5.10	0.024	V	46.7(75.1)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.021	IV	51.2(82.4)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.038	V	51.2(82.4)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.021	IV	51.2(82.4)
T-A	32.2500	117.5000	01/13/1877	20 0 0.0	0.0	5.00	0.020	IV	52.0(83.7)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.027	V	52.7(84.8)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.020	IV	54.2(87.1)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.019	IV	55.5(89.4)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.059	VI	55.5(89.4)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.025	V	55.6(89.5)
DMG	33.5000	116.5000	09/30/1916	211 0.0	0.0	5.00	0.019	IV	56.2(90.4)
DMG	32.7000	116.3000	02/24/1892	720 0.0	0.0	6.70	0.053	VI	57.5(92.6)
DMG	33.3430	116.3460	04/28/1969	232042.9	20.0	5.80	0.029	V	57.6(92.7)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.042	VI	58.9(94.8)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.020	IV	59.9(96.4)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.017	IV	61.0(98.1)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.038	V	61.3(98.7)
DMG	33.4000	116.3000	02/09/1890	12 6 0.0	0.0	6.30	0.038	V	61.8(99.4)
DMG	33.2000	116.2000	05/28/1892	1115 0.0	0.0	6.30	0.037	V	62.1(99.9)

****

-END OF SEARCH- 30 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 1999

LENGTH OF SEARCH TIME: 200 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 4.1 MILES (6.6 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 6.8

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.522 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 0.500
b-value= 0.302
beta-value= 0.696

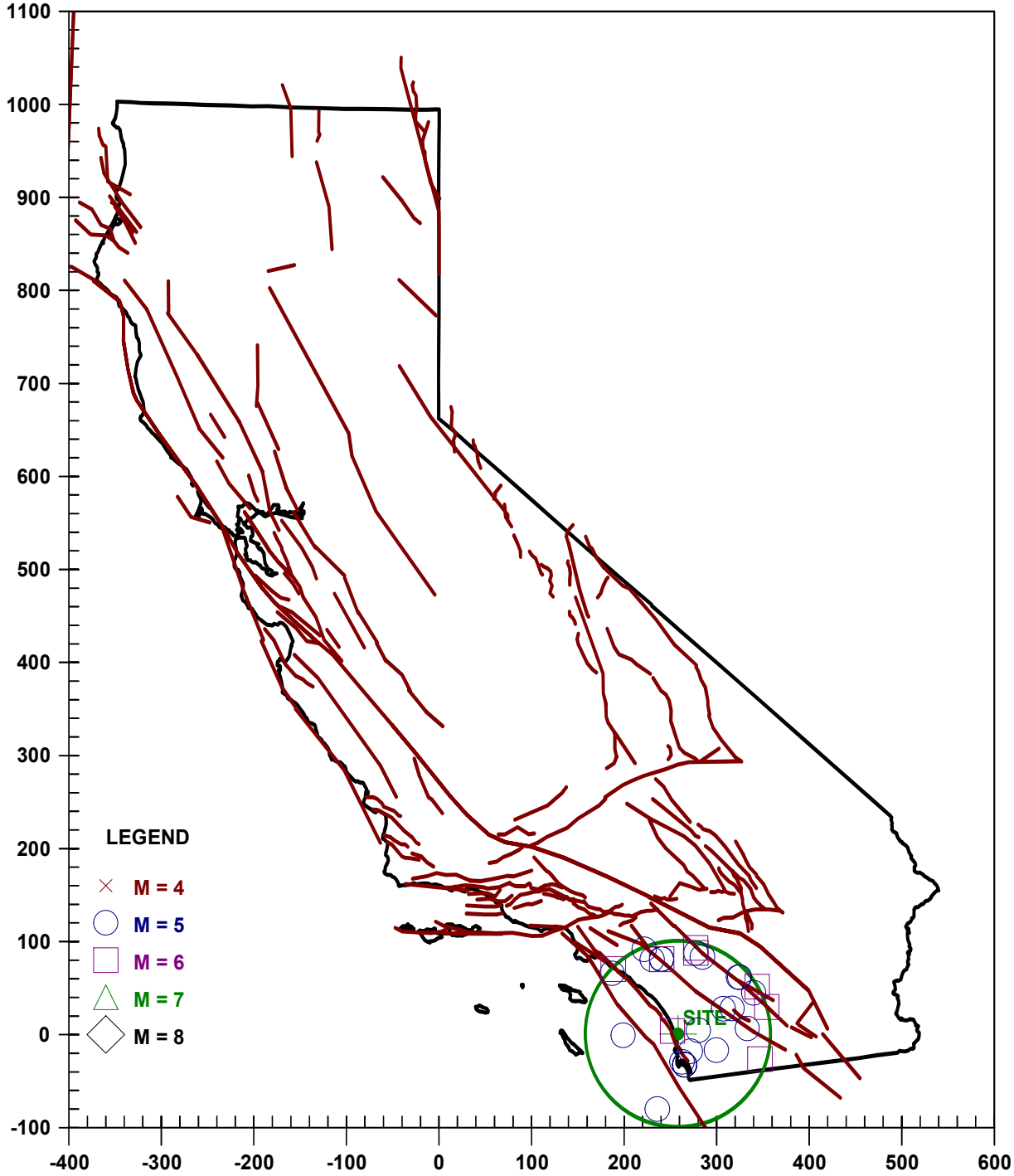
Page 2

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	30	0.15075
4.5	30	0.15075
5.0	30	0.15075
5.5	13	0.06533
6.0	8	0.04020
6.5	3	0.01508

EARTHQUAKE EPICENTER MAP

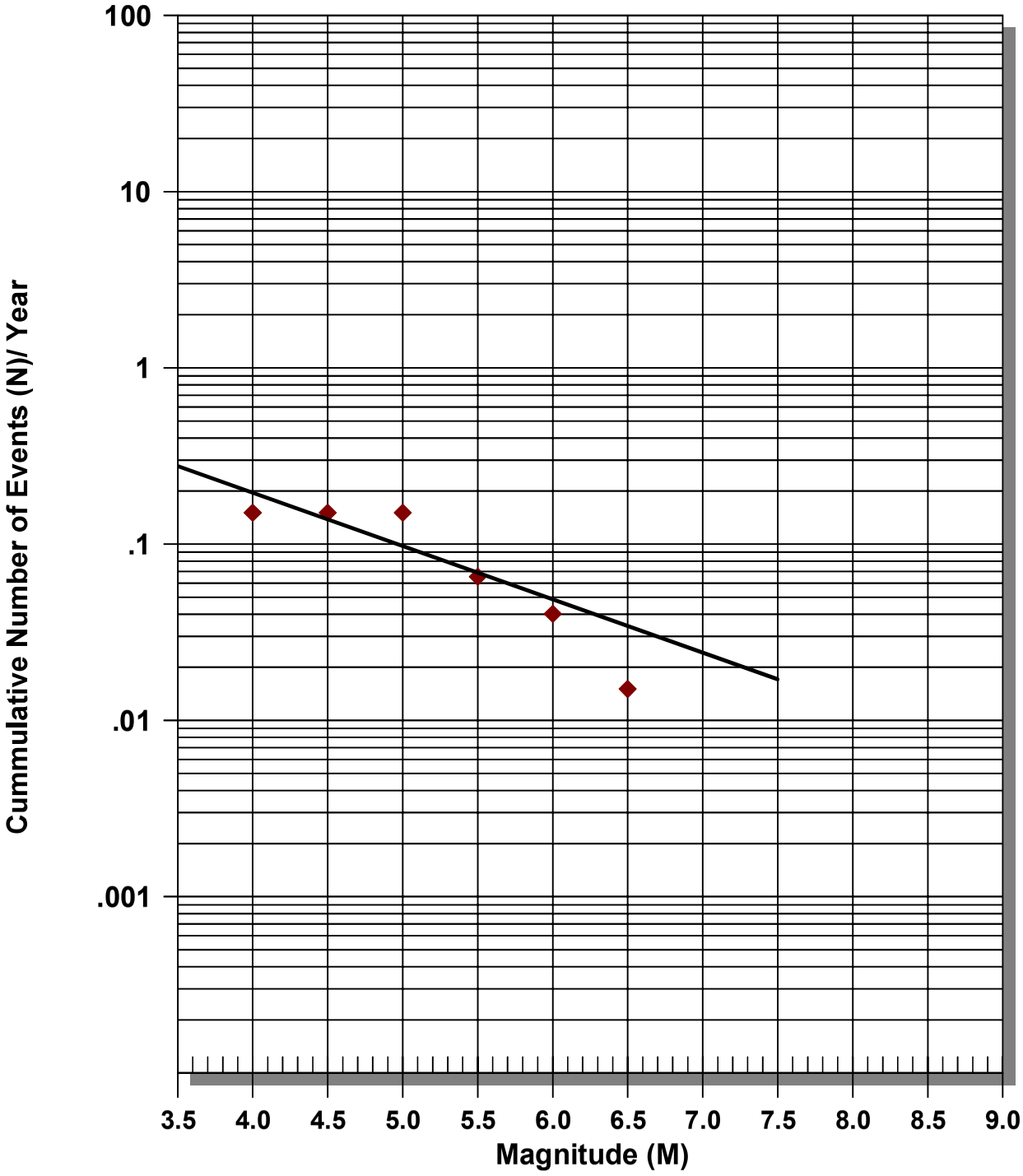
PMB LLC



W.O. 7971-A-SC
PLATE C-10

EARTHQUAKE RECURRENCE CURVE

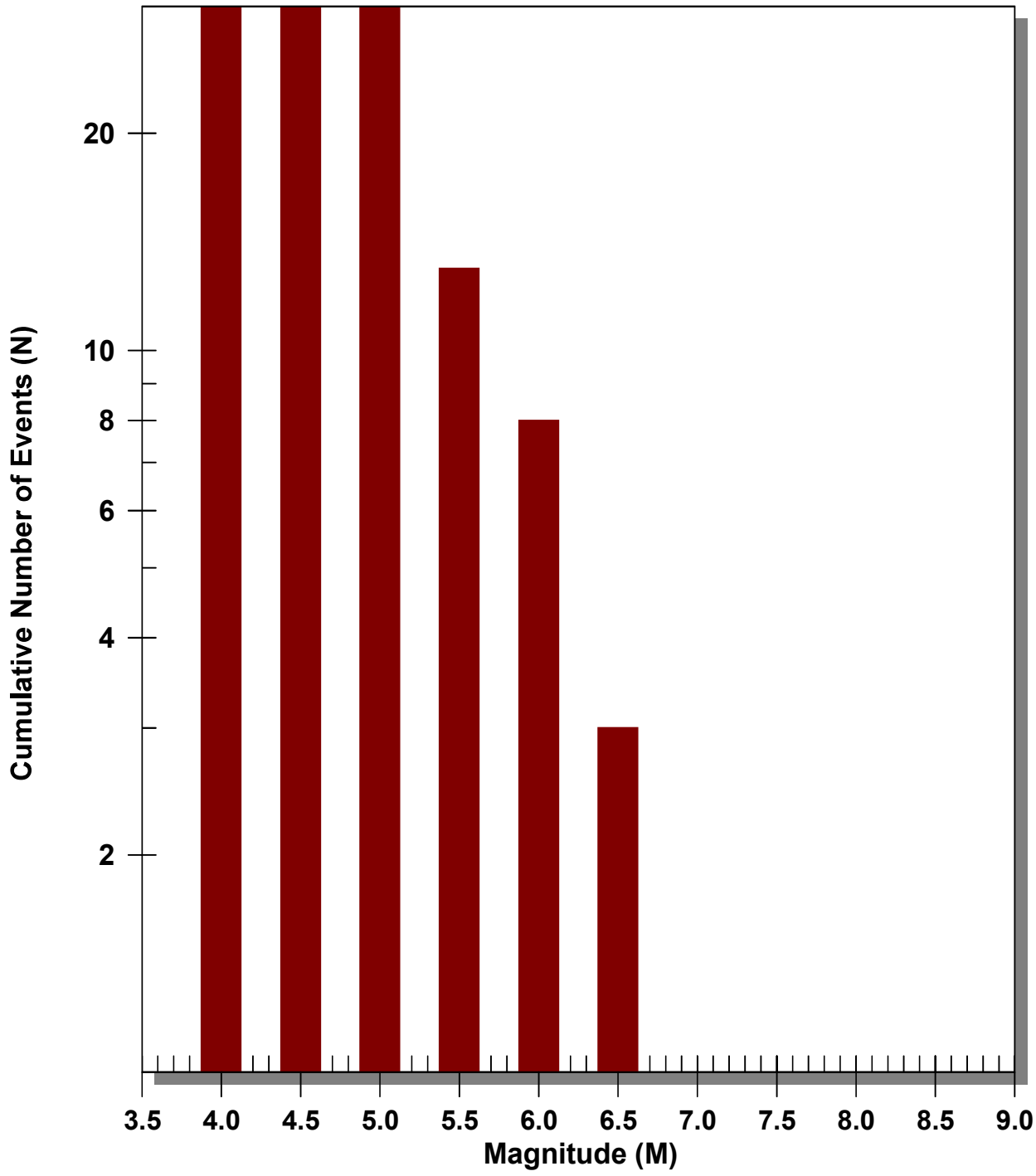
PMB LLC



W.O. 7971-A-SC
PLATE C-11

Number of Earthquakes (N) Above Magnitude (M)

PMB LLC



W.O. 7971-A-SC
PLATE C-12

APPENDIX D

INFILTRATION FEASIBILITY WORKSHEET C.4-1
PER CITY (2018)

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		**Project Phase:**
Location/limts of DMA undefined		Design Phase
Criteria 1: Infiltration Rate Screening		
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☐ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☒ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).	
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☒ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.	
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☒ No; full infiltration is not required. Answer "No" to Criteria 1 Result.	
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.	

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

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

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions	Worksheet C.4-1:Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
1F	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result. Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.	
Site specific infiltration testing was performed on an immediately adjacent site, see GSI (2017) and yielded an average infiltration rate of 0.28 inches per hour.	

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐Yes	☐No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐Yes	☐No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐Yes	☐No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation**. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐Yes	☐No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
2B-3	**Liquefaction.** If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐Yes	☐No
2B-4	**Slope Stability.** If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐Yes	☐No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐Yes	☐No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐Yes	☐No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐Yes	☐No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result - Full Infiltration Geotechnical Screening[12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full Infiltration Condition ☒ Complete Part 2

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

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions	Worksheet C.4-1:Form I-8A[10]
Part 2 - Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	**Project Phase:**
Location/limits of DMA undefined	Design Phase

Criteria 3: Infiltration Rate Screening	
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).	

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐Yes	☐No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐Yes	☐No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐Yes	☐No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation**. Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐Yes	☐No
4B-2	**Expansive Soils**. Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
4B-3	**Liquefaction.** If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐Yes	☐No
4B-4	**Slope Stability.** If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐Yes	☐No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐Yes	☐No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐Yes	☐No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐Yes	☐No

Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions		Worksheet C.4-1:Form I-8A[10]	
Criteria 4 result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐Yes	☐No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 2 Result - Partial Infiltration Geotechnical Screening[13]	Result
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

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

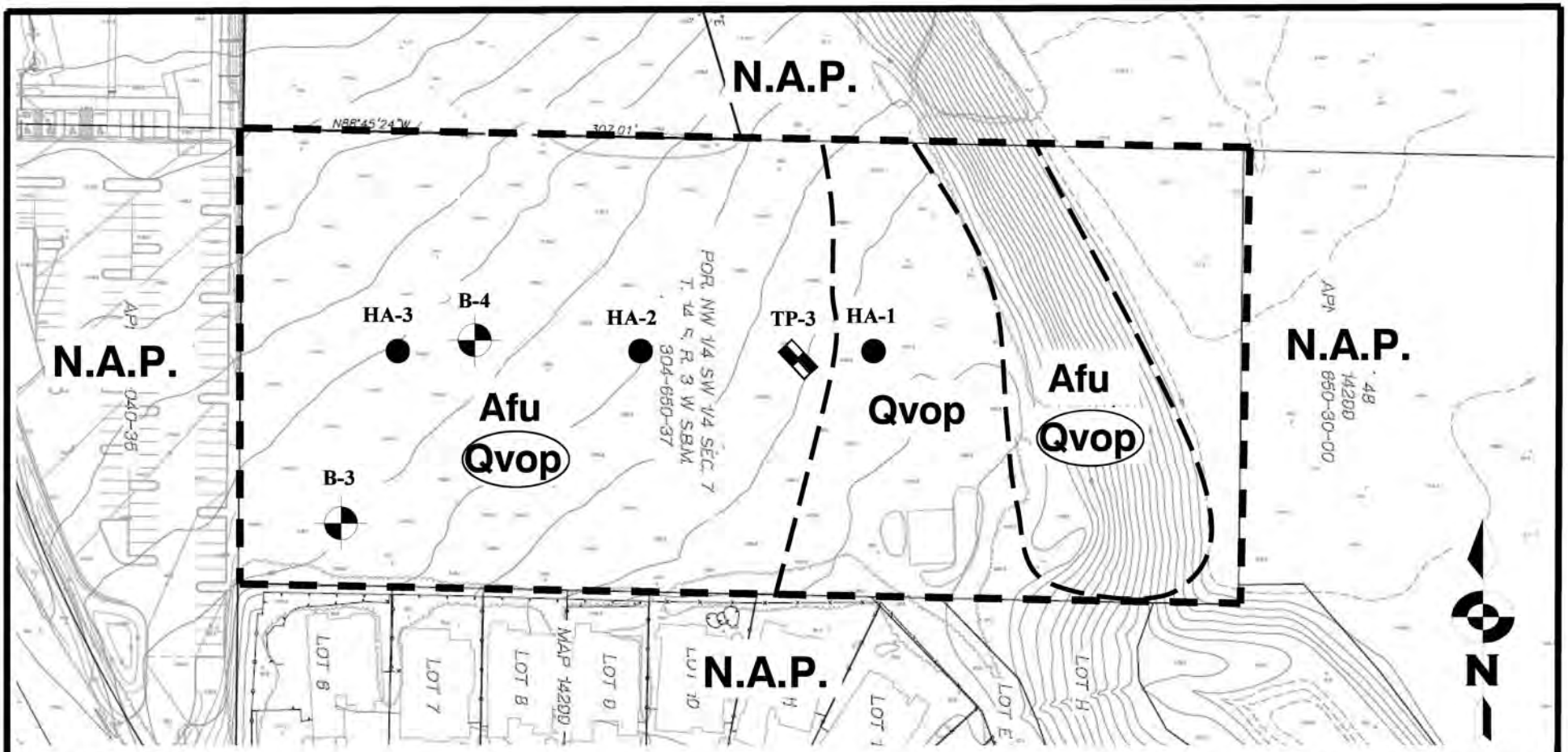


Figure Adapted from Sheet 4 of Leppart Engineering, 2011

GSI LEGEND

Afu	Artificial Fill (Uncontrolled)
Qvop	Quaternary Very Old Paralic Deposits (Bedrock), Circled Where Buried
	Approximate Location of Geologic Contact
B-4	Approximate Location of Exploratory Boring By Geocon (2008)
TP-3	Approximate Location of Test Pit By GSI (2011)
HA-3	Approximate Location of Hand Auger Boring (This Study)
	Area Under The Purview Of This Report
N.A.P.	Not A Part Of This Study

50 0 50 100

GeoSoils, Inc.

PLATE 1

GEOTECHNICAL MAP

W.O. 7971-A-SC	DATE: 9/20	SEE BAR SCALE