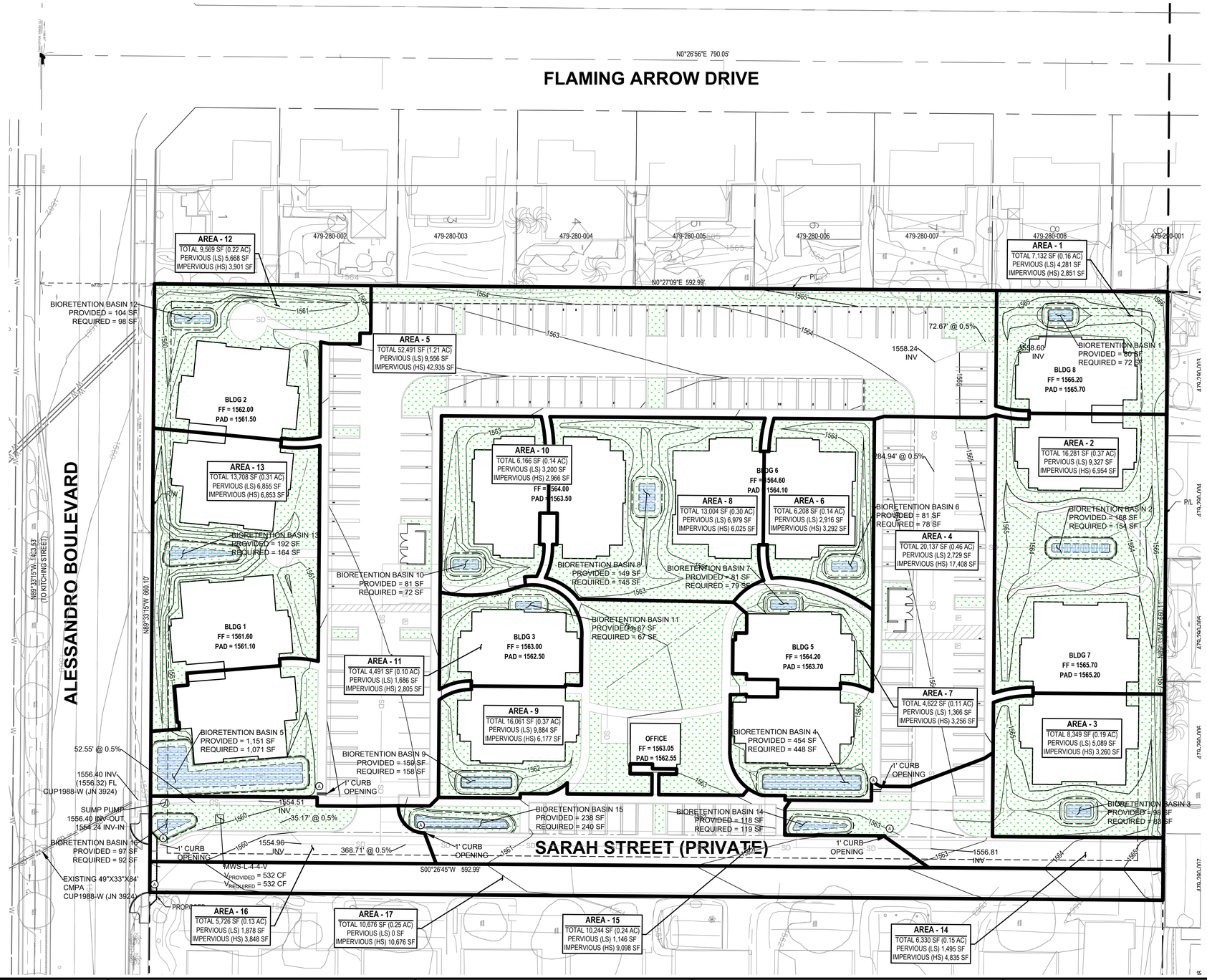
APPENDIX G1

PRELIMINARY WATER QUALITY MANAGEMENT PLAN

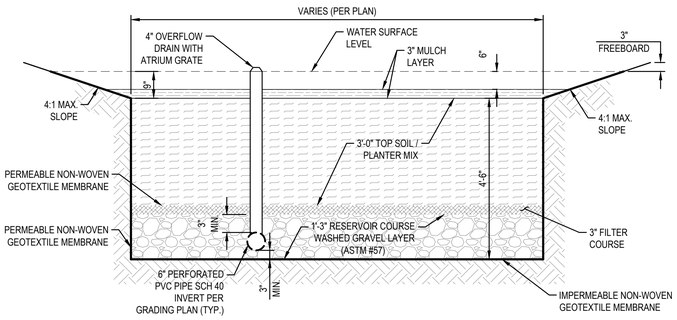
PRELIMINARY WQMP SITE PLAN
VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553



LEGEND:

SOURCE CONTROL	
1	ON-SITE STORM DRAIN INLETS
2	INDOOR & STRUCTURAL PEST CONTROL
3	LANDSCAPE/OUTDOOR PESTICIDE USE
4	REFUSE AREAS

- PROPOSED PERVIOUS AREA
- PROPOSED IMPERVIOUS AREA
- PROPOSED BIORETENTION BASIN
- DRAINAGE BOUNDARY
- (A) STENCIL "NO DUMPING" SIGN



BIORETENTION BASIN TYPICAL SECTION
SCALE: 1" = 2'-0"

DMA	BMP TYPE	$A_{REQUIRED}$ (SF)	$A_{PROVIDED}$ (SF)
AREA - 1	BIORETENTION BASIN	72	80
AREA - 2	BIORETENTION BASIN	154	168
AREA - 3	BIORETENTION BASIN	83	98
AREA - 4	BIORETENTION BASIN	448	453
AREA - 5	BIORETENTION BASIN	1071	1151
AREA - 6	BIORETENTION BASIN	78	81
AREA - 7	BIORETENTION BASIN	79	81
AREA - 8	BIORETENTION BASIN	145	149
AREA - 9	BIORETENTION BASIN	158	159
AREA - 10	BIORETENTION BASIN	72	81
AREA - 11	BIORETENTION BASIN	67	67
AREA - 12	BIORETENTION BASIN	98	104
AREA - 13	BIORETENTION BASIN	164	192
AREA - 14	BIORETENTION BASIN	119	118
AREA - 15	BIORETENTION BASIN	240	238
AREA - 16	BIORETENTION BASIN	92	97
TOTAL		3140	3317

DMA	BMP TYPE	$V_{REQUIRED}$ (CF)	$V_{PROVIDED}$ (CF)
AREA - 17	MODULAR WETLAND SYSTEM	532	532

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A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCHMARK
DESCRIPTION:
485FT SOUTH OF C/L ALESSANDRO BLVD., 48FT EAST OF C/L PERRIS BLVD., 34FT NORTH OF ECR TO STRIP MALL, 76FT SOUTH OF BCR TO WALLGREENS. 1FT EAST OF SIDEWALK, SET 3" BRASS DISK IN CONC. FLUSH WITH SIDEWALK STAMPED LS 8136, M-79 RESET 2009.
ELEVATION 1563.092 FEET (NGVD 29).

BASIS OF BEARINGS
THE CENTERLINE OF ALESSANDRO BOULEVARD SHOWN AS N 89° 33' 15" W, ON TRACT MAP NO. 10056, AS FILED IN BOOK 102, PAGES 67 THROUGH 73 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, WAS USED AS THE BASIS OF BEARINGS.

REGISTERED PROFESSIONAL ENGINEER — MAHTR WABER — No. C69050 Exp. 6/30/22 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
19210 S. VERMONT AVE., SUITE 115, GARDENA, CA 90248
P (424) 344-2464 F (562) 372-5282

PRELIMINARY WQMP SITE PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/18/2022
SHEET 4 OF 5 SHEETS

W:\21-036 VICTORY GARDENS PROJECT\DWG\21036PTB.dwg Oct 18, 2022 - 9:54am

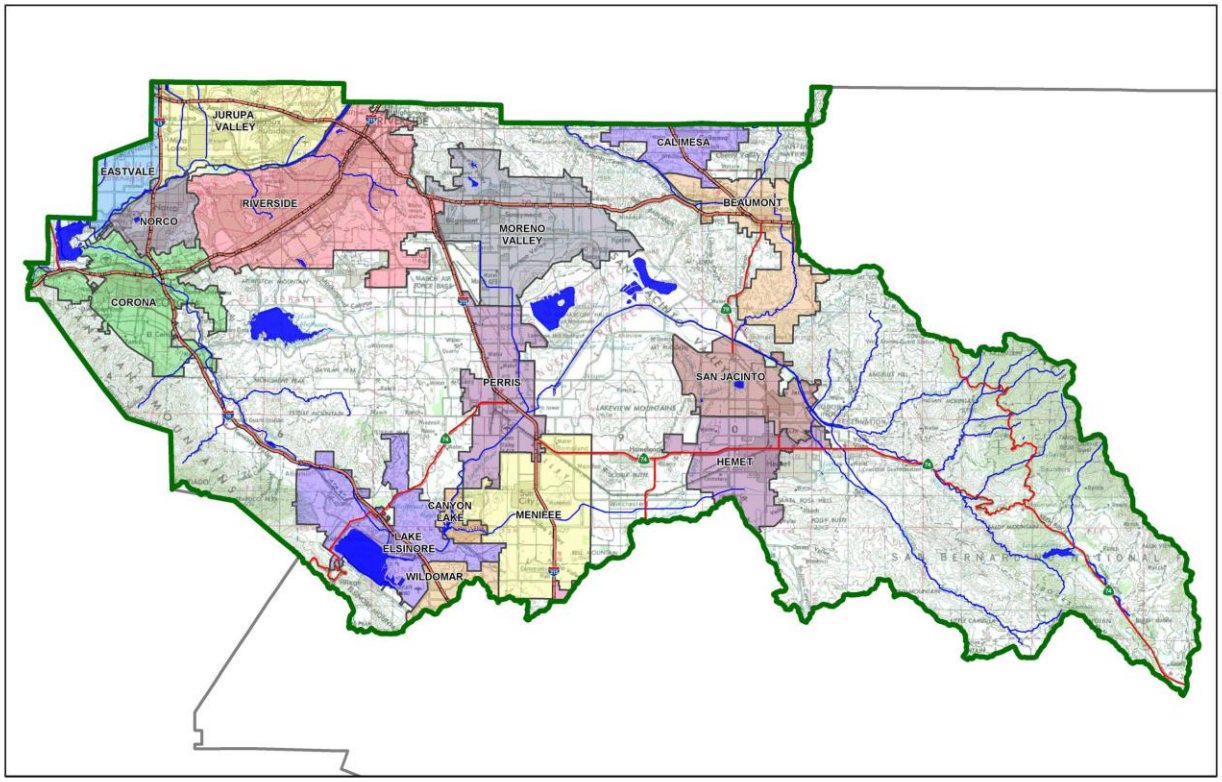
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Valley Gardens

Development No: 13989 Moreno Rose Place, Moreno Valley, CA 92553

Design Review/Case No: LWQ21-0055



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 09/24/2021

Revision Date(s): 10/21/2022

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

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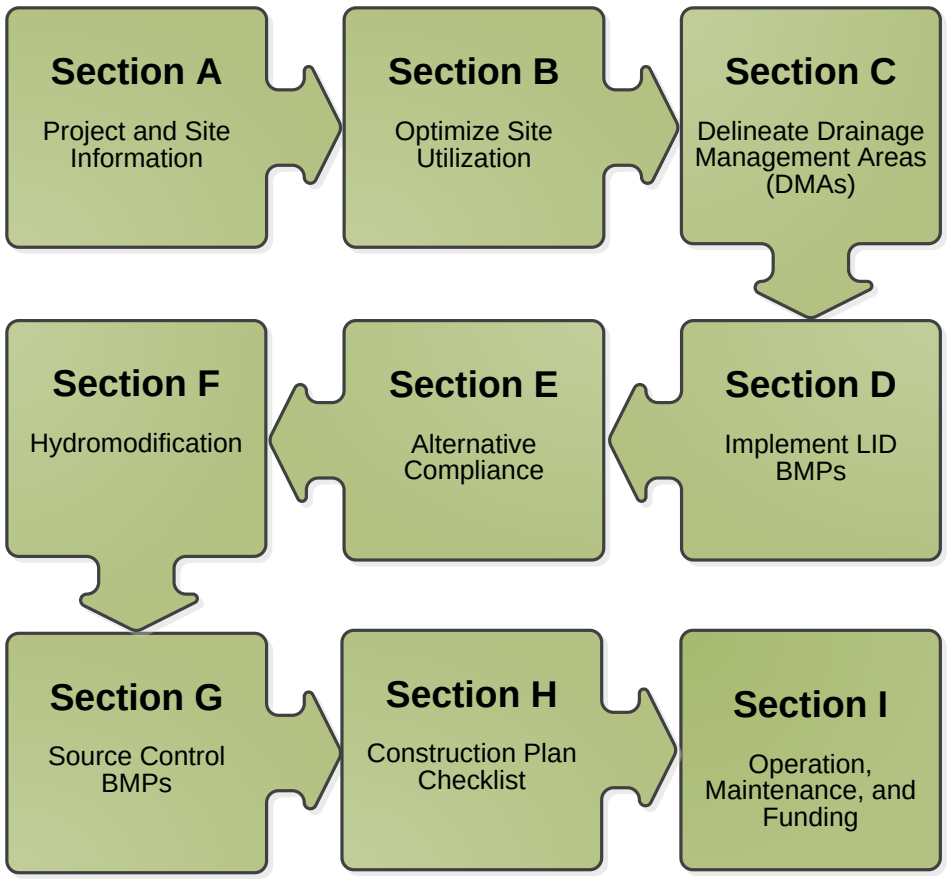
A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand and will help facilitate a well-prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Moreno Valley Garden, LLC by Waber Consultants, Inc. for the Valley Gardens project.

This WQMP is intended to comply with the requirements of City of Moreno Valley for Ordinance No. 827 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Moreno Valley Water Quality Ordinance (Municipal Code Chapter 8.10).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Mahir Waber	10/21/2022
Preparer's Signature	Date
Mahir Waber P.E., QSD	Principal
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	New Development Projects, Parking Lots
Planning Area:	Valley Gardens
Community Name:	Valley Gardens
Development Name:	Valley Gardens

PROJECT LOCATION

Latitude & Longitude (DMS): 33.918, -117.221

Project Watershed and Sub-Watershed: Santa Ana Watershed

Gross Acres: 4.85 AC

APN(s): 479-220-024

Map Book and Page No.: Book 102, Page 67-73

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	New Development Projects, Parking Lots
Proposed or Potential SIC Code(s)	6513
Area of Impervious Project Footprint (SF)	137,140
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	137,140
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N

Proposed Conditions:

The proposed project will include 8 residential apartment buildings with one office. Other improvements will include asphalt and concrete driveways, hardscape and landscaping. The site is proposing 7 bioretention basins for 7 DMAs in the landscape areas in the prosed site. Calculations are provided.

EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	21,447
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	-
What is the Water Quality Design Storm Depth for the project?	0.67

Existing Conditions:

The subject property is located along the north side of Alessandro Boulevard, east of Flaming Arrow Drive, in the City of Moreno Valley. The generally rectangular shaped parcel is elongated in a north to south direction. The site is relatively level with topography descending gradually from north to south on the order of a few feet. The site is currently vacant and covered in light vegetation.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Santa Ana River, Reach 3	Copper, Lead, Pathogens	N/A	N/A
Santa Ana River, Reach 2	Indicator Bacteria	N/A	N/A
Santa Ana River, Reach 1	Fecal Coliform	Secondary Contact, Swimming	40 mile
Pacific Ocean			

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* Grading and building permits from City of Moreno Valley	☒ Y	☐ N

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Yes, the proposed site will preserve existing site drainage patterns. The proposed drainage pattern for the site is in a southeasternly direction matching the existing drainage pattern.

Did you identify and protect existing vegetation? If so, how? If not, why?

No, there are no significant trees and other natural vegetation needed to be preserved. The site is barren.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Yes, even though the infiltration rate at the depths tested indicate stiff/dense soils which are not suitable for storm water infiltration, infiltration for the proposed landscape areas will be persevered. Landscape areas will not be compacted.

Did you identify and minimize impervious area? If so, how? If not, why?

Yes, the site has been designed with the idea of minimizing impervious areas. The site is designed with landscaping provided along the north, west and south boundaries and along the building and parking space areas which totally contribute to 32.5% of the total site area compared to typical new developments which have a pervious area of around 10%

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Yes, runoff is designed to drain into landscape areas and into the bioretention facilities.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[12]	Area (Sq. Ft.)	DMA Type
Area – 1 Bioretention Basin #1	Concrete or Asphalt, Ornamental Landscaping	7,132	D
Area – 2 Bioretention Basin #2	Concrete or Asphalt, Ornamental Landscaping	16,281	D
Area – 3 Bioretention Basin #3	Concrete or Asphalt, Ornamental Landscaping	8,349	D
Area – 4 Bioretention Basin #4	Concrete or Asphalt, Ornamental Landscaping	20,137	D
Area – 5 Bioretention Basin #5	Concrete or Asphalt, Ornamental Landscaping	52,491	D
Area – 6 Bioretention Basin #6	Concrete or Asphalt, Ornamental Landscaping	6,208	D
Area – 7 Bioretention Basin #7	Concrete or Asphalt, Ornamental Landscaping	4,622	D
Area – 8 Bioretention Basin #8	Concrete or Asphalt, Ornamental Landscaping	13,004	D
Area – 9 Bioretention Basin #9	Concrete or Asphalt, Ornamental Landscaping	16,061	D
Area – 10 Bioretention Basin #10	Concrete or Asphalt, Ornamental Landscaping	6,166	D
Area – 11 Bioretention Basin #11	Concrete or Asphalt, Ornamental Landscaping	4,491	D
Area – 12 Bioretention Basin #12	Concrete or Asphalt, Ornamental Landscaping	9,569	D
Area – 13	Concrete or Asphalt,	13,708	D

Bioretention Basin #13	Ornamental Landscaping		
Area – 14 Bioretention Basin #14	Concrete or Asphalt, Ornamental Landscaping	6,330	D
Area – 15 Bioretention Basin #15	Concrete or Asphalt, Ornamental Landscaping	10,244	D
Area – 16 Bioretention Basin #16	Concrete or Asphalt, Ornamental Landscaping	5,726	D
Area – 17 Modular Wetland System	Concrete or Asphalt, Ornamental	10,676	D

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2]*If multi-surface provide back-up*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA	**Receiving Self-Retaining DMA**

DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
Area – 1	Bioretention Basin #1
Area – 2	Bioretention Basin #2
Area – 3	Bioretention Basin #3
Area – 4	Bioretention Basin #4
Area – 5	Bioretention Basin #5
Area – 6	Bioretention Basin #6
Area – 7	Bioretention Basin #7
Area – 8	Bioretention Basin #8
Area – 9	Bioretention Basin #9
Area – 10	Bioretention Basin #10
Area – 11	Bioretention Basin #11
Area – 12	Bioretention Basin #12
Area – 13	Bioretention Basin #13
Area – 14	Bioretention Basin #14
Area – 15	Bioretention Basin #15
Area – 16	Bioretention Basin #16
Area – 17	Modular Wetland System

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Co-Permittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: Areas 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17.		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 1.71 AC

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 3.27 AC

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.05

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 3.43 AC

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
3.43 AC	1.58 AC

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shutdowns or other lapses in occupancy:

Projected Number of Daily Toilet Users: 128

Project Type: Residential

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 3.27 AC

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 108

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 353

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
353	128

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shutdowns or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: N/A

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Co-permittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
Area - 1	☐	☐	☒	☐	☐
Area - 2	☐	☐	☒	☐	☐
Area - 3	☐	☐	☒	☐	☐
Area - 4	☐	☐	☒	☐	☐
Area –5	☐	☐	☒	☐	☐
Area –6	☐	☐	☒	☐	☐
Area - 7	☐	☐	☒	☐	☐
Area - 8	☐	☐	☒	☐	☐
Area - 9	☐	☐	☒	☐	☐
Area – 10	☐	☐	☒	☐	☐
Area – 11	☐	☐	☒	☐	☐
Area –12	☐	☐	☒	☐	☐
Area –13	☐	☐	☒	☐	☐
Area - 14	☐	☐	☒	☐	☐
Area –15	☐	☐	☒	☐	☐
Area - 16	☐	☐	☒	☐	☐
Area - 16	☐	☐	☐	☒	☐

The proposed site will include 8, 2-storey residential buildings. According to the Riverside County Guidance Document Section 2.4.5, LID Infiltration BMPs are not to be used when infiltration rate for the site is less than 1.6 inches per hour. The infiltration rate measured was 0.20 inch per hour. Therefore, infiltration is not feasible at the site.

The available irrigated landscape has been measured to be 1.71 acres which is below the minimum required irrigated area which is determined to be 3.30 acres. Therefore, Harvest and Use is not feasible.

Bioretention basins with underdrains are provided as BMPs for all the DMAs. WQMP site plan provides locations and sizing of each bioretention BMP in each DMA.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Co-Permittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Co-Permittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA - 1 Bioretention Basin #1	*7,132*	*Mixed Surface Types*	*0.46*	*0.31*	*2,243.1*	*0.67*	*125.2*	*140*
Total	7,132				2,243.1		125.2	140

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 2 Bioretention Basin #2	*16,281*	*Mixed Surface Types*	*0.427*	*0.30*	*4,804.2*	*0.67*	*268.2*	*294*
Total	16,281				4,804.2		268.2	294

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA - 3 Bioretention Basin #3	*8,349*	*Mixed Surface Types*	*0.451*	*0.31*	*2,580.9*	*0.67*	*144.1*	*171.5*
Total	8,349				2,580.9		144.1	171.5

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 4 Bioretention Basin #4	*20,137*	*Mixed Surface Types*	*0.878*	*0.70*	*14,075 .9*	*0.67*	*785.9*	*799*
Total	20,137				14,075. 9		785.9	799

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 5 Bioretention Basin #5	*52,491*	*Mixed Surface Types*	*0.836*	*0.64*	*33,764*	*0.67*	*1,885.2*	*2,025*
Total	52,491				33,764		1,885.2	2,025

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 6 Bioretention Basin #6	*6,208*	*Mixed Surface Types*	*0.577*	*0.39*	*2,431.9*	*0.67*	*135.8*	*141.75*
Total	6,208				2,431.9		135.8	141.75

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 7 Bioretention Basin #7	*4,622*	*Mixed Surface Types*	*0.734*	*0.53*	*2,436.6*	*0.67*	*136*	*141*
Total	4,622				2,436.6		136	141

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 8 Bioretention Basin #8	*13,004*	*Mixed Surface Types*	*0.517*	*0.35*	*4,554.5*	*0.67*	*254.3*	*262*
Total	13,004				4,554.5		254.3	262

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 9 Bioretention Basin #9	*16,061*	*Mixed Surface Types*	*0.446*	*0.31*	*4,917.4*	*0.67*	*274.6*	*278*
Total	16,061				4,917.4		274.6	278

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 10 Bioretention Basin #10	*6,166*	*Mixed Surface Types*	*0.533*	*0.36*	*2,225.1*	*0.67*	*124.2*	*141.75*
Total	6,166				2,225.1		124.2	141.75

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 11 Bioretention Basin #11	*4,491*	*Mixed Surface Types*	*0.662*	*0.46*	*2,063.5*	*0.67*	*115.2*	*115.3*
Total	4,491				2,063.5		115.2	115.3

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 12 Bioretention Basin #12	*9,569*	*Mixed Surface Types*	*0.467*	*0.32*	*3,050*	*0.67*	*170.3*	*182*
Total	9,569				3,050		170.3	182

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 13 Bioretention Basin #13	*13,708*	*Mixed Surface Types*	*0.55*	*0.37*	*5,106.2*	*0.67*	*285.1*	*336*
Total	13,708				5,106.2		285.1	336

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 14 Bioretention Basin #14	*6,330*	*Mixed Surface Types*	*0.787*	*0.58*	*3,698.3*	*0.67*	*206.5*	*206.5*
Total	6,330				3,698.3		206.5	206.5

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 15 Bioretention Basin #15	*10,244*	*Mixed Surface Types*	*0.899*	*0.73*	*7,466.1*	*0.67*	*416.9*	*414*
Total	10,244				7,466.1		416.9	414

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 16 Bioretention Basin #16	*5,726*	*Mixed Surface Types*	*0.705*	*0.50*	*2,855.2*	*0.67*	*159.4*	*169*
Total	5,726				2,855.2		159.4	169

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
	[A]		[B]	[C]	[A] x [C]			
AREA – 17 Modular Wetland System	*10,676*	*Concrete or Asphalt*	*1*	*0.89*	*9,523*	*0.67*	*531.7*	*532*
Total	10,676				9,523		531.7	532

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

$$V_{BMP}(ft^3) = \frac{[A] \times [B]}{12\ (in/ft)}$$

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Co-Permittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☒ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☒	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Higher density development	5%
Total Credit Percentage[1]	5%

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Co-Permittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	-	-	-
Volume (Cubic Feet)	-	-	-

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

The proposed site will eventually channel to Canyon Lake. According to the Riverside County - Santa Ana Region Watershed Action Plan Appendix A – Map 1, the site will drain to adequate sumps that are engineered and regularly maintained. The project will limit the disturbance of natural waterbodies and drainage systems and conserve natural areas to maintain the biological integrity of natural waterbodies and drainage systems. Permanent measures will also be provided to reduce the pollutant loads from the development site.

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Storm drain inlets	Permanent controls – Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch basin Markers may be available from the Riverside County Flood Control and Water Conservative District, call 951.955.1200 to verify.	Maintain and periodically repaint or replace inlet markings. See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance", in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Future indoor and structural pest control	Note building design features that discourage entry of pests.	Provide Integrated Pest Management information to owners, lessees, and operators.
Trash Storage Areas	Permanent Control – State that signs will be provided on or near dumpsters with the words "Do	Provide adequate number of receptacles. Inspect receptacles regularly, repair or replace leaky receptacles. Keep receptacles

	not dump hazardous materials here" or similar	covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Plazas, Sidewalks and Parking Lots		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Landscape / Outdoor Pesticide Use	Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know See applicable operational BMPs in "What you should know http://rcflood.org/stormwater/Error! Hyperlink reference not valid. Provide IPM information to new owners, lessees and operators.
Miscellaneous Drain or Wash Water or Other Sources • Boiler drain lines • Condensate drain lines • Roofing, gutters, and trim.	Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Owner shall perform maintenance when there is standing water for more than 72 hours and trash and debris accumulation. The owner pays the qualified contractor to perform required maintenance.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

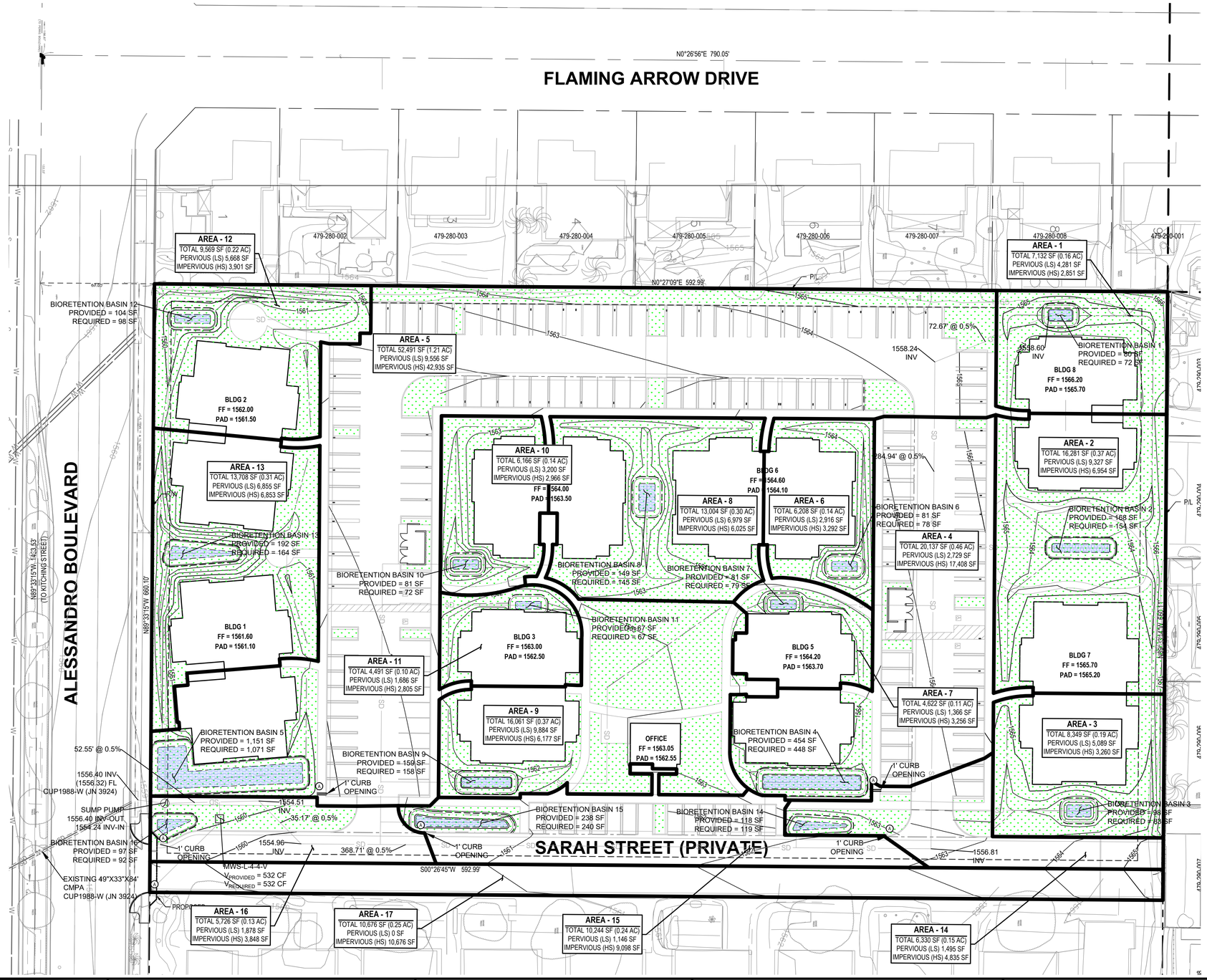
☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

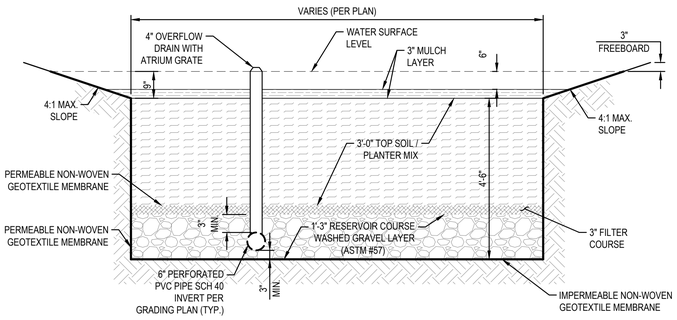
PRELIMINARY WQMP SITE PLAN
VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553



LEGEND:

SOURCE CONTROL	
1	ON-SITE STORM DRAIN INLETS
2	INDOOR & STRUCTURAL PEST CONTROL
3	LANDSCAPE/OUTDOOR PESTICIDE USE
4	REFUSE AREAS

- PROPOSED PERVIOUS AREA
- PROPOSED IMPERVIOUS AREA
- PROPOSED BIORETENTION BASIN
- DRAINAGE BOUNDARY
- (A) STENCIL "NO DUMPING" SIGN



BIORETENTION BASIN TYPICAL SECTION
SCALE: 1" = 2'-0"

DMA	BMP TYPE	$A_{REQUIRED}$ (SF)	$A_{PROVIDED}$ (SF)
AREA - 1	BIORETENTION BASIN	72	80
AREA - 2	BIORETENTION BASIN	154	168
AREA - 3	BIORETENTION BASIN	83	98
AREA - 4	BIORETENTION BASIN	448	453
AREA - 5	BIORETENTION BASIN	1071	1151
AREA - 6	BIORETENTION BASIN	78	81
AREA - 7	BIORETENTION BASIN	79	81
AREA - 8	BIORETENTION BASIN	145	149
AREA - 9	BIORETENTION BASIN	158	159
AREA - 10	BIORETENTION BASIN	72	81
AREA - 11	BIORETENTION BASIN	67	67
AREA - 12	BIORETENTION BASIN	98	104
AREA - 13	BIORETENTION BASIN	164	192
AREA - 14	BIORETENTION BASIN	119	118
AREA - 15	BIORETENTION BASIN	240	238
AREA - 16	BIORETENTION BASIN	92	97
TOTAL		3140	3317

DMA	BMP TYPE	$V_{REQUIRED}$ (CF)	$V_{PROVIDED}$ (CF)
AREA - 17	MODULAR WETLAND SYSTEM	532	532

DIGALERT
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TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCHMARK
DESCRIPTION:
485FT SOUTH OF C/L ALESSANDRO BLVD., 48FT EAST OF C/L PERRIS BLVD., 34FT NORTH OF ECR TO STRIP MALL, 76FT SOUTH OF BCR TO WALLGREENS. 1FT EAST OF SIDEWALK, SET 3" BRASS DISK IN CONC. FLUSH WITH SIDEWALK STAMPED LS 8136, M-79 RESET 2009.
ELEVATION 1563.092 FEET (NGVD 29).

BASIS OF BEARINGS
THE CENTERLINE OF ALESSANDRO BOULEVARD SHOWN AS N 89° 33' 15" W, ON TRACT MAP NO. 10056, AS FILED IN BOOK 102, PAGES 67 THROUGH 73 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, WAS USED AS THE BASIS OF BEARINGS.

REGISTERED PROFESSIONAL ENGINEER — MAHTR WABER — No. C69050 Exp. 6/30/22 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
19210 S. VERMONT AVE., SUITE 115, GARDENA, CA 90248
P (424) 344-2464 F (562) 372-5282

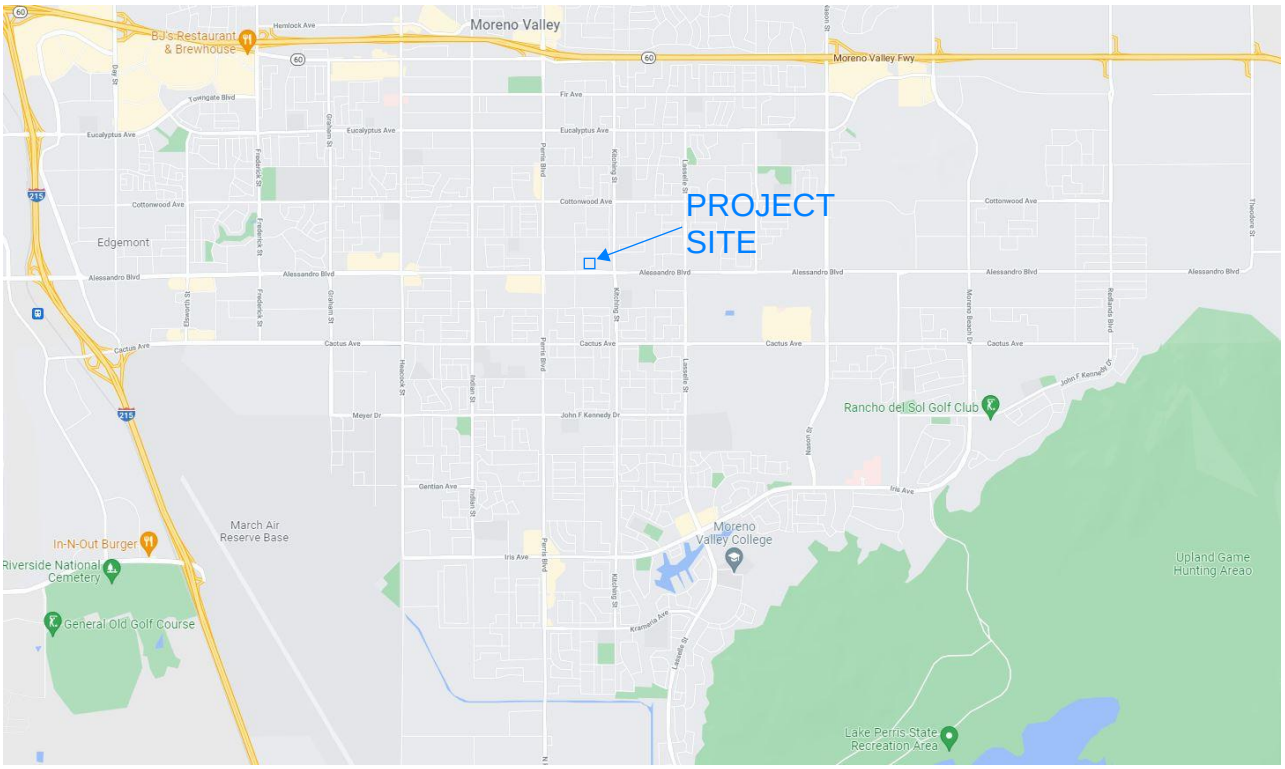
PRELIMINARY WQMP SITE PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

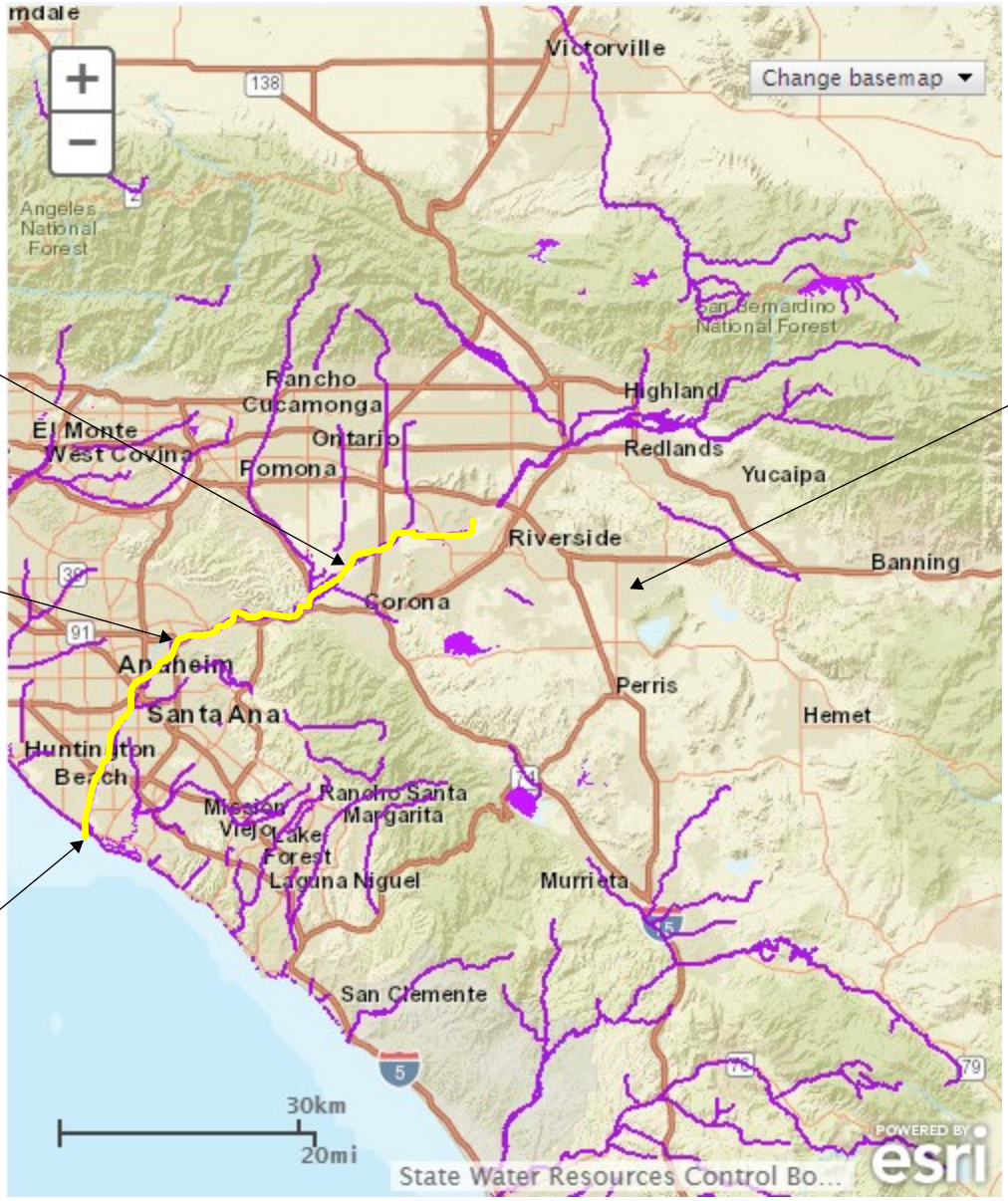
JOB NO. 21036
DATE: 10/18/2022
SHEET 4 OF 5 SHEETS

W:\21-036 VICTORY GARDENS PROJECT\DWG\21036PTB.dwg Oct 18, 2022 - 9:54am

LOCATION MAP



RECEIVING WATER MAPS



R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SITE LOCATION

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | HEMET | MURRIETA | TEMECULA

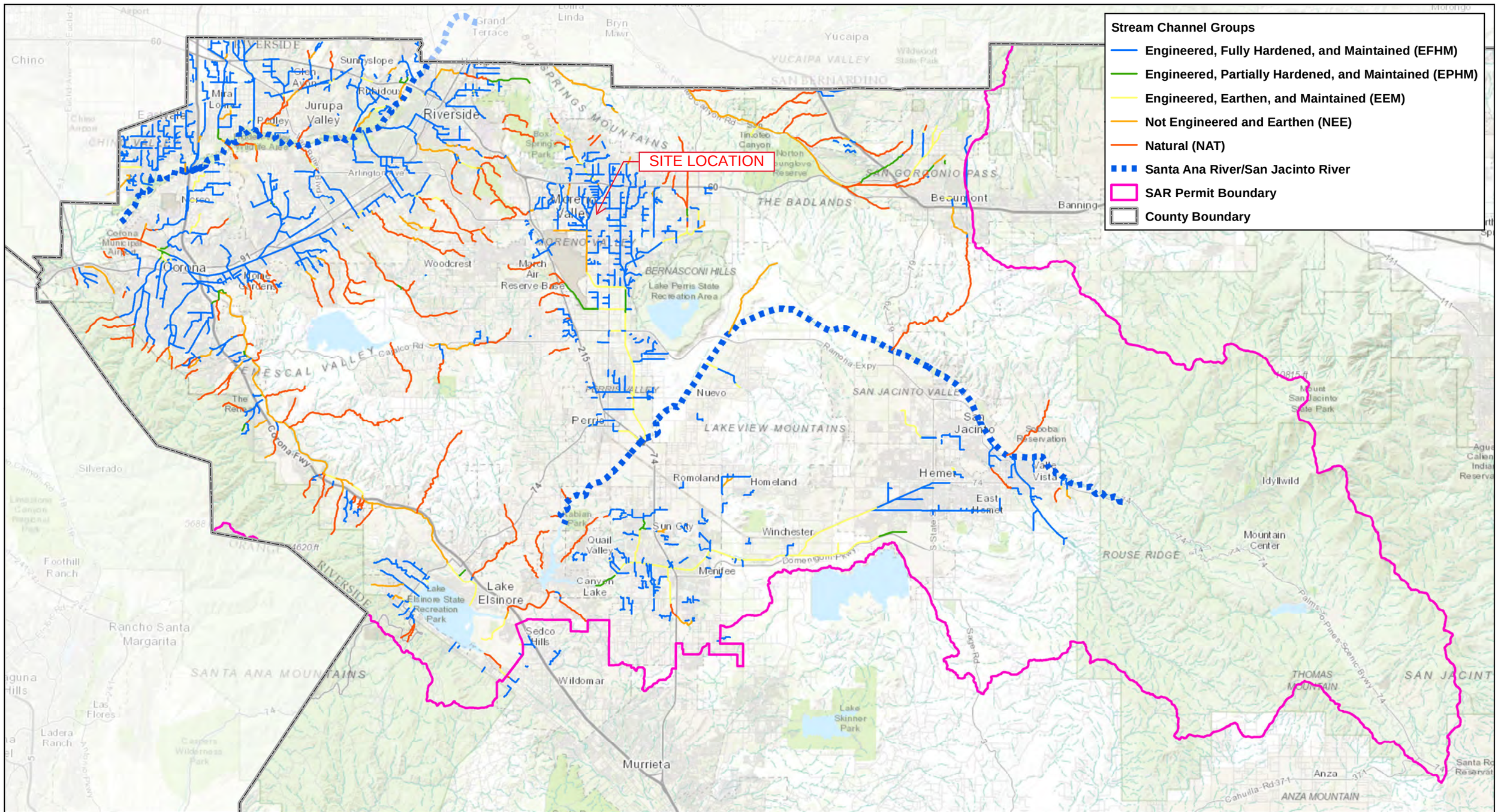
N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011



N

0 2.5 5 10 Miles

Revised February 2017

Existing Storm Drain / Watercourse Delineation Map
SAR Permittees

Map 1

Appendix 2: Construction Plans

Grading and Drainage Plans

PRELIMINARY SITE PLAN
VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

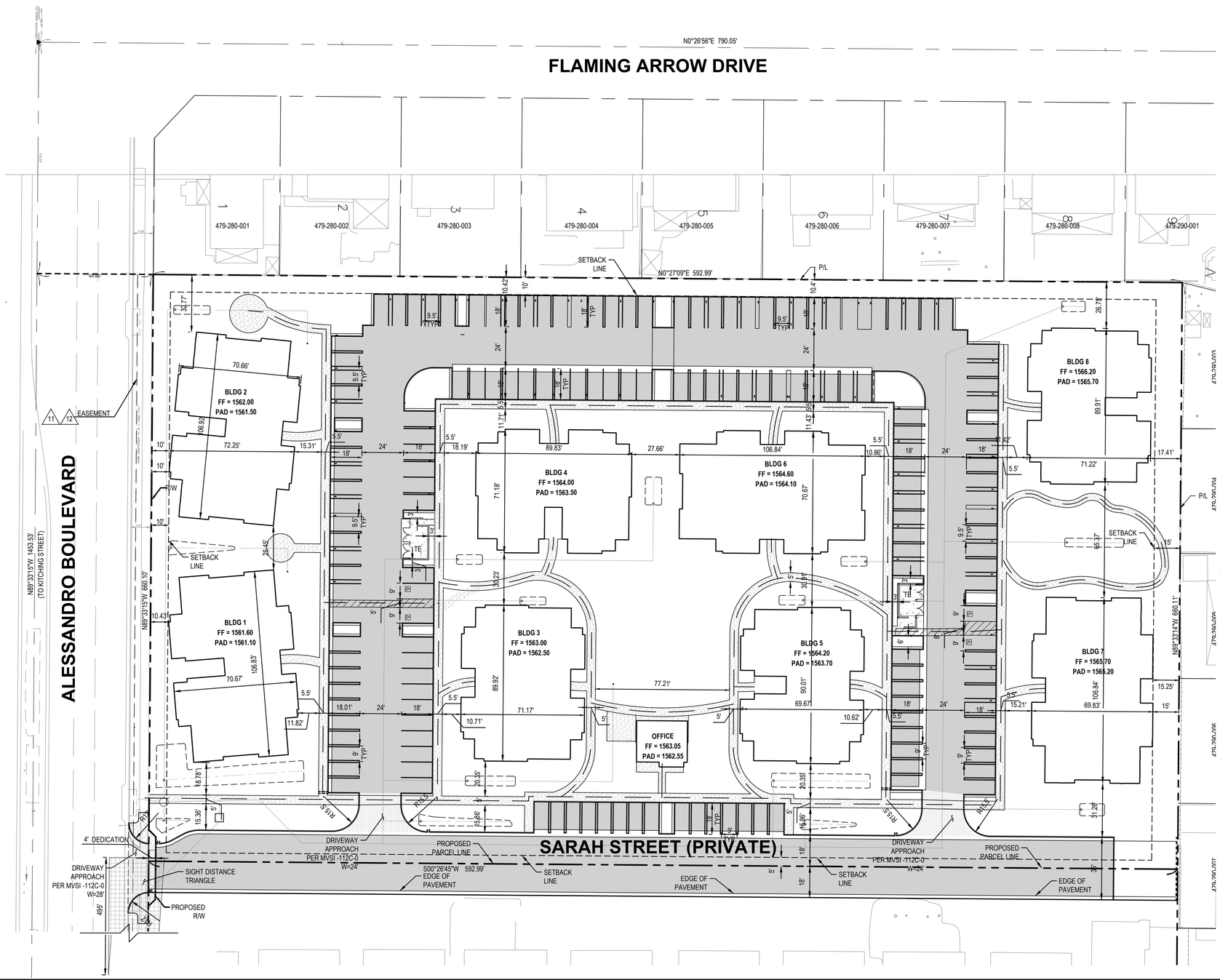
LEGEND

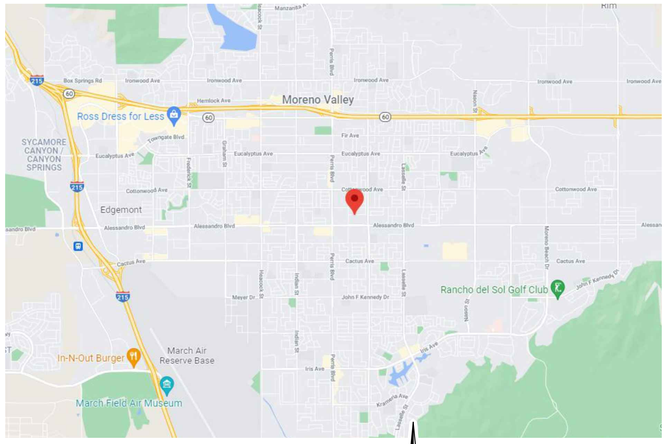
- R/W OR P/L
- EASEMENT LINE
- SETBACK LINE
- ACCESSIBLE PATH OF TRAVEL

EASEMENT LEGEND:

11 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED OCTOBER 20, 1927 IN BOOK 734 OF DEEDS, PAGE520.

12 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED NOVEMBER 9, 1927 IN BOOK 734 OF DEEDS, PAGE133.





VICINITY MAP
SCALE 1" = 1 MILE

OWNER / DEVELOPER:
MORENO VALLEY GARDEN, LLC
CONTACT: MR.TRAN CHUNG
39903 CAMDEN COURT
TEMECULA, CA 92591
P (917)-838-9869
EMAIL: IBTCHUNG@GMAIL.COM

APPLICANT / CIVIL ENGINEER:
WABER CONSULTANTS, INC.
CONTACT: MAHIR WABER, PE.
19210 S.VERMONT AVE.,
GARDENA, CA 90248
P (424) 344-2464
F (562) 372-3282
EMAIL: MWABER@WABERCONSULTANTS.COM

PROJECT DESCRIPTION

SUBDIVIDING 1 PARCEL (APN: 479-220-024) INTO 2 PARCELS. PARCEL 1 IS UNDEVELOPED SITE. CONSTRUCTION OF EIGHT 2-STORY APARTMENT BUILDINGS WITHIN PARCEL 1. PARCEL 2 TO BE LEFT AS IS.

OWNERSHIP STATEMENT:

TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER

LEGAL DESCRIPTION:

LOT 7 IN BLOCK 101 OF THE LANDS OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT COMPANY, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 10 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED RECORDED NOVEMBER 27, 1979 AS INSTRUMENT NO. 251543 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; ALSO EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO THE CITY OF MORENO VALLEY BY DEED RECORDED JUNE 16, 1989 AS INSTRUMENT NO. 89-198172 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

APN 479-220-024

SITE STATISTICS:

ADDRESS	13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553
APN	479-220-024
LAND USE ZONING	COMU
PROPOSED LAND USE	RENTAL APARTMENT
FEMA FLOOD ZONE	ZONE X
GROSS AREA:	391,435 SF (8.99 ACRES)
NET AREA:	391.275 SF (8.98 ACRES)

BUILDINGS:

BLDG 1 - 2 STORY	10,242 SF
BLDG 2 - 2 STORY	10,242 SF
BLDG 3 - 2 STORY	8,288 SF
BLDG 4 - 2 STORY	8,288 SF
BLDG 5 - 2 STORY	8,288 SF
BLDG 6 - 2 STORY	8,288 SF
BLDG 7 - 2 STORY	10,242 SF
BLDG 8 - 2 STORY	10,242 SF
TOTAL BUILT UP AREA	69,600 SF
TOTAL LOT COVERAGE	37,381 SF

OPEN SPACE REQUIRED (300 sf/ unit)	= 64 x 300 = 19,200 REQ'D 86,302 SF / 43.0% PROVIDED
PROPOSED FAR	19% FAR

PARKING:

32 (2-BRD) x 2 PER UNIT	= 64 REQ'D SPACES
32 (2-BRD) x 2.5 PER UNIT	= 80 REQ'D SPACES
64 (2-BRD) x .25 PER UNIT	= 16 REQ'D SPACES
TOTAL	160 SPACES REQUIRED
	160 SPACES PROVIDED

COVERED PARKING REQ'D :

32 (2-BRD) x 1	= 32 REQ'D SPACES
32 (3-BRD) x 2	= 64 REQ'D SPACES
	96 COVERED SPACES REQUIRED
	103 COVERED SPACES PROVIDED

ACCESSIBLE SPACES REQUIRED:

No. of Automobile Spaces required per 1109A.4
2% of 72 Spaces Assigned to Covered Dwelling Units = 1.44 = 2
5% of 16 Unassigned Spaces= 0.8 = 1

Total Required Accessible Spaces 3

Total Provided Accessible Spaces 4 ADA PROVIDED (1 VAN ACCESSIBLE 1 COVERED)

EV FUTURES REQUIRED PER CALGREEN (10% OF TOTAL PARKING) = 160 x .10 = 16
= 16 FUTURE EV REQ'D / 16 FUTURE EV PROVIDED

ADA VAN	1	
ADA	3	
FEV	16 STALLS PROVIDED	16 STALLS REQUIRED (10% OF TOTAL PARKING
P	55	
COVERED	85	
TOTAL PARKING	160 STALLS PROVIDED	

BUILDING CONSTRUCTION

CONSTRUCTION TYPE:	TYPE V-B	
ALLOWABLE BUILDING HEIGHT:	2 STORIES	40'
PROPOSED BUILDING HEIGHT:	2 STORIES	28'-11"

30' 15' 0 30' 60'
SCALE: 1" = 30'

CITY RECORD NUMBER PEN21-0251

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCHMARK
DESCRIPTION:
485FT SOUTH OF C/L ALESSANDRO BLVD., 48FT EAST OF C/L PERRIS BLVD., 34FT NORTH OF ECR TO STRIP MALL, 76FT SOUTH OF BCR TO WALLGREENS. 1FT EAST OF SIDEWALK, SET 3" BRASS DISK IN CONC. FLUSH WITH SIDEWALK STAMPED LS 8136, M-79 RESET 2009.
ELEVATION 1563.092 FEET (NGVD 29).

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THE CENTERLINE OF ALESSANDRO BOULEVARD SHOWN AS N 89° 33' 15" W, ON TRACT MAP NO. 10056, AS FILED IN BOOK 102, PAGES 67 THROUGH 73 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, WAS USED AS THE BASIS OF BEARINGS.

REGISTERED PROFESSIONAL ENGINEER — MAHIR WABER — No. C69050 Exp. 6/30/22 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
19210 S. VERMONT AVE., SUITE 115, GARDENA, CA 90248
P (424) 344-2464 F (562) 372-3282

PRELIMINARY SITE PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/21/2022
SHEET 1 OF 5 SHEETS

W:\21-036 VICTORY GARDENS PROJECT\DWG\21036-01TT.dwg Oct 21, 2022 - 9:28am

PRELIMINARY GRADING PLAN
VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

LEGEND:

- NEW PCC SIDEWALK
- NEW AC PAVEMENT
- NEW PCC PAVEMENT
- NEW PCC DRIVEWAY
- R/W OR P/L
- EASEMENT LINE
- CURB
- CURB AND GUTTER
- FLOW LINE
- SD — STORM DRAIN LINE
- PERFORATED STORM DRAIN LINE

ABBREVIATIONS:

AC	ASPHALT CONCRETE
CF	CURB FACE
EX.	EXISTING
FF	FINISHED FLOOR
FL	FLOW LINE
MAX.	MAXIMUM
MIN.	MINIMUM
P/L	PROPERTY LINE
PCC	PORTLAND CEMENT CONCRETE
R/W	RIGHT OF WAY
RL	RIDGE LINE

OWNER / DEVELOPER:
MORENO VALLEY GARDEN, LLC
CONTACT: MR.TRAN CHUNG
39903 CAMDEN COURT
TEMECULA, CA 92591
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PROJECT DESCRIPTION

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CONSTRUCTION OF EIGHT 2-STORY APARTMENT BUILDINGS WITHIN PARCEL 1. PARCEL 2 TO BE LEFT AS IS.

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TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER

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APN 479-220-024

TOPOGRAPHY

TOPOGRAPHICAL SURVEY WAS PERFORMED ON AUGUST 17TH, 2021 BY WABER CONSULTANTS, INC.

UTILITY COMPANIES	EMERGENCY NUMBERS
BOX SPRINGS MUTUAL WATER COMPANY	(951) 653-6419
CHARTER SPECTRUM	(877) 906-9121
EASTERN MUNICIPAL WATER DIST	(951) 928-3777
EDGEMONT COMMUNITY SERVICES DISTRICT	(951) 784-2632
FRONTIER COMMUNICATION	(800) 921-8101
SC EDISON COMPANY	(800) 655-4555
SC GAS COMPANY	(800) 427-2200
SUNESYS	(951) 278-0400
RIVERSIDE TRANSIT AGENCY	(951) 565-5164
UNDERGROUND SERVICE ALERT	(800) 227-2600
MORENO VALLEY UTILITY ADMINISTRATION	(951) 413-3500
SPECIAL DISTRICTS ADMINISTRATION	(951) 413-3480
TRAFFIC SIGNAL MAINTENANCE (CITY)	(951) 413-3140
VERIZON WIRELESS	(800) 922-0204

SITE STATISTICS:

ADDRESS	13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553
APN	479-220-024
LAND USE ZONING	COMU
PROPOSED LAND USE	RENTAL APARTMENT
FEMA FLOOD ZONE	ZONE X
GROSS AREA:	391,435 SF (8.99 ACRES)
NET AREA:	391.275 SF (8.98 ACRES)

PARCEL : 1 200,519 SQ. FT. (4.60 AC)

BUILDINGS:

BLDG 1 - 2 STORY	10,242 SF
BLDG 2 - 2 STORY	10,242 SF
BLDG 3 - 2 STORY	8,288 SF
BLDG 4 - 2 STORY	8,288 SF
BLDG 5 - 2 STORY	8,288 SF
BLDG 6 - 2 STORY	8,288 SF
BLDG 7 - 2 STORY	10,242 SF
BLDG 8 - 2 STORY	10,242 SF
TOTAL BUILT UP AREA	69,600 SF
TOTAL LOT COVERAGE	37,381 SF

OPEN SPACE REQUIRED (300 sf/ unit) = 64 x 300 = 19,200 REQ'D
86,302 SF / 43.9% PROVIDED

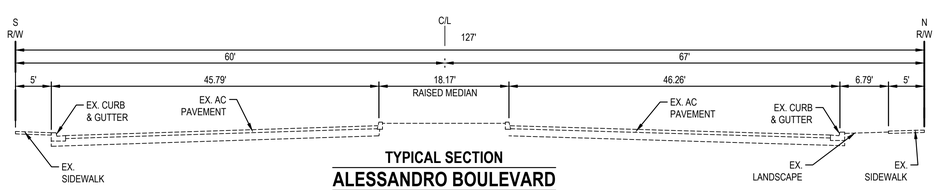
PROPOSED FAR 19% FAR

BUILDING CONSTRUCTION

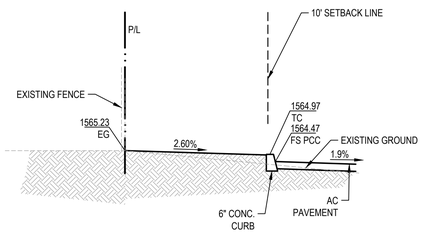
CONSTRUCTION TYPE:	TYPE V-B
ALLOWABLE BUILDING HEIGHT:	2 STORIES 40'
PROPOSED BUILDING HEIGHT:	2 STORIES 28'-11"

PARCEL : 2 190,916 SQ. FT. (4.38 AC)

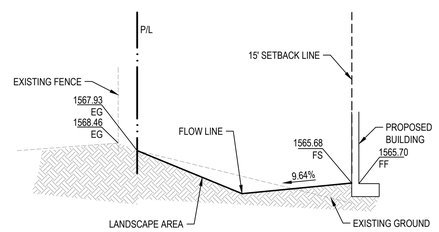
EXISTING RESIDENCE HOMES



TYPICAL SECTION
ALESSANDRO BOULEVARD
DIVIDED MAJOR ARTERIAL
STD DWG MVSI-101A-0
SCALE: 1" = 10'



SECTION B-B
SCALE: 1" = 5'



SECTION C-C
SCALE: 1" = 5'

ESTIMATED EARTHWORK QUANTITIES	
CUT	1,112 CY
FILL	7,626 CY
IMPORT	6,514 CY
EXPORT	-

EARTHWORK QUANTITIES SHOWN ARE RAW ESTIMATES ONLY INTENDED FOR ESTABLISHING GOVERNING AGENCY FEES.

CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE QUANTITIES FOR BID PURPOSES AND ANY EXPORT OR IMPORT REQUIRED TO BALANCE THE SITE.

CITY RECORD NUMBER PEN21-0251

DIGALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCHMARK
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485FT SOUTH OF C/L ALESSANDRO BLVD., 48FT EAST OF C/L PERRIS BLVD., 34FT NORTH OF ECR TO STRIP MALL, 76FT SOUTH OF BCR TO WALLGREENS. 1FT EAST OF SIDEWALK, SET 3" BRASS DISK IN CONC. FLUSH WITH SIDEWALK STAMPED LS 8136, M-79 RESET 2009.
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PRELIMINARY GRADING PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/21/2022
SHEET 2 OF 5 SHEETS

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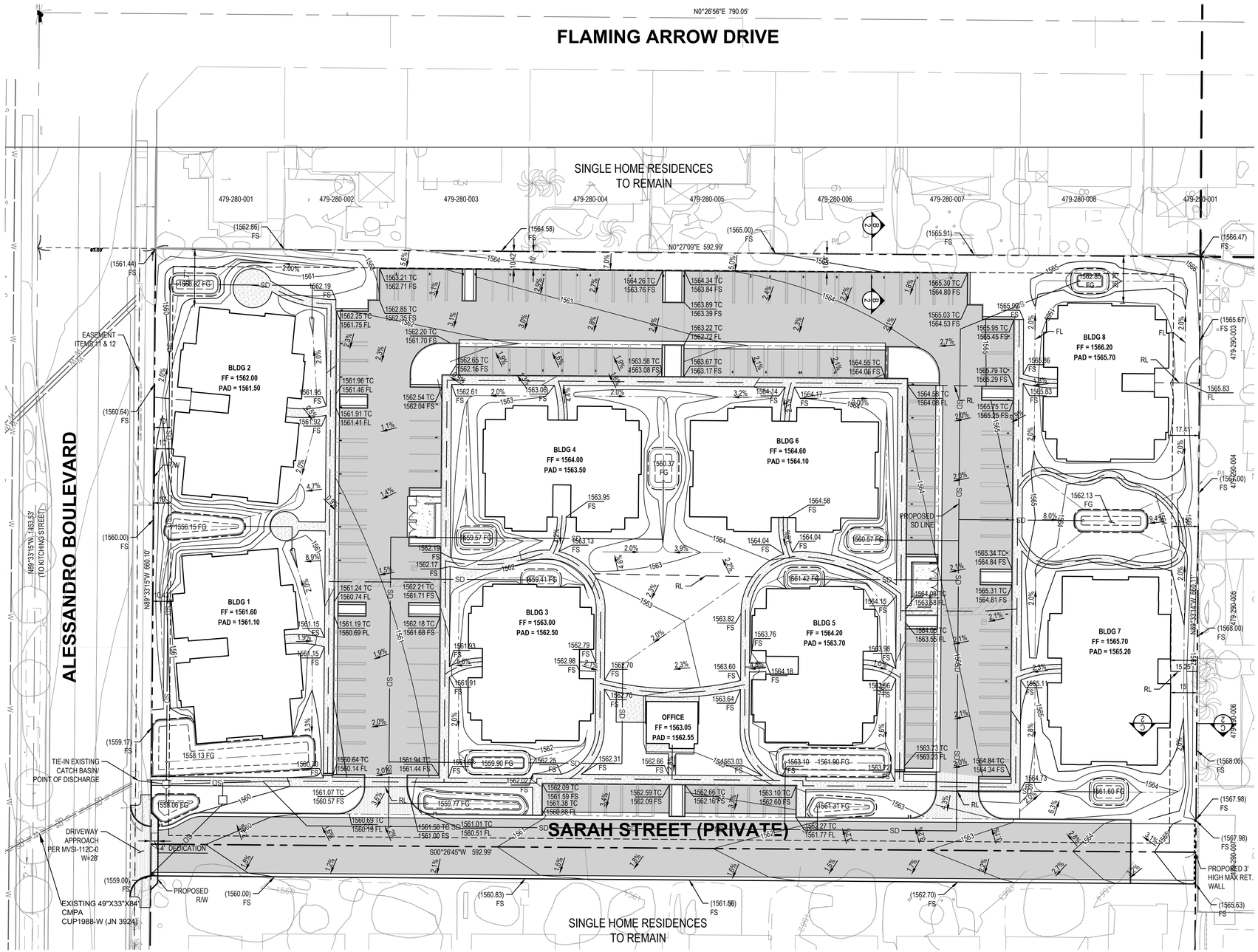
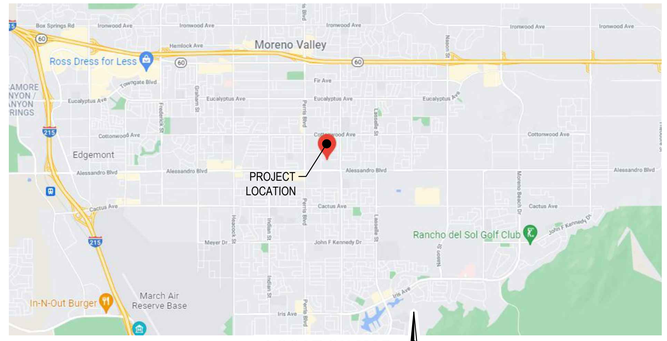
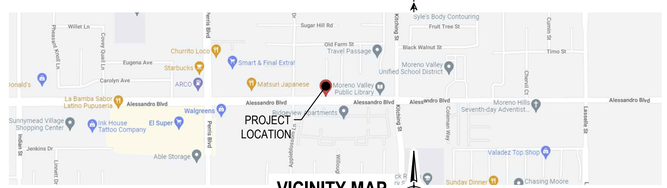
PRELIMINARY GRADING PLAN
VALLEY GARDENS

13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553





LOCATION MAP
SCALE 1" = 1 MILE



VICINITY MAP
SCALE 1" = 1000'

ABBREVIATIONS:

AC	ASPHALT CONCRETE
CF	CURB FACE
EX.	EXISTING
FF	FINISHED FLOOR
FL	FLOW LINE
MAX.	MAXIMUM
MIN.	MINIMUM
P/L	PROPERTY LINE
PCC	PORTLAND CEMENT CONCRETE
R/W	RIGHT OF WAY
RL	RIDGE LINE

LEGEND:

- NEW PCC SIDEWALK
- NEW AC PAVEMENT
- NEW PCC PAVEMENT
- NEW PCC DRIVEWAY
- R/W OR P/L
- EASEMENT LINE
- CURB
- CURB AND GUTTER
- FLOW LINE
- SD — STORM DRAIN LINE
- PERFORATED STORM DRAIN LINE
- ACCESSIBLE PATH OF TRAVEL

EASEMENT LEGEND:

11 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED OCTOBER 20, 1927 IN BOOK 734 OF DEEDS, PAGE 520.
IN FAVOR OF: MIDLAND SCHOOL DISTRICT OF MIDLAND

12 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED NOVEMBER 9, 1927 IN BOOK 744 OF DEEDS, PAGE 133.
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14 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 12, 1956 IN BOOK 2010, PAGE 494 OF OFFICIAL RECORDS.
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15 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JANUARY 18, 1957 IN BOOK 2026, PAGE 324 OF OFFICIAL RECORDS.
N FAVOR OF: CALIFORNIA ELECTRIC POWER COMPANY AND CALIFORNIA WATER AND TELEPHONE COMPANY

30' 15' 0 30' 60'
SCALE: 1" = 30'

CITY RECORD NUMBER PEN21-0251

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REVISIONS

DATE	△	DESCRIPTION

BENCHMARK
DESCRIPTION:
485FT SOUTH OF C/L ALESSANDRO BLVD., 48FT EAST OF C/L PERRIS BLVD., 34FT NORTH OF ECR TO STRIP MALL, 76FT SOUTH OF BCR TO WALLGREENS. 1FT EAST OF SIDEWALK, SET 3" BRASS DISK IN CONC. FLUSH WITH SIDEWALK STAMPED LS 8136, M-79 RESET 2009.
ELEVATION 1563.092 FEET (NGVD 29).

BASIS OF BEARINGS
THE CENTERLINE OF ALESSANDRO BOULEVARD SHOWN AS N 89° 33' 15" W, ON TRACT MAP NO. 10056, AS FILED IN BOOK 102, PAGES 67 THROUGH 73 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, WAS USED AS THE BASIS OF BEARINGS.

REGISTERED PROFESSIONAL ENGINEER — MANTR WABER — No. C69050 — Exp. 6/30/22 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
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P (424) 344-2464 F (562) 372-3282

PRELIMINARY GRADING PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/21/2022
SHEET 3 OF 5 SHEETS

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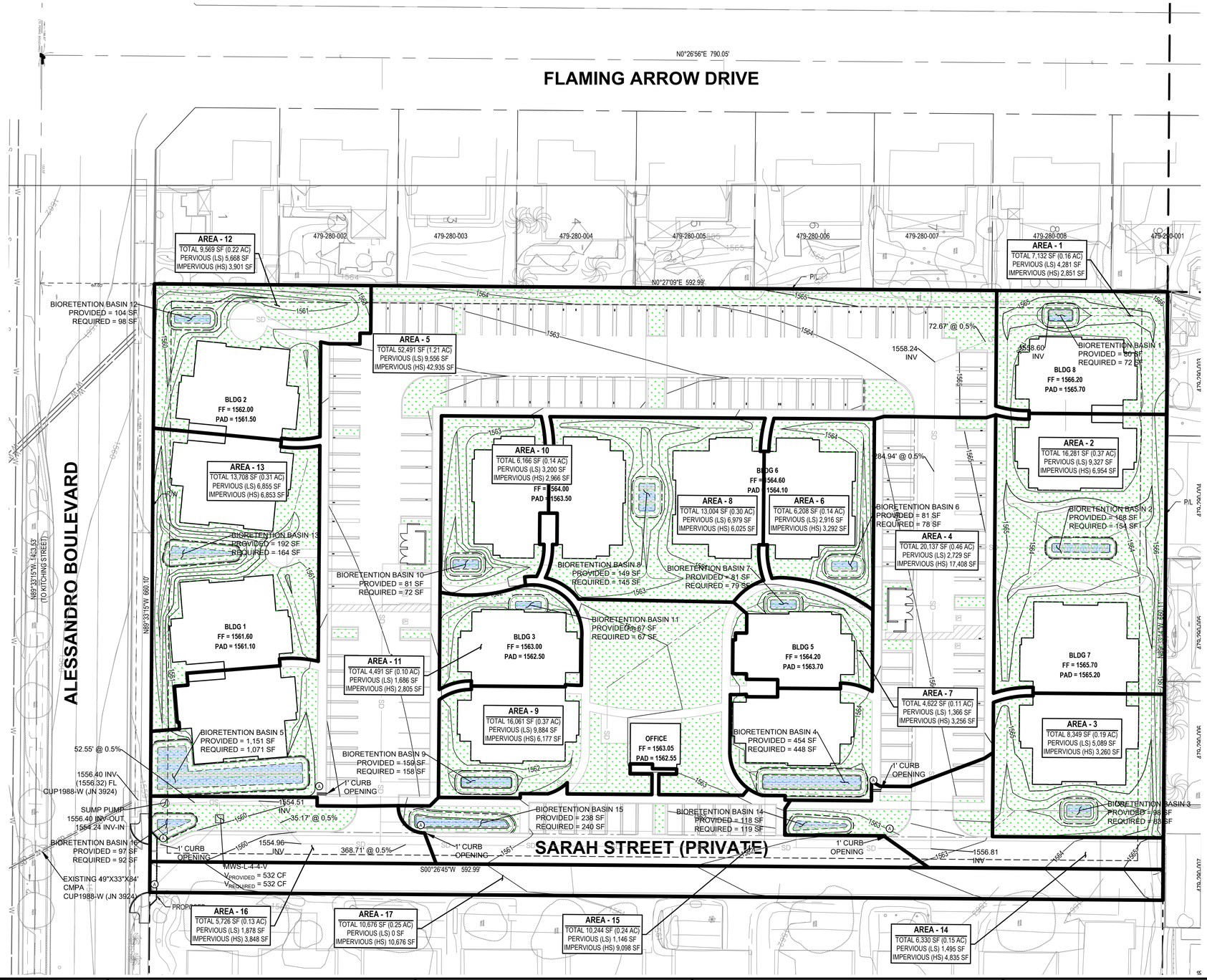
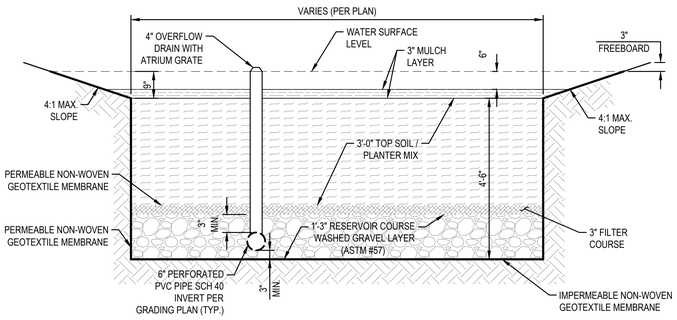
PRELIMINARY WQMP SITE PLAN
VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553



LEGEND:

SOURCE CONTROL	
1	ON-SITE STORM DRAIN INLETS
2	INDOOR & STRUCTURAL PEST CONTROL
3	LANDSCAPE/OUTDOOR PESTICIDE USE
4	REFUSE AREAS

- PROPOSED PERVIOUS AREA
- PROPOSED IMPERVIOUS AREA
- PROPOSED BIORETENTION BASIN
- DRAINAGE BOUNDARY
- (A) STENCIL "NO DUMPING" SIGN



BIORETENTION BASIN TYPICAL SECTION
SCALE: 1" = 2'-0"

DMA	BMP TYPE	$A_{REQUIRED}$ (SF)	$A_{PROVIDED}$ (SF)
AREA - 1	BIORETENTION BASIN	72	80
AREA - 2	BIORETENTION BASIN	154	168
AREA - 3	BIORETENTION BASIN	83	98
AREA - 4	BIORETENTION BASIN	448	453
AREA - 5	BIORETENTION BASIN	1071	1151
AREA - 6	BIORETENTION BASIN	78	81
AREA - 7	BIORETENTION BASIN	79	81
AREA - 8	BIORETENTION BASIN	145	149
AREA - 9	BIORETENTION BASIN	158	159
AREA - 10	BIORETENTION BASIN	72	81
AREA - 11	BIORETENTION BASIN	67	67
AREA - 12	BIORETENTION BASIN	98	104
AREA - 13	BIORETENTION BASIN	164	192
AREA - 14	BIORETENTION BASIN	119	118
AREA - 15	BIORETENTION BASIN	240	238
AREA - 16	BIORETENTION BASIN	92	97
TOTAL		3140	3317

DMA	BMP TYPE	$V_{REQUIRED}$ (CF)	$V_{PROVIDED}$ (CF)
AREA - 17	MODULAR WETLAND SYSTEM	532	532

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REGISTERED PROFESSIONAL ENGINEER — MAHTR WABER — No. C69050 Exp. 6/30/22 — CIVIL — STATE OF CALIFORNIA

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PRELIMINARY WQMP SITE PLAN

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/18/2022
SHEET 4 OF 5 SHEETS

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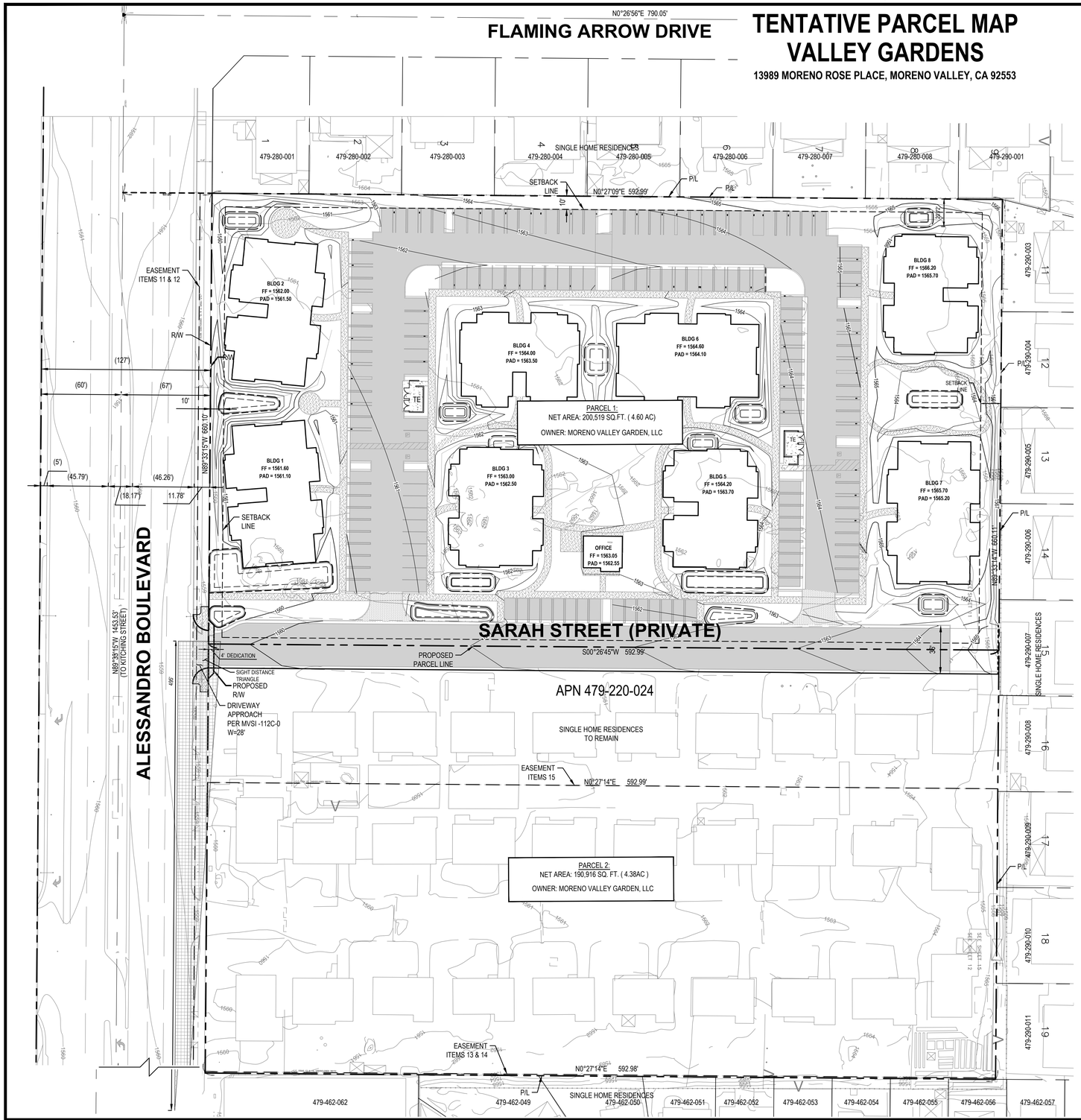
TENTATIVE PARCEL MAP
VALLEY GARDENS

13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553



LEGEND

- R/W OR P/L
- EASEMENT LINE
- SETBACK LINE
- 1565 — PROPOSED CONTOUR LINES
- 1561 — EXISTING CONTOUR LINES
- PROPOSED IMPROVEMENTS
- EXISTING IMPROVEMENTS

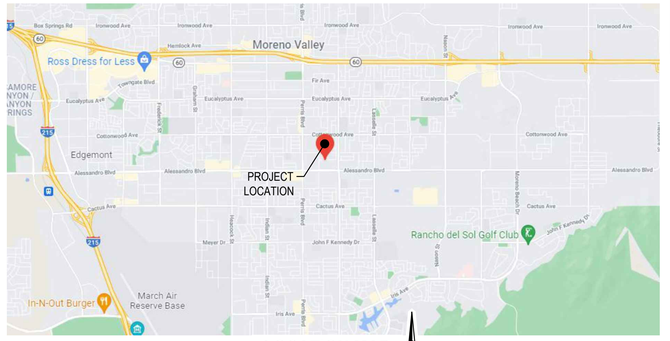
BLDG	BUILDING
TE	TRASH ENCLOSURE
FF	FINISH FLOOR

OWNER / DEVELOPER:

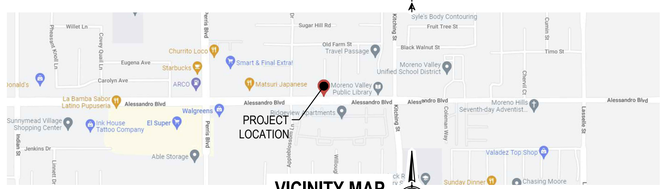
MORENO VALLEY GARDEN, LLC
CONTACT: MR.TRAN CHUNG
39903 CAMDEN COURT
TEMECULA, CA 92591
P (917)-838-9869
EMAIL: IBTCHUNG@GMAIL.COM

APPLICANT / CIVIL ENGINEER:

WABER CONSULTANTS, INC.
CONTACT: MAHIR WABER, PE.
19210 S.VERMONT AVE.,
GARDENA, CA 90248
P (424) 344-2464
F (562) 372-3282
EMAIL: MWABER@WABERCONSULTANTS.COM



LOCATION MAP
SCALE 1" = 1 MILE



VICINITY MAP
SCALE 1" = 1000'

PROJECT DESCRIPTION

SUBDIVIDING 1 PARCEL (APN: 479-220-024) INTO 2 PARCELS.
CONSTRUCTION OF EIGHT 2-STORY APARTMENT BUILDINGS WITH PARCEL 1. PARCEL 2. TO BE LEFT AS IS.

EASEMENT LEGEND:

11 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED OCTOBER 20, 1927 IN BOOK 734 OF DEEDS, PAGE 520.
IN FAVOR OF: MIDLAND SCHOOL DISTRICT OF MIDLAND

12 EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED NOVEMBER 9, 1927 IN BOOK 744 OF DEEDS, PAGE 133.
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N FAVOR OF: CALIFORNIA ELECTRIC POWER COMPANY AND CALIFORNIA WATER AND TELEPHONE COMPANY

OWNERSHIP STATEMENT:

TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER

LEGAL DESCRIPTION:

LOT 7 IN BLOCK 101 OF THE LANDS OF BEAR VALLEY AND ALESSANDRO DEVELOPMENT COMPANY, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 11, PAGE 10 OF MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED RECORDED NOVEMBER 27, 1979 AS INSTRUMENT NO. 251543 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA; ALSO EXCEPTING THEREFROM THAT PORTION AS CONVEYED TO THE CITY OF MORENO VALLEY BY DEED RECORDED JUNE 16, 1989 AS INSTRUMENT NO. 89-198172 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

APN 479-220-024

SITE STATISTICS:

ADDRESS	13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553
APN	479-220-024
LAND USE ZONING	COMU
PROPOSED LAND USE	RENTAL APARTMENT
FEMA FLOOD ZONE	ZONE X
GROSS AREA:	391,435 SF (8.99 ACRES)
NET AREA:	391.275 SF (8.98 ACRES)

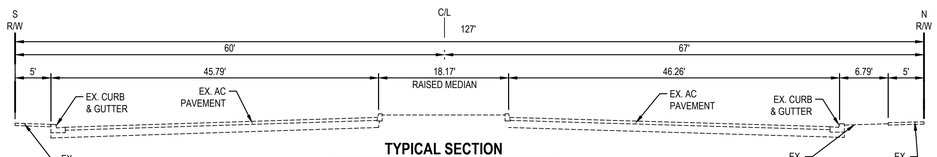
PARCEL : 1 200,519 SQ. FT. (4.60 AC)

BUILDINGS:

BLDG 1 - 2 STORY	10,242 SF
BLDG 2 - 2 STORY	10,242 SF
BLDG 3 - 2 STORY	8,288 SF
BLDG 4 - 2 STORY	8,288 SF
BLDG 5 - 2 STORY	8,288 SF
BLDG 6 - 2 STORY	8,288 SF
BLDG 7 - 2 STORY	10,242 SF
BLDG 8 - 2 STORY	10,242 SF
TOTAL BUILT UP AREA	69,600 SF
TOTAL LOT COVERAGE	37,381 SF
OPEN SPACE REQUIRED (300 sf/ unit)	= 64 x 300 = 19,200 REQ'D
	86,302 SF / 43.9% PROVIDED
PROPOSED FAR	19% FAR
BUILDINGS TO BE TYPE VA SPRINKLERED	
BUILDING HEIGHT	29 FT PROVIDED (60 FT PERMITTED)

PARCEL : 2 190,916 SQ. FT. (4.38 AC)

EXISTING RESIDENCE HOMES



TYPICAL SECTION
ALESSANDRO BOULEVARD
DIVIDED MAJOR ARTERIAL
STD DWG MVSI-101A-0
SCALE: 1" = 10'

CITY RECORD NUMBER PEN21-0251

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

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REVISIONS

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REGISTERED PROFESSIONAL ENGINEER MAHIR WABER No. C69050 Exp. 6/30/22 CIVIL STATE OF CALIFORNIA

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TENTATIVE PARCEL MAP

VALLEY GARDENS
13989 MORENO ROSE PLACE, MORENO VALLEY, CA 92553

JOB NO. 21036
DATE: 10/21/2022
SHEET 5 OF 5 SHEETS

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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Geotechnical Engineering Investigation
Proposed Multi-Unit Residential Development
North of Alessandro Boulevard and
East of Flaming Arrow Drive
City of Moreno Valley, California

Tran Chung
39903 Camden Court
Temecula, California 92591

Project Number 22686-21
August 27, 2021

NorCal Engineering

NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469 Fax (562) 799-9459

August 27, 2021 Project Number 22686-21

Tran Chung
39903 Camden Court
Temecula, California 92591

RE: **Geotechnical Engineering Investigation** - Proposed Multi-Unit Residential Development - Located North of Alessandro Boulevard and East of Flaming Arrow Drive, in the City of Moreno Valley, California

Dear Mr. Chung:

Pursuant to your request, this firm has performed a Geotechnical Engineering Investigation for the above referenced project in accordance with your approval of our proposal dated July 13, 2021. The purpose of this investigation is to evaluate the geotechnical conditions of the subject site and to provide recommendations for the proposed multi-unit residential development.

The scope of work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration and sampling; 3) laboratory testing; 4) soil infiltration testing; 5) engineering analysis of field and laboratory data; 5) preparation of a geotechnical engineering report. It is the opinion of this firm that the proposed development is feasible from a geotechnical standpoint provided that the recommendations presented in this report are followed in the design and construction of the project.

1.0 Project Description

It is proposed to construct a two-story, 67-unit residential development as shown on the attached Site Plan by Irwin Partners Architects dated August, 5 2021. Other improvements will include asphalt and/or concrete driveways, hardscape and landscaping. The proposed grading will consist of cuts on the order of a few feet with minor fills to achieve finished grade elevations. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 Site Description

The subject property is located along the north side of Alessandro Boulevard, east of Flaming Arrow Drive, in the City of Moreno Valley. The generally rectangular shaped parcel is elongated in a north to south direction. The site is relatively level with topography descending gradually from north to south on the order of a few feet. The site is currently vacant and covered in light vegetation.

3.0 Site Exploration

The field investigation consisted of the placement of ten (10) subsurface exploratory trenches by a backhoe to depths ranging between 5 and 16 feet below current ground elevations. The explorations were visually classified and logged by a field engineer with location of the subsurface explorations shown on the attached Site Plan. The exploratory borings revealed the existing earth materials to consist of fill and natural soil. Detailed descriptions of the subsurface conditions are listed on the boring logs in Appendix A. It should be noted that the transition from one soil type to another as shown on the borings logs is approximate and may in fact be a gradual transition. The soils encountered are described as follows:

Fill: A fill soil classifying as a brown, clayey SILT with some sand and occasional gravel, concrete and rootlets was encountered across the site to a depth of 1 to 1½ feet below ground surface. These soils were noted to be soft to medium stiff and dry.

Natural: An undisturbed native soil classifying as brown, silty sandy CLAY was encountered beneath the fill soils. The native soils were observed to be medium stiff to stiff and dry to damp.

The overall engineering characteristics of the earth material were relatively uniform with each excavation. No groundwater was encountered to the depths of our borings and no caving occurred.

4.0 Laboratory Tests

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one-inch-long brass rings with an inside diameter of 2.42 inches into the undisturbed soils. The sampler was driven a total of six inches into undisturbed soils. Bulk bag samples were obtained in the upper soils for expansion index tests and maximum density tests. All test results are included in Appendix B, unless otherwise noted.

4.1 **Field Moisture Content** (ASTM: D 2216) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

4.2 **Maximum Density tests** (ASTM: D 1557) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

4.3 **Expansion Index tests** (ASTM: D 4829) were performed on remolded samples of the upper soils to determine expansive characteristics. Results of these tests are provided on Table II.

4.4 **Atterberg Limits** (ASTM: D 4318) consisting of liquid limit, plastic limit and plasticity index were performed on representative soil samples. Results are shown on Table III.

4.5 **Corrosion tests** consisting of sulfate, pH, resistivity and chloride analysis to determine potential corrosive effects of soils on concrete and underground utilities. Test results are provided on Table IV.

4.6 **R-Value test** per California Test Method 301 was performed on a representative sample, which may be anticipated to be near subgrade to determine pavement design. Results are provided within the pavement design section of the report.

4.7 **Direct Shear tests** (ASTM: D 3080) were performed on undisturbed and/or remolded samples of the subsurface soils. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plate A.

4.8 **Consolidation tests** (ASTM: D 2435) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates B and C.

5.0 Seismicity Evaluation

The proposed development lies outside of any Alquist-Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered unlikely. The San Jacinto (Valley Segment) Fault is located approximately 7 kilometers from the site and is capable of producing a Magnitude 6.9 earthquake. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults. The seismic design acceleration parameters are provided below and are based on the 2019 California Building Code (CBC) for the referenced project. The data was obtained from the American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/ and is attached in Appendix C.

Seismic Design Acceleration Parameters

Latitude	33.918
Longitude	-117.221
Site Class	D
Risk Category	II
Mapped Spectral Response Acceleration	S_S = 1.653 S_1 = 0.644
Adjusted Maximum Acceleration	S_{MS} = 1.653
Design Spectral Response Acceleration Parameters	S_{DS} = 1.102
Peak Ground Acceleration	PGA_M = 0.77

Use of these values is dependent on requirements of ASCE 7-16, 11-4.8, Exception 2 that requires the value of the seismic response coefficient C_s be determined by Equation 12.8.2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either 12.8-3 for $T_L \geq T \geq 1.5T_s$ or Equation 12.8-4 for $T > T_L$. Computations and verification of these conditions is referred to the structural engineer.

6.0 Liquefaction Evaluation

The site is expected to experience ground shaking and earthquake activity that is typical of the Southern California area. It is during severe shaking that loose, granular soils below the groundwater table can liquefy. Based on review of the *City of Moreno Valley Geological Faults and Liquefaction Map (September 22, 2016, revised May 2017)*, the site is *not* situated in an area of generalized liquefaction susceptibility. Thus, design of the proposed construction in conformance with the latest Building Code provisions for earthquake design is expected to provide mitigation of ground shaking hazards that are typical in Southern California.

7.0 Infiltration Characteristics

Infiltration tests within the site were performed to provide preliminary infiltration rates for the purpose of planning and design of an on-site water disposal system. The infiltration tests consisted of the double ring infiltration test per ASTM Method D 3385. The field infiltration rate was computed using a reduction factor – R_f based on the field measurements with our calculations given in Appendix D. Based upon the results of our testing, the soils encountered in the planned on-site drainage disposal system area exhibit the following infiltration rates.

Boring/Test No.	Depth	Soil Classification	Field Infiltration Rate	Design Rate
T-1	5'	Silty Sandy CLAY	0.58 in/hr	0.19 in/hr
T-2	7.5'	Silty SAND	0.64 in/hr	0.21 in/hr

Based on the results of our field testing, the subsurface soils encountered in the proposed on-site drainage disposal system shall utilize the design infiltration rates based on a safety factor of 3.0 or greater in compliance with the County of Riverside "Low Impact Development BMP Design" guidelines. All systems must meet the latest city and/or county specifications and the California Regional Water Quality Control Board (CRWQCB) requirements.

The infiltration rates at the depths tested indicate the stiff/dense soils encountered in our test locations *are not* suitable for storm water infiltration at the project site. The recommendations and conclusions contained in this report are based upon the soil conditions encountered in the test excavations.

8.0 Conclusions and Recommendations

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent structures.

The following recommendations are based upon soil conditions encountered in our field investigation; these near-surface soil conditions could vary across the site. Variations in the soil conditions may not become evident until the commencement of grading operations for the proposed development and revised recommendations from the soils engineer may be necessary based upon the conditions encountered.

It is recommended that site inspections are performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. The following sections present a discussion of geotechnical related requirements for specific design recommendations of different aspects of the project.

8.1 Site Grading Recommendations

All vegetation and demolition debris shall be removed and hauled prior to the start of grading operations. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached "Specifications for Compacted Fill Operations".

8.1.1 **Removal and Recompaction Recommendations**

All disturbed soils and/or fill (about 1 to 1½ feet below ground surface) shall be removed to competent native material, the exposed surface scarified to a depth of 12 inches, brought to within 2% of optimum moisture content and compacted to a minimum of 90% of the laboratory standard (ASTM: D 1557) prior to placement of any additional compacted fill soils, foundations, slabs-on-grade and pavement. Grading shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

It is possible that isolated areas of undiscovered fill not described in this report are present on site; if found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction.

Any imported fill material should be preferably soil similar to the upper soils encountered at the subject site. All soils shall be approved by this firm prior to importing at the site and will be subjected to additional laboratory testing to assure concurrence with the recommendations stated in this report.

If placement of slabs-on-grade and pavement is not completed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the soils engineer as to the suitability of the supporting soils may be needed.

Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase. Adequate drainage away from the structures, pavement and slopes should be provided at all times.

8.1.2 **Fill Blanket Recommendations**

Due to the potential for differential settlement of foundations placed on compacted fill and medium stiff native materials, it is recommended that all foundations be underlain by a uniform compacted fill blanket at least two feet in thickness. This fill blanket shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

8.2 **Temporary Excavations**

Temporary *unsurcharged* excavations in the existing site materials may be made at vertical inclinations up to 4 feet in height unless cohesionless soils are encountered. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring or flatter excavations may be required. The temporary cut slope gradients given above do not preclude local raveling and sloughing. Once finalized sections are made available, this firm shall review and provide stability calculations with updated excavation recommendations.

Temporary shoring design may utilize an active earth pressure of 25 pcf without any surcharge due to adjacent traffic, equipment or structures. The passive fluid pressures of 250 pcf may be doubled to 500 pcf for temporary design. Any drilled caissons will require to be cased due to the potential of caving. Shoring members should not be vibrated or driven due to the potential for damage to nearby improvements. All excavations shall be made in accordance with the requirements of the geotechnical engineer, CAL-OSHA and other public agencies having jurisdiction. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

8.3 **Foundation Design**

All foundations may be designed utilizing an allowable bearing capacity of 2,000 psf for a minimum embedded depth of 24 inches into approved engineered fill. The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 24-inch minimum depth, up to 3,000 psf. A one-third increase may be used when considering short-term loading and seismic forces. All foundations shall be reinforced a minimum of one No. 4 bar, top and bottom. A representative of this firm shall inspect all foundation excavations prior to pouring concrete.

8.4 **Settlement Analysis**

Resultant pressure curves for the consolidation tests are shown on Plates B and C. Computations utilizing these curves and the recommended allowable soil bearing capacities reveal that the foundations will experience settlements on the order of ¾ inch and differential settlements of less than ¼ inch.

8.5 **Lateral Resistance**

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction - 0.35

Equivalent Passive Fluid Pressure = 200 lbs./cu.ft.

Maximum Passive Pressure = 2,000 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils or competent native materials.

8.6 **Retaining Wall Design Parameters**

Active earth pressures against retaining walls will be equal to the pressures developed by the following fluid densities. These values are for **granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. An equivalent fluid pressure of 45 pcf may be utilized for the restrained wall condition with a level grade behind the wall.

The seismic-induced lateral soil pressure for walls greater than 6 feet may be computed using a triangular pressure distribution with the maximum value at the top of the wall. The maximum lateral pressure of (20 pcf) H where H is the height of the retained soils above the wall footing should be used in final design of retaining walls. Sliding resistance values and passive fluid pressure values may be increased by 1/3 during short-term wind and seismic loading conditions.

All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system. The subsurface drainage system shall consist of a 4-inch diameter perforated PVC pipe encased with gravel and wrapped with filter fabric. The granular backfill to be utilized immediately adjacent to retaining walls shall consist of an approved granular soil with a sand equivalency greater than 30. This backfill zone of free draining material shall consist of a wedge beginning a minimum of one horizontal foot from the base of the wall extending upward at an inclination of no less than ¾ to 1 (horizontal to vertical).

8.7 Slab Design

All slabs shall be a minimum of four inches in thickness reinforced a minimum of No. 3 bars, sixteen inches in each direction and placed on approved subgrade soils. The subgrade soils shall be moisture conditioned 3% over optimum moisture levels in the upper eighteen inches. All concrete slabs for hardscape and driveway areas situated near existing street levels shall be a minimum of four inches in thickness and placed on approved subgrade soils. The subgrade soils shall be moisture conditioned over optimum moisture levels in the upper foot.

A vapor retarder should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs.*

The moisture retarder may be placed directly upon compacted subgrade soils conditioned to near optimum moisture levels, although one to two inches of sand beneath the membrane is desirable. The subgrade upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

8.8 Pavement Section Design

The table below provides a preliminary pavement design based upon a R-Value of 33 for the subgrade soils for the proposed pavement areas. Final pavement design may need to be based on R-Value testing of the subgrade soils near the conclusion of site grading to assure that these soils are consistent with those assumed in this preliminary design.

Type of Traffic	Traffic Index	Asphalt (in.)	Base Material (in.)
Automobile Parking Stalls	4.0	3.0	4.0
Light Vehicle Traffic Areas	5.5	3.5	6.5

Any concrete slab-on-grade in pavement areas shall be a minimum of six inches in thickness reinforced and placed on approved subgrade soils. All pavement areas shall have positive drainage toward an approved outlet from the site. Drain lines behind curbs and/or adjacent to landscape areas should be considered by client and the appropriate design engineers to prevent water from infiltrating beneath pavement. If such infiltration occurs, damage to pavement, curbs and flow lines, especially on sites with expansive soils, may occur during the life of the project.

Any approved base material shall consist of a Class II aggregate or equivalent and should be compacted to a minimum of 95% relative compaction. All pavement materials shall conform to the requirements set forth by the City of Riverside. The base material; and asphaltic concrete should be tested prior to delivery to the site and during placement to determine conformance with the project specifications. A pavement engineer shall designate the specific asphalt mix design to meet the required project specifications.

8.9 **Utility Trench and Excavation Backfill**

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded with clean sand having a sand equivalency rating of 30 or more. This bedding material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

8.10 **Corrosion Design Criteria**

Representative samples of the surficial soils, typical of the subgrade soils expected to be encountered within foundation excavations and underground utilities were tested for corrosion potential. The minimum resistivity value obtained for the samples tested is representative of an environment that may be severely corrosive to metals. The soil pH value was considered to be neutral and may not have a significant effect on soil corrosivity.

Consideration should be given to corrosion protection systems for buried metal such as protective coatings, wrappings or the use of PVC where permitted by local building codes. According to Table 4.3.1 of ACI 318 Building Code and Commentary, these contents revealed negligible sulfate concentrations. Therefore, a Type II cement according to latest CBC specifications may be utilized for building foundations at this time. It is recommended that additional sulfate tests be performed at the completion of site grading to assure that the as graded conditions are consistent with the recommendations stated in this design. Corrosion test results may be found on the attached Table III.

8.11 **Expansive Soil**

The upper on-site soils are low un expansion potential (EI 21-50). When soils have an expansion index (EI) of 20 or more, special attention should be given to the project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance. Expansion test results may be found on the attached Table II.

9.0 Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

This firm should have the opportunity to review the final plans (72 hours required) to verify that all our recommendations are incorporated. This report and all conclusions are subject to the review of the controlling authorities for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and soil engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker
Project Engineer
R.G.E. 841

REGISTERED PROFESSIONAL ENGINEER
KEITH D. TUCKER
No. 841
Exp. 12/31/2022
GEOTECHNICAL
STATE OF CALIFORNIA

Mike Barone
Project Manager

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation

Any existing low-density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Geotechnical Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557).

In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

Material for Fill

The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Geotechnical Engineering firm a minimum of 72 hours prior to importation of site.

Placement of Compacted Fill Soils

The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Geotechnical Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Geotechnical Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Geotechnical Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Geotechnical Engineering firm as deemed necessary. A 24-hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Geotechnical Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades should be designed to the latest building code and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

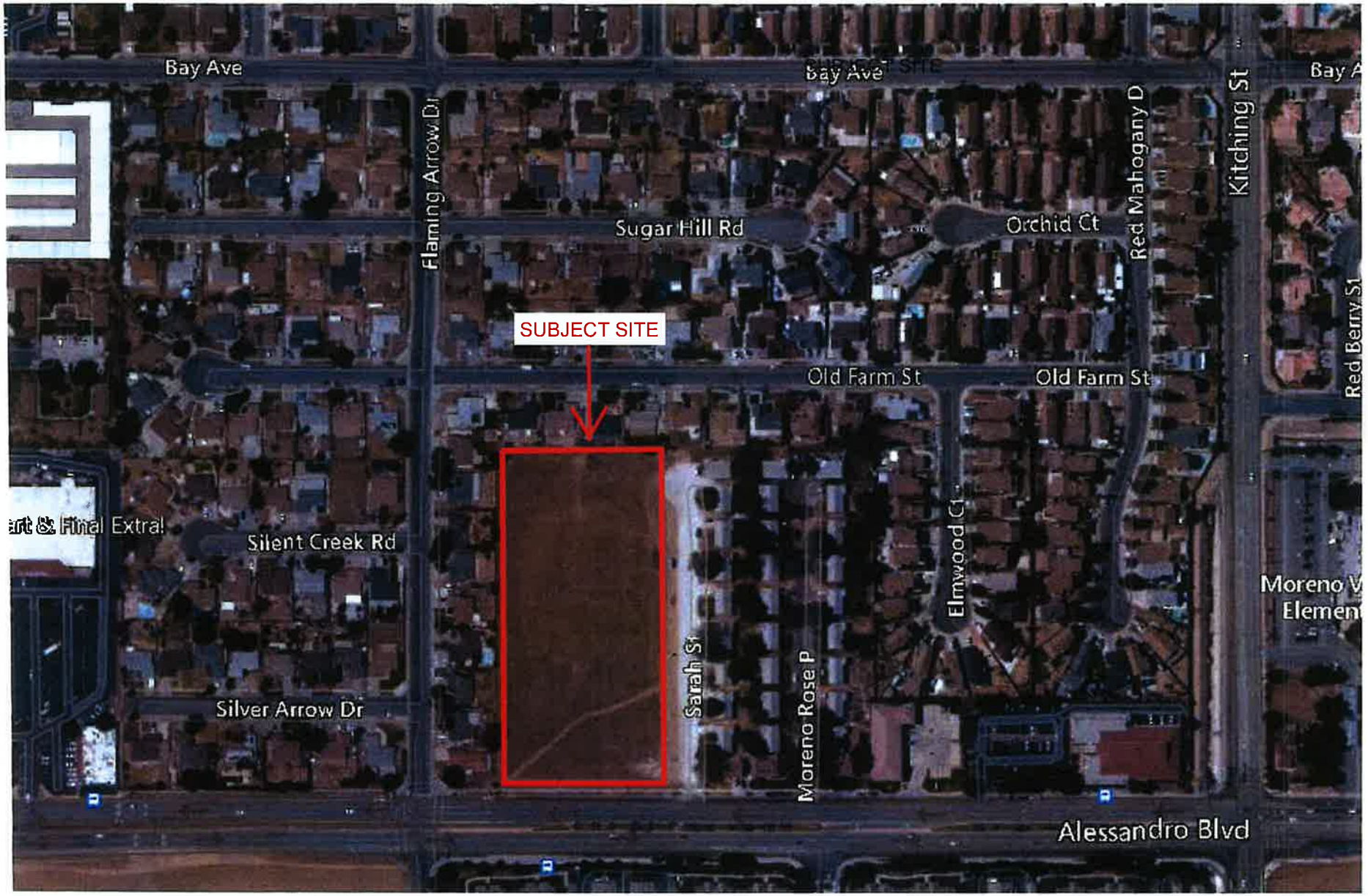
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

TRAN CHUNG

PROJECT: 22686-21 | DATE: AUGUST 2021

VICINITY MAP

1" = +/- 50'

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

TRAN CHUNG

PROJECT 22686-21 **DATE** AUGUST 2021

SITE PLAN

List of Appendices
(in order of appearance)

Appendix A
Log of Excavations

Tran Chung 22686-21	Log of Trench T-1

Boring Location: Alessandro & Flaming Arrow, Moreno Valle	
Date of Drilling: 7/23/21	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples		Laboratory		
			Type	Blow Counts	Moisture	Dry Density	Fines Content %
0		FILL Clayey silty SAND with occasional gravel, concrete Brown, medium stiff, dry					
		NATURAL Silty sandy CLAY Brown, stiff, damp					
5		GWT not encountered Trench completed at depth of 5'					
10							
15							
20							
25							
30							
35							

NorCal Engineering

Tran Chung 22686-21	Log of Trench T-2

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | **Groundwater Depth:** None Encountered

Drilling Method: Backhoe

Hammer Weight: | **Drop:**

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional rootlets Brown, medium stiff, dry					
		NATURAL Silty sandy CLAY Brown, stiff, damp					
5							
		Silty (fine to coarse grained) SAND with occasional gravel Brown, dense, moist					
10		Trench completed at depth of 10'					
15							
20							
25							
30							
35							

NorCal Engineering

Tran Chung
22686-21

Log of Trench T-3

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional gravel, rootlets Brown, medium stiff, dry	▽ ■		4.1	117.1	
		NATURAL Silty sandy CLAY Brown, medium stiff, damp					
5			■		6.0	111.0	
10			■		6.5	92.8	
		Silty (fine to coarse grained) SAND with occasional gravel Brown, dense, moist					
		Silty CLAY Brown, stiff, moist					
15			■		11.9	105.5	
		Trench completed at depth of 16'					
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Tran Chung
22686-21

Log of Trench T-4

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional rootlets Brown, soft, dry	■		2.0	108.1	
		NATURAL Silty sandy CLAY Brown, medium stiff, dry to damp					
5		GWT not encountered					
10		Trench completed at depth of 10'					
15							
20							
25							
30							
35							

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NorCal Engineering

Tran Chung
22686-21

Log of Trench T-5

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional gravel, rootlets Brown, soft, dry					
		NATURAL Silty sandy CLAY Brown, stiff, damp	■		3.4	111.3	
5		GWT not encountered					
		Sandy CLAY Brown, stiff, damp	■		8.6	106.6	
10		Silty CLAY Brown, stiff, damp	☑		8.5		
		Trench completed at depth of 12.5'					
15							
20							
25							
30							
35							

Tran Chung 22686-21	Log of Trench T-6

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional gravel, concrete Brown, soft, dry	■		6.2	111.9	
		NATURAL Silty sandy CLAY Brown, stiff, damp	■		5.5	117.9	
5		GWT not encountered					
10		Trench completed at depth of 10'					
15							
20							
25							
30							
35							

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Tran Chung
22686-21

Log of Trench T-7

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional rootlets Brown, soft, dry					
		NATURAL Silty sandy CLAY Brown, stiff, damp	■		3.6	114.3	
5		GWT not encountered					
10		Silty (fine to coarse grained) SAND with occasional gravel Brown, dense, damp					
		Trench completed at depth of 11'					
15							
20							
25							
30							
35							

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NorCal Engineering

Tran Chung
22686-21

Log of Trench T-8

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional gravel, rootlets Brown, medium stiff, dry					
		NATURAL Silty sandy CLAY Brown, stiff, damp	■		4.9	114.3	
5		Trench completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Tran Chung
22686-21

Log of Trench T-9

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | **Groundwater Depth:** None Encountered

Drilling Method: Backhoe

Hammer Weight: | **Drop:**

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey silty SAND with occasional gravel Brown, medium stiff, dry					
		NATURAL Silty sandy CLAY Brown, medium stiff, damp	■		4.4	111.8	
5		GWT not encountered					
10		Silty (fine to coarse grained) SAND with occasional gravel Brown, dense, damp Trench completed at depth of 10'					
15							
20							
25							
30							
35							

Tran Chung
22686-21

Log of Trench T-10

Boring Location: Alessandro & Flaming Arrow, Moreno Valle

Date of Drilling: 7/23/21 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL					
		Clayey silty SAND with occasional rootlets					
		Brown, medium stiff, dry	■		1.3	116.7	
		NATURAL					
		Silty sandy CLAY					
5		Brown, stiff, dry to damp	■		4.7	114.6	
		Trench completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\22686-21.log Date: 8/24/2021

NorCal Engineering

Appendix B
Laboratory Tests

TABLE I
MAXIMUM DENSITY TESTS

Sample	Classification	Optimum Moisture (%)	Maximum Dry Density (lbs/cu.ft)
T3 @ 1'	Silty Sandy CLAY	10.5	128.0

TABLE II
EXPANSION TESTS

Sample	Classification	Expansion Index
T3 @ 1'	Silty Sandy CLAY	33

TABLE III
ATTERBERG LIMITS

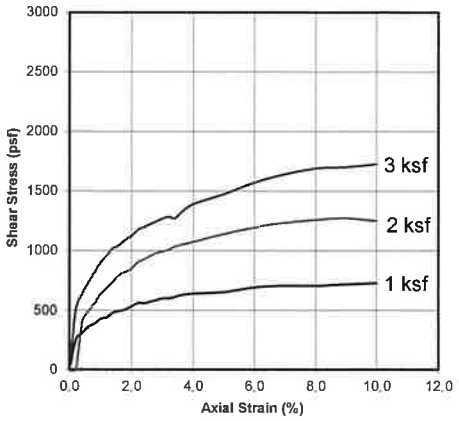
Sample	Liquid Limit	Plastic Limit	Plasticity Index
T-3 @ 5'	18	17	1
T-3 @ 10'	26	17	9

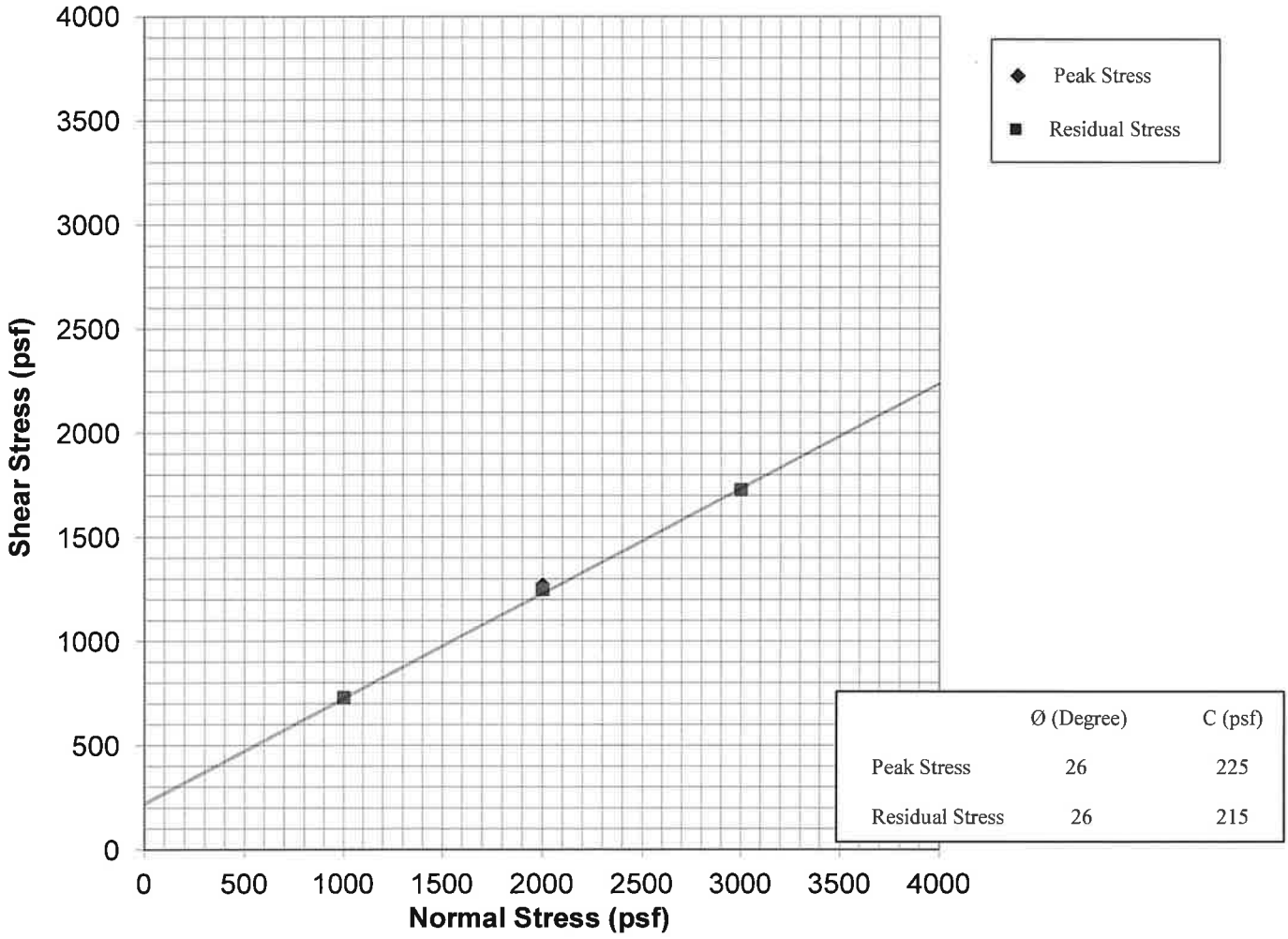
TABLE IV
CORROSION TESTS

Sample	pH	Electrical Resistivity	Sulfate (%)	Chloride (ppm)
T-3 @ 1'	7.0	15,320	N.D.	111

% by weight
ppm – mg/kg
N.D. = Non-Detect

Sample No.		T6@2'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Silty Sandy Clay		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	730	1273	1728
Displacement	(in)	0.250	0.225	0.250
Residual Stress	(psf)	730	1250	1728
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	111.9	111.9	111.9
In Situ Water Content	(%)	6.2	6.2	6.2
Saturated Water Content	(%)	18.7	18.7	18.7
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	26	225
Residual Stress	26	215

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Tran Chung

PROJECT NUMBER: 22686-21 DATE: 8/17/2021

DIRECT SHEAR TEST

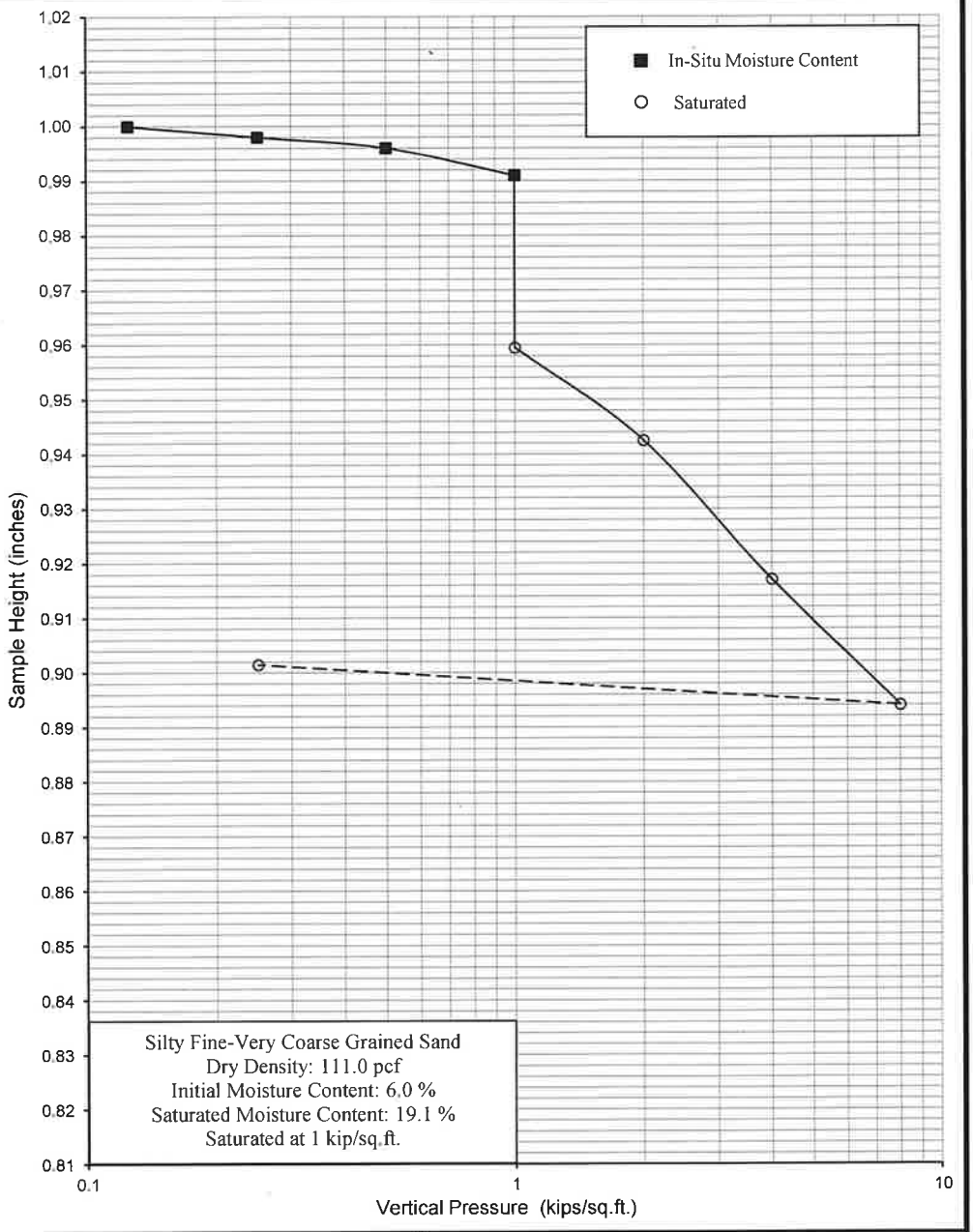
ASTM D3080

Plate A

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9960	0.4	
1	0.9910	0.9	
1	0.9595	4.1	
2	0.9425	5.8	
4	0.9170	8.3	
8	0.8940	10.6	
0.25	0.9015	9.9	Saturated

Sample No.	T3	Depth	5'	Date	8/17/2021

Date Tested: 8/12/2021
Sample: T3
Depth: 5'



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Tran Chung

PROJECT NUMBER: 22686-21 DATE: 8/17/2021

CONSOLIDATION TEST

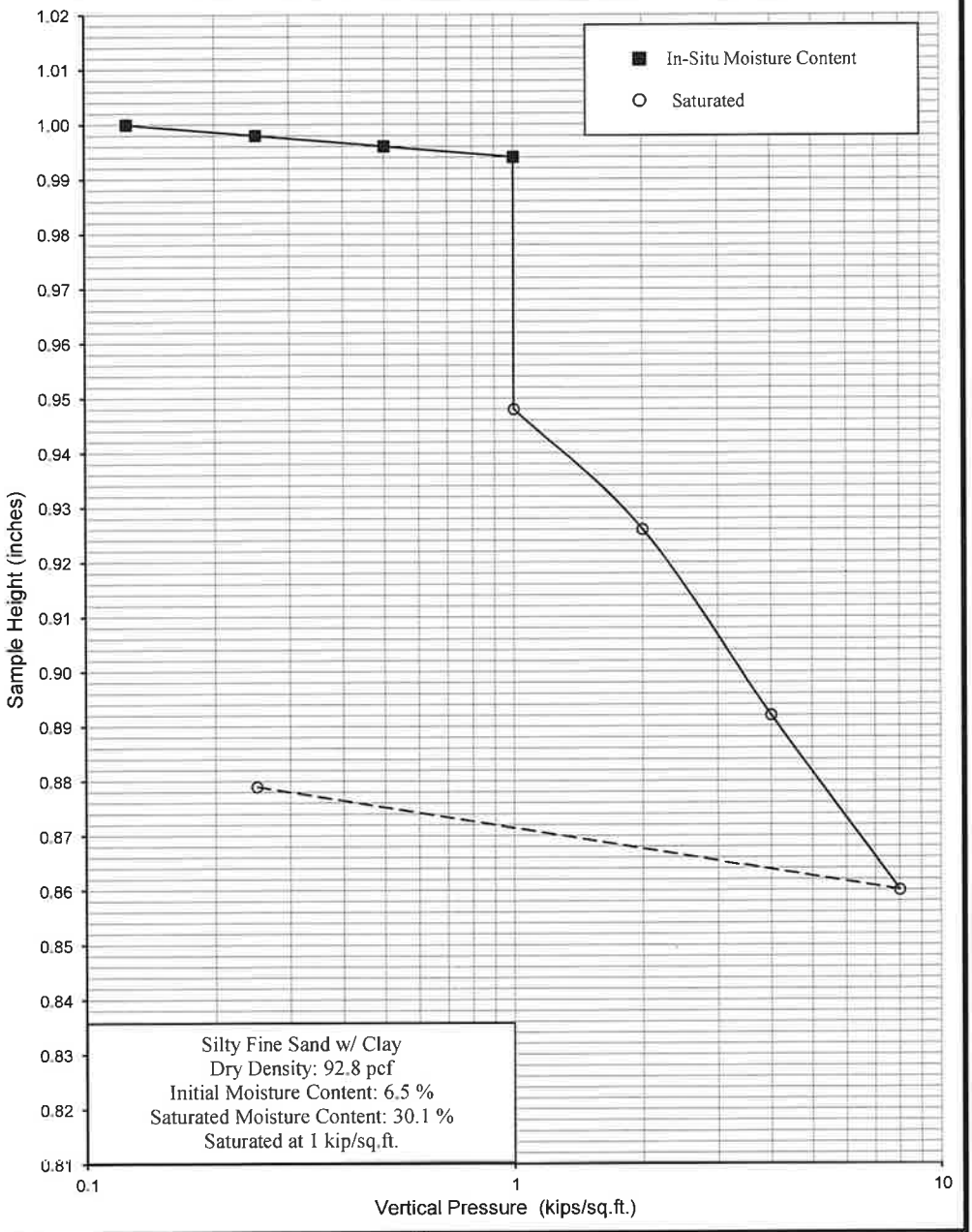
ASTM D2435

Plate B

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9980	0.2	
0.5	0.9960	0.4	
1	0.9940	0.6	
1	0.9480	5.2	Saturated
2	0.9260	7.4	
4	0.8920	10.8	
8	0.8600	14.0	
0.25	0.8790	12.1	

Date Tested:	**8/12/2021**
Sample:	**T3**
Depth:	**10'**

Sample No.	T3	Depth	10'	Date	8/17/2021



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Tran Chung

PROJECT NUMBER: 22686-21 DATE: 8/17/2021

CONSOLIDATION TEST

ASTM D2435

Plate C

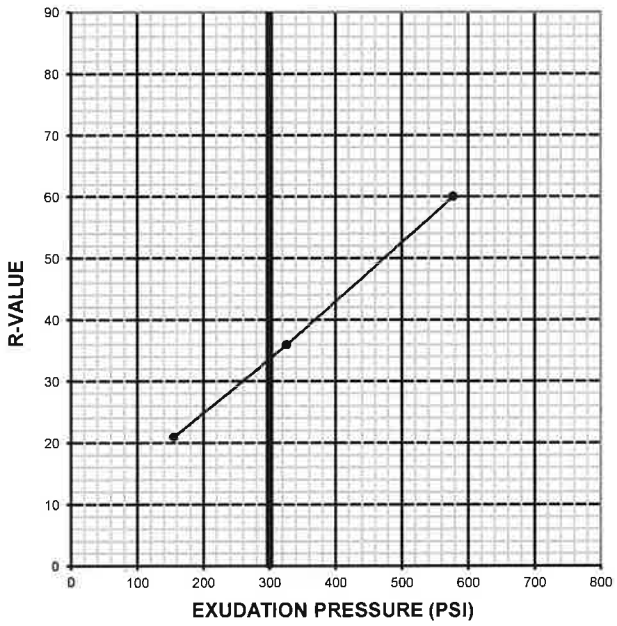
R-VALUE TEST REPORT

☑ CT-301 ☐ ASTM-D2844

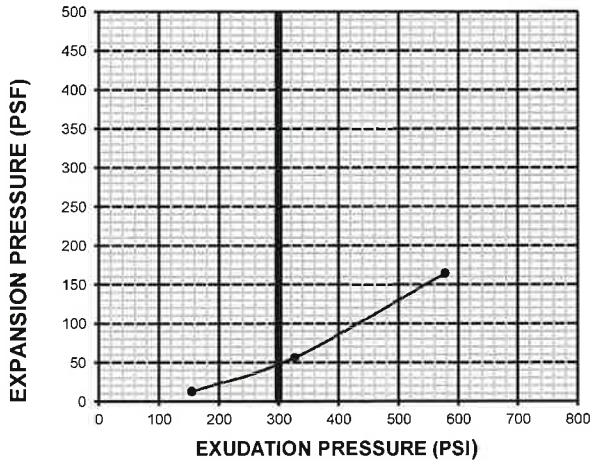
PROJECT NAME:	Norcal: Tran Cheng 22686-21	PROJECT NUMBER:	L-210801
SAMPLE LOCATION:	N of Alessandro Boulevard and E of Flaming Arrow Drive, Moreno Valley	SAMPLE NUMBER:	T1
SAMPLE DESCRIPTION:	CLAYEY SAND (SC), brown	SAMPLE DEPTH:	2'
SAMPLED BY:	Norcal 7/23/21	TESTED BY:	ER
		DATE TESTED:	8/8/2021

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	8.7	9.7	10.7
WEIGHT OF SAMPLE, grams	1042	1086	1124
HEIGHT OF SAMPLE, Inches	2.33	2.35	2.48
DRY DENSITY, pcf	124.8	127.7	124.1
COMPACTOR AIR PRESSURE, psi	280	220	130
EXUDATION PRESSURE, psi	577	326	155
EXPANSION, Inches x 10exp-4	38	13	3
STABILITY Ph 2,000 lbs (160 psi)	40	72	100
TURNS DISPLACEMENT	4.07	4.68	5.80
R-VALUE UNCORRECTED	65	40	21
R-VALUE CORRECTED	60	36	21
EXPANSION PRESSURE (psf)	164.2	56.2	13.0

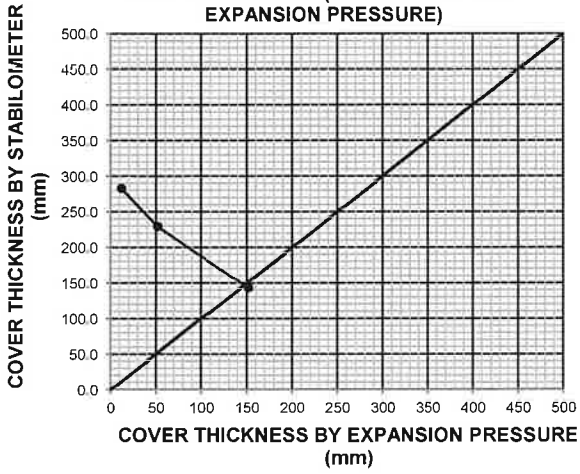
R-VALUE VS. EXUDATION PRESSURE



EXPANSION PRESSURE VS. EXUDATION PRESSURE



COVER THICKNESS (STABILOMETER BY EXPANSION PRESSURE)



R-VALUE AT EQUILIBRIUM:	33

R-VALUE BY EXUDATION PRESSURE:	33
R-VALUE BY EXPANSION PRESSURE:	58
EXPANSION PRESSURE AT 300 PSI EXUDATION:	45
TRAFFIC INDEX (Assumed):	5.5
GRAVEL FACTOR (Assumed):	1.5
UNIT MASS OF COVER MATERIAL, kg/m^3 (Assumed):	2100.0

Appendix C
Seismic Hazard Report

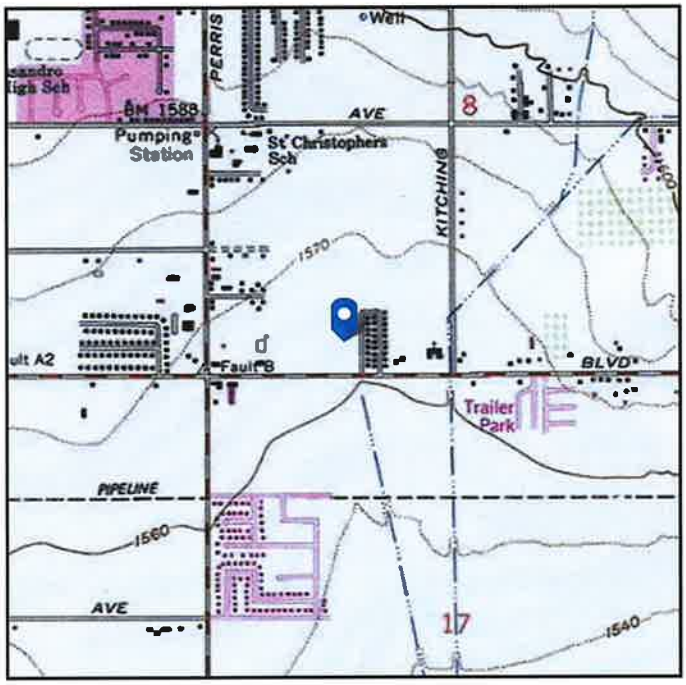
NorCal Engineering

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 1566.66 ft (NAVD 88)
Latitude: 33.918062
Longitude: -117.221483



ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.653	S_{D1} :	N/A
S_1 :	0.644	T_L :	8
F_a :	1	PGA :	0.7
F_v :	N/A	PGA_M :	0.77
S_{MS} :	1.653	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.102	C_v :	1.431

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Wed Aug 25 2021

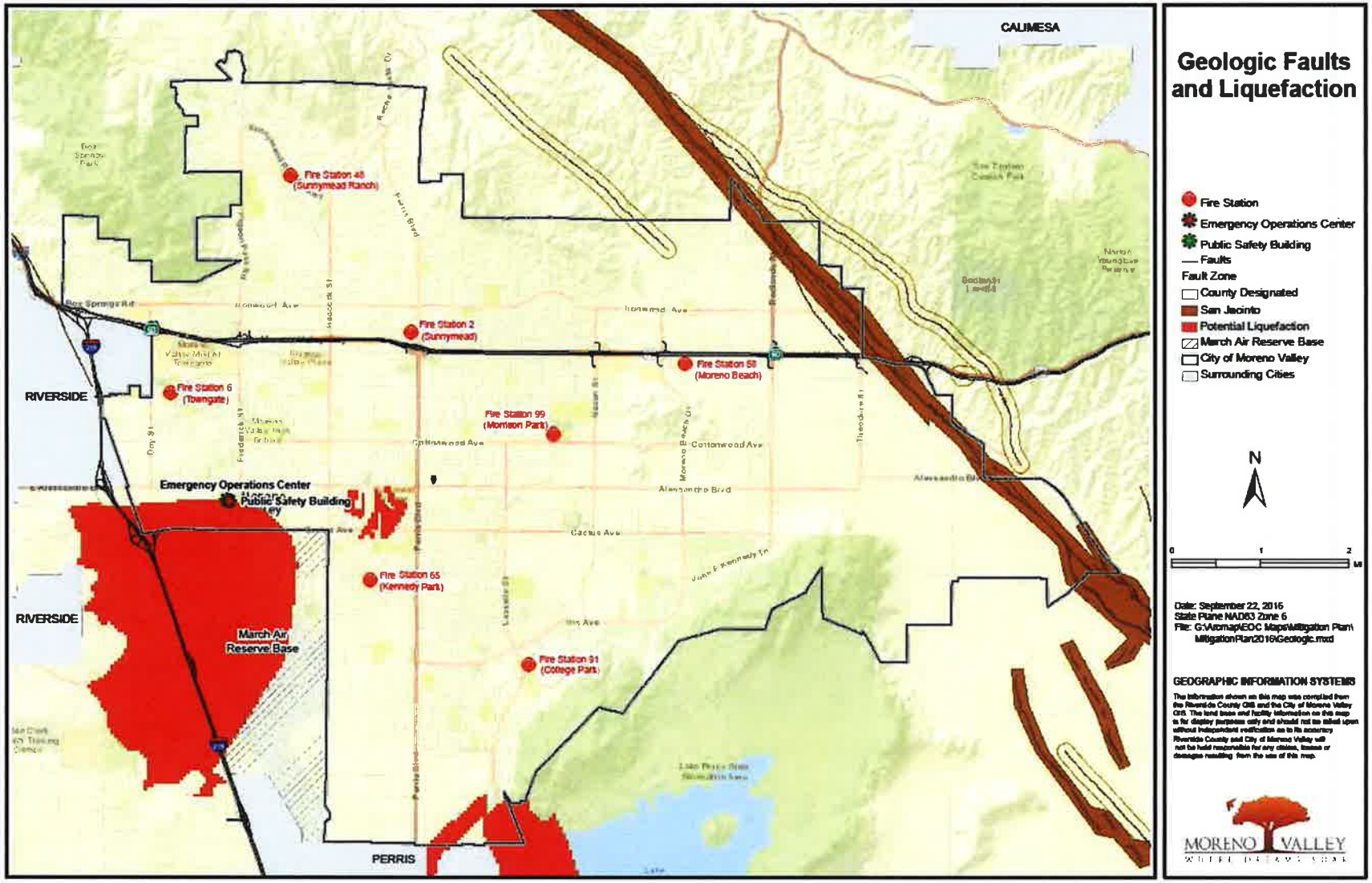
Date Source: USGS Seismic Design Maps

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Figure 4-1.1: Moreno Valley Geologic Faults and Liquefaction



Appendix D
Soil Infiltration Data

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Tran Chung
Project No.: 22686-21
Date: 7/23/2021
Test No. 1
Depth: 5'
Tested By: D.L.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
7:58			100.7			37.6					
8:13	15	15	101.6	0.9		38.1	0.5				
8:13			101.6			38.1					
8:28	15	30	102.6	1.0		38.6	0.5				
8:28			102.6			38.6					
8:43	15	45	103.6	1.0		39.3	0.7				
8:43			103.6			39.3					
8:58	15	60	104.4	0.8		40.0	0.7				
8:58			104.4			40.0					
9:13	15	75	105.1	0.7		40.6	0.6				
9:13			105.1			40.6					
9:28	15	90	105.9	0.8		41.1	0.5				
9:28			105.9			41.1					
9:43	15	105	106.6	0.7		41.7	0.6		2.8	2.4	
9:43			104.2			40.6					
9:58	15	120	104.6	0.4		41.1	0.5		1.6	2.0	
9:58			104.6			41.1					
10:13	15	135	104.9	0.3		41.5	0.4		1.2	1.6	
10:13			104.9			41.5					
10:28	15	150	105.2	0.3		41.9	0.4		1.2	1.6	
10:28			105.2			41.9					
10:43	15	165	105.4	0.2		42.3	0.4		0.8	1.6	
10:43			105.4			42.3					
10:58	15	180	105.2	0.3		42.9	0.6		1.2	2.4	

Average = 1.46 / 1.93 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Tran Chung
Project No.: 22686-21
Date: 7/23/2021
Test No. 2
Depth: 10'
Tested By: D.L.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
9:09			132.1			42.0					
9:24	15	15	132.5	0.4		43.0	1.0				
9:24			132.5			43.0					
9:39	15	30	133.0	0.5		43.8	0.8				
9:39			133.0			43.8					
9:54	15	45	133.6	0.6		44.7	0.9				
9:54			133.6			44.7					
10:09	15	60	134.2	0.6		45.5	0.8				
10:09			134.2			45.5					
10:24	15	75	134.4	0.2		46.1	0.6				
10:24			134.4			46.1					
10:39	15	90	137.7	0.3		46.8	0.7				
10:39			137.7			46.8					
10:54	15	105	138.1	0.4		47.5	0.7		1.6	2.8	
10:54			138.1			47.5					
11:09	15	120	138.5	0.4		48.1	0.6		1.6	2.4	
11:09			138.5			48.1					
11:24	15	135	138.8	0.3		48.8	0.7		1.2	2.8	
11:24			128.8			41.2					
11:39	15	150	129.1	0.3		42.1	0.9		1.2	3.6	
11:39			129.1			42.1					
11:54	15	165	129.6	0.6		42.9	0.8		2.4	3.2	
11:54			129.6			42.9					
12:09	15	180	130.0	0.4		43.5	0.6		1.6	2.4	

Average = 1.6 / 2.86 cm/hr

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 1	*7132*	*Mixed Surface Types*	*0.46*	*0.31*	*2243.1*			
	7132		***Total***		**2243.1**	**0.67**	***125.2***	***140***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Waber Consultants, Inc. — Date: 10/20/2022

Designed by: Mahir Waber P.E., LEED AP — Case No: LWQ21-0055

Company Project Number/Name: 21036 VALLEY GARDENS

BMP Identification

BMP NAME / ID: AREA - 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 2	*16281*	*Mixed Surface Types*	*0.427*	*0.30*	*4804.2*			
	16281	***Total***			**4804.2**	**0.67**	***268.2***	***294***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 3	*8349*	*Mixed Surface Types*	*0.451*	*0.31*	*2580.9*			
	8349		*Total*		*2580.9*	*0.67*	*144.1*	*171.5*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 4	*20137*	*Mixed Surface Types*	*0.878*	*0.70*	*14075.9*			
	20137		*Total*		14075.9	0.67	*785.9*	*799*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 5	*52491*	*Mixed Surface Types*	*0.836*	*0.64*	*33764*			
	52491		*Total*		33764	0.67	*1885.2*	*2025*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 6	*6208*	*Mixed Surface Types*	*0.577*	*0.39*	*2431.9*			
	6208		*Total*		*2431.9*	*0.67*	*135.8*	*141.75*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 7	*4622*	*Mixed Surface Types*	*0.734*	*0.53*	*2436.6*			
	4622		*Total*		*2436.6*	*0.67*	*136*	*141*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Waber Consultants, Inc. Date: 10/20/2022

Designed by: Mahir Waber P.E., LEED AP Case No: LWQ21-0055

Company Project Number/Name: 21036 VALLEY GARDENS

BMP Identification

BMP NAME / ID: AREA - 8

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 8	*13004*	*Mixed Surface Types*	*0.517*	*0.35*	*4554.5*			
	13004	***Total***			**4554.5**	**0.67**	**254.3**	**262**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Waber Consultants, Inc. — Date: 10/20/2022

Designed by: Mahir Waber P.E., LEED AP — Case No: LWQ21-0055

Company Project Number/Name: 21036 VALLEY GARDENS

BMP Identification

BMP NAME / ID: AREA - 9

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 9	*16061*	*Mixed Surface Types*	*0.446*	*0.31*	*4917.4*			
	16061	***Total***			**4917.4**	**0.67**	***274.6***	***278***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 10

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 10	*6166*	*Mixed Surface Types*	*0.533*	*0.36*	*2225.1*			
	6166		***Total***		**2225.1**	**0.67**	***124.2***	***141.75***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 11

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 11	*4491*	*Mixed Surface Types*	*0.662*	*0.46*	*2063.5*			
	4491		*Total*		*2063.5*	*0.67*	*115.2*	*115.3*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 12

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 12	*9569*	*Mixed Surface Types*	*0.467*	*0.32*	*3050*			
	9569		*Total*		*3050*	*0.67*	*170.3*	*182*

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Waber Consultants, Inc. — Date: 10/20/2022

Designed by: Mahir Waber P.E., LEED AP — Case No: LWQ21-0055

Company Project Number/Name: 21036 VALLEY GARDENS

BMP Identification

BMP NAME / ID: AREA - 13

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 13	*13708*	*Mixed Surface Types*	*0.55*	*0.37*	*5106.2*			
	13708	**Total**			**5106.2**	**0.67**	**285.1**	**336**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 14

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 14	*6330*	*Mixed Surface Types*	*0.787*	*0.58*	*3698.3*			
	6330		***Total***		**3698.3**	**0.67**	***206.5***	***206.5***

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Waber Consultants, Inc.
Date: 10/20/2022
Designed by: Mahir Waber P.E., LEED AP
Case No: LWQ21-0055
Company Project Number/Name: 21036 VALLEY GARDENS

BMP Identification

BMP NAME / ID: AREA - 15

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 15	*10244*	*Mixed Surface Types*	*0.899*	*0.73*	*7466.1*			
	10244	**Total**			**7466.1**	**0.67**	**416.9**	**417**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 16

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 16	*5726*	*Mixed Surface Types*	*0.705*	*0.50*	*2855.2*			
	5726	**Total**			**2855.2**	**0.67**	**159.4**	**169**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Waber Consultants, Inc.	Date	10/20/2022
Designed by	Mahir Waber P.E., LEED AP	Case No	LWQ21-0055
Company Project Number/Name	21036 VALLEY GARDENS		

BMP Identification

BMP NAME / ID: AREA - 17

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.67 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Area - 17	*10676*	*Concrete or Asphalt*	*1*	*0.89*	*9523*			
	10676	***Total***			**9523**	**0.67**	***531.7***	***532***

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 1	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.16 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 125 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 14.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.75 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 72 ft^2

Proposed Surface Area A= 80 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 2	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.37	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	268	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	13.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.75	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	154	ft^2
Proposed Surface Area	A=	168	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 3	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.19	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	144	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	15.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.75	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	83	ft^2
Proposed Surface Area	A=	98	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 4	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.46	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	786	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	16.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.76	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	448	ft^2
Proposed Surface Area	A=	454	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 5	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	1.21	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,885	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	18.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.76	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	1,071	ft^2
Proposed Surface Area	A=	1,151	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 6	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.14	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	136	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	13.5	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.75	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	78	ft^2
Proposed Surface Area	A=	81	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 7	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.11 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 136 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 12.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.74 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M = 79 ft^2

Proposed Surface Area A= 81 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 8	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T= 0.3 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 254 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 17.5 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.76 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M = 145 ft^2

Proposed Surface Area A= 149 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 9	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.37 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 275 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 13.5 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.75 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M = 158 ft^2

Proposed Surface Area A= 159 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 10	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.14 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 124 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 13.5 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.75 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 72 ft^2

Proposed Surface Area A= 81 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 11	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.1	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	115	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	9.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.72	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	67	ft^2
Proposed Surface Area	A=	67	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 12	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.22	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	170	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	13.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.75	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	98	ft^2
Proposed Surface Area	A=	104	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 13	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.31 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 285 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 13.5 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.75 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$ A_M = 164 ft^2

Proposed Surface Area A= 192 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 14	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.15 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 206 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 11.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.74 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 119 ft^2

Proposed Surface Area A= 118 ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 15	Legend:	Required Entries / Calculated Cells

Company Name: Waber Consultants, Inc. Date: 20-Oct

Designed by: Mahir Waber County/City Case No.: LWQ21-00 55

Design Volume

Enter the area tributary to this feature A_T = 0.24 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 417 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 11.5 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.74 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 240 ft^2

Proposed Surface Area A= 238 ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0.5 %

6" Check Dam Spacing 0 feet

Describe Vegetation: Natural Grasses

Notes:

Bioretention Facility - Design Procedure	BMP ID: Basin 16	Legend:	Required Entries / Calculated Cells

Company Name:	Waber Consultants, Inc.	Date:	20-Oct
Designed by:	Mahir Waber	County/City Case No.:	LWQ21-00 55

Design Volume

Enter the area tributary to this feature	A_T=	0.13	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	159	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	12.5	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.74	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	92	ft^2
Proposed Surface Area	A=	97	ft^2

Bioretention Facility Properties

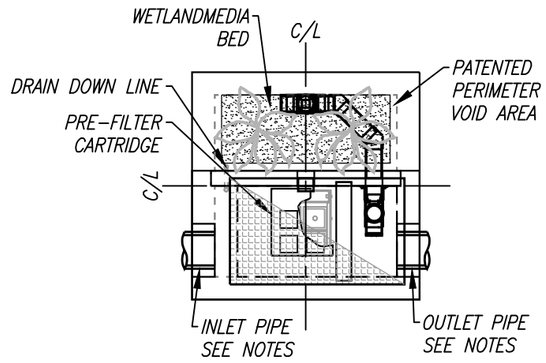
Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.5	%
6" Check Dam Spacing		0	feet

Describe Vegetation: Natural Grasses

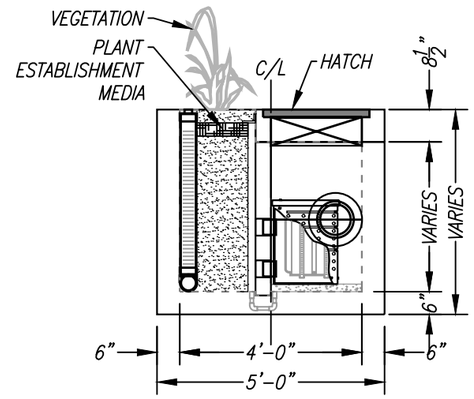
Notes:

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.052	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
FRAME & COVER	24" X 42"	OPEN PLANTER	N/A
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



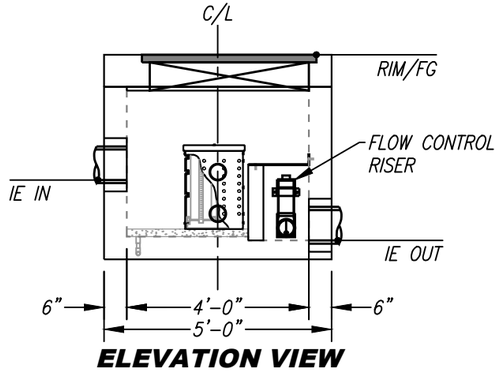
LEFT END VIEW

INSTALLATION NOTES

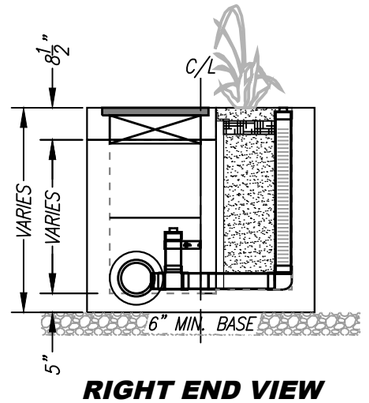
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

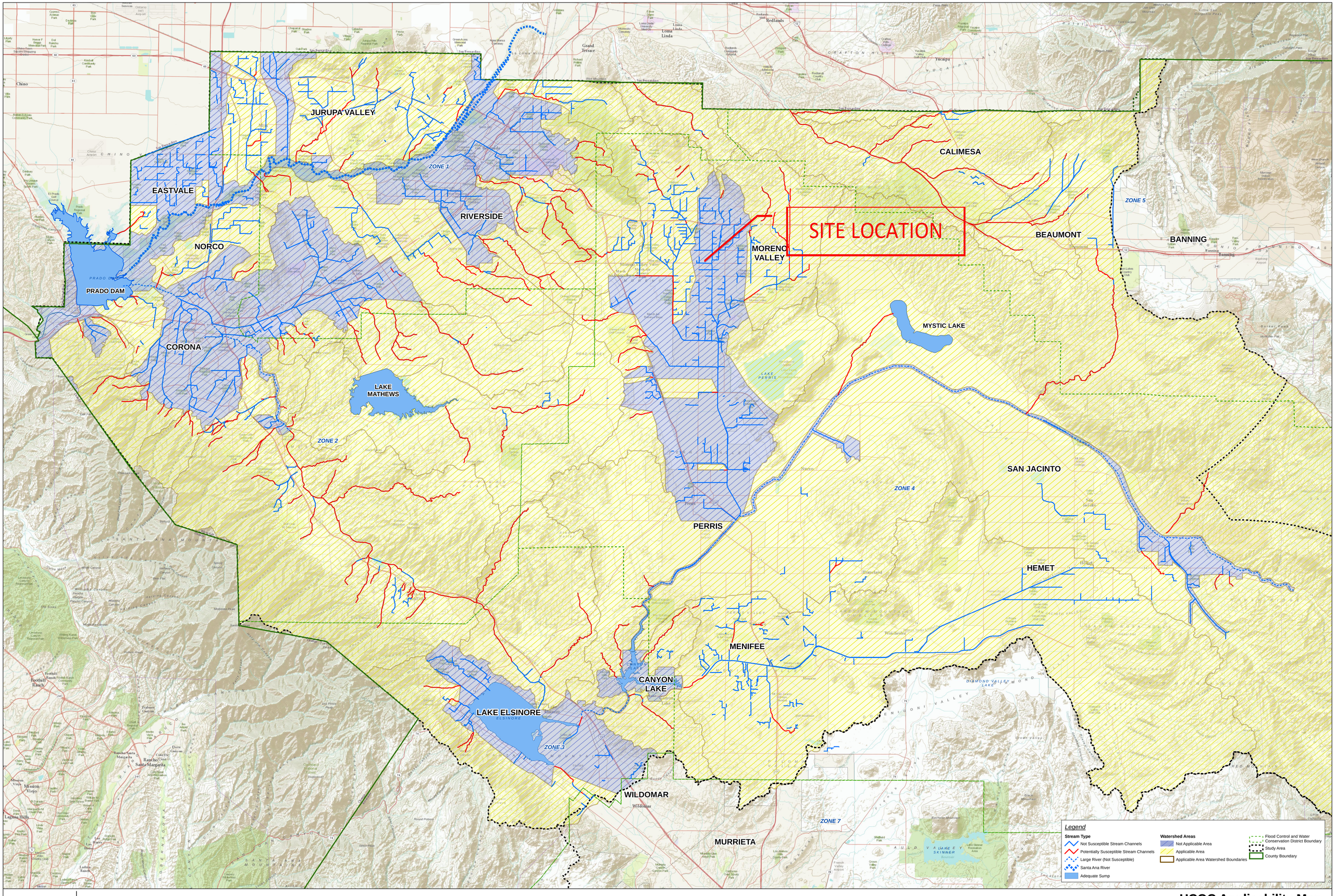
TREATMENT FLOW (CFS)	0.052
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	1.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-4-4-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19 10:LEF

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



HCOC Applicability Map

Hydromodification Susceptibility Documentation Report and Mapping
Riverside County Flood Control and Water Conservation District

Map 2

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☐ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☐ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ D1. **Need for future indoor & structural pest control**		☒ **Note building design features that discourage entry of pests.**	☒ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☒ D2. **Landscape/ Outdoor Pesticide Use**	☐ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☐ **Show self-retaining landscape areas, if any.** ☒ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☐ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☒ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ☐ **Consider using pest-resistant plants, especially adjacent to hardscape.** ☐ **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☐ **Maintain landscaping using minimum or no pesticides.** ☒ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☒ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ E. **Pools, spas, ponds, decorative fountains, and other water features.**	☐ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	☐ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ F. **Food service**	☐ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ☐ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	☐ **Describe the location and features of the designated cleaning area.** ☐ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
☒ G. **Refuse areas**	☒ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ☒ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ☐ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☒ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☒ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☒ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

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

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ N. **Fire Sprinkler Test Water**		☐ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	☐ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ☒ **Boiler drain lines** ☒ **Condensate drain lines** ☐ **Rooftop equipment** ☐ **Drainage sumps** ☒ **Roofing, gutters, and trim.** ☐ **Other sources**		☒ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ☒ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ☐ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ☒ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☐ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information