CITY OF PERRIS

DEVELOPMENT SERVICES DEPARTMENT
PLANNING DIVISION
MEMORANDUM

TO Alfredo Garcia, Project Planner
FROM: Cynthia Gabaldon P.E., CPSWQ, CPESC, QSD/P
DATE: August 11, 2021

RE: P20-00017
Phelan Perris
Nance Street and Webster Ave.
Perris, California

As part of the current Riverside County Municipal Waste Discharge Permit, the City of Perris is required to review all submitted Water Quality Management Plans (WQMP).

Two preliminary WQMP submittals for the commercial project submitted as P20-00017, Phelan Perris, Nance Street and Webster Ave., Perris, California. The project's preliminary WQMP submittal revised dated July 2021 (signed May 17, 2021) **was determined to be in substantial compliance, for a preliminary WQMP, in concept, with the requirements of the 2012 Riverside County WQMP Manual.**

The following conditions apply:

The development shall be subject to all provisions of City of Perris Ordinance Number 1194, which establishes stormwater/urban runoff management and discharge controls to improve water quality and comply with federal regulations, and any subsequent amendments, revisions, or ordinances pertaining thereto.

The structural BMPs selected for this project have been approved in concept. The owner shall submit a final WQMP including plans and details providing the elevations, slopes, and other details for the proposed structural BMPs including modular wetlands units, trash enclosure and self-retaining landscape. The Public Works Department shall review and approve the final WQMP text, plans and details.

The Modular Wetlands Units will need to be maintained to optimum efficiency for the life of the project.

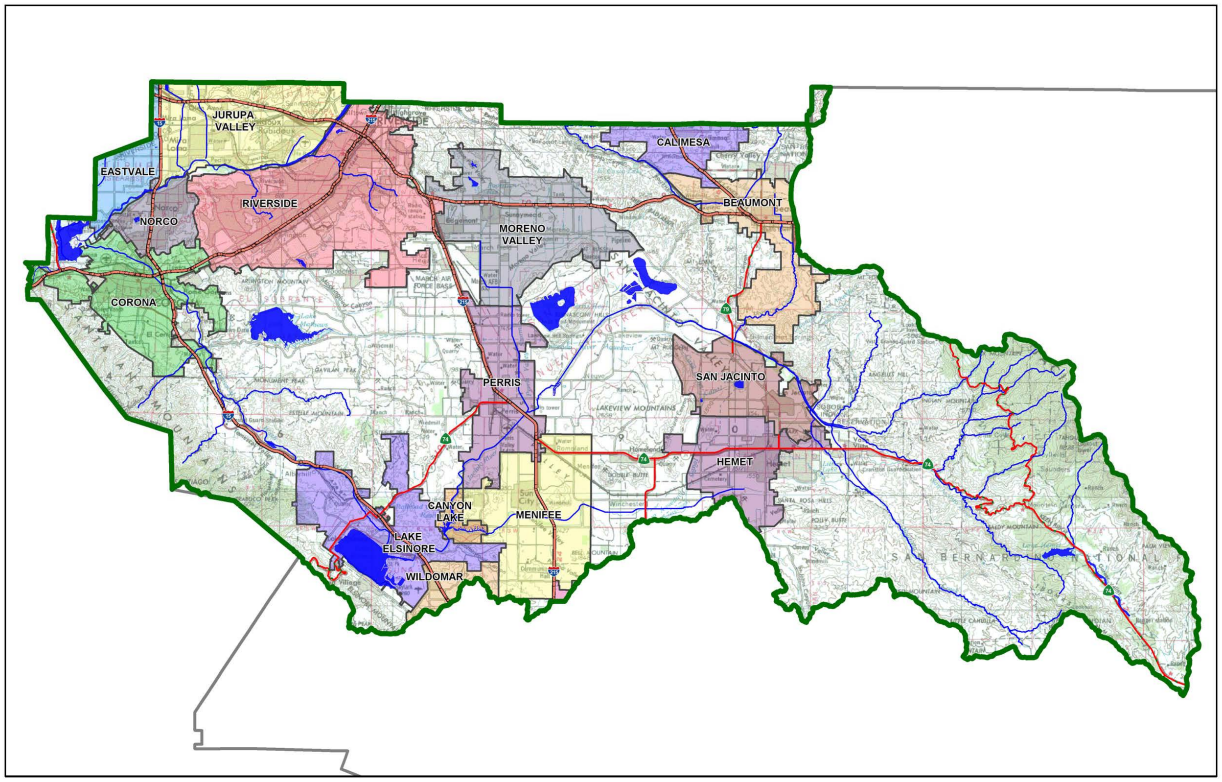
Project Specific Water Quality Management Plan

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

Project Title: Phelan Perris

Development No: TBD

Design Review/Case No: P20-00017



☒ **Preliminary**
☐ **Final**

Original Date Prepared: September 25, 2020

Revision Date(s): February 2, 2021

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

Contact Information:

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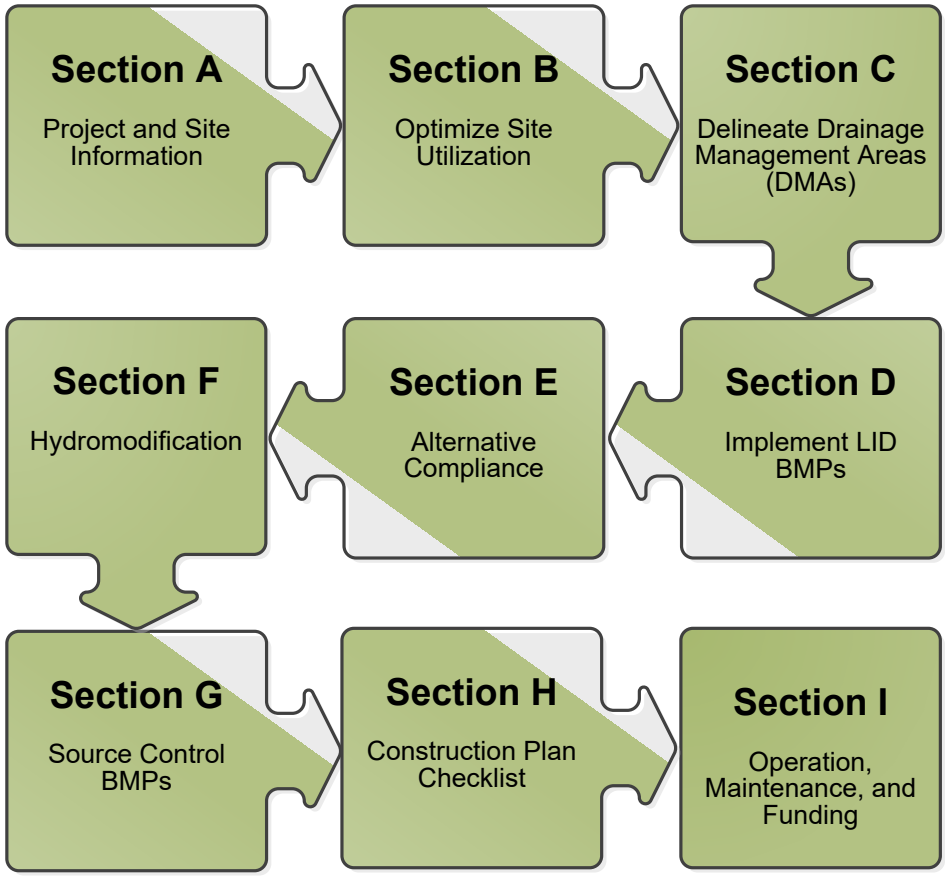
A Brief Introduction

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 Phelan Development Company by Tory R. Walker Engineering, Inc. for the Phelan Perris project (PLN No. P20-00017)

This WQMP is intended to comply with the requirements of the City of Perris 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 Perris Water Quality Ordinance 1194 (Municipal Code Section 14.22)

"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."

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

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	General Industrial (GI)
Planning Area:	Planning Area 1 (North Industrial)
Planning Region:	Perris Valley Commerce Center
Development Name:	Phelan Perris
PROJECT LOCATION	
Latitude & Longitude (DD): 33.8545°, -117.2431°	
Project Watershed and Sub-Watershed: Santa Ana (watershed), Perris Reservoir (subwatershed)	
Gross Acres: 5.0	
APN(s): 302-030-010	
Map Book and Page No.: Thomas Brothers, page TBD	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Light Industrial (LI)
Proposed or Potential SIC Code(s)	4225 (TBD)
Area of Impervious Project Footprint (SF)	221,144
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	206,305
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
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
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)	N/A
What is the Water Quality Design Storm Depth for the project?	0.62 inches

The Phelan Perris project is a proposed 5-acre industrial tilt up warehouse building in the City of Perris. The site is bounded by West Nance Street to the north, APN 302-030-012 to the east, APN 302-030-005 to the south, and North Webster Avenue to the west. The existing undeveloped site appears to be vacant, ultimately discharging to the Perris Valley Channel via concentrated street flow and the City of Perris MS4. Existing land cover consists of compacted pervious cover without vegetation. The existing site does not appear to receive run-on from adjacent right-of-way or properties. The proposed development includes a 108,000 square foot warehouse building, paved parking, self-retaining LID landscaped areas, and two BioClean Modular Wetlands underground biotreatment systems (models MWS-L-8-24-V and MWS-L-8-12-C for DMAs D/1 and D/2, respectively) for flow-based pollutant control. Infiltration was determined to be feasible for the project site. Pollutant sources are projected to include on-site storm drain inlets, landscape/outdoor pesticide use, refuse areas, loading docks, plazas, sidewalks, and parking lots.

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
Perris Valley Channel	N/A	AGR, GWR, REC1, REC2, WARM, WILD	N/A
San Jacinto River, Reach 3	N/A	AGR, GWR, REC1, REC2, WARM, WILD	N/A
Canyon Lake (Railroad Canyon Reservoir)	Nutrients	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
San Jacinto River, Reach 1	N/A	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
Lake Elsinore	DDT (Dichlorodiphenyl trichloroethane), Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls), Toxicity	REC1, REC2, WARM, WILD	N/A

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 – ***DEPENDENTS ON TENANT AND SPECIFIC PROPOSED INDUSTRIAL ACTIVITIES***	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* City of Perris Building Permit City of Perris Grading Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

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?

Existing drainage patterns have been identified, and the overall drainage pattern will be preserved. The existing site discharges to the storm drain within West Nance Street. The proposed development will also discharge directly to the existing storm drain within West Nance Street without flow diversion and with pollutant control provided for the 85th percentile 24-hour storm.

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

Existing vegetation is not present and therefore cannot be preserved.

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

The natural infiltration capacity has been identified as extremely limited per the site-specific geotechnical investigation, which concurs with working knowledge of the soils typically residing within the City of Perris. Therefore, natural infiltration capacity is a constraint.

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

Proposed impervious area has been limited to provide for essential proposed functions and safety (i.e., building footprint, parking, sidewalk, ADA compliance, etc.). The site will host business office and light industrial activities; therefore paved parking and drive aisles are necessary to support the vehicular traffic required by the proposed function.

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

All runoff will be dispersed to landscaped swales prior to reaching the proposed BMPs. Insufficient demand for harvest and use is a site constraint, therefore impervious area dispersion was considered as an LID opportunity.

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)[1][2]	Area (Sq. Ft.)	DMA Type
DMA D/1	Mixed*	145,505	Type D
DMA D/2	Mixed*	75,639	Type D

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

**Mixed surface types include roof areas, paved parking, LID BMPs, and self-retaining landscaped islands. Therefore, the associated BMPs have been conservatively over-sized by assuming these self-retaining areas produce runoff.*

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

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

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/1 SRA	Landscape	1,739	0.61	*D/1 SR**A***	0.10	0.62
D/2 SRA	Landscape	203	0.61	*D/2 SR**A***	0.10	0.62

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

**All non-sloping landscaped areas have been designed to be self-retaining. Self-retaining landscaped areas have been conservatively designed to provide 3 inches of retention depth for the complete tributary area thereto.*

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]
D/1 SRA	1,739	Ornamental Landscaping	0.10	174	*D/1 SR**A***	1,739	0.10
D/2 SRA	203	Ornamental Landscaping	0.10	20	*D/2 SR**A***	203	0.10

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

DMA Name or ID	BMP Name or ID
DMA D/1	BMP D/1
DMA D/2	BMP D/2

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.

**DMAs are identified as the sum of their parts (i.e., DMA D/1 = DMA D/1 ROOF, D/1 CONC, D/1 LSCAPE, and D/1 SRA, as classified in Table C.1, above)*

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 Copermittee 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?		✓
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		✓
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?		✓
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	✓	
If Yes, list affected DMAs: DMAs D/1 & D/2		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		✓
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		✓
Describe here: BMPs must have 10-foot setback from foundations		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

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: 0.34 acres

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: 5.1 acres

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: 0.88

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: 4.5 acres

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)
4.5 acres	0.34 acres

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 shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 102

Project Type: Industrial

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: 5.1 acres

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: 177

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: 899

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)
899	102

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 shut downs 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 Copermittee 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	
DMA D/1	☐	☐	☐	☒	☐
DMA D/2	☐	☐	☐	☒	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

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 Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee 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 Imperious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP D/1* *BioClean MWS-L-8-24-V-UG*		
	[A]		[B]	[C]	[A] x [C]			
D/1 ROOF	*65,753*	*Roofs*	*1*	*0.89*	*58,652*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cubic feet per second)*	*Proposed Flow Rate on Plans (cubic feet per second)*
D/1 CONC	*72,477*	*Concrete or Asphalt*	*1*	*0.89*	*64,649*			
D/1 LSCAPE	*5,536*	*Ornamental Landscaping*	*0.1*	*0.10*	*612*			
D/1 SRA	*1,739*	*Ornamental Landscaping*	*0.1*	*0.10*	*192*			
	145,505				124,105	0.20	0.6	***0.693***

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP D/2* *BioClean MWS-L-8-12-C*		
	[A]		[B]	[C]	[A] x [C]			
D/2 ROOF	*42,500*	*Roofs*	*1*	*0.89*	*37,910*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cubic feet per second)*	*Proposed Flow Rate on Plans (cubic feet per second)*
D/2 CONC	*25,575*	*Concrete or Asphalt*	*1*	*0.89*	*22,813*			
D/2 LSCAPE	*7,361*	*Ornamental Landscaping*	*0.1*	*0.10*	*813*			
D/2 SRA	*203*	*Ornamental Landscaping*	*0.1*	*0.10*	*22*			
	75,639				61,559	0.20	0.3	***0.346***

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 Copermittee). 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 is not required to be completed per the Section E checklist on page 19, but has been completed in accordance with the directions provided by City review staff

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]
N/A	N/A
Total Credit Percentage[1]	N/A

[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]				
N/A	N/A	N/A	N/A	N/A	N/A	*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)*
	N/A				N/A	N/A	N/A	N/A	N/A

[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]
N/A	N/A	N/A

[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 Copermittee 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	N/A	N/A	N/A
Volume (Cubic Feet)	N/A	N/A	N/A

[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:

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.

The site is located within the HCOC exemption area as presented in the HCOC Map, part of the WAP document, approved April 20, 2017. Therefore, HCOC mitigation is not required.

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
On-site storm drain 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.	1. Maintain and periodically repaint or replace inlet markings. 2. Provide stormwater pollution prevention information to new site owners, lessees, or operators. 3. See applicable operational BMPs in Fact Sheet SC-74, "Drainage System Maintenance," in Appendix 10. 4. Include the following in lease agreements: "Tenant shall now allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drain."
Landscape/outdoor pesticide use	1. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. 2. 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. 3. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. 4. Consider using pest-resistant plants, especially adjacent to hardscape. 5. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	1. Maintain landscaping using minimum or no pesticides. 2. Prevent erosion of slopes by planting fast-growing, dense ground covering plants. 3. Plant native vegetation to reduce the amount of water, fertilizers, and pesticides applied to the landscape. 4. Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers. 5. Do not rake or blow leaves, clippings, or pruning waste into the street, gutter, or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program. 6. Provide IPM information to new owners, lessees and operators.

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Refuse areas	1. Site design features dumpster enclosures. 2. Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	1. Periodic inspections for leaky, overfilled, uncovered, or other problematic conditions will occur. Corrective action will be made upon detection, as circumstances permit. 2. Dumping of liquid or hazardous wastes will be prohibited. 3. Spill control materials will be available on-site. 4. See Fact Sheet SC-34, "Waste Handling and Disposal" in Appendix 10.
Industrial processes	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	1. CASQA Stormwater Quality Handbook for Industrial & Commercial Facilities Best Management Practices will be referenced, as appropriate. 2. RC Flood's Industrial & Commercial Facilities BMP fact sheet will be referenced, as appropriate.
Loading Docks	N/A	Move loaded and unloaded items indoors as soon as possible.
Plazas, Sidewalks, and Parking Lots	N/A	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.

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.

This section will be completed and addressed at the time of the final WQMP submittal.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP D/1	BioClean Modular Wetlands Linear MWS-L-8-24-V-UG	TBD	33.854990° N 117.242970° W
BMP D/2	BioClean Modular Wetlands Linear MWS-L-8-12-C	TBD	33.826778° N 117.231719° W

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: **This section will be completed and addressed at the time of the final WQMP submittal.**

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

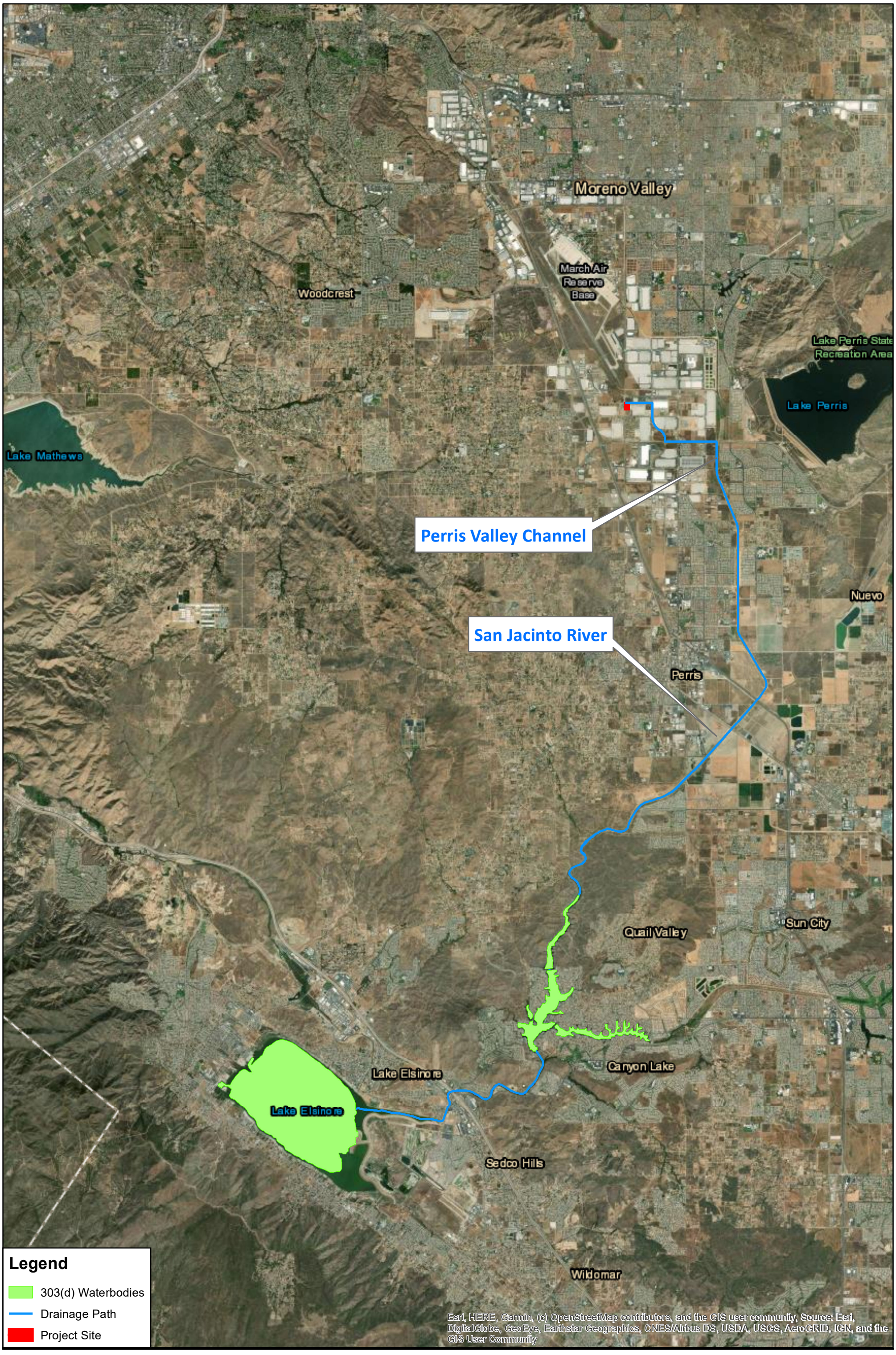
Phelan Perris: Location Map
West Nance Street
Perris, CA 92571

NOT TO SCALE

Feet
0 250 500 1,000

TRWE

Exhibit Date: 9/25/2020
X:\Projects2\156 (SDH & Associates)\40 (Phelan Perris)\05 GIS\Map Docs\156-40 - Location Map.mxd



Phelan Perris: Receiving Waters Map
West Nance Street
Perris, CA 92571

Exhibit Date: 9/25/2020
X:\Projects2\156 (SDH & Associates)\40 (Phelan Perris)\05 GIS\Map Docs\156-40 - Receiving Waters.mxd

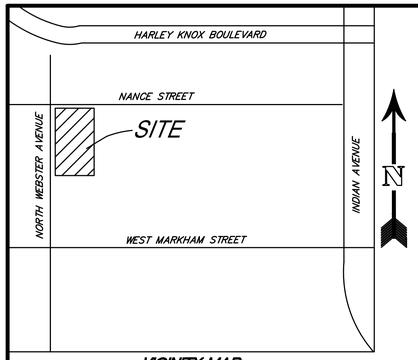
NOT TO SCALE

Feet
0 5,000 10,000 20,000

Data Sources:
Esri World Imagery: October 2018
Drainage Path: USGS NHD
303(d): State Water Resources Control Board

TRWE

POST-CONSTRUCTION BMP SITE PLAN
PHELAN PERRIS
P20-00017



VICINITY MAP
NOT TO SCALE

OWNER/APPLICANT

PHELAN DEVELOPMENT COMPANY
450 NEWPORT CENTER DRIVE, SUITE 405
NEWPORT BEACH, CA 92660

CIVIL ENGINEER

SDH & ASSOCIATES
14060 MERIDIAN PARKWAY
RIVERSIDE, CA 92518
(951) 683-3691

WQMP PREPARER

TORY R. WALKER ENGINEERING, INC.
122 CIVIC CENTER DRIVE, STE. 206
VISTA, CA 92084
(760) 414-9212

LEGEND

- DRAINAGE MANAGEMENT AREA
- BMP FOOTPRINT
- SELF-RETAINING DMA
- PROPOSED STORM DRAIN
- CURB AND GUTTER
- RIBBON DRAIN
- 1280 EXISTING CONTOUR LINE
- SLOPE
- ROOF DOWNSPOUT & DIRECTION
- DISCHARGE POINT (POINT OF COMPLIANCE, POC)
- LANDSCAPE/PERVIOUS AREA
- CONCRETE/IMPERVIOUS AREA
- ROOFS/IMPERVIOUS AREA

GENERAL NOTES

1. DMAs D/1 AND D/2 HAVE BEEN CONSERVATIVELY ASSUMED TO BE 95% AND 90% IMPERVIOUS, RESPECTIVELY, FOR PLANNING-LEVEL DESIGN
2. PROJECT SITE IS LOCATED WITHIN A REGIONAL DRAINAGE AREA THAT DOES NOT CAUSE OR CONTRIBUTE TO A HYDROLOGIC CONDITION OF CONCERN (HCOC)
3. ALL PROPOSED LANDSCAPING HAS BEEN CONSERVATIVELY CLASSIFIED AS HYDROLOGIC SOIL GROUP TYPE "D"
4. PARCEL WILL SUPPORT LIGHT INDUSTRIAL ACTIVITY
5. BUILDING WILL BE USED EXCLUSIVELY FOR WAREHOUSE STORAGE
6. DEPTH TO GROUNDWATER FROM FACILITY BOTTOM IS GREATER THAN 15 FEET
7. PRECISE DOWNSPOUT LOCATIONS TO BE PROVIDED AT THE DESIGN PHASE
8. PEAK FLOWS AT DISCHARGE POINT CALCULATED PER RATIONAL METHOD HYDROLOGY
9. NO OFFSITE RUN-ON IS PRESENT

LID CONSTRAINTS

1. NATIVE SOILS AT PROJECT SITE FEATURE POOR INFILTRATION RATES (LESS THAN 0.5 IN/HR)
2. INSUFFICIENT DEMAND FOR HARVEST AND USE

LID OPPORTUNITIES

1. UTILIZATION OF VEGETATED DRAINAGE CONVEYANCE ALONG NORTHERLY EASTERLY PROPERTY LINES

SITE DESIGN BMPs

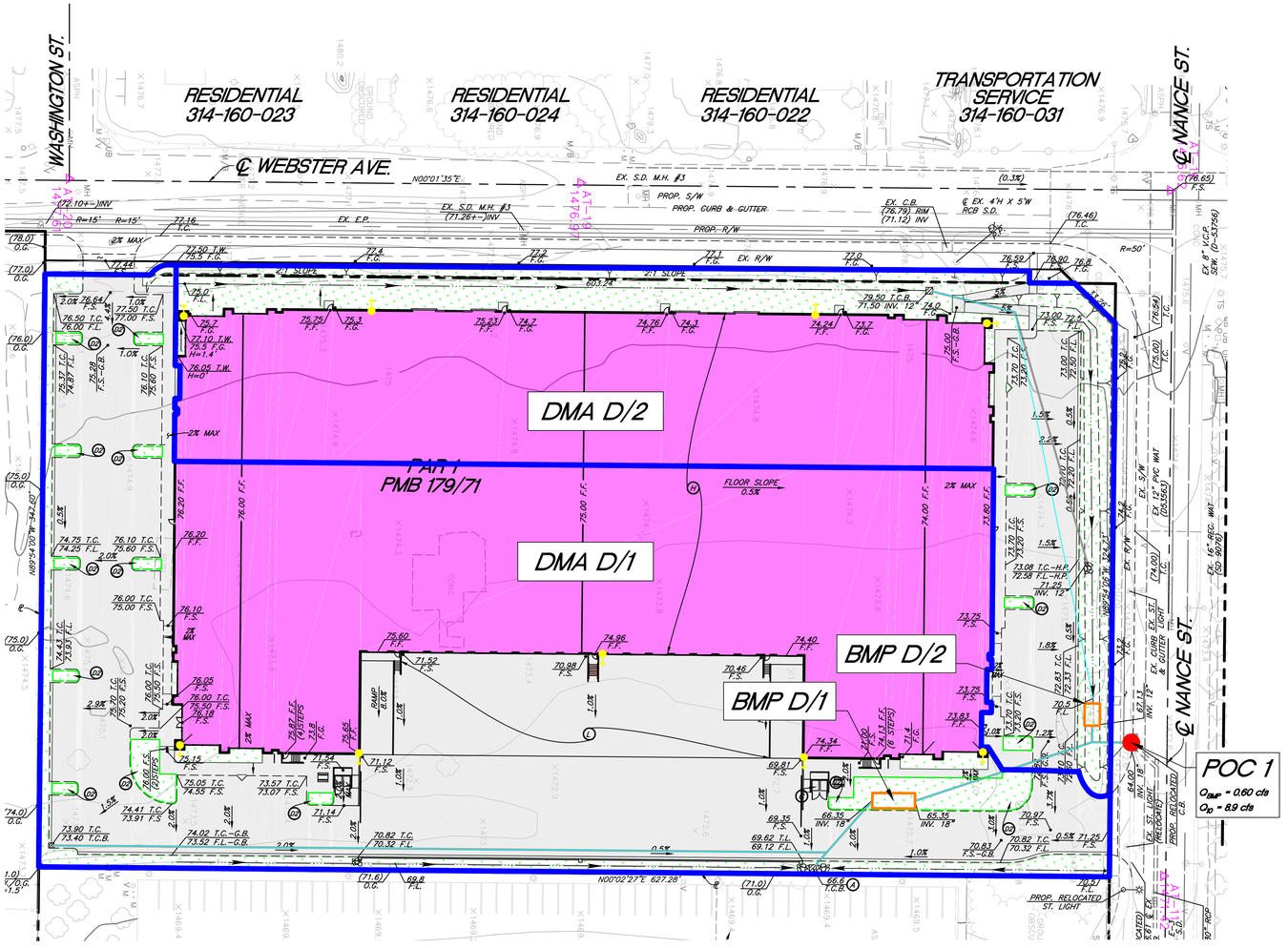
- BUILDING SIZED TO THE MAXIMUM ALLOWABLE 50-FOOT ZONING HEIGHT
- BUILDING WILL NOT EXCEED MAXIMUM ALLOWABLE 50 PERCENT LOT COVERAGE
- LOT PROVIDES MORE THAN THE MINIMUM REQUIRED 12 PERCENT LANDSCAPE AREA
- DISTURBANCE IN PLANNED GREEN SPACE AND PROPOSED LANDSCAPE AREAS WILL BE AVOIDED
- ROOFTOPS WILL DRAIN INTO ADJACENT PERVIOUS AREAS
- LANDSCAPING FEATURES NATIVE AND DROUGHT-TOLERANT SPECIES

SOURCE CONTROL BMP LEGEND

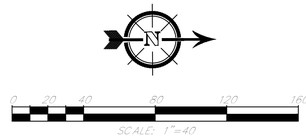
- (A) LOCATION OF STORM DRAIN INLET
- (22) SELF-RETAINING LANDSCAPE AREA
- (G) REFUSE AREA
- (H) LIGHT INDUSTRIAL PROCESS AREA
- (M) LOADING DOCK AREA

PERMANENT SOURCE CONTROL BMPs

- MARK ALL INLETS WITH THE WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR
- REFUSE AREAS WILL BE COVERED, GRADED, AND PAVED TO PREVENT RUN-ON AND WIND DISPERSAL
- SITE REFUSE WILL BE HANDLED BY A PROFESSIONAL WASTE MANAGEMENT COMPANY
- SIGNS WILL BE POSTED ON OR NEAR DUMPSTERS STATING "DO NOT DUMP HAZARDOUS MATERIALS HERE" OR SIMILAR
- ALL PROCESS ACTIVITIES TO BE PERFORMED INDOORS
- NO PROCESSES TO DRAIN TO EXTERIOR OR TO STORM DRAIN SYSTEM
- ROOF DOWNSPOUTS SHALL BE POSITIONED TO DIRECT STORM WATER AWAY FROM THE LOADING AREA (LOCATIONS TO BE DETERMINED AT DESIGN PHASE)
- 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 OFFSITE STORM DRAIN SYSTEM
- ROOFTOP MOUNTED EQUIPMENT WITH POTENTIAL TO PRODUCE POLLUTANTS SHALL BE ROOFED AND/OR HAVE SECONDARY CONTAINMENT
- ANY DRAINAGE SUMPS ONSITE 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



DMA ID	BMP ID	DCQ (cfs)	Q_{BMP} (cfs)
D/1	D/1	0.60	0.693
D/2	D/2	0.30	0.346



CITY OF PERRIS

POST-CONSTRUCTION BMP SITE PLAN
PHELAN PERRIS
P20-00017

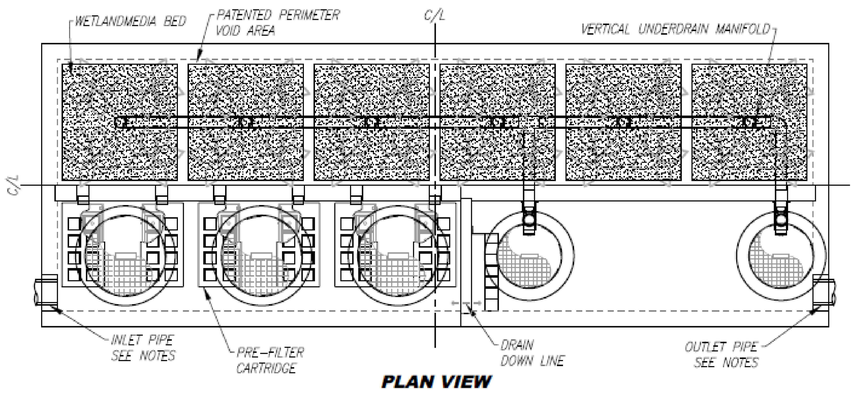
1 OF 3 SHEETS

POST-CONSTRUCTION BMP SECTION DETAIL
PHELAN PERRIS
P20-00017

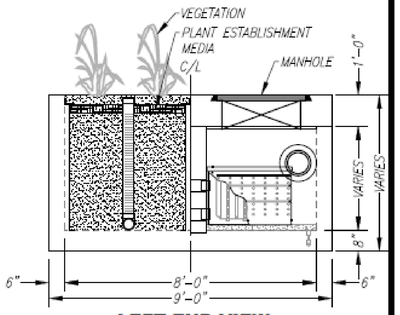
BMP D/1

SITE SPECIFIC DATA			
PROJECT NUMBER		TBD	
PROJECT NAME		PHELAN PERRIS	
PROJECT LOCATION		PERRIS, CA	
STRUCTURE ID		DMA D/1	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.693	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	66.35	HDPE	12 IN
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	65.35	HDPE	12 IN
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	70.77		
SURFACE LOAD	INDIRECT TRAFFIC		
FRAME & COVER	3EA Ø30"	UNDERGROU	2EA Ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



LEFT END VIEW

INSTALLATION NOTES

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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

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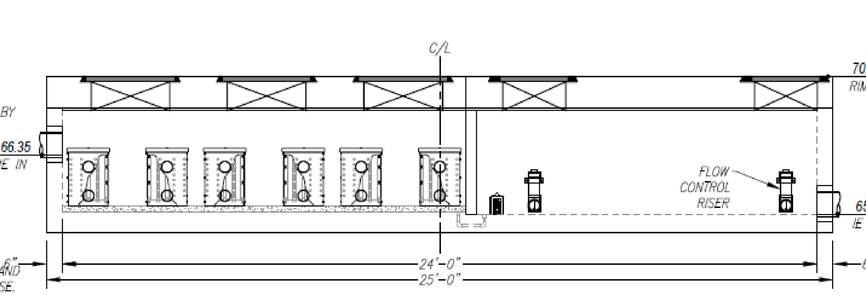
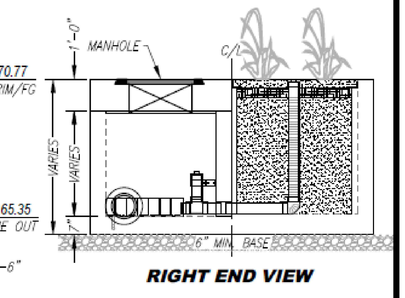


ELEVATION VIEW



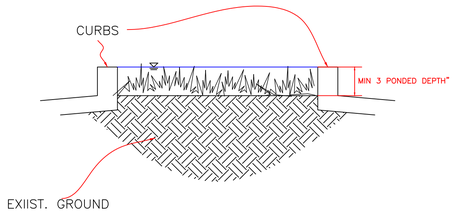
RIGHT END VIEW

TREATMENT FLOW (CFS)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

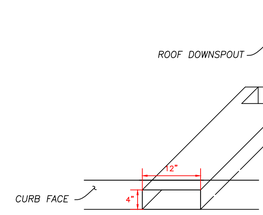
Bio Clean — A Forterra Company

MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

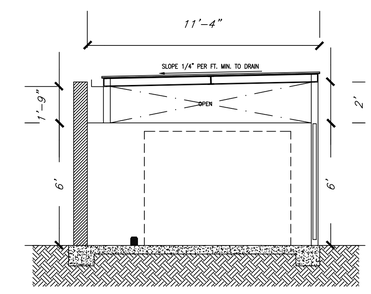
TYPICAL INLET PLACARD DETAIL
NOT TO SCALE



SELF-RETAINING LANDSCAPE (TYPICAL)
NOT TO SCALE



ROOF DRAIN & CURB OUTLET STRUCTURE DETAIL
NOT TO SCALE



TRASH ENCLOSURE STRUCTURE DETAIL
NOT TO SCALE

CITY OF PERRIS	
POST-CONSTRUCTION BMP SECTION DETAIL PHELAN PERRIS P20-00017	2 OF 3 SHEETS

POST-CONSTRUCTION BMP SECTION DETAIL
PHELAN PERRIS
P20-00017

BMP D/2

SITE SPECIFIC DATA			
PROJECT NUMBER		TBD	
ORDER NUMBER		TBD	
PROJECT NAME		PHELAN PERRIS	
PROJECT LOCATION		PERRIS,CA	
STRUCTURE ID		BMP D/2	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.346	
TREATMENT HGL AVAILABLE (FT)			TBD
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	67.13	HDPE	12 IN
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION		71.21	
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	2EA ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			

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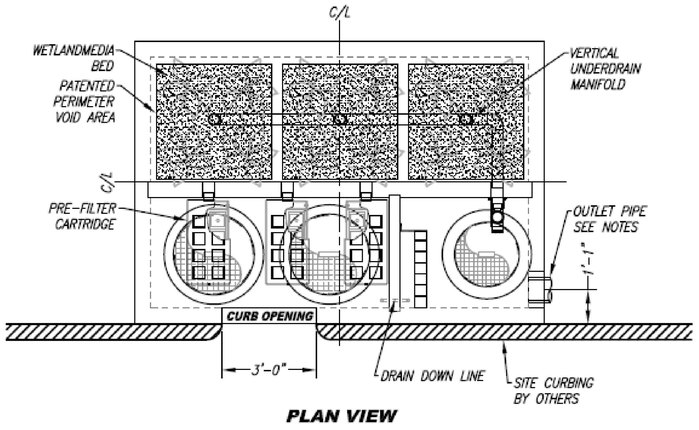
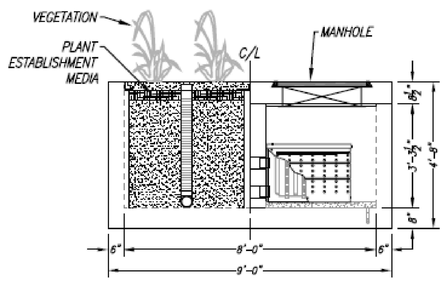
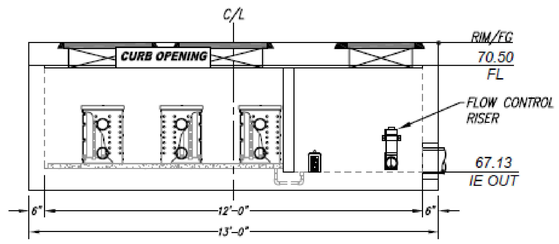


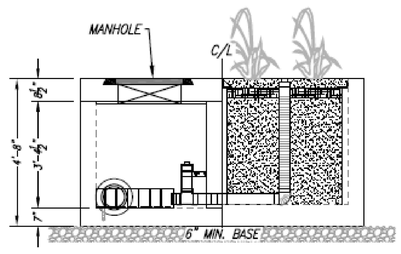
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.346
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

Bio Clean — A Forterra Company

MWS-L-8-12-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

CITY OF PERRIS	2 OF 3 SHEETS
POST-CONSTRUCTION BMP SECTION DETAIL PHELAN PERRIS P20-00017	

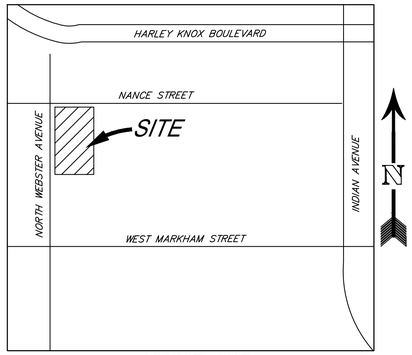
Appendix 2: Construction Plans

Grading and Drainage Plans

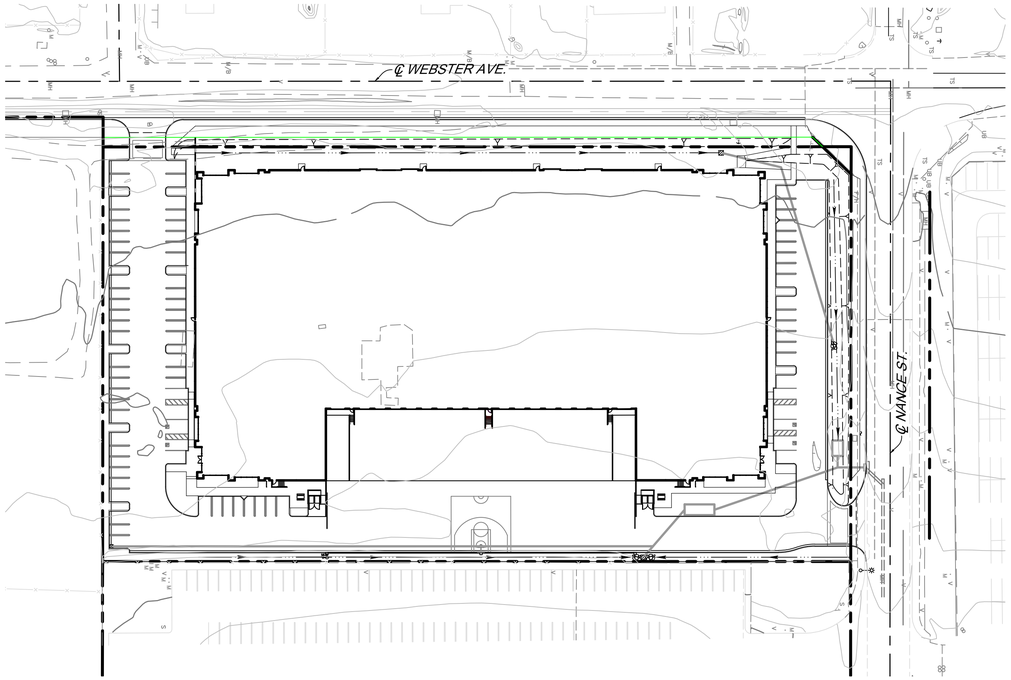
CITY OF PERRIS

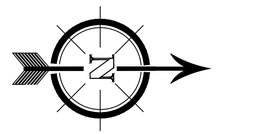
PRELIMINARY GRADING PLAN

SDH & ASSOCIATES, INC.
JANUARY 2021



VICINITY MAP
NOT TO SCALE





SCALE 1"=60'

OWNER/ DEVELOPER

PHELAN DEVELOPMENT COMPANY
450 NEWPORT CENTER DRIVE, SUITE 405
NEWPORT BEACH, CA 92660
PHONE: (949) 720-8050

ENGINEER

SDH & ASSOCIATES, INC
14060 MERIDIAN PARKWAY
RIVERSIDE, CA. 92518
VOICE: (951) 683-3691
FAX: (951) 788-2314

ARCHITECT

CARLILE COATSWORTH ARCHITECTS, INC.
18600 MACARTHUR BOULEVARD, SUITE 300
IRVINE CA. 92612
PHONE: (949) 833-1930

EARTHWORK

CUT: 4,777 C.Y.
FILL: 4,777 C.Y.

SOURCE OF TOPO

ARROWHEAD MAPPING CORP.
1887 BUSINESS
CENTER DR SUITE 5A
SAN BERNADINO CA. 92408
VOICE: (909) 889-2420
FLOWN: 11-16-19

UTILITY PURVEYORS

WATER..... E.M.W.D.
GAS..... SO. CALIF. GAS
ELECTRICAL..... EDISON
TELEPHONE..... VERIZON
SEWER..... CITY OF PERRIS/EMWD
CABLE..... VERIZON

PROJECT DATA

SITE AREA: 217,798 S.F. (5.00 AC.)
BUILDING AREA: 109,250 S.F.

PARKING INFO

PARKING REQUIRED: 79 SPACES
PARKING PROVIDED: 79 SPACES

HAZARDOUS MATERIALS

NOT IN A FIRE HAZARD ZONE

FEMA FLOOD ZONE DESIGNATION

ZONE D

ZONING AND LAND USE

EXISTING ZONING..... PVCC SP
EXISTING LAND USE.....VACANT
PROPOSED ZONING.....PVCC SP
PROPOSED LAND USE.....INDUSTRIAL

THOMAS BROTHERS INFO.

PAGE: 747, GRID: E7

WATER QUALITY

A PROJECT SPECIFIC WQMP
WILL BE PREPARED
FOR THIS PROJECT

ZONING DISTRIC

NOT IN A ZONING DISTRICT/AREA

APN

302-030-010

SCHOOL DISTRICT

VAL VERDE UNIFIED

SHEET INDEX

SHEET 1: TITLE SHEET
SHEET 2: PRELIMINARY GRADING PLAN
SHEET 3: SECTIONS AND DETAILS

LEGEND

T.C.B.	-	TOP CATCH BASIN
F.G.	-	FINISHED GRADE
F.L.	-	FLOW LINE
H.P.	-	HIGH POINT
EXIST.	-	EXISTING
P.E.	-	PAD ELEVATION
G.B.	-	GRADE BREAK

TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

CONSTRUCTION NOTES

1. CONSTRUCT P.C.C./A.C. DRIVE ISLE & PARKING AREAS
2. CONSTRUCT 6" CURB ONLY
3. CONSTRUCT 6" CURB AND GUTTER (ONSITE)
4. CONSTRUCT P.C.C. SIDEWALK (FINISHED SURFACE MATERIALS PER ARCH. PLANS)
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6. CONSTRUCT 48"X48" CATCH BASIN
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8. CONSTRUCT 12" HDPE STORM DRAIN
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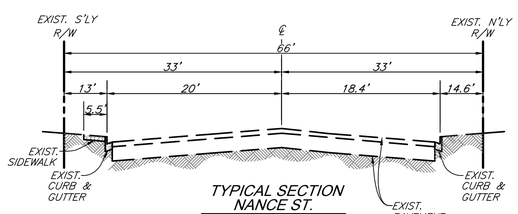
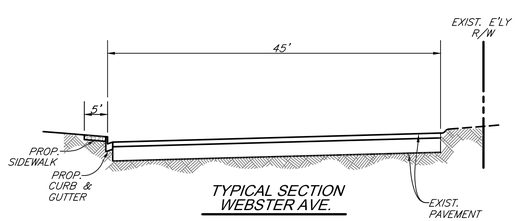


TYPICAL SECTION
NANCE ST.



TYPICAL SECTION
WEBSTER AVE.

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS

MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. DRAWN BY: S.J.S.
CHECKED BY: D.A.S. PROJECT MANAGER: S.S.

PLANNING DIVISION: DATE:

PREPARED BY: DATE:
DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-21

SEAL:
REGISTERED PROFESSIONAL ENGINEER
DANE A. SOMMERS
No. 90433
Exp. 9-30-21
CIVIL
STATE OF CALIFORNIA

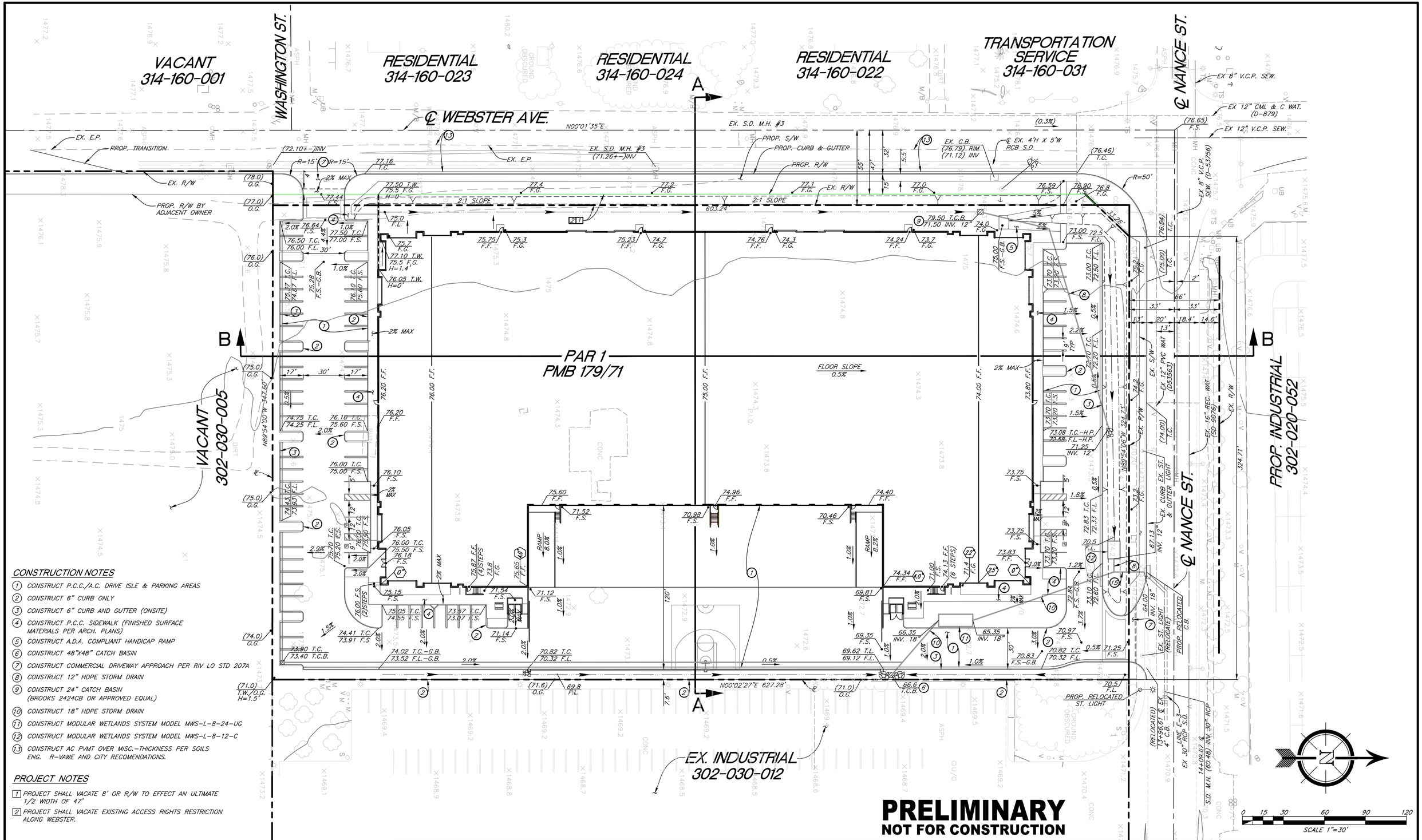
PREPARED BY:
SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
14060 Meridian Parkway 102
Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=60'
DATE: JANUARY 2021

BENCH MARK:
USC & GS BENCHMARK
NGS PID DX2725
ELEV.= 1535.16 (NAVD 88)

CITY OF PERRIS
PRELIMINARY GRADING PLAN
1 OF 3 SHEETS

FOR: W.O. CITY FILE NO.



CONSTRUCTION NOTES

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2. CONSTRUCT 6" CURB ONLY
3. CONSTRUCT 6" CURB AND GUTTER (ONSITE)
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5. CONSTRUCT A.D.A. COMPLIANT HANDICAP RAMP
6. CONSTRUCT 48"X48" CATCH BASIN
7. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH PER RIV LO STD 207A
8. CONSTRUCT 12" HDPE STORM DRAIN
9. CONSTRUCT 24" CATCH BASIN (BROOKS 2424CB OR APPROVED EQUAL)
10. CONSTRUCT 18" HDPE STORM DRAIN
11. CONSTRUCT MODULAR WETLANDS SYSTEM MODEL MWS-L-8-24-UG
12. CONSTRUCT MODULAR WETLANDS SYSTEM MODEL MWS-L-8-12-C
13. CONSTRUCT AC PVMT OVER MISC.-THICKNESS PER SOILS ENG. R-VAWE AND CITY RECOMENDATIONS.

PROJECT NOTES

1. PROJECT SHALL VACATE 8' OR R/W TO EFFECT AN ULTIMATE 1/2 WIDTH OF 47'
2. PROJECT SHALL VACATE EXISTING ACCESS RIGHTS RESTRICTION ALONG WEBSTER.

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1"=30'

REVISIONS				
MARK	DESCRIPTION	BY	APPR	DATE
DESIGNED BY: S.S.	DRAWN BY: S.J.S.			
CHECKED BY: D.A.S.	PROJECT MANAGER: S.S.			

PLANNING DIVISION: DATE:

PREPARED BY: DATE:

DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-21

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 Exp. 9-30-21 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:
SDH AND ASSOCIATES INC.
27383 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =30'

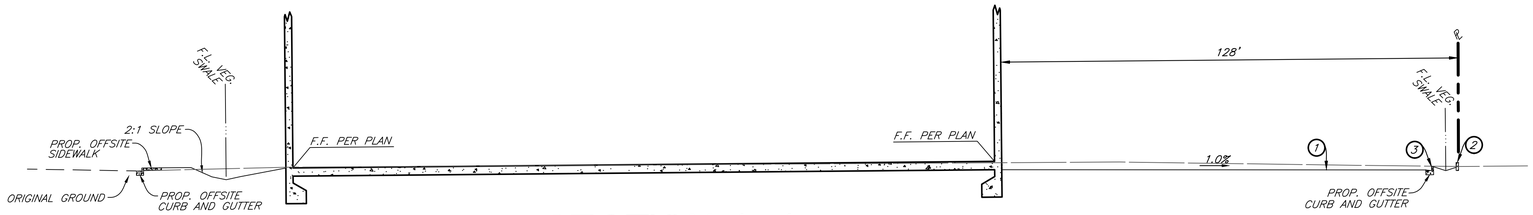
DATE: JANUARY 2021

CITY OF PERRIS

PRELIMINARY GRADING PLAN

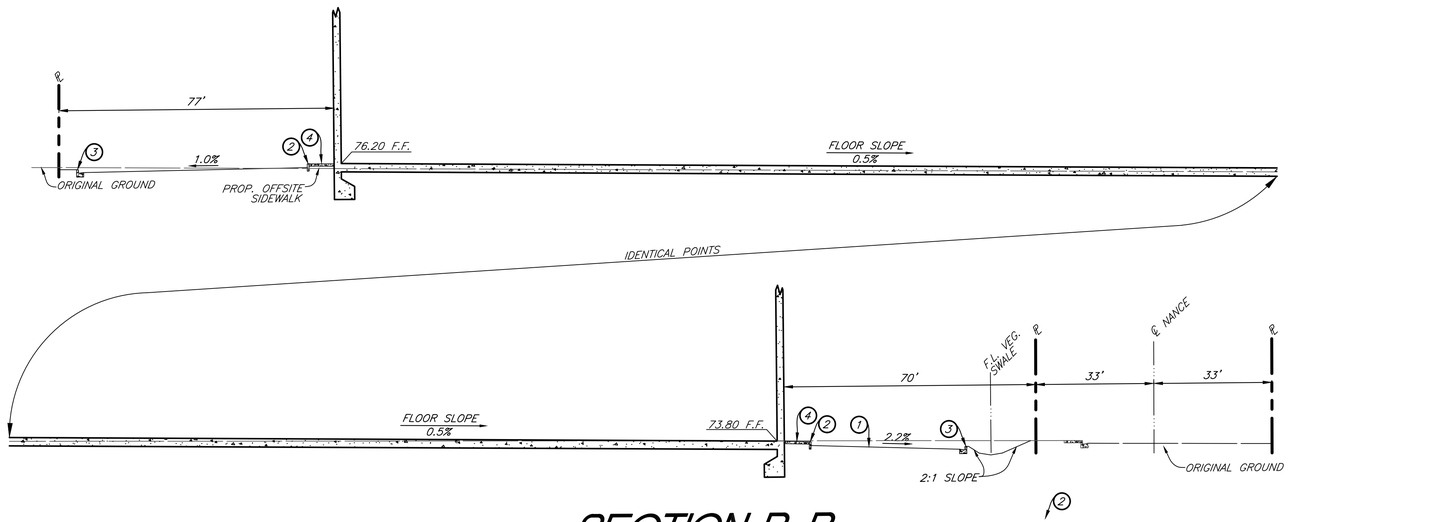
2 OF 3 SHEETS

FOR: | W.O. | CITY FILE NO.



SECTION A-A

SCALE 1:20'



SECTION B-B

SCALE 1:20'

CONSTRUCTION NOTES

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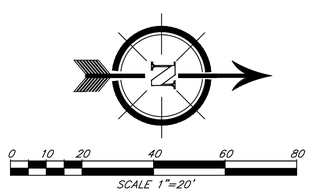

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Riverside, California 92518
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=20'

DATE: JANUARY 2021

CITY OF PERRIS

SECTIONS

3 OF 3 SHEETS

FOR: | W.O. | CITY FILE NO.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Geotechnical Engineering Investigation

Proposed Industrial Warehouse Development
SEC of Nance Street and Webster Avenue Boulevard
Perris, California

Phelan Development Company
450 Newport Center Drive, Suite 405
Newport Beach, California 92660

Attn: Ms. Katrina DeArmey

Project Number 22016-20
September 14, 2020

NorCal Engineering

NorCal Engineering

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

September 14, 2020 Project Number 22016-20

Phelan Development Company
450 Newport Center Drive, Suite 405
Newport Beach, California 92660

Attn: Ms. Katrina DeArmey

RE: **Geotechnical Engineering Investigation** - Proposed Industrial Warehouse Development - Located at the Southeast Corner of Nance Street and Webster Avenue Boulevard, in the City of Perris, California

Dear Mr. DeArmey:

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 31, 2020. The purpose of this investigation is to evaluate the geotechnical conditions of the subject site and to provide recommendations for the proposed industrial warehouse 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 an industrial warehouse development consisting of 109,250 square feet as shown on the attached Site Plan by Carlile Coatsworth Architects, Inc. dated December 10, 2019. The proposed concrete tilt-up building will be supported by a conventional slab-on-grade foundation system with perimeter-spread footings and isolated interior footings. Other improvements will include asphalt and concrete pavement areas, hardscape and landscaping. It is assumed that the proposed grading for the development will include cut and fill procedures on the order of a few feet 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 4.76-acre subject property is located at the southeast corner of Nance Street and Webster Avenue, in the City of Perris. The generally rectangular-shaped parcel is elongated in a north to south to west direction with topography of the relatively level descending slightly from a north to south direction on the order of a few feet. The site is undeveloped parcel covered with a moderate vegetation growth of natural grasses and weeds.

3.0 Site Exploration

The investigation consisted of the placement of nine (9) subsurface exploratory trenches by a backhoe to depths ranging between 5 and 20 feet below current ground elevations. The explorations were visually classified and logged by a field engineer with locations of the subsurface explorations shown on the attached plan. The exploratory trenches revealed the existing earth materials to consist of fill and natural soil. Detailed descriptions of the subsurface conditions are listed on the trench logs in Appendix A. It should be noted that the transition from one soil type to another as shown on the trench 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, fine to medium grained, clayey SILT was encountered across the site to depth of 1 to 2.5 feet below ground surface. These soils were noted to be soft and damp.

Natural: A natural undisturbed soil classifying as a brown, clayey SILT was encountered beneath the upper fill soils. The native soils as encountered were observed to be stiff and moist.

The overall engineering characteristics of the earth material were relatively uniform with each excavation. Groundwater was not encountered to the depth of our trenches 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. 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 site is situated in an area of high regional seismicity and the San Jacinto (San Jacinto Valley) fault is located about 10 kilometers from the site. 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 parameters are provided on the following page and are based on the 2019 California Building Code (CBC) Standard ASCE/SEI 7-16. The data was obtained from the American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/. The ASCE 7 Hazards Report is attached in Appendix C.

Seismic Design Acceleration Parameters

Latitude	33.855
Longitude	-117.243
Site Class	D
Risk Category	I/II/III
Mapped Spectral Response Acceleration	S_S = 1.500 S_1 = 0.580
Adjusted Maximum Acceleration	S_{MS} = 1.500
Design Spectral Response Acceleration Parameters	S_{DS} = 1.000
Peak Ground Acceleration	PGA_M = 0.550

6.0 Liquefaction Evaluation

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. The analysis indicates the potential for liquefaction at this site to be low due to groundwater in excess of 50 feet based on review with the State of California Department of Water Resources of nearby water wells. Thus, the 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 to 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.

Trench/Test No.	Depth	Soil Classification	Field Infiltration Rate	Design Rate
T-1/TH-1	5'	Clayey SILT	0.55 in/hr	0.18 in/hr
T-2/TH-2	10'	Clayey SILT	0.24 in/hr	0.08 in/hr
T-3/TH-3	5'	Clayey SILT	0.20 in/hr	0.07 in/hr

The correction factors CF_t, CF_v and CF_s are given below based on soils at 5 to 10 feet from our field tests.

a) $CF_t = Rf = 1.0$ for our double ring infiltration test holes.

b) $CF_v = 1.0$ based on uniform soils encountered in three (3) trenches for infiltration tests.

c) $CF_s = 3.0$ for long-term siltation, plugging and maintenance. The subsurface soils are likely to have some plugging and regular maintenance of storm water discharge devices is required.

Based on the results of our field testing, the subsurface soils encountered in the proposed on-site drainage disposal system at 5 to 10 feet below ground surface and into very stiff fine-grained clayey soils which are not suitable for seepage pits at the site. All systems must meet the latest county specifications and the California Regional Water Quality Control Board (CRWQCB) requirements.

It is recommended that foundations shall be setback a minimum distance of 10 feet from the drainage disposal system and the bottom of footing shall be a minimum of 10 feet from the expected zone of saturation. The boundary of the zone of saturation may be assumed to project downward from the top of the permeable portion of the disposal system at an inclination of 1 to 1 or flatter, as determined by the geotechnical engineer.

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 be 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. Any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

8.1 Site Grading Recommendations

Any vegetation and/or demolition debris shall be removed and hauled from proposed grading areas 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 Placement of Compacted Fill.*

8.1.1 Removal and Recompaction Recommendations

All disturbed soils and/or fill (about 1 to 2.5 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 native materials, it is recommended that all foundations including floor slab areas 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 Shrinkage and Subsidence

Results of our in-place density tests reveal that the soil shrinkage will be less than 5 to 10% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.2 feet die to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements, or topographic approximations.

Although these values are only approximate, they represent our best estimate of lost yardage, which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing the actual equipment and grading techniques should be conducted.

8.3 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. All excavations shall be made in accordance with the requirements of the soils 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.

8.4 Foundation Design

All foundations may be designed utilizing the following allowable bearing capacities for an embedded depth of 24 inches into approved engineered fill with the corresponding widths:

Allowable Bearing Capacity (psf)		
Width (feet)	Continuous Foundation	Isolated Foundation
1.5	2000	2500
2.0	2075	2575
4.0	2375	2875
6.0	2500	3000

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 a maximum of 4,000 psf. A one-third increase may be used when considering short-term loading and seismic forces. Any foundations located along property line may utilize an allowable bearing capacity of 1,500 psf and embedded into competent native soils. 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.

8.5 **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.

8.6 **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.

8.7 **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 **approved 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 granular backfill to be utilized immediately adjacent to retaining walls shall consist of an approved select 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).

8.8 Slab Design

All concrete slabs shall be a minimum of six inches in thickness in the proposed warehouse areas and four inches in office and hardscape both reinforced a minimum of No. 3 bars, sixteen inches in each direction and positioned in the center of slab and placed on approved subgrade soils. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon soils expansion potential and proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect. All subgrade soils shall be moisture conditioned to 3% over optimum moisture content to a depth eighteen inches.

A vapor retarder (10-mil minimum thickness) 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.

8.9 Pavement Section Design

The table on the following page provides a preliminary pavement design based upon an R-Value of 20 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.

The recommendations are based upon estimated traffic loads. Client should submit any other anticipated traffic loadings to the geotechnical engineer, if necessary, so that pavement sections may be reviewed to determine adequacy to support the proposed loadings.

Type of Traffic	Traffic Index	Asphalt (in.)	Base Material (in.)
Automobile Parking Stalls	4.0	3.0	6.0
Light Vehicle Circulation Areas	5.5	3.5	9.5
Heavy Truck Access Areas	7.0	4.0	14.0

Any concrete slab-on-grade in pavement areas shall be a minimum of seven inches in thickness and may be 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 Perris. 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.

8.10 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.

8.11 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 mildly alkaline 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 IV.

8.12 **Expansive Soil**

Since expansive soils were encountered, 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.

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. A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and geotechnical 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. 12/31/2020
GEOTECHNICAL
STATE OF CALIFORNIA

Scott D. Spensiero
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 Soils 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 Soils 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.

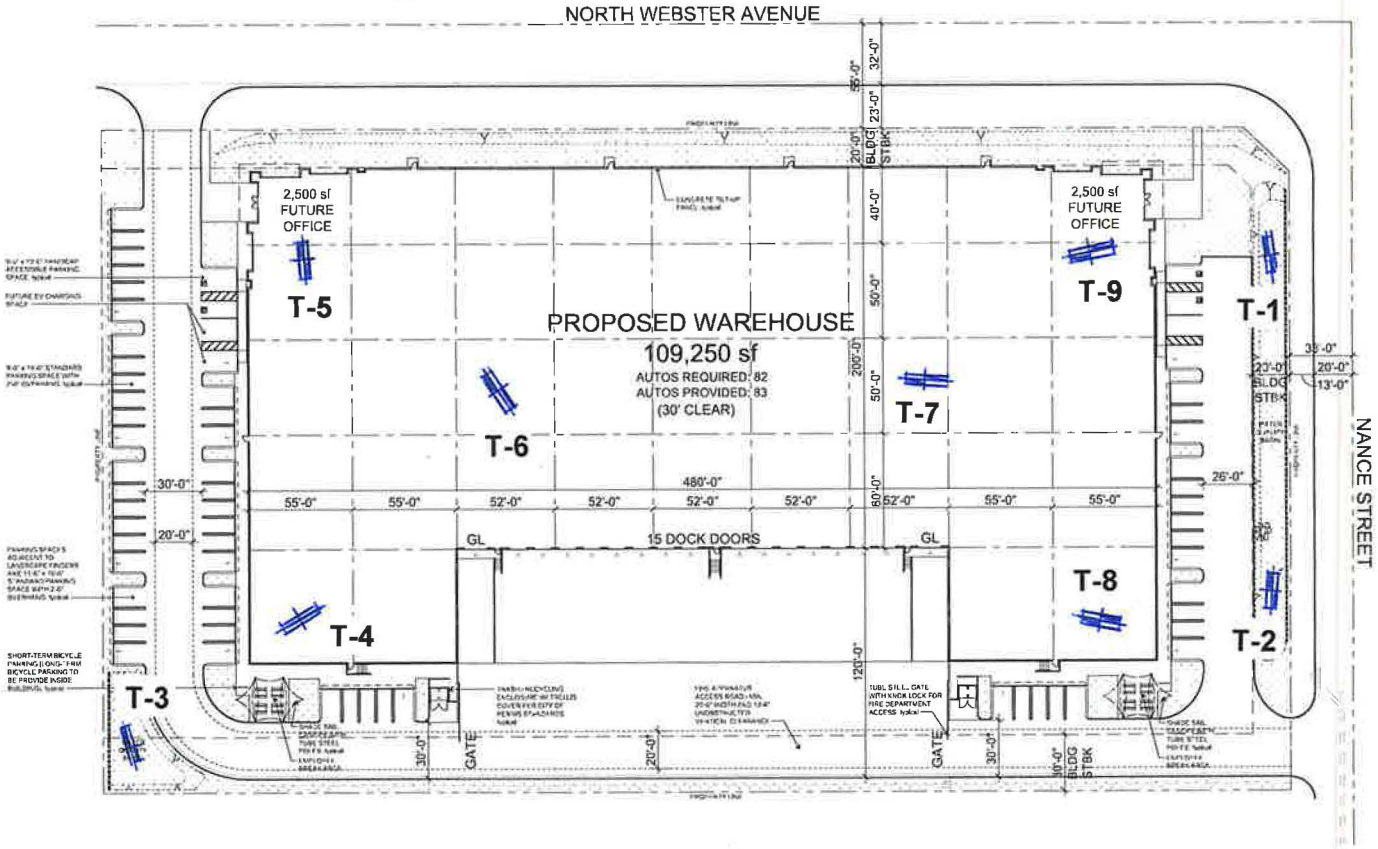
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent 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.



1 INCH = 100 FEET

NorCal Engineering

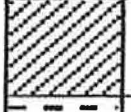
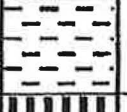
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT 22016-20 **DATE** SEPTEMBER 2020

SITE PLAN

List of Appendices
(in order of appearance)

Appendix A

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

NorCal Engineering

KEY:

- ■ Indicates 2.5-inch Inside Diameter. Ring Sample.
- ⊠ Indicates 2-inch OD Split Spoon Sample (SPT).
- ⧅ Indicates Shelby Tube Sample.
- ◫ Indicates No Recovery.
- ◧ Indicates SPT with 140# Hammer 30 in. Drop.
- ☑ Indicates Bulk Sample.
- ◩ Indicates Small Bag Sample.
- ◨ Indicates Non-Standard
- ⊠ Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Phelan Development Company
22016-20

Log of Trench T-1

Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

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Phelan Development Company 22016-20	Log of Trench T-2

Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist					
5		GWT not encountered					
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

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Phelan Development Company
22016-20

Log of Trench T-3

Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp					
		GWT not encountered					
		NATURAL Clayey SILT Brown, stiff, moist					
5		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

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NorCal Engineering

Phelan Development Company
22016-20

Log of Trench T-4

Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp	■		7.9	103.9	
		NATURAL Clayey SILT Brown, stiff, moist					
5			■		9.5	108.0	
10			■		6.5	102.8	
15			■		11.7	99.7	
20		Boring completed at depth of 20'	■		9.0	95.3	
25							
30							
35							

GWT not encountered

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Phelan Development Company 22016-20	Log of Trench T-5
Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■		8.6	106.9	
5		GWT not encountered	■		9.3	104.1	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

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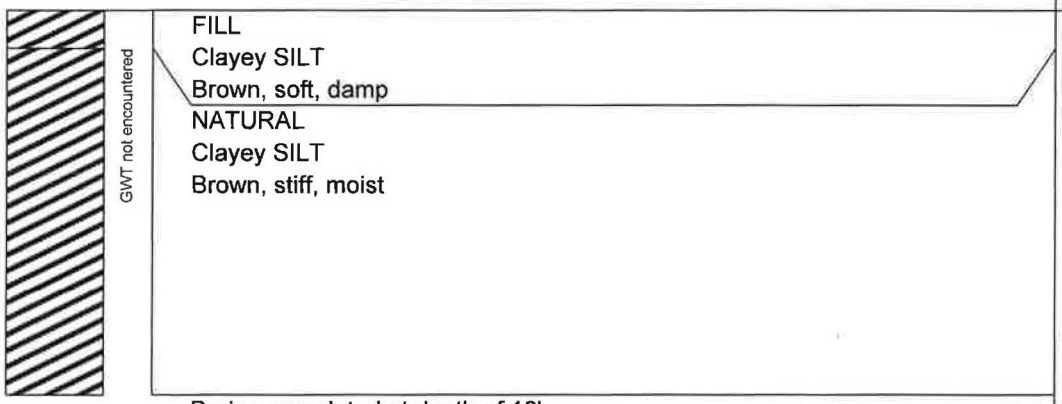
NorCal Engineering

Phelan Development Company 22016-20	Log of Trench T-6
Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■		9.6	109.7	
5			■		11.0	107.1	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

Date: 9/10/2020 File: C:\Superlog4\PROJECT\22016-20.log

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NorCal Engineering

Phelan Development Company
22016-20

Log of Trench T-7

Boring Location: Nance and Webster, Perris

Date of Drilling: 8/31/2020 | **Groundwater Depth:** None Encountered

Drilling Method: Hand Auger

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 SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■		6.2	106.7	
5			■		5.5	110.1	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

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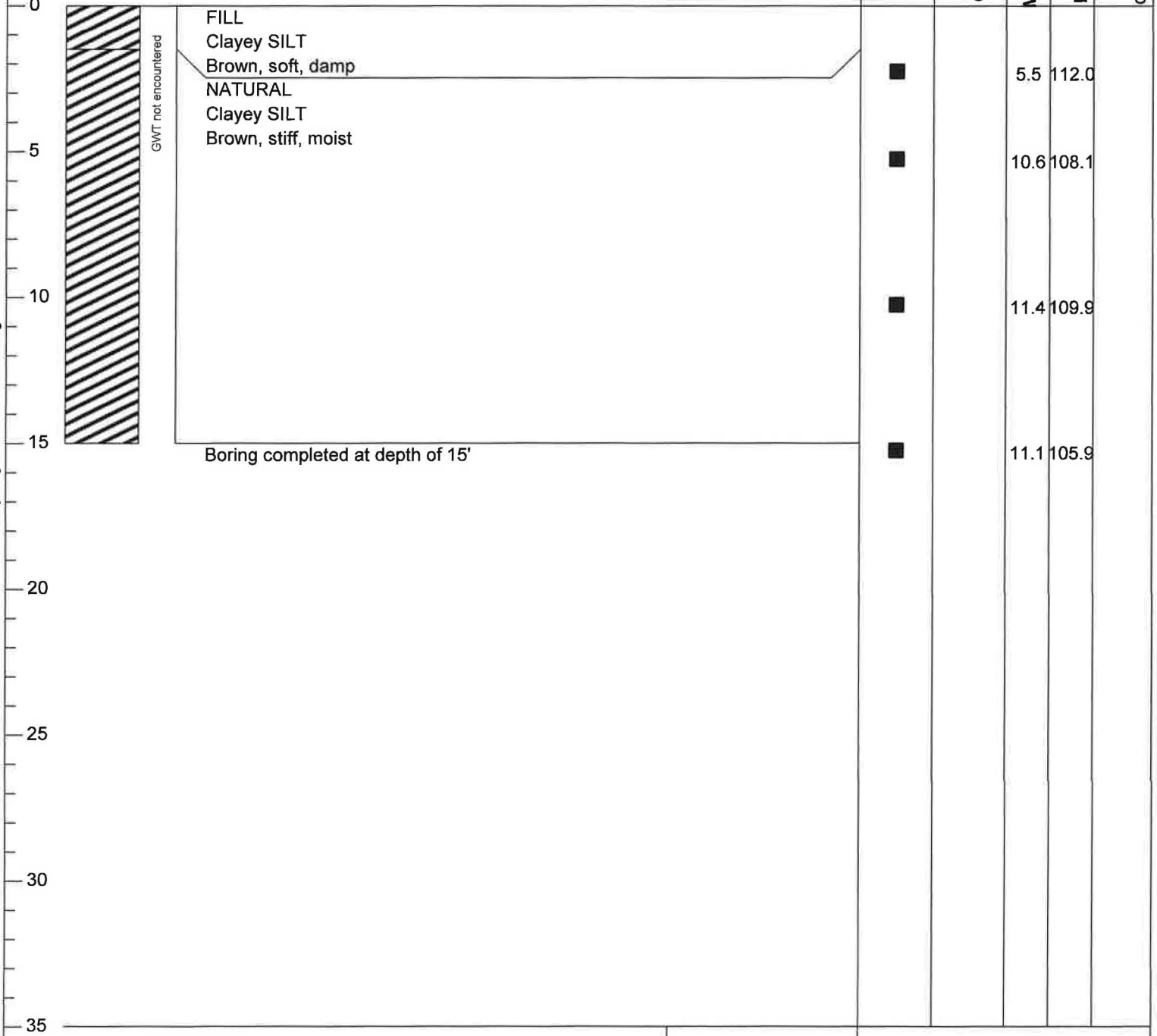
NorCal Engineering

Phelan Development Company 22016-20	Log of Trench T-8
Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	



SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECT\22016-20.log Date: 9/10/2020

NorCal Engineering

Phelan Development Company
22016-20

Log of Trench T-9

Boring Location: Nance and Webster, Perris	
Date of Drilling: 8/31/2020	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
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 SILT Brown, soft, damp	■		8.7	108.1	
		NATURAL Clayey SILT Brown, stiff, moist	■		10.6	111.1	
10		Boring completed at depth of 10'	■		11.3	108.0	
15							
20							
25							
30							
35							

GWT not encountered

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NorCal Engineering

Appendix B

TABLE I
MAXIMUM DENSITY TESTS

Sample	Classification	Optimum Moisture (%)	Maximum Dry Density (lbs/cu.ft)
T-4 @ 2'	Clayey SILT	14.0	110.0
T-9 @ 2'	Clayey SILT	13.5	117.0

TABLE II
EXPANSION TESTS

Sample	Classification	Expansion Index
T-4 @ 2'	Clayey SILT	70
T-9 @ 2'	Clayey SILT	64

TABLE III
ATTERBERG LIMITS

Sample	Liquid Limit	Plastic Limit	Plasticity Index
T-4 @ 2-5'	32	21	11
T-4 @ 8-10'	33	21	12

TABLE IV
CORROSION TESTS

Sample	pH	Electrical Resistivity	Sulfate (%)	Chloride (ppm)
T-4 @ 2'	7.2	2,760	0.005	289

% by weight
ppm – mg/kg

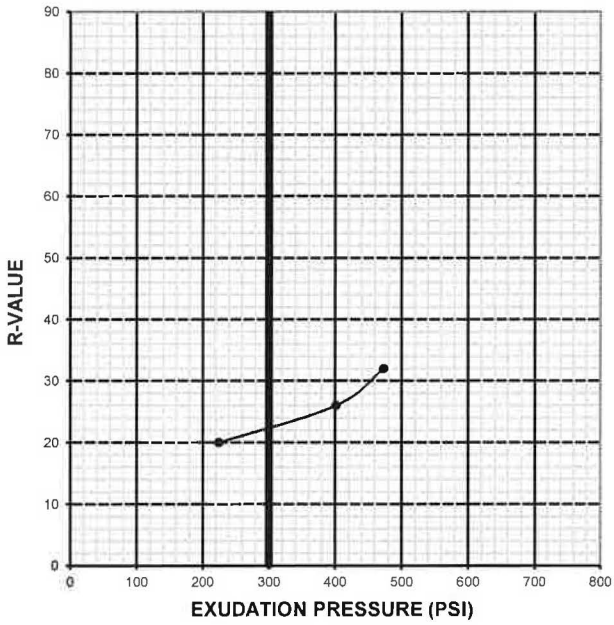
R-VALUE TEST REPORT

☑ CT-301 ☐ ASTM-D2844

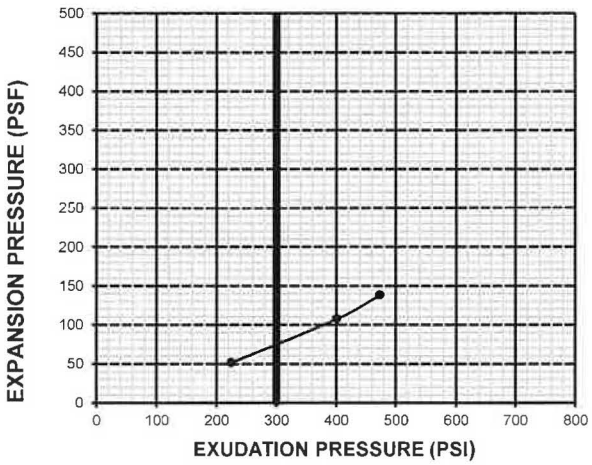
PROJECT NAME:	Norcal Phelan Development Company	PROJECT NUMBER:	L-200901
SAMPLE LOCATION:	SEC of N. Webster Ave and Nance St, Perris, CA	SAMPLE NUMBER:	T1
SAMPLE DESCRIPTION:	SANDY CLAY (CL), brown	SAMPLE DEPTH:	2'
SAMPLED BY:	Norcal JS 8/31/20	TESTED BY:	JV
		DATE TESTED:	9/10/2020

TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	10.6	11.0	11.6
WEIGHT OF SAMPLE, grams	1126	1166	1136
HEIGHT OF SAMPLE, Inches	2.41	2.51	2.48
DRY DENSITY, pcf	128.1	126.8	124.4
COMPACTOR AIR PRESSURE, psi	235	190	150
EXUDATION PRESSURE, psi	473	401	225
EXPANSION, Inches x 10exp-4	32	25	12
STABILITY Ph 2,000 lbs (160 psi)	80	94	104
TURNS DISPLACEMENT	4.55	5.03	5.54
R-VALUE UNCORRECTED	35	26	20
R-VALUE CORRECTED	32	26	20
EXPANSION PRESSURE (psf)	138.2	108.0	51.8

R-VALUE VS. EXUDATION PRESSURE



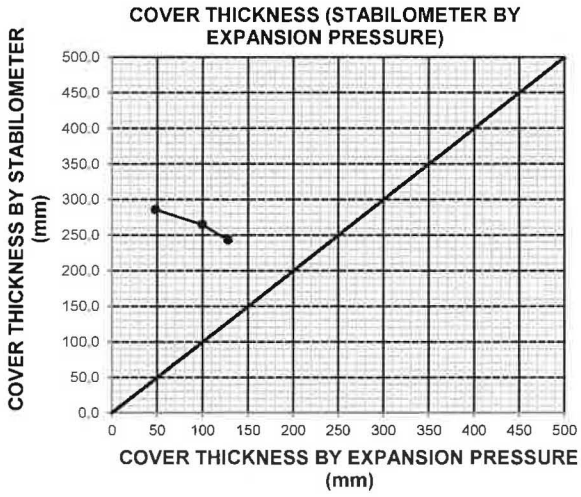
EXPANSION PRESSURE VS. EXUDATION PRESSURE



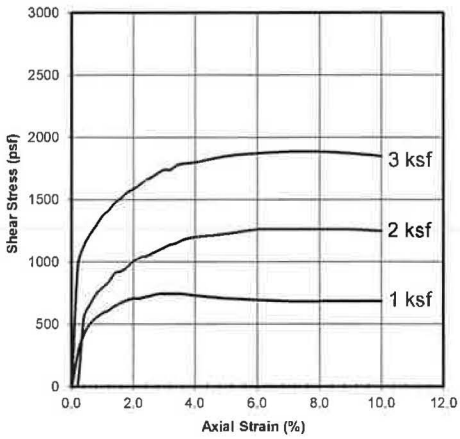
R-VALUE AT EQUILIBRIUM:	22

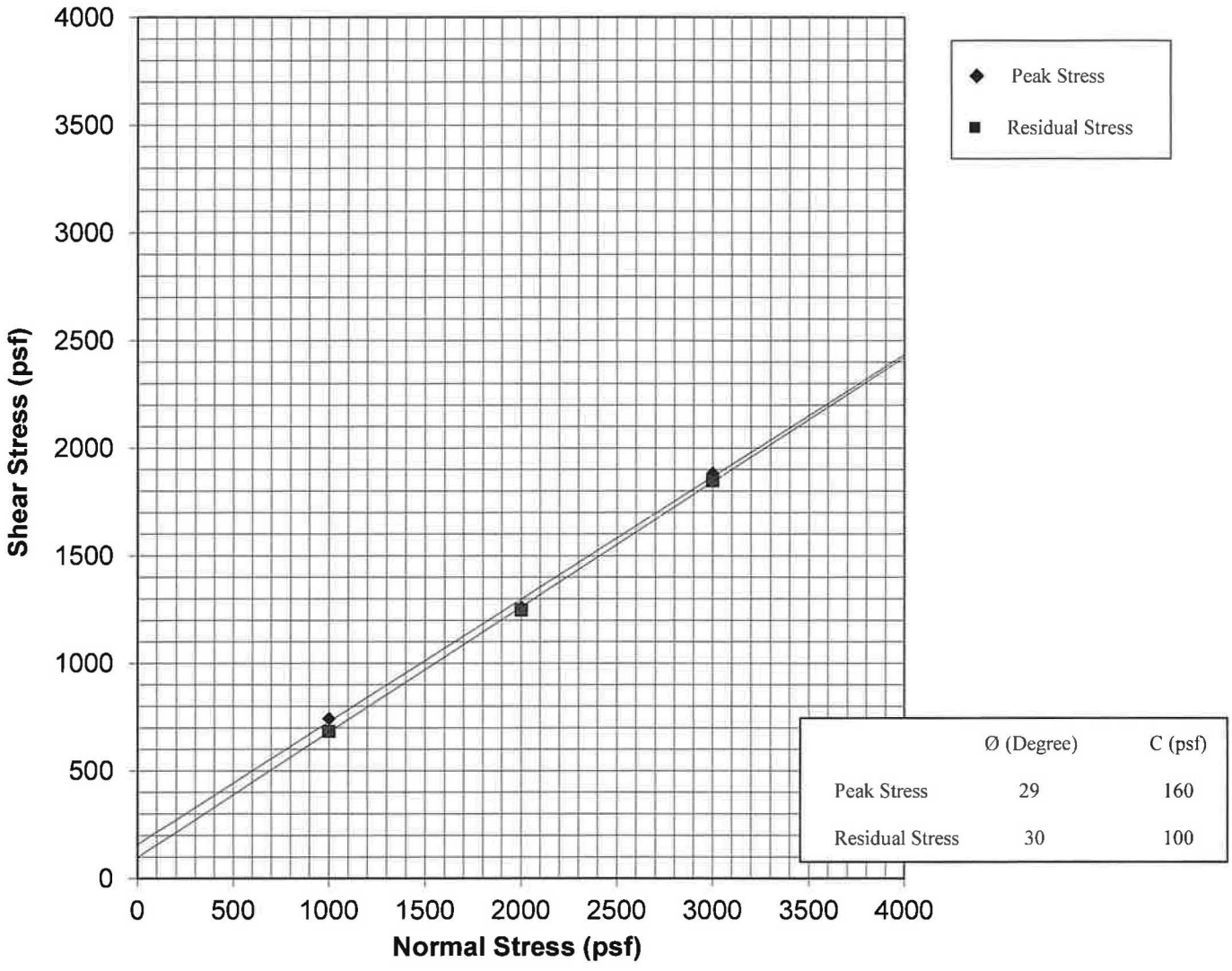
R-VALUE BY EXUDATION PRESSURE:	22
R-VALUE BY EXPANSION PRESSURE:	N.A.
EXPANSION PRESSURE AT 300 PSI EXUDATION:	75
TRAFFIC INDEX (Assumed):	5.5
GRAVEL FACTOR (Assumed):	1.5
UNIT MASS OF COVER MATERIAL, kg/m^3 (Assumed):	2100.0

COVER THICKNESS (STABILOMETER BY EXPANSION PRESSURE)



Sample No.		T4@2'		
Sample Type:		Undisturbed/Saturated		
Soil Description:		Silty Clay w/ Some Sand		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	744	1260	1884
Displacement	(in)	0.070	0.150	0.175
Residual Stress	(psf)	684	1248	1848
Displacement	(in.)	0.250	0.250	0.250
In Situ Dry Density	(pcf)	103.9	103.9	103.9
In Situ Water Content	(%)	7.9	7.9	7.9
Saturated Water Content	(%)	30.6	30.6	30.6
Strain Rate	(in/min)	0.020	0.020	0.020





	Ø (Degree)	C (psf)
Peak Stress	29	160
Residual Stress	30	100

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Phelan Development Company

PROJECT NUMBER: 22016-20 DATE: 9/17/2020

DIRECT SHEAR TEST

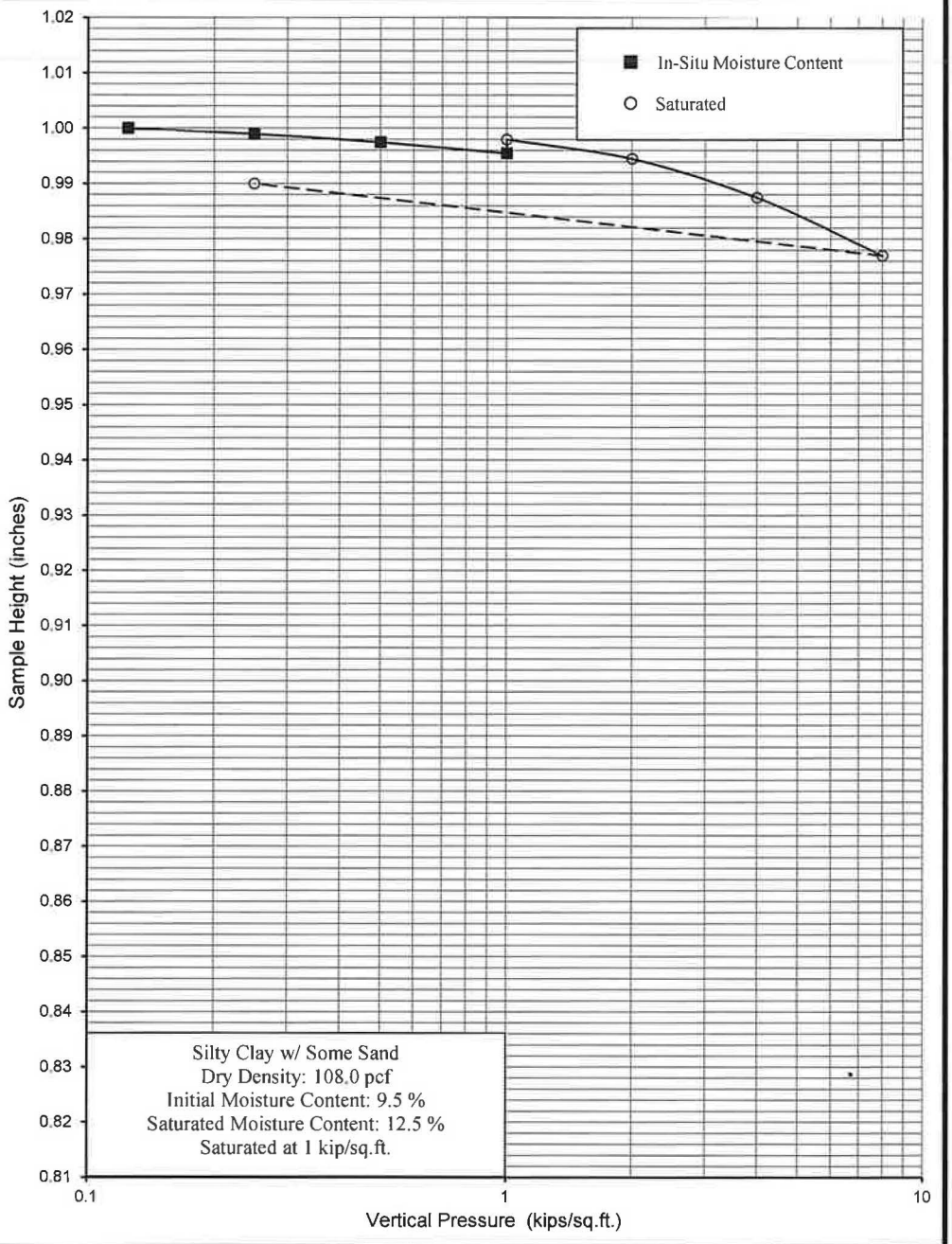
ASTM D3080

Plate A

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9990	0.1	
0.5	0.9975	0.2	
1	0.9955	0.4	
1	0.9980	0.2	Saturated
2	0.9945	0.6	
4	0.9875	1.3	
8	0.9770	2.3	
0.25	0.9900	1.0	

Date Tested: 9/14/2020
Sample: T4
Depth: 5'

Sample No.	T4	Depth	5'	Date	9/17/2020



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SOILS AND GEOTECHNICAL CONSULTANTS

Phelan Development Company

PROJECT NUMBER: 22016-20 DATE: 9/17/2020

CONSOLIDATION TEST

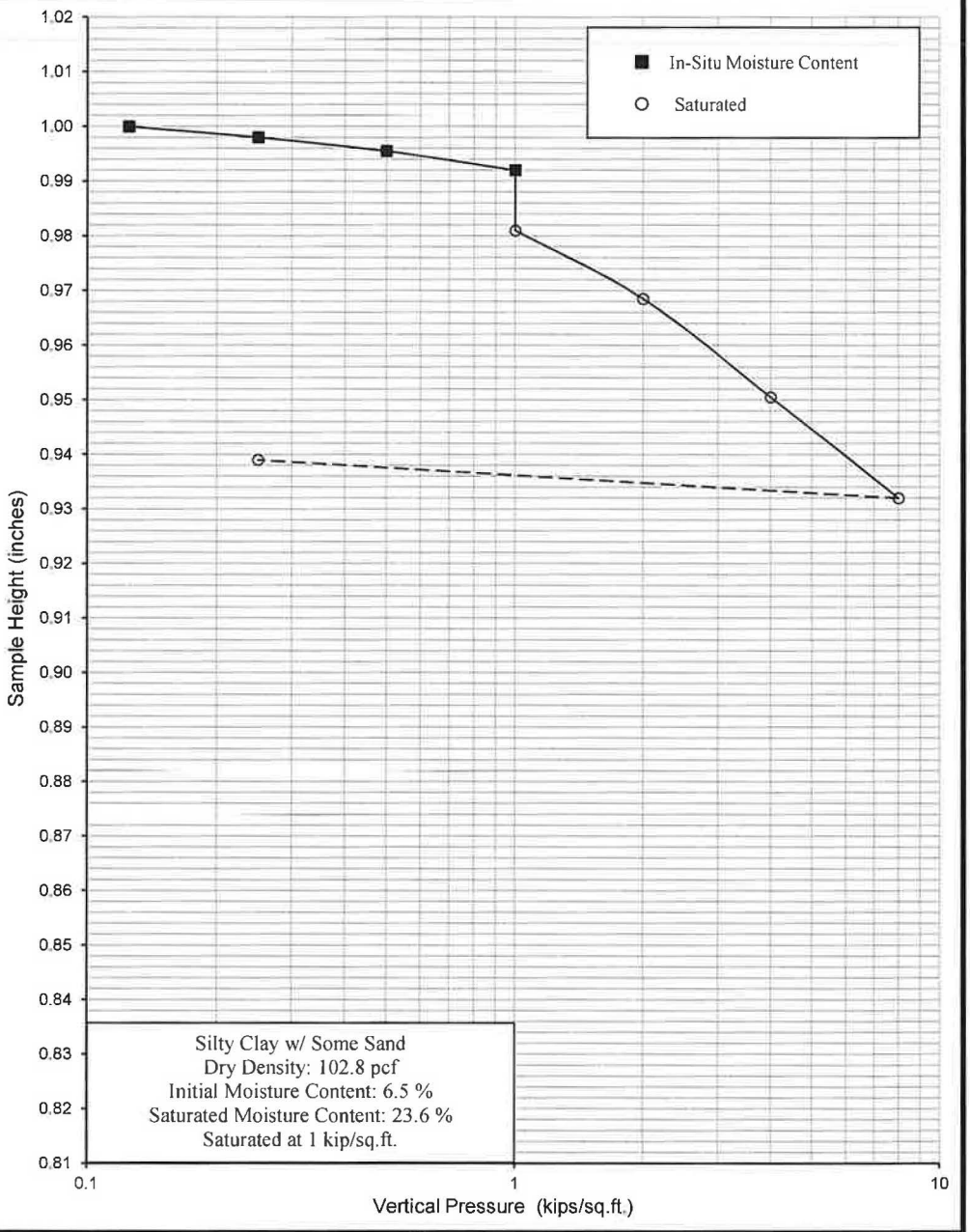
ASTM D2435

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	0.9955	0.4	
1	0.9920	0.8	
1	0.9810	1.9	
2	0.9685	3.2	
4	0.9505	5.0	
8	0.9320	6.8	
0.25	0.9390	6.1	Saturated

Sample No.	T4	Depth	10'	Date	9/17/2020

Date Tested: 9/14/2020
Sample: T4
Depth: 10'



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SOILS AND GEOTECHNICAL CONSULTANTS

Phelan Development Company

PROJECT NUMBER: 22016-20 DATE: 9/17/2020

CONSOLIDATION TEST

ASTM D2435

Plate C

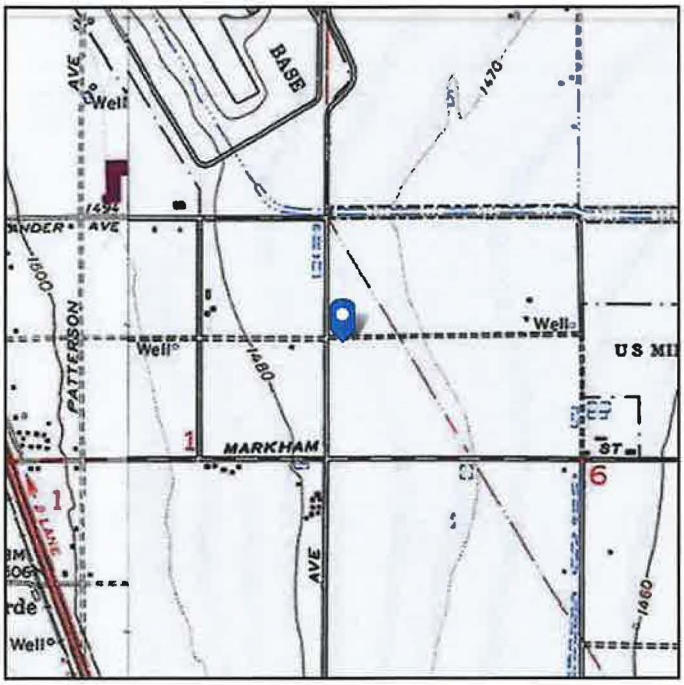
Appendix C

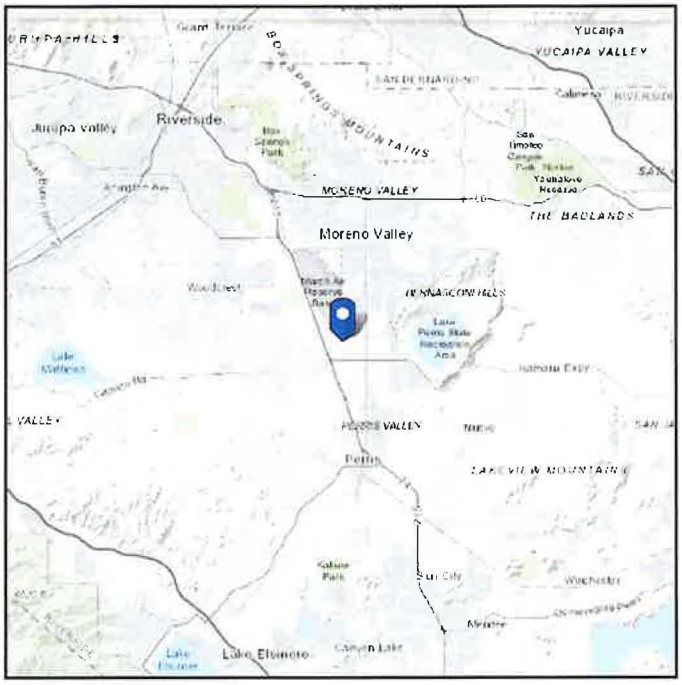
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 1477.54 ft (NAVD 88)
Latitude: 33.855267
Longitude: -117.243284





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.5	S_{D1} :	N/A
S_1 :	0.58	T_L :	8
F_a :	1	PGA :	0.5
F_v :	N/A	PGA_M :	0.55
S_{MS} :	1.5	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1.25
S_{DS} :	1	C_v :	1.4

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

Data Accessed: Tue Sep 08 2020

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.

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Appendix D

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Phelan Development Company
Project No.: 22016-20
Date: 8/31/2020
Test No. 1
Depth: 5'
Tested By: J.S. Jr.

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)
8:20			103.5			45.5					
8:35	15	15	104.3	0.8		45.8	0.3				
8:35			104.3			45.8					
8:50	15	30	104.9	0.6		46.0	0.2				
8:50			104.9			46.0					
9:05	15	45	105.3	0.4		46.2	0.2				
9:05			105.3			45.2					
9:20	15	60	105.6	0.3		46.5	0.3				
9:20			105.6			46.5					
9:35	15	75	106.0	0.4		46.8	0.3				
9:35			106.0			46.8					
9:50	15	90	106.4	0.4		47.1	0.3				
9:50			106.4			47.1					
10:05	15	105	106.7	0.3		47.3	0.2		1.2	0.8	
10:05			106.7			47.3					
10:20	15	120	107.1	0.4		47.5	0.2		1.6	0.8	
10:20			100.0			40.0					
10:35	15	135	100.4	0.4		40.5	0.5		1.6	2.0	
10:35			100.4			40.5					
10:50	15	150	100.7	0.3		40.9	0.4		1.2	1.6	
10:50			101.7			40.9					
11:05	15	165	101.1	0.4		41.3	0.4		1.6	1.6	
11:05			101.1			41.3					
11:20	15	180	101.4	0.3		41.6	0.3		1.2	1.2	

Average = 1.4 / 1.3 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Phelan Development Company
Project No.: 22016-20
Date: 8/31/2020
Test No. 2
Depth: 10'
Tested By: J.S. Jr.

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)
11:10			101.6			43.0					
11:25	15	15	102.0	0.4		43.5	0.5				
11:25			102.0			43.5					
11:40	15	30	102.2	0.2		43.8	0.3				
11:40			102.2			43.8					
11:55	15	45	102.4	0.2		44.3	0.5				
11:55			102.4			44.3					
12:10	15	60	102.5	0.1		44.6	0.3				
12:10			102.5			44.6					
12:25	15	75	102.6	0.1		45.0	0.4				
12:25			102.6			45.0					
12:40	15	90	102.7	0.1		45.5	0.5		0.4	2.0	
12:40			102.7			45.5					
12:55	15	105	102.8	0.1		45.8	0.3		0.4	1.2	
12:55			102.8			45.8					
1:10	15	120	103.0	0.2		46.1	0.3		0.8	1.2	
1:10			103.0			46.1					
1:25	15	135	103.2	0.2		46.5	0.4		0.8	1.6	
1:25			103.2			46.5					
1:40	15	150	103.4	0.2		46.9	0.4		0.8	1.6	
1:40			103.4			46.9					
1:55	15	165	103.5	0.1		47.2	0.3		0.4	1.2	
1:55			103.5			47.2					
2:05	15	180	103.6	0.1		47.6	0.4		0.4	1.6	

Average = 0.6 / 1.5 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Phelan Development Company
Project No.: 22016-20
Date: 8/31/2020
Test No. 3
Depth: 5'
Tested By: J.S. Jr.

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)
8:49			72.7			38.6					
9:04	15	15	73.0	0.3		38.9	0.3				
9:04			73.0			38.9					
9:19	15	30	73.3	0.3		39.0	0.1				
9:19			73.3			39.0					
9:34	15	45	73.6	0.3		39.4	0.4				
9:34			73.6			39.4					
9:49	15	60	73.8	0.2		39.4	0.0				
9:49			73.8			39.4					
10:04	15	75	74.1	0.3		39.5	0.1				
10:04			74.1			39.5					
10:19	15	90	74.2	0.1		40.0	0.5	0.4	2.0		
10:19			74.2			40.0					
10:34	15	105	74.3	0.1		40.3	0.3	0.4	1.2		
10:34			74.3			40.3					
10:49	15	120	74.4	0.1		40.4	0.1	0.4	0.4		
10:49			74.4			40.4					
11:04	15	135	74.5	0.1		40.6	0.2	0.4	0.8		
11:04			74.5			40.6					
11:19	15	150	74.7	0.2		40.9	0.3	0.8	1.2		
11:19			74.7			40.9					
11:34	15	165	74.8	0.1		41.2	0.3	0.4	1.2		
11:34			74.8			41.2					
11:49	15	180	75.0	0.2		41.5	0.3	0.8	1.2		

Average = 0.5 / 1.1 cm/hr

Appendix 4: Historical Site Conditions

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

TO BE PROVIDED IN FINAL WQMP (IF APPLICABLE)

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

NOT APPLICABLE

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Flow Rate, Q_{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	TRWE	Date	9/25/2020
Designed by	AJS	Case No	TBD
Company Project Number/Name	Phelan Perris		

BMP Identification

BMP NAME / ID: BMP D/1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

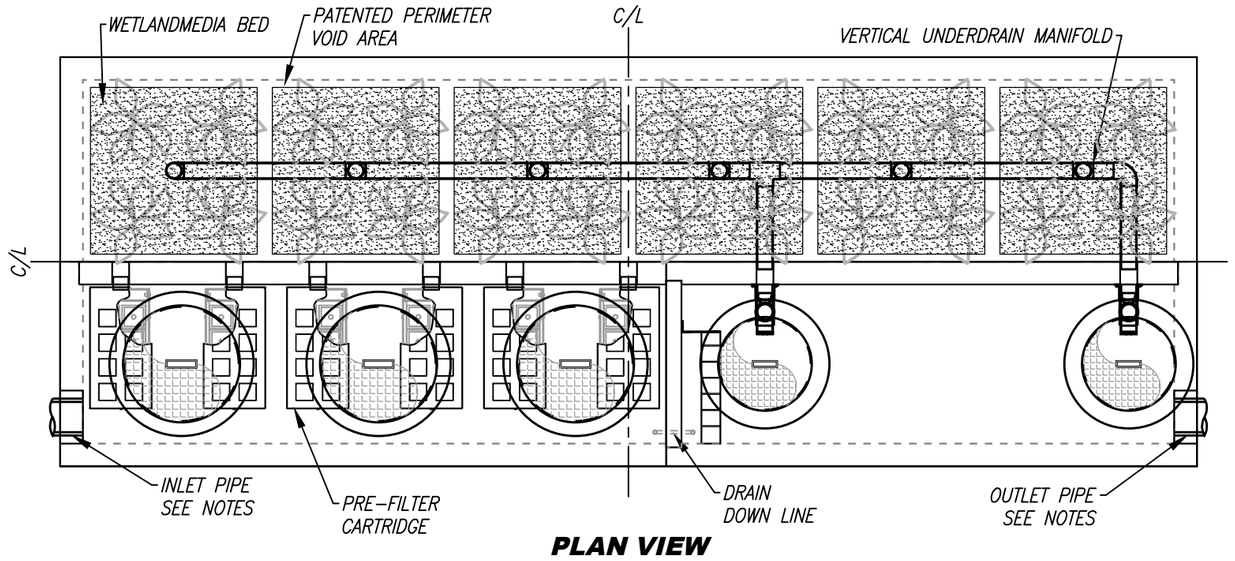
DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
D/1 ROOF	*65753*	*Roofs*	*1*	*0.89*	*58651.7*			
D/1 CONC	*72477*	*Concrete or Asphalt*	*1*	*0.892*	*64649.3*			
D/1 LS	*5536*	*Ornamental Landscaping*	*0.1*	*0.11046*	*611.5*			
D/1 SRA	*1739*	*Ornamental Landscaping*	*0.1*	*0.11046*	*192.1*			
	145505	***Total***			**124104.6**	**0.20**	***0.6***	***0.693***

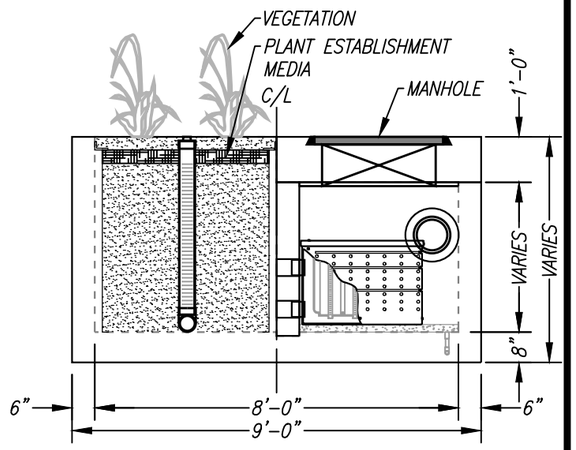
Notes: DMA was conservatively assumed to be 95% impervious for planning-level design.

SITE SPECIFIC DATA			
PROJECT NUMBER		TBD	
PROJECT NAME		PHELAN PERRIS	
PROJECT LOCATION		PERRIS, CA	
STRUCTURE ID		DMA D/1	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.693	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	66.35	HDPE	12 IN
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	65.35	HDPE	12 IN
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	70.77		
SURFACE LOAD	INDIRECT TRAFFIC		
FRAME & COVER	3EA ø30"	UNDERGROUND	2EA ø24"
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



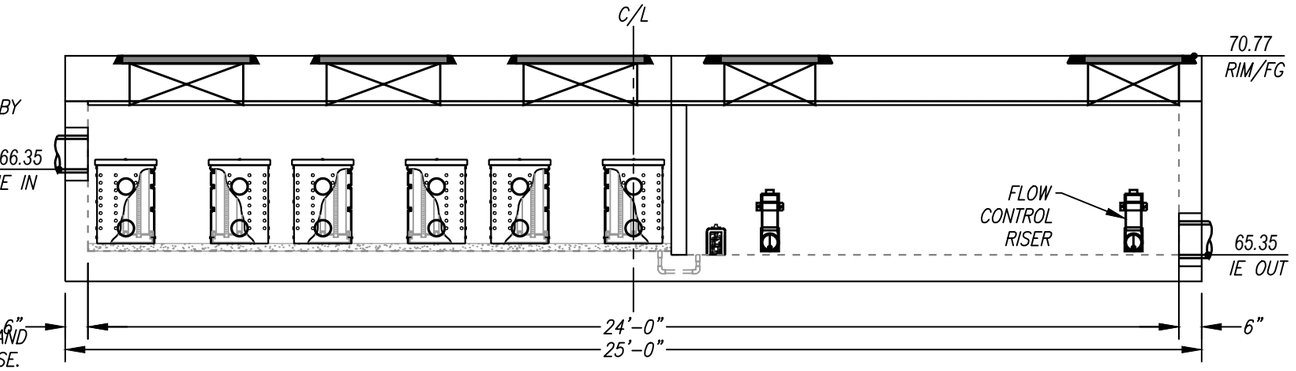
LEFT END VIEW

INSTALLATION NOTES

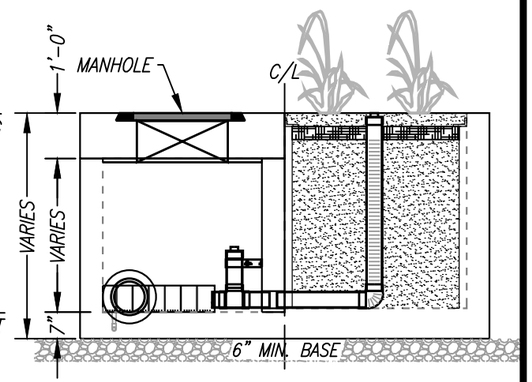
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER 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)	0.693
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

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A Forterra Company

MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19 10:LEF

Santa Ana Watershed - BMP Design Flow Rate, Q_{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: TRWE
Date: 9/25/2020
Designed by: AJS
Case No: TBD
Company Project Number/Name: Phelan Perris

BMP Identification

BMP NAME / ID: BMP D/2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

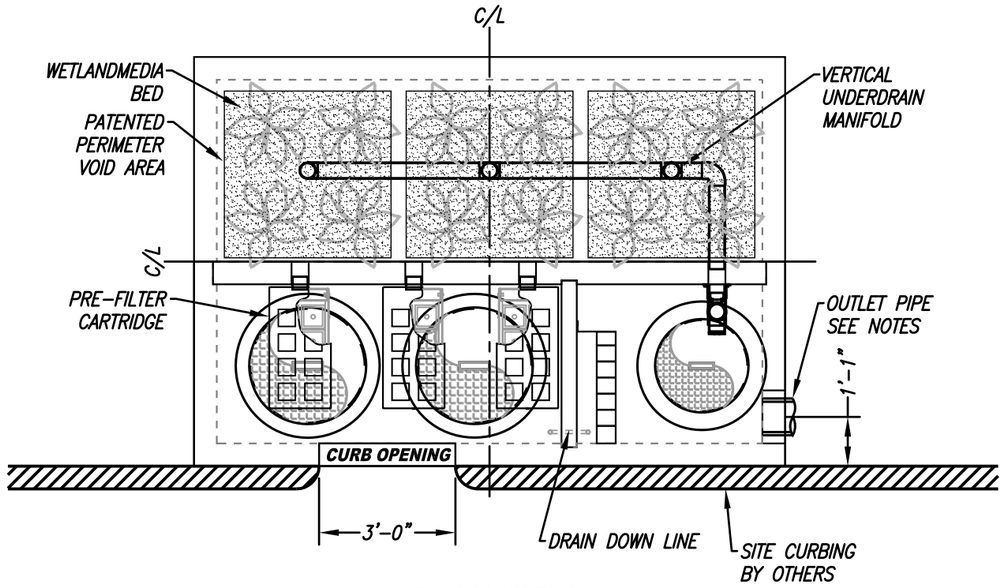
Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
D/2 ROOF	*42500*	*Roofs*	*1*	*0.89*	*37910*			
D/2 CONC	*25575*	*Concrete or Asphalt*	*1*	*0.892*	*22813*			
D/2 LS	*7361*	*Ornamental Landscaping*	*0.1*	*0.11046*	*813.1*			
D/2 SRA	*203*	*Ornamental Landscaping*	*0.1*	*0.11046*	*22.4*			
	75639	***Total***			**61558.5**	**0.20**	**0.3**	**0.346**

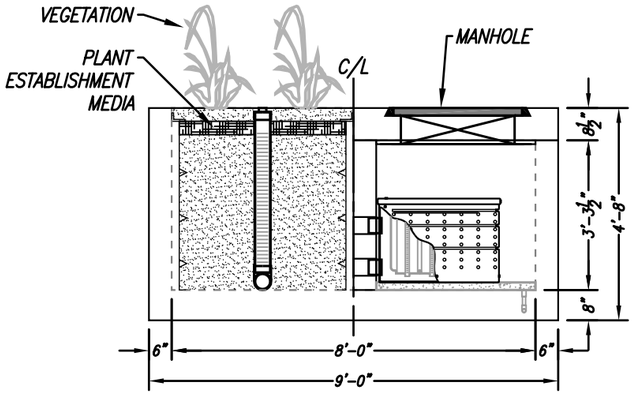
DMAs

Notes: DMA was conservatively assumed to be 90% impervious for planning-level design.

SITE SPECIFIC DATA			
PROJECT NUMBER		TBD	
ORDER NUMBER		TBD	
PROJECT NAME		PHELAN PERRIS	
PROJECT LOCATION		PERRIS,CA	
STRUCTURE ID		BMP D/2	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		0.346	
TREATMENT HGL AVAILABLE (FT)			TBD
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			TBD
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	N/A	N/A	N/A
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	67.13	HDPE	12 IN
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION		71.21	
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	2EA ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



PLAN VIEW



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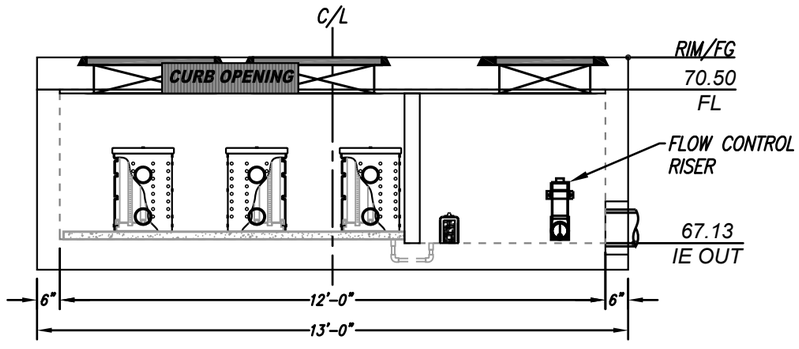
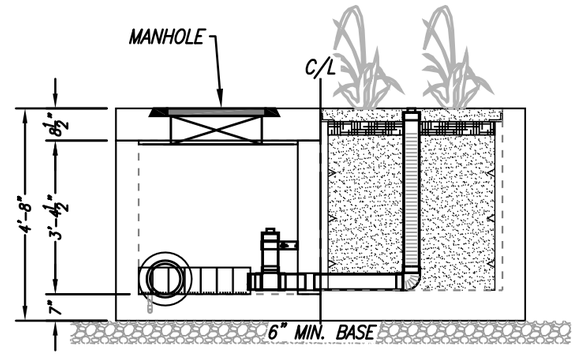


ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.346
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

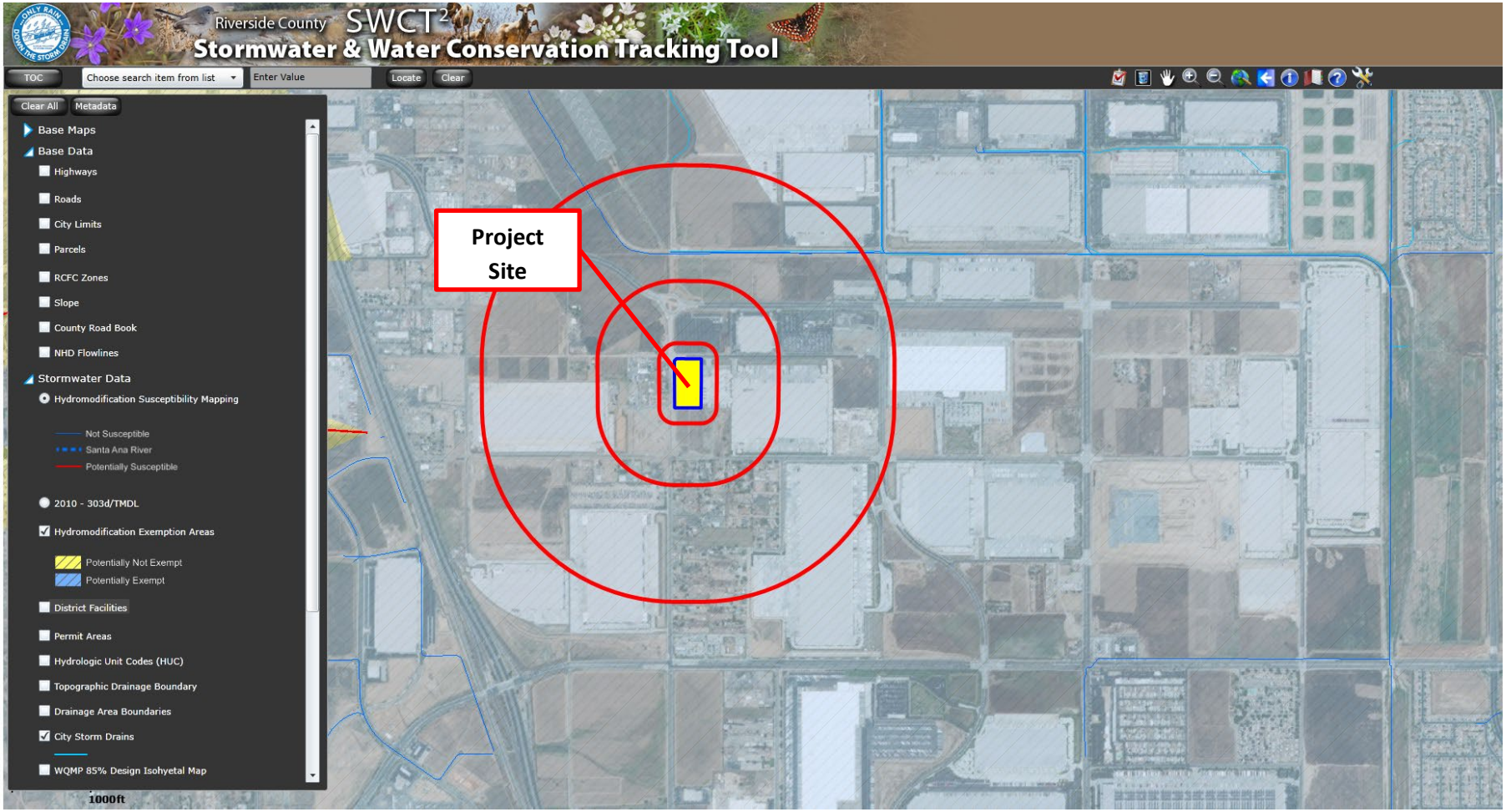
Bio Clean
A Forterra Company

MWS-L-8-12-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

The site discharges to the Perris Valley Channel through segments of the City of Perris MS4 that have been determined to be "not susceptible" to hydromodification per the Watershed Action Plan (WAP) document, Map 2, approved April 20, 2017. Therefore, HCOC mitigation for the proposed project is not required.


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Base Maps
Base Data
Highways
Roads
City Limits
Parcels
RCFC Zones
Slope
County Road Book
NHD Flowlines
Stormwater Data
Hydromodification Susceptibility Mapping
Not Susceptible
Santa Ana River
Potentially Susceptible
2010 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
1000ft
Project Site

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

TO BE PROVIDED IN FINAL WQMP

Appendix 9: O&M

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

TO BE PROVIDED IN FINAL WQMP

Appendix 10: Educational Materials

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

TO BE PROVIDED IN FINAL WQMP