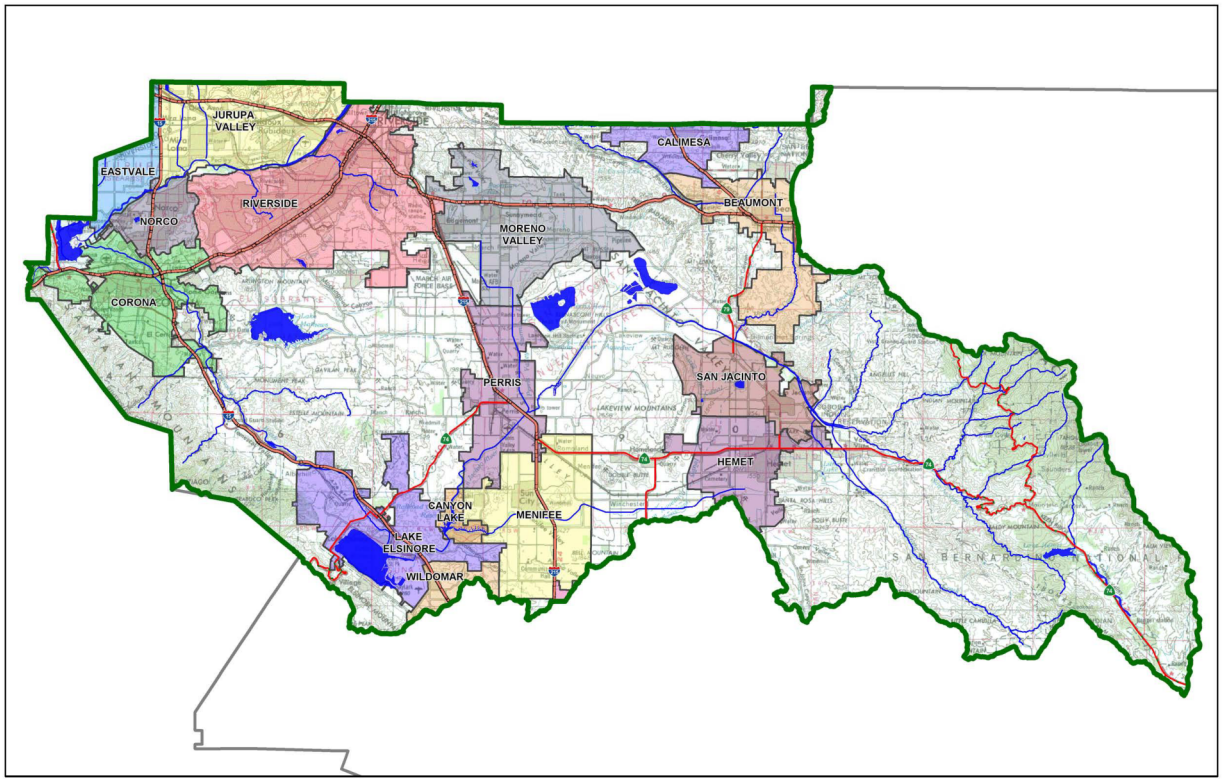
Project Specific Water Quality Management Plan

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

Project Title: Westport-Perris

Development No: NE Corner of Ramona Expressway and Brennan Avenue

Design Review/Case No: P22-00021



☒ **Preliminary**
☐ **Final**

Original Date Prepared: May 27, 2022

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

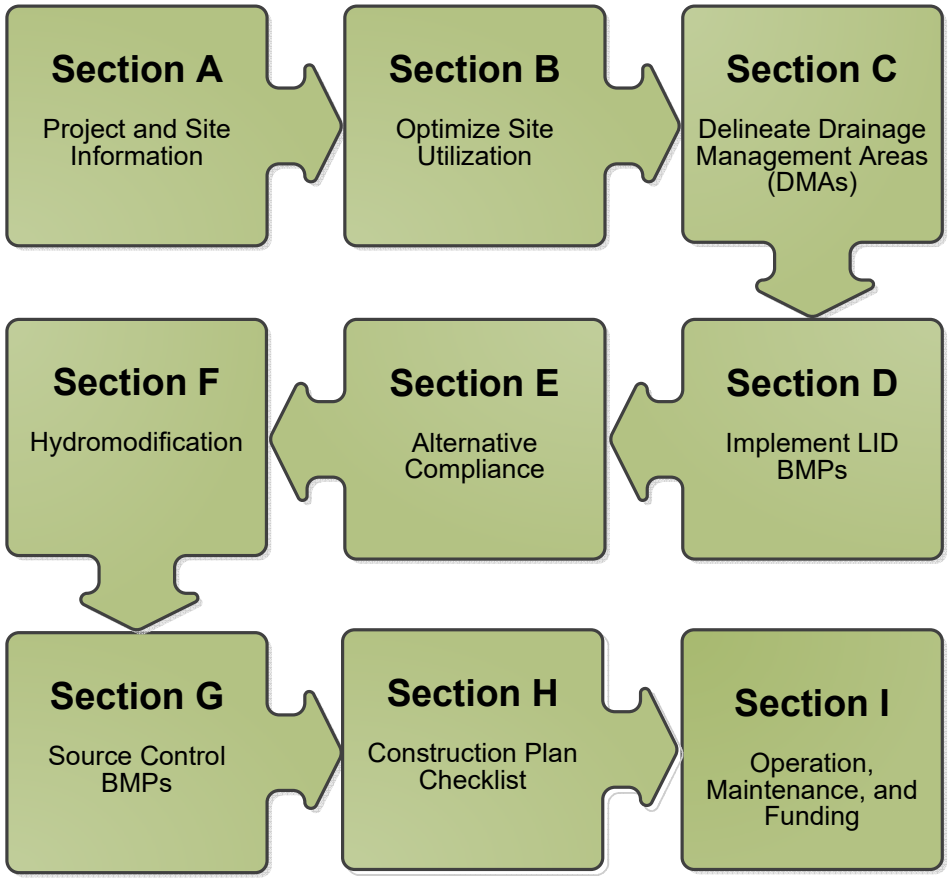
Contact Information:

Prepared for:
Westport Properties, Inc.
2201 Dupont Drive, Suite 700
Irvine, CA 92612
(949) 748-5900

Prepared by:
SDH & Associates, Inc.
27363 Via Industria
Temecula, CA 92590
(951) 683-3691

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 Westport Properties, Inc. for the Westport-Perris project (City Case No. P22-00021).

This WQMP is intended to comply with the requirements of City of Perris for Water Quality Ordinance 1194, 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 the City of Perris Water Quality Ordinance 1194.

"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: 11/10/22
Owner's Printed Name: David Kelly	Owner's Title/Position: VP of Development

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: 11/10/2022
Preparer's Printed Name: Nobu Murakami	Preparer's Title/Position: Water Resources Engineer

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	Mead Valley Area Plan (MVAP)
Community Name:	City of Perris
Development Name:	Westport-Perris

PROJECT LOCATION
Latitude & Longitude (DMS): 33°50'43.87"N, 117°14'23.32"W
Project Watershed and Sub-Watershed: Santa Ana (Watershed) Perris Reservoir (Sub Watershed)
Gross Acres: ~4.5 acres (parcel)
APN(s): 302-260-078, 302-260-079, 302-260-080, and 302-260-081
Map Book and Page No.: Map No. 36144 on file in Book 230, Pages 38 and 39 of Parcel Maps

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Light Industrial
Proposed or Potential SIC Code(s)	1541
Area of Impervious Project Footprint (SF)	171,198 SF
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	171,198 SF
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)	See Appendix 3 – NRCS Soil Type B
What is the Water Quality Design Storm Depth for the project?	0.62 inch

Westport Properties, Inc. is proposing to develop an industrial tilt-up warehouse building and associated parking as part of this project, which is located at the northeast corner of the intersection of Ramona Expressway and Brennan Avenue, in the City of Perris, California. A vicinity map is provided in Appendix 1 of this report for reference purpose. Applicable Assessor Parcel Numbers (APNs) are 302-260-078, 302-260-079, 302-260-080, and 302-260-081. The site is approximately 4.5 acres (parcel gross area) with a drainage management area of approximately 4.5 acres. The proposed warehouse building footprint is approximately 99,957 square feet (including 5,650 square feet office) and there will be a total of 44 parking spaces to be provided. The proposed impervious and pervious footprints within the drainage management area are approximately 171,198 square feet and 24,064 square feet, respectively. The project also includes frontage street improvements.

In the existing condition, the site is vacant (dirt open space) and contains very little vegetation. It appears the vegetation has been cleared over time. Runoff from the site generally drains in an easterly direction towards a privately-maintained open trapezoidal channel located to the east of the project (maintained by others). Offsite run-on is not expected. To the east of the aforementioned trapezoidal channel (running parallel to it) is an existing 54-inch reinforced concrete pipe (RCP) that in interim is maintained by the City of Perris and ultimately to be maintained by RCFC&WCD once the ultimate MDP Line E gets built out. This is shown on a storm drain

plan titled, "Perris Valley MDP Lateral "E-4", Stage 1" (Project No. 4-0-0460; Drawing No. 4-1070; PM 36010). Separately, to the south of the project running parallel to Ramona Expressway, there is an existing 90-inch RCP (part of the MDP Line E) that in interim is maintained by the City of Perris and in the future to be maintained by RCFC one the Line E gets built out, based on a storm drain plan titled, "Perris Valley MDP Line E Stage 3" (Project No. 4-0-00488; Drawing No. 4-1117; PM 36512 / PM 36582; City File No. P8-1226). Lastly, to the north of the existing 90-inch RCP running parallel to Ramona Expressway is an existing 42-inch RCP that is maintained by the City of Perris in perpetuity, based on a storm drain plan titled, "Perris Valley MDP Line E Stage 2 Lateral E-4 Stage 1" (Project No. 4-0-0488 / 4-0-0460; Drawing No. 4-1070; PM 36010). The aforementioned three storm drain systems contribute to the downstream MDP Line E that is currently constructed to the intersection of Ramona Expressway and Indian Avenue. Relevant reference drawings (excerpts) are included in Appendix E of this report for reference purpose. From this point, runoff drains via surface flow in an easterly direction until it reaches the existing Perris Valley Storm Drain Channel.

In the post-project condition, the drainage characteristics will be maintained similar as compared to the pre-project condition. Runoff from a portion of the site (DMA 1A) will be directed to a proposed BMP (proprietary modular wetland system; MWS-L-8-12-V-UG) located near the southeasterly corner of the project for storm water quality treatment to comply with the City and Santa Ana Region's Water Quality Management Plan (WQMP) requirements. Remaining portion of the site (DMA 1B) will be treated by a proposed vegetated swale. As the three aforementioned existing storm drain systems are contributing to the same existing MDP Line E downstream, the project plans to connect the on-site flows to the existing 42-inch RCP in the project frontage along Ramona Expressway that is maintained by the City of Perris. From this point, runoff continues to drain to the same existing MDP Line E facility. Since runoff connects into an existing MDP Line E system that is designed to have capacity to accommodate the ultimate buildout condition peak flows from this area including the project, the flood control detention mitigation should not be necessary.

In support of the infiltration feasibility for the proposed permanent storm water BMP, the project-specific geotechnical engineer conducted infiltration testing and results indicated field infiltrate rates of 0.0 and 0.2 in/hr. These rates are below the infiltration threshold of 1.6 in/hr; and therefore, infiltration is not feasible for this project. Furthermore, this rate is at or below the threshold for bioretention LID BMP. As such, this would fall under the biotreatment category. Therefore, the project proposes a LID Biotreatment BMP (vegetated swale) for the proposed landscape area to the south (DMA 1B) and a proprietary modular wetland system (MWS) for the remaining area (DMA 1A), in order to address the storm water quality management plan requirements.

Provided below is a summary list of the proposed BMPs for the project:

- **<u>LID Self-treating landscape areas</u> – The project will provide on-site landscape areas (considered as LID self treating landscape areas) throughout the development.**
- **<u>Covered Trash Enclosure</u> (part of site design and source control) – The proposed trash enclosure area will be covered.**
- **<u>Pre-treatment BMPs</u> – The project plans to provide proprietary Connector Pipe Screen (CPS) by BioClean/Contech at each of the on-site catch basin location to pre-treat the storm water runoff, prior to discharging into the proposed treatment control BMPs listed below.**
- **<u>Treatment Control BMPs (structural BMPs)</u>:**
  - **BMP 1A – A Modular Wetland System (MWS-L-8-12-V-UG) for storm water treatment (flow-based approach) is proposed to treat runoff from a portion of the site, DMA 1A.**
  - **BMP 1B – A LID Biotreatment BMP vegetated swale is provided along the southerly edge of the site to treat the remaining portion of the site, DMA 1B.**

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 Storm Drain	N/A	N/A	San Jacinto River Rach 3 (downstream).
San Jacinto River Reach 3 – Canyon Lake to Nuevo Road (HU#802.11)	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	This river reach has existing or potential RARE beneficial use.
Canyon Lake (HU#802.11, 802.12)	Nutrients, Pathogens	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	San Jacinto River Reaches 1 (downstream).
San Jacinto River Rach 1 (HU#802.32, 802.31)	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	This river reach has existing or potential RARE beneficial use.
Lake Elsinore (HU#802.31)	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Toxicity	MUN, REC1, REC2, COMM, WARM, WILD, RARE	The lake has existing or potential RARE beneficial use.

Note: Based on the direction from the City, the 2012 impairment listing is referenced.

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 (dependent on tenant)	☒ 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 – Grading Permit & Building 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?

The existing site drains in an easterly direction towards an existing privately maintained channel east of the property and drains to an existing MDP Line E along Ramona Expressway, maintained by RCFC.

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

The site has little or no existing vegetation as it has been graded and consistently cleared over many years.

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

Where applicable, runoff from the proposed hardscape area will be directed towards landscape area in an effort to promote incidental infiltration and preserve the infiltration capacity. Additionally, roof

runoff through downspouts will be directed to proposed landscape areas where feasible to help slow down the storm water runoff.

In support of the infiltration feasibility for the proposed permanent storm water BMP, the project-specific geotechnical engineer conducted infiltration testing and the results indicated field infiltration rates of 0.0 and 0.2 inch/hour. These rates are below the infiltration threshold of 1.6 in/hr; and therefore, infiltration is not feasible for this project.

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

Impervious areas are only used where necessary and have been minimized to the extent practicable. Parking spaces are minimized close to the required amount and the landscaped areas have been maximized to the extent practicable.

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

Runoff from impervious surfaces is directed to the pervious landscape areas where possible to help promote incidental infiltration and evaporation, prior to being directed to the proposed structural BMP for water quality treatment.

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 1A-1	Ornamental Landscaping	8,130	Type D
DMA 1A-2	Concrete or Asphalt	51,728	Type D
DMA 1A-3	Roofs	46,327	Type D
DMA 1B-1	Ornamental Landscaping	15,934	Type D
DMA 1B-2	Concrete or Asphalt	22,124	Type D
DMA 1B-3	Roofs	51,019	Type D

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

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA 1A-1	8,130	Landscaping	Drip
DMA 1B-1	15,934	Landscaping	Drip

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]
N/A						

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

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

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

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

DMA Name or ID	BMP Name or ID
DMA 1A-1	BMP 1A –Modular Wetland System (MWS-L-8-12-V-UG)
DMA 1A-2	BMP 1A –Modular Wetland System (MWS-L-8-12-V-UG)
DMA 1A-3	BMP 1A –Modular Wetland System (MWS-L-8-12-V-UG)
DMA 1B-1	BMP 1B – LID Biotreatment BMP (Vegetated Swale)
DMA 1B-2	BMP 1B – LID Biotreatment BMP (Vegetated Swale)
DMA 1B-3	BMP 1B – LID Biotreatment BMP (Vegetated Swale)

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the 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: DMA 1A, DMA 1B		
…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: Clayey materials observed approximately 5' below existing grade and below and 25' setback would be needed from structures and retaining walls for infiltration facilities.		

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: Insert Area (Acres)

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

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: Insert Area (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: EIATIA Factor

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: Insert Area (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)
Insert Area (Acres)	Insert Area (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: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

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: Insert Area (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: TUTIA Factor

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: Required number of toilet users

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)**
Insert Area (Acres)	Insert Area (Acres)

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.

Insert narrative description here.

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: Projected Average Daily Use (gpd)

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: Insert Area (Acres)

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: Enter Value

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: Minimum use required (gpd)

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)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

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.

Note: A portion of the site (DMA 1B) will be treated by a LID Biotreatment BMP. The remaining portion of the site (DMA 1A) will be treated via a proposed Modular Wetland System (MWS). The Modular Wetland System is sized per flow-based approach and proposed for DMA 1A.

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 1A-1	☐	☐	☐	☐	☒
DMA 1A-2	☐	☐	☐	☐	☒
DMA 1A-3	☐	☐	☐	☐	☒
DMA 1B-1	☐	☐	☐	☒	☐
DMA 1B-2	☐	☐	☐	☒	☐
DMA 1B-3	☐	☐	☐	☒	☐

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.

Note: As indicated above, based on the recommended infiltration rate by the project-specific geotechnical engineer, infiltration and bioretention are not technically feasible and the suitable BMP is Biotreatment LID BMP and a proprietary MWS. A vegetated swale (LID Biotreatment BMP) is provided on the southerly edge of the project to treat a portion of the site (DMA 1B) and a proprietary MWS is proposed to treat the remaining area (DMA 1A).

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 Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP 1A / Modular Wetland System (MWS-L-8-12-V-UG)*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1A-1	*8,130*	*Ornamental Landscaping*	*0.1*	*0.11*	*898*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1A-2	*51,728*	*Concrete or Asphalt*	*1.0*	*0.89*	*46141.4*			
DMA 1A-3	*46,327*	*Roofs*	*1.0*	*0.89*	*41323.7*			
	$A_T = \Sigma[A]$ 106,185				Σ= [D] 88363.1	[E] 0.62	$[F] = \frac{[D]x[E]}{12}$ 4565.4	[G] **N/A – Flow-based MWS. See Table E.3**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document.

[E] is obtained from Section 2.3.1 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.

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP 1B / LID Biotreatment BMP Vegetated Swale*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1B-1	*15,934*	*Ornamental Landscaping*	*0.1*	*0.11*	*1760*			
DMA 1B-2	*22,124*	*Concrete or Asphalt*	*1.0*	*0.89*	*19734.6*			
DMA 1B-3	*51,019*	*Roofs*	*1.0*	*0.89*	*45508.9*			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$ 89,077				Σ= [D] 67003.5	[E] 0.62	$[F] = \frac{[D]x[E]}{12}$ 3461.8	[G] **3,572**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document.

[E] is obtained from Section 2.3.1 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.

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.

Note: A portion of the site (DMA 1B) will be treated by a LID Biotreatment BMP (vegetated swale); however, the remaining portion of the site (DMA 1A) will be treated via a proprietary Modular Wetland Systems (MWS). Therefore, the relevant parts of this Section are also completed.

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[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		*BMP 1A / Modular Wetland System (MWS-L-8-12-V-UG)*		
	[A]		[B]	[C]	[A] x [C]				
DMA 1A-1	*8,130*	*Ornamental Landscaping*	*0.1*	*0.11*	*898*	*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)*
DMA 1A-2	*51,728*	*Concrete or Asphalt*	*1.0*	*0.892*	*46141.4*				
DMA 1A-3	*46,327*	*Roofs*	*1.0*	*0.892*	*41323.7*				
	A_T = Σ[A] 106,185				Σ= [D] 88363.1	[E] 0.20	[F] $= \frac{[D]x[E]}{[G]}$ 0.4	[F] X (1-[H]) N/A	[I] **0.406**

[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

Table E.4 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperviousness Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*BMP 1B / LID Biotreatment BMP Vegetated Swale*		
	[A]		[B]	[C]	[A] x [C]				
DMA 1B-1	*15,934*	*Ornamental Landscaping*	*0.1*	*0.11*	*1760*	*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)*
DMA 1B-2	*22,124*	*Concrete or Asphalt*	*1.0*	*0.892*	*19734.6*				
DMA 1B-3	*51,019*	*Roofs*	*1.0*	*0.892*	*45508.9*				
	A_T = Σ[A] 89,077				Σ= [D] 67003.5	[E] 0.20	[F] $= \frac{[D]x[E]}{[G]}$ 0.3	[F] X (1-[H]) N/A	[I] **0.3**

[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.5 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Modular Wetland System (BMP 1A)	Metals, Nutrients, Pesticides, Toxic Organic Compounds, Sediments, Trash & Debris, and Oil & Grease	Metal (Medium), Nutrients/Pesticides (Medium), Toxic Organic Compounds (Medium), Sediments (High), Trash & Debris (High), Oil & Grease (High)

[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		
Volume (Cubic Feet)			

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

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

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

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

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.

Note: The project is within the Riverside County WAP HCOC Exemption area approved on April 20, 2017.

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.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. 3See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to

		storm drain."
Interior floor drains	Interior floor drains shall be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Building design features including sealants barriers and fully closing windows and doors have been included to discourage entry of pests.	Integrated Pest Management (IPM) information to be provided to owners, lessees, and operators.
Landscape/outdoor pesticide use	Final Landscape Plans will accomplish the following: Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. Prevent erosion of slopes by planting fast-growing, dense ground covering plants. Plant native vegetation to reduce the amount of water, fertilizers, and pesticides applied to the landscape. Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers. 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. Integrated Pest Management (IPM) information to be provided to owners, lessees, and operators.
Refuse areas	Site design features dumpster enclosures. Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	Periodic inspections for leaky, overfilled, uncovered, or other problematic conditions will occur. Corrective action will be made upon detection, as circumstances permit. Dumping of liquid or hazardous wastes will be prohibited. Spill control materials will be available on-site. All wastes to properly stored and disposed of in accordance with all applicable Local, State and Federal regulations
Industrial Processes	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system. See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/
Loading Docks	Maintain in a clean and orderly fashion. Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. Provide a roof overhang over the loading area or	Move loaded and unloaded items indoors as soon as possible. See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

	install door skirts (cowling) at each bay that enclose the end of the trailer.	
Fire Sprinkler Test Water	Provide a means to drain fire sprinkler test water to the sanitary sewer.	See the note in the Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous Drain or Wash Water or Other Sources	Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain. Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary. Roofing, gutters, and trim made out of unprotected metals that may leach into runoff shall be avoided.	Inspect periodically to verify that equipment is not leaking or discharging to the storm drain system.
Plazas, Sidewalks, and Parking Lots	Maintain in a clean and orderly fashion.	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 wash water 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.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP 1A	BMP 1A – Modular Wetland System (MWS-L-8-12-V-UG)	Grading Plan Sheet - TBD	33°50'41.98" N / 117°14'21.48" W (+/-)
BMP 1B	BMP 1B – LID Biotreatment BMP Vegetated Swale	Grading Plan Sheet - TBD	33°50'41.39" N / 117°14'24.29" 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.

Note: The corresponding plan sheet numbers in the above table will be provided at the time of the Final 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: See Appendix 9

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

☐ Y ☒ N

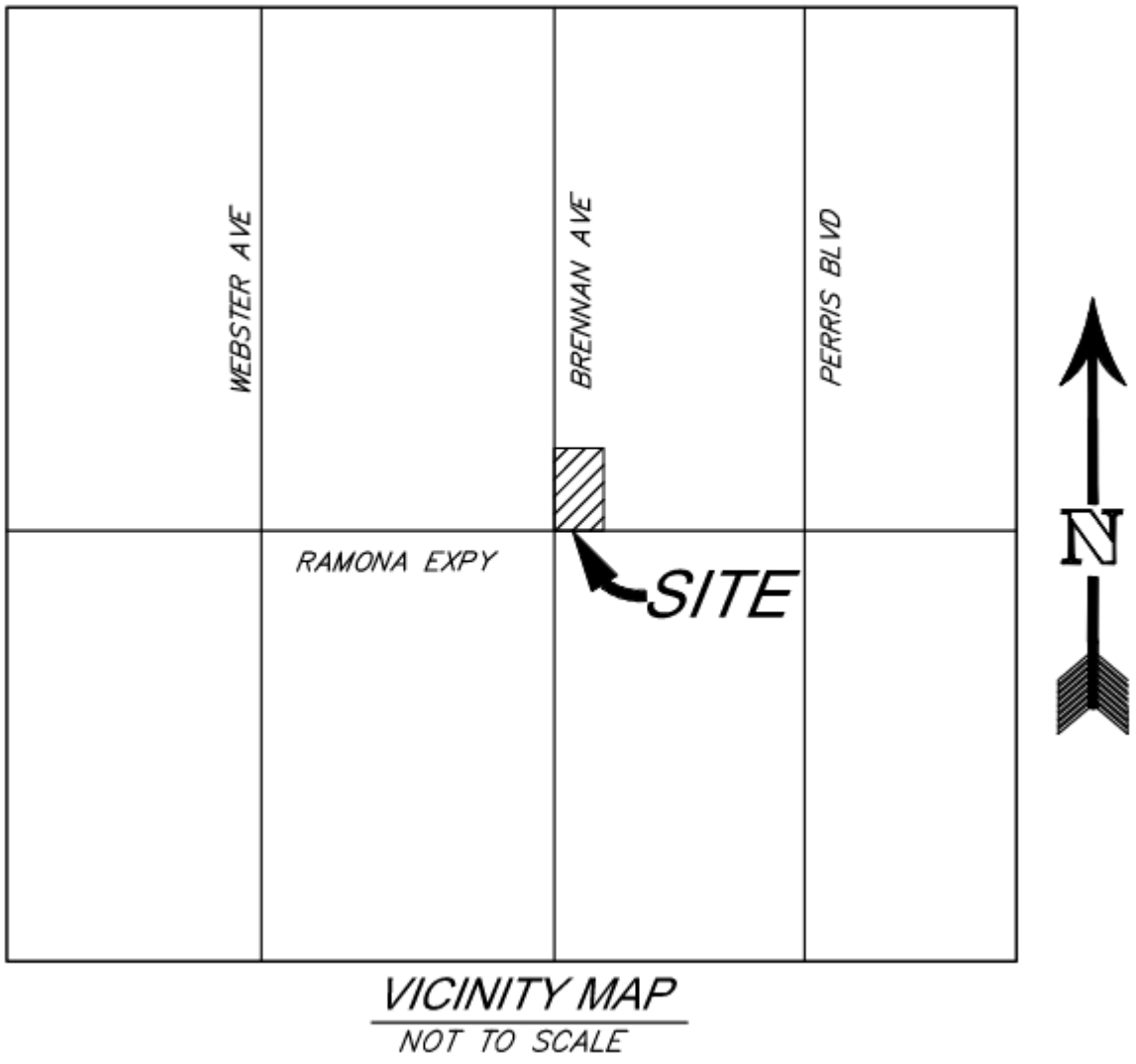
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Note: To be completed at the time of the FWQMP.

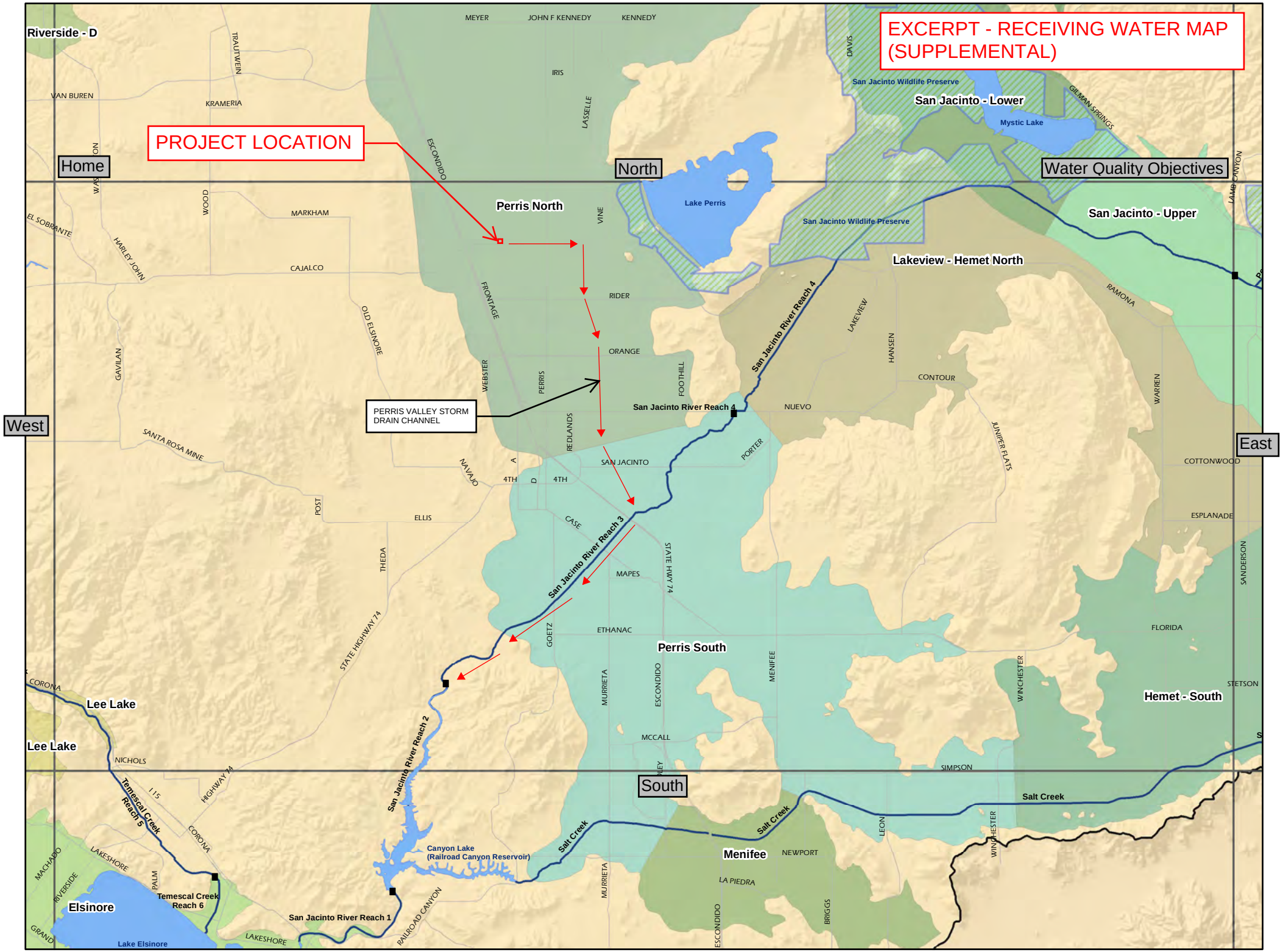
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

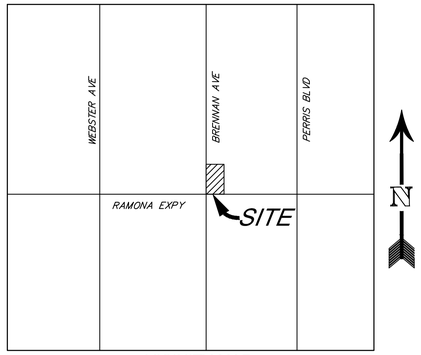
Vicinity Map



The project is located at the northeast corner of the intersection of Ramona Expressway and Brennan Avenue, in the City of Perris, CA.


EXCERPT - RECEIVING WATER MAP (SUPPLEMENTAL)
PROJECT LOCATION
Home
North
Water Quality Objectives
West
East
South
PERRIS VALLEY STORM DRAIN CHANNEL
Riverside - D
Perris North
Lake Perris
San Jacinto Wildlife Preserve
San Jacinto - Lower
Mystic Lake
San Jacinto - Upper
Lakeview - Hemet North
San Jacinto River Reach 4
San Jacinto River Reach 3
San Jacinto River Reach 2
San Jacinto River Reach 1
Perris South
Hemet - South
Menifee
Lee Lake
Canyon Lake
(Railroad Canyon Reservoir)
Elsinore
Lake Elsinore
Temescal Creek Reach 5
Temescal Creek Reach 6
Salt Creek
MEYER
JOHN F KENNEDY
KENNEDY
IRIS
LASSELLE
DAVIS
GILMAN SPRINGS
TRAUTWEIN
VAN BUREN
KRAMERIA
WASHINGTON
ESCONDIDO
WOOD
MARKHAM
EL SOBRANTE
HARLEY JOHN
CAJALCO
VINE
FRONTAGE
RIDER
ORANGE
OLD ELSINORE
GAVILAN
WEBSTER
PERRIS
FOOTHILL
REDLANDS
SANTA ROSA MINE
NAVAJO
4TH
SAN JACINTO
POST
ELLIS
CASE
THEDA
STATE HIGHWAY 74
MAPES
STATE HWY 74
GOETZ
ETHANAC
MURRIETA
ESCONDIDO
MENIFEE
MCCALL
SIMPSON
LAKEVIEW
HANSEN
CONTOUR
NUEVO
PORTER
JUNIPER FLATS
RAMONA
WARREN
COTTONWOOD
ESPLANADE
SANDERSON
FLORIDA
STETSON
WINCHESTER
LEON
NEWPORT
LA PIEDRA
BRIGGS
CORONA
NICHOLS
HIGHWAY 74
115
MACHADO
LAKESHORE
PALM
RIVERSIDE
GRAND
RAILROAD CANYON
LAMB CANYON

DMA PLAN
WESTPORT-PERRIS



VICINITY MAP
NOT TO SCALE

DMA LEGEND & AREAS

DRAINAGE MANAGEMENT AREA

DISCHARGE LOCATION

DMA LEGEND & AREAS

DMA 1A DRAINING TO MWS (BMP 1A)

DMA 1A–1 (ORNAMENTAL LANDSCAPING) – 8,130 S.F.

DMA 1A–2 (CONCRETE OR ASPHALT) – 51,728 S.F.

DMA 1A–3 (ROOFS) – 46,327 S.F.

TOTAL AREA = 106,185 S.F.

DMA 1B DRAINING TO VEGETATED SWALE (BMP 1B)

DMA 1B–1 (ORNAMENTAL LANDSCAPING) – 15,934 S.F.

DMA 1B–2 (CONCRETE OR ASPHALT) – 22,124 S.F.

DMA 1B–3 (ROOFS) – 51,019 S.F.

TOTAL AREA = 89,077 S.F.

MISC. DMAs

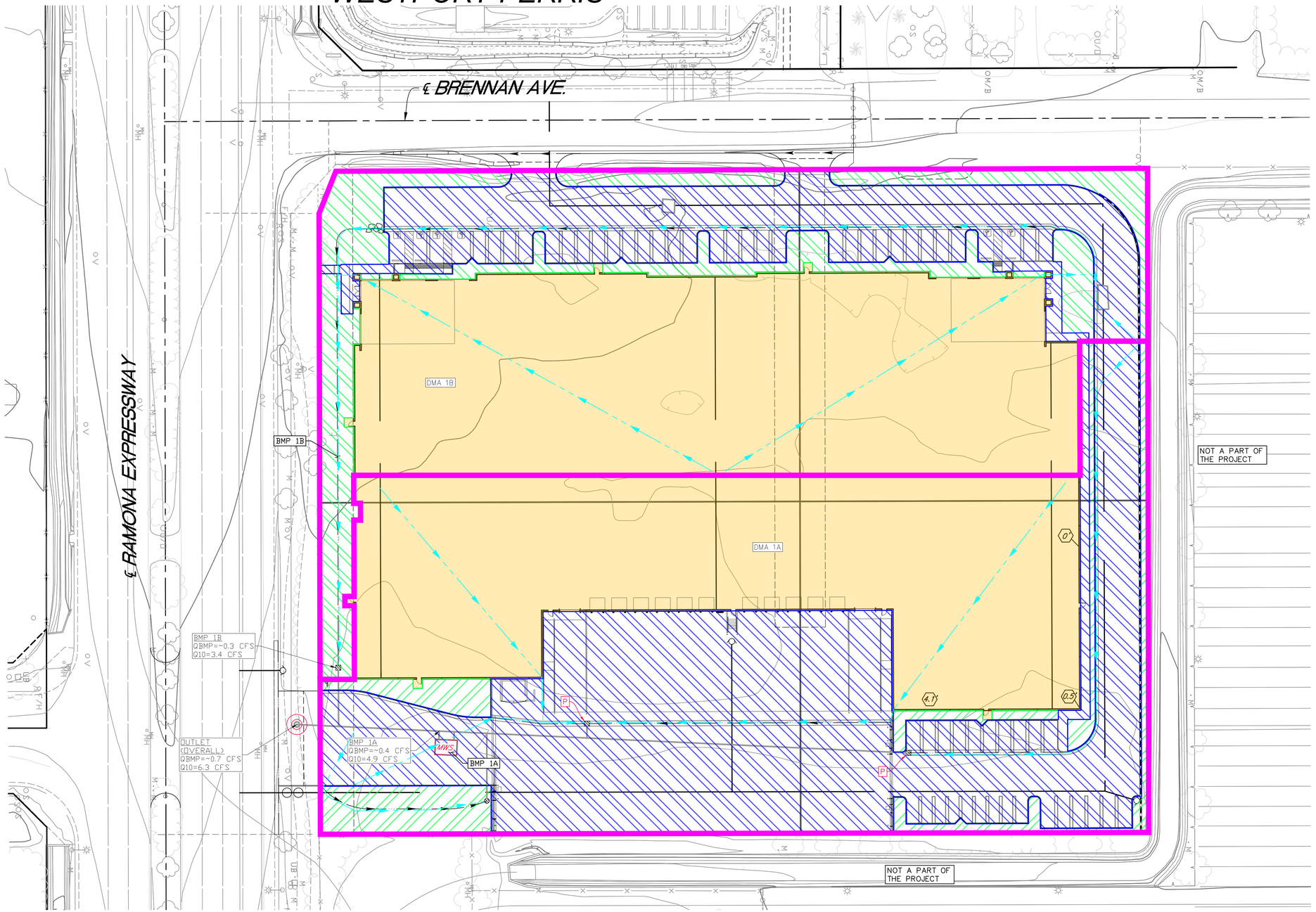
PERMANENT STRUCTURAL BMP

MWS — BMP 1A – MODULAR WETLAND SYSTEM (MWS) – MODEL NO. MWS-L-8-12-V-UG

BMP 1B – LID BIOTREATMENT BMP – VEGETATED SWALE – B=2'; Z=4:1; D=1.25' (SEE BMP SECTION DETAILS)

PRE-TREATMENT BMP

P — PROPOSED CONNECTOR PIPE SCREEN (CPS) – PRE-TREATMENT DEVICE AT SELECT PROPOSED CATCH BASIN



0 15 30 60 90 120

SCALE 1"=30'

REVISED: NOVEMBER 2022

CITY OF PERRIS

DMA PLAN

WESTPORT-PERRIS

NE CORNER OF RAMONA EXPRESSWAY & BRENNAN AVE.
(CITY CASE NO. P22-00021)

1 OF 3 SHEETS

NOT FOR CONSTRUCTION - THIS POST-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

POST-CONSTRUCTION BMP SITE PLAN
WESTPORT-PERRIS

GENERAL NOTES

1. THERE IS NO OFFSITE RUN-ON FOR THIS PROJECT.
2. IN SUPPORT OF THE INFILTRATION FEASIBILITY FOR THE PROPOSED PERMANENT STORM WATER BMP, THE PROJECT-SPECIFIC GEOTECHNICAL ENGINEER CONDUCTED INFILTRATION TESTING AND RESULTS INDICATED FIELD INFILTRATE RATES OF 0.0 AND 0.2 IN/HR. THESE RATES ARE BELOW THE INFILTRATION THRESHOLD OF 1.6 IN/HR; AND THEREFORE, INFILTRATION IS NOT FEASIBLE FOR THIS PROJECT. FURTHERMORE, THIS RATE IS AT OR BELOW THE THRESHOLD FOR BIORETENTION LID BMP. AS SUCH, THIS WOULD FALL UNDER THE BIOTREATMENT CATEGORY. THEREFORE, THE PROJECT PROPOSES A BIOTREATMENT BMP (VEGETATED SWALE) FOR THE PROPOSED LANDSCAPE AREA TO THE SOUTH (DMA 1B) AND A PROPRIETARY MODULAR WETLAND SYSTEM (MWS) FOR THE REMAINING AREA, IN ORDER TO ADDRESS BOTH THE STORM WATER QUALITY MANAGEMENT PLAN REQUIREMENTS.
3. THE PROJECT IS SHOWN ON THE FEMA FLOOD INSURANCE RATE MAP (FIRM) NUMBER 06065C1430H, EFFECTIVE AUGUST 18, 2014 AND LABELED AS ZONE X. NO FEMA SUBMITTALS ARE ANTICIPATED TO BE REQUIRED FOR THIS PROJECT.
4. PRELIMINARY DETAILS FOR TRASH ENCLOSURE WITH COVER, STENCIL, AND/OR ROOF DRAIN OUTLET LOCATIONS ARE PROVIDED ON THIS EXHIBIT OR BMP DETAIL SHEET; HOWEVER, THOSE DETAILS COULD BE REFINED FURTHER AT THE TIME OF FINAL WQMP.

PERMANENT SOURCE CONTROL BMPs

① MARK ALL INLETS WITH THE WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR
② ENCLOSED REFUSE AREA WITH SIGNS POSTED NEARBY STATING "DO NOT DUMP HAZARDOUS MATERIALS HERE" OR SIMILAR

- LANDSCAPING DESIGNED 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.

OPERATIONAL SOURCE CONTROL BMPs

- MAINTAIN LANDCAPING USING MINIMUM OR NO PESTICIDES
- PREVENT EROSION OF SLOPES BY PLANTING FAST-GROWING, DENSE GROUND COVERING PLANTS
- PLANT NATIVE VEGETATION TO REDUCE THE AMOUNT OF WATER, FERTILIZERS, AND PESTICIDES APPLIED TO THE LANDSCAPE
- DO NOT OVERWATER
- USE IRRIGATION PRACTICES SUCH AS DRIP IRRIGATION, SOAKER HOSES OR MICRO-SPRAY SYSTEMS
- PERIODICALLY INSPECT AND FIX LEAKS AND MISDIRECTED SPRINKLERS.
- DO NOT RAKE OR BLOW LEAVES, CLIPPINGS, OR PRUNING WASTE INTO THE STREET, GUTTER OR STORM DRAIN
- DISPOSE OF GREEN WASTE BY COMPOSTING, HAULING IT TO A PERMITTED LANDFILL, OR RECYCLING IT THROUGH YOUR CITY'S PROGRAM
- PROVIDE IPM INFORMATION TO NEW OWNERS, LESSEES AND OPERATORS
- PERIODIC INSPECTIONS FOR LEAKY, OVERFILLED, UNCOVERED, OR OTHER PROBLEMATIC CONDITIONS WILL OCCUR
- CORRECTIVE ACTION WILL BE MADE UPON DETECTION, AS CIRCUMSTANCES PERMIT
- DUMPING OF LIQUID OR HAZARDOUS WASTES WILL BE PROHIBITED
- SPILL CONTROL MATERIALS WILL BE AVAILABLE ON-SITE
- MOVE LOADED AND UNLOADED ITEMS INDOORS AS SOON AS POSSIBLE
- 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 THE STORM DRAIN)

LID OPPORTUNITIES

1. PRESERVE EXISTING PERVIOUS AREA WHERE POSSIBLE.
2. LANDSCAPED AREAS DESIGNED TO BE SELF-RETAINING WHERE FEASIBLE.

DMA LEGEND & AREAS

DMA 1A DRAINING TO MWS (BMP 1A)

DMA 1A-1 (ORNAMENTAL LANDSCAPING) = 8,130 S.F.

DMA 1A-2 (CONCRETE OR ASPHALT) = 51,728 S.F.

DMA 1A-3 (ROOFS) = 46,327 S.F.

TOTAL AREA = 106,185 S.F.

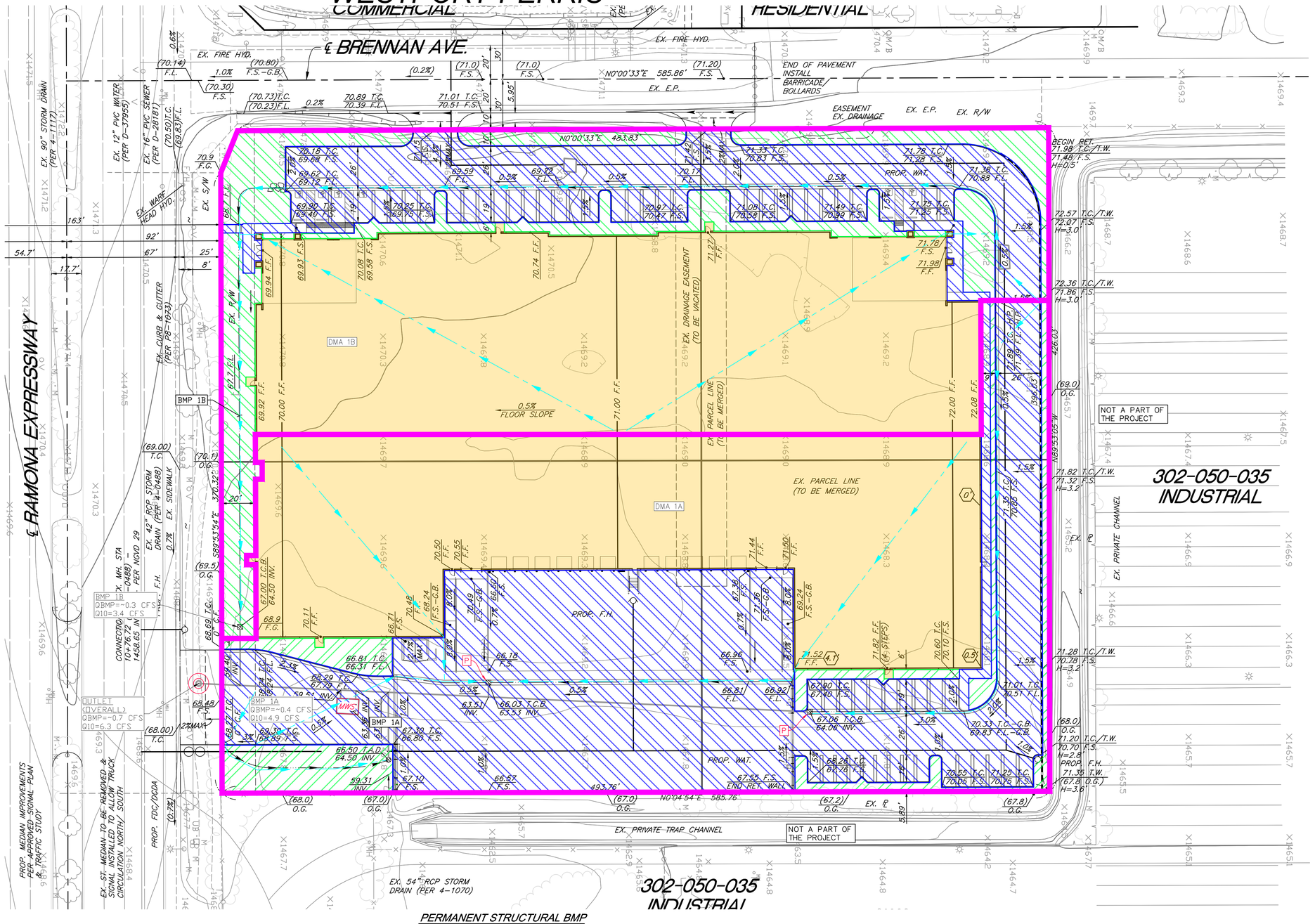
DMA 1B DRAINING TO VEGETATED SWALE (BMP 1B)

DMA 1B-1 (ORNAMENTAL LANDSCAPING) = 15,934 S.F.

DMA 1B-2 (CONCRETE OR ASPHALT) = 22,124 S.F.

DMA 1B-3 (ROOFS) = 51,019 S.F.

TOTAL AREA = 89,077 S.F.



LEGEND

- DRAINAGE MANAGEMENT AREA
- TRACT BOUNDARY
- CENTERLINE
- CURB AND GUTTER
- 1280 EXISTING CONTOUR LINE
- SLOPE
- ROOF DRAIN LOCATION (TBD)
- DISCHARGE LOCATION
- PROPOSED STORM DRAIN
- GENERAL SURFACE FLOW PATH

PERMANENT STRUCTURAL BMP

MWS — BMP 1A – MODULAR WETLAND SYSTEM (MWS) – MODEL NO. MWS-L-8-12-V-UG

BMP 1B – LID BIOTREATMENT BMP – VEGETATED SWALE – B=2'; Z=4:1; D=1.25' (SEE BMP SECTION DETAILS)

PRE-TREATMENT BMP

P — PROPOSED CONNECTOR PIPE SCREEN (CPS) – PRE-TREATMENT DEVICE AT SELECT PROPOSED CATCH BASIN

0 15 30 60 90 120
SCALE 1"=30'

REVISED: NOVEMBER 2022

CITY OF PERRIS
POST-CONSTRUCTION BMP SITE PLAN
WESTPORT-PERRIS
NE CORNER OF RAMONA EXPRESSWAY & BRENNAN AVE.
(CITY CASE NO. P22-00021)

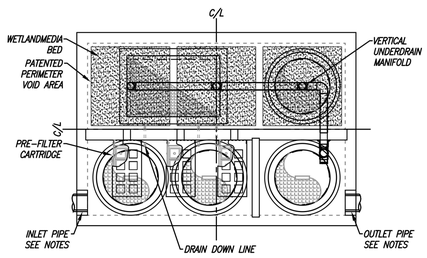
2 OF 3 SHEETS

NOT FOR CONSTRUCTION - THIS POST-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

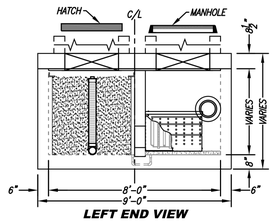
POST-CONSTRUCTION BMP SECTION DETAILS
WESTPORT-PERRIS

SITE SPECIFIC DATA			
PROJECT NUMBER		732122 - 010	
PROJECT NAME		WESTPORT - PERRIS	
PROJECT LOCATION		PERRIS, CA	
STRUCTURE ID		BMP 1A	
TREATMENT REQUIRED			
FLOW BASED (CFS)			
0.406			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	63.01	HDPE	8"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	59.61	HDPE	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	68.6		
SURFACE LOAD	DIRECT TRAFFIC		
NOTES:			

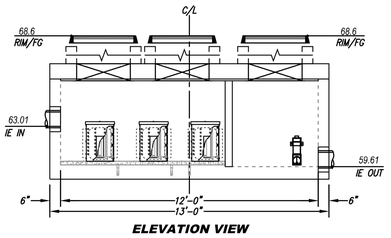
* PRELIMINARY NOT FOR CONSTRUCTION



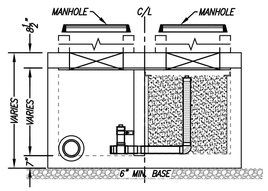
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT 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 MANUFACTURER'S 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 FOR VERIFYING PROJECT ENGINEER'S 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 WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH 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 CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH 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 CONTECH.

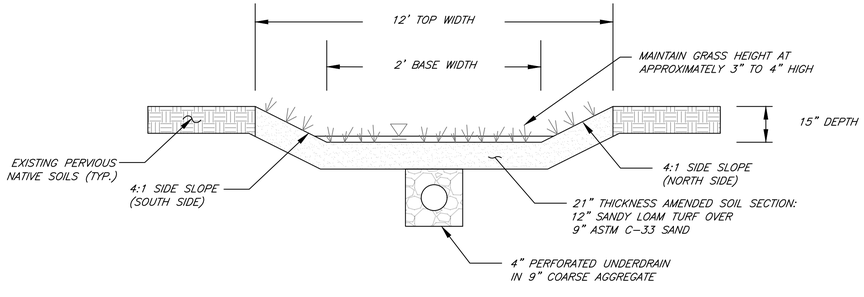
TREATMENT FLOW (CFS)	0.406
OPERATING HEAD (FT)	4.0
PRETREATMENT LOADING RATE (GPM/SF)	2.4
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS — FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com

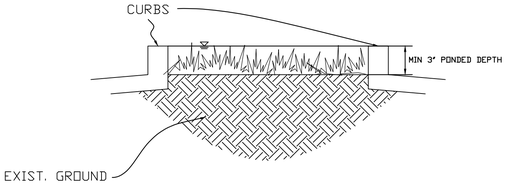
MWS-L-8-12-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

BMP 1A - MODULAR WETLAND SYSTEM (MWS) DETAIL - MWS-L-8-12-V-UG
NOT TO SCALE

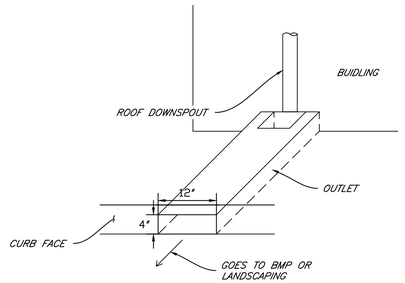


BMP 1B - LID BIOTREATMENT BMP - VEGETATED SWALE - TYPICAL SECTION
NOT TO SCALE

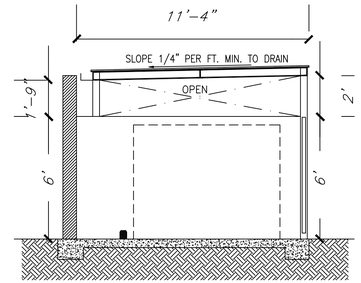
INLET PLACARD DETAIL (TYP.)
NOT TO SCALE



LANDSCAPED ISLAND DETAIL (TYP.)
NOT TO SCALE

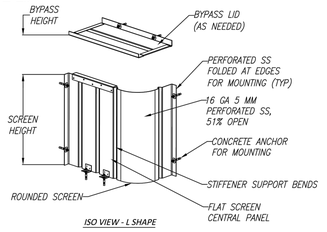


ROOF DRAIN CURB OUTLET STRUCTURE DETAIL (TYP.)
NOT TO SCALE



TRASH ENCLOSURE STRUCTURE DETAIL (TYP.)
NOT TO SCALE

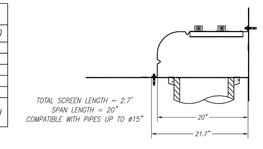
CONNECTOR PIPE SCREEN (CPS)
L 2.7



ISO VIEW - L SHAPE

CPS L WITH 2.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	3.84
18	7.06
24	10.88
30	15.20
36	19.99

NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.



TOP SECTION VIEW - L SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED WHEN THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 1 YEAR MANUFACTURER'S		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 308 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640		REVISIONS:	DATE:
		REVISIONS:	DATE:
DATE: 1/17/2020	SCALE: NTS	REVISIONS:	DATE:
DRAWER: G.M.S.	UNITS = INCHES	REVISIONS:	DATE:

Bio Clean — A Forterra Company

PRE-TREATMENT: PROPRIETARY CONNECTOR PIPE SCREEN (CPS) - TYP.
NOT TO SCALE

REVISED: NOVEMBER 2022

CITY OF PERRIS
POST-CONSTRUCTION BMP SECTION DETAILS
WESTPORT-PERRIS
NE CORNER OF RAMONA EXPRESSWAY & BRENNAN AVE.
(CITY CASE NO. P22-00021)

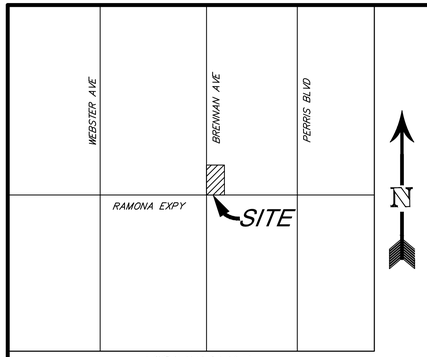
3 OF 3 SHEETS

NOT FOR CONSTRUCTION – THIS POST-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

Appendix 2: Construction Plans

Grading and Drainage Plans

Note: Preliminary site plans are provided.

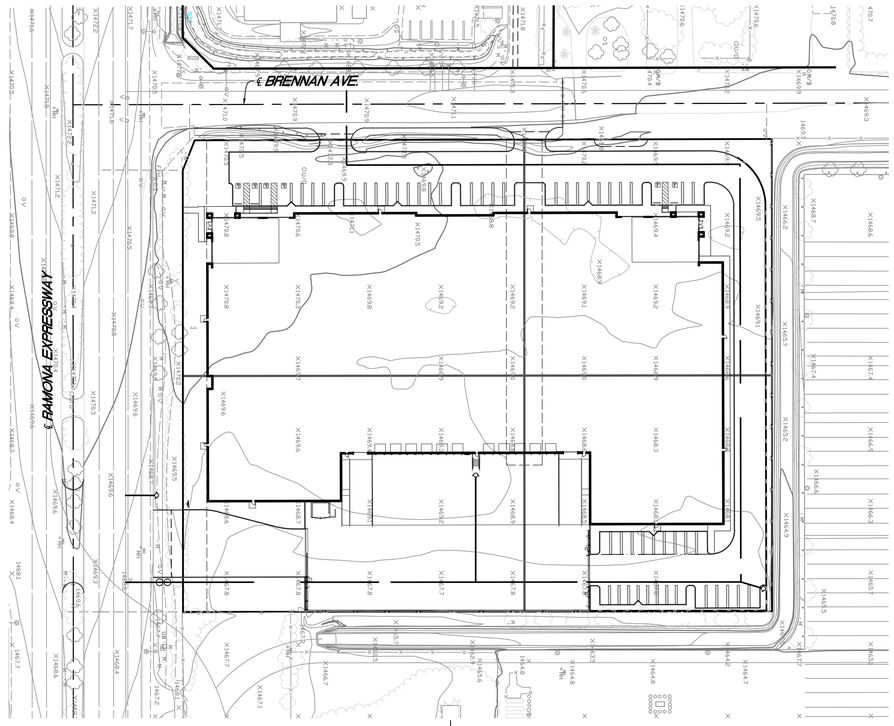


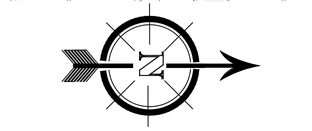
VICINITY MAP
NOT TO SCALE

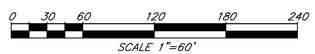
IN THE CITY PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

PRELIMINARY GRADING PLAN

NOVEMBER 2022







SCALE 1"=60'

OWNER/APPLICANT

WESTPORT PROPERTIES, INC.
2201 DUPONT DRIVE, SUITE
700 IRVINE, CA 92612
TEL: (949) 748-5900
ATTN: DAVID KELLY

ENGINEER

SDH & ASSOCIATES, INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691

TOPOGRAPHY SOURCE

AERIAL PHOTOGRAMMETRY PERFORMED BY:
ARROWHEAD MAPPING
TEL: (909) 889-2420

ARCHITECT

HPA ARCHITECTURE
18831 BARDEEN AVE. STE.#100
IRVINE, CA 92612
TEL: (949) 863-1770

EARTHWORK

CUT: 10,500 C.Y.
FILL: 10,500 C.Y.

UTILITY PURVEYORS

WATER.....EASTERN MUNICIPAL WATER DISTRICT
GAS..... SO CAL GAS
ELECTRICAL..... SCE
TELEPHONE.....VERIZON
SEWER.....EASTERN MUNICIPAL WATER DISTRICT

PROJECT DATA

SITE AREA: 195,270 S.F. (4.5 AC.)
BUILDING AREA: 99,957 S.F. (INCLUDES 5,650 S.F. OFFICE)

PARKING INFO

PARKING REQUIRED: 42 SPACES
PARKING PROVIDED: 44 SPACES

COMMUNITY FACILITIES DISTRICT

SITE IS NOT WITHIN A COMMUNITY FACILITIES DISTRICT

HAZARDOUS MATERIALS

NOT IN A FIRE HAZARD ZONE

FEMA FLOOD ZONE DESIGNATION

ZONE X

ZONING AND LAND USE

EXISTING ZONING..... LI (LIGHT INDUSTRIAL)
EXISTING LAND USE..... MODULAR STORAGE
PROPOSED ZONING..... LI (LIGHT INDUSTRIAL)
PROPOSED LAND USE..... INDUSTRIAL

WATER QUALITY

A PROJECT SPECIFIC WQMP WILL BE PREPARED FOR THIS PROJECT

THOMAS BROTHERS INFO.

PAGE: 777, GRID: F1

APN:

302-260-078
302-260-079
302-260-080
302-260-081

SCHOOL DISTRICT

VAL VERDE UNIFIED

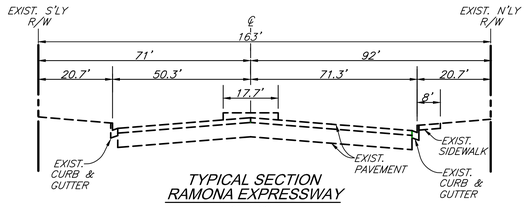
SHEET INDEX

LEGEND

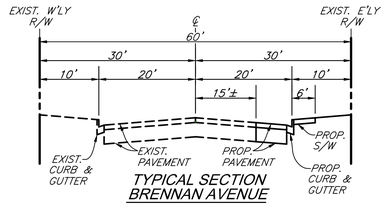
T.C.B. – TOP CATCH BASIN
F.G. – FINISHED GRADE
F.L. – FLOW LINE
H.P. – HIGH POINT
EXIST. – EXISTING
P.E. – PAD ELEVATION
G.B. – GRADE BREAK
◯ – STEM WALL HEIGHT
TRACT BOUNDARY
CENTERLINE
CURB AND GUTTER
1280 EXISTING CONTOUR LINE
LOT LINE
SLOPE

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS: PARCELS 1 THROUGH 4 OF PARCEL MAP NO. 36144, ON FILE IN BOOK 230, PAGES 38 AND 39 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY, CALIFORNIA.



TYPICAL SECTION
RAMONA EXPRESSWAY
NOT TO SCALE



TYPICAL SECTION
BRENNAN AVENUE
NOT TO SCALE

CONSTRUCTION NOTES

1. CONSTRUCT 3" A.C. OVER 4" A.B. PAVEMENT DRIVE AND PARKING AREAS
2. CONSTRUCT 6" CURB ONLY
3. CONSTRUCT 6" CURB AND AND GUTTER
4. CONSTRUCT 4" PCC SIDEWALK (FINISH PER LANDSCAPE PLANS)
5. CONSTRUCT 24" CATCH BASIN
6. CONSTRUCT 3" WIDE CONCRETE RIBBON GUTTER
7. CONSTRUCT PVC STORM DRAIN PIPE
8. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH 207A
9. CONSTRUCT RETAINING WALL
10. CONSTRUCT RIP-RAP PAD
11. CONSTRUCT HANDICAP RAMP
12. CONSTRUCT PCC SIDEWALK PER CITY STD. IN R/W
13. CONSTRUCT AC. OVER A.B. (OFFSITE) T1=7.5
14. CONSTRUCT OFFSITE 6" CURB & GUTTER PER RIVERSIDE COUNTY STD. 200
15. CONSTRUCT 1.5' GAP IN CURB FOR DRAINAGE CONVEYANCE
16. CONSTRUCT SIGNAGE INDICATING THAT TRUCKS MUST GO STRAIGHT/ NO TRUCK TRAFFIC ON RAMONA
17. SAWCUT & REMOVE EXISTING MEDIAN IMPROVEMENTS
18. CONSTRUCT AC/ AB ROADWAY TO MATCH EXISTING
19. INSTALL LANDSCAPE DRAIN WITH ATRIUM GRATE

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS

MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. DRAWN BY: K.O.F.
CHECKED BY: D.S. PROJECT MANAGER: S.J.S.

PLANNING DIVISION: DATE:

PREPARED BY: DATE:

DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 Exp. 9-30-23 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:

SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=60'

DATE: NOVEMBER 2022

BENCHMARK: NGS DESIGNATION AZ2405 DESCRIBED BY CALTRANS 1969 NEAR PERRIS, TRON INTERSECTION OF INTERSTATE_215 AND CAJALCO EXPWY PROCEED WESTERLY ALONG CAJALCO EXPWY TO A STREET, PROCEED NORTHERLY ALONG A STREET TO MESSINA LANE, PROCEED NORTHEASTERLY ALONG MESSINA LANE TO END OF PAVEMENT, PROCEED WESTERLY ACROSS DIRT AREA APPROXIMATELY 0.1 MILE (0.2 KM) TO MONUMENT, 530 FEET (161.5 M) NORTH ALONG RAILROAD TRACKS FROM THE INTERSECTION OF THE RAILROAD TRACKS AND CAJALCO EXPWY BRIDGE, 4.5 FEET (1.4 M) WEST OF CHAIN-LINK FENCE, 24 FEET (7.3 M) EAST OF RAILROAD TRACKS, INDICATED BY AN ALUMINUM POST, FOUND A CA DIV. OF HWY. DISCS (DOT STAMPED BM 226-69. REFERENCE MMD YB 4205 08 005. ELEV = 1500.67' (NAVD88)

CITY OF PERRIS
WESTPORT PERRIS
PRELIMINARY GRADING PLAN
TITLE SHEET

1 OF 3 SHEETS

FOR: W.O. CITY FILE NO.

CONSTRUCTION NOTES

1. CONSTRUCT 3" A.C. OVER 4" A.B. PAVEMENT DRIVE AND PARKING AREAS
2. CONSTRUCT 6" CURB ONLY
3. CONSTRUCT 6" CURB AND AND GUTTER
4. CONSTRUCT 4" PCC SIDEWALK (FINISH PER LANDSCAPE PLANS)
5. CONSTRUCT 24" CATCH BASIN
6. CONSTRUCT 3" WIDE CONCRETE RIBBON GUTTER
7. CONSTRUCT PVC STORM DRAIN PIPE
8. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH 207A
9. CONSTRUCT RETAINING WALL
10. CONSTRUCT RIP-RAP PAD
11. CONSTRUCT HANDICAP RAMP
12. CONSTRUCT PCC SIDEWALK PER CITY STD. IN R/W
13. CONSTRUCT AC. OVER A.B. (OFFSITE) T1=7.5
14. CONSTRUCT OFFSITE 6" CURB & GUTTER PER RIVERSIDE COUNTY STD. 200
15. CONSTRUCT 1.5' GAP IN CURB FOR DRAINAGE CONVEYANCE
16. CONSTRUCT SIGNAGE INDICATING THAT TRUCKS MUST GO STRAIGHT/ NO TRUCK TRAFFIC ON RAMONA
17. SAWCUT & REMOVE EXISTING MEDIAN IMPROVEMENTS
18. CONSTRUCT AC/ AB ROADWAY TO MATCH EXISTING
19. INSTALL LANDSCAPE DRAIN WITH ATRIUM GRATE
20. CONSTRUCT VEGETATED SWALE (B=2'; D=1.25'; Z=4:1)
21. CONSTRUCT MODULAR WETLAND SYSTEM
22. CONSTRUCT 6" WIDE DURA SLOPE TRENCH DRAIN WITH TRUCK RATED GRATE

0 15 30 60 90 120
SCALE 1"=30'

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS			
MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. | DRAWN BY: X.O.F.
CHECKED BY: D.S. | PROJECT MANAGER: S.J.S.

PLANNING DIVISION: DATE:

PREPARED BY: DATE:
DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER DANE A. SOMMERS No. 90433 Exp. 9-30-23 CIVIL STATE OF CALIFORNIA

PREPARED BY:
SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=30'

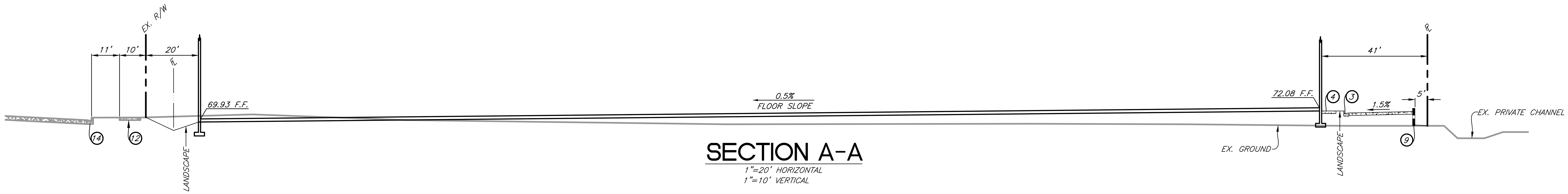
DATE: NOVEMBER 2022

BENCHMARK: CALTRANS BENCH MONUMENT STAMPED BY CALTRANS, 1980 NEAR INTERSECTION OF INTERSTATE 215 AND CAJALCO EXPWY. PROCEED WESTERLY ALONG CAJALCO EXPWY TO A STREET, PROCEED NORTHERLY ALONG A STREET TO MESSINA LANE, PROCEED NORTHEASTERLY ALONG MESSINA LANE TO END OF PAVEMENT, PROCEED WESTERLY ACROSS DIRT AREA APPROXIMATELY 0.1 MILE (0.2 KM) TO MONUMENT, 530 FEET (161.5 M) NORTH ALONG RAILROAD TRACKS FROM THE INTERSECTION OF THE RAILROAD TRACKS AND CAJALCO EXPWY BRIDGE, 4.5 FEET (1.4 M) WEST OF CHAIN-LINK FENCE, 24 FEET (7.3 M) EAST OF RAILROAD TRACKS, INDICATED BY AN ALUMINUM POST, FOUND A CA. DIV. OF HWYS DISK STAMPED BM 22A-RR, REFERENCE MND TB 4265 06 005. ELEV = 1550.67 (NAVD88)

CITY OF PERRIS
WESTPORT PERRIS
PRELIMINARY GRADING PLAN

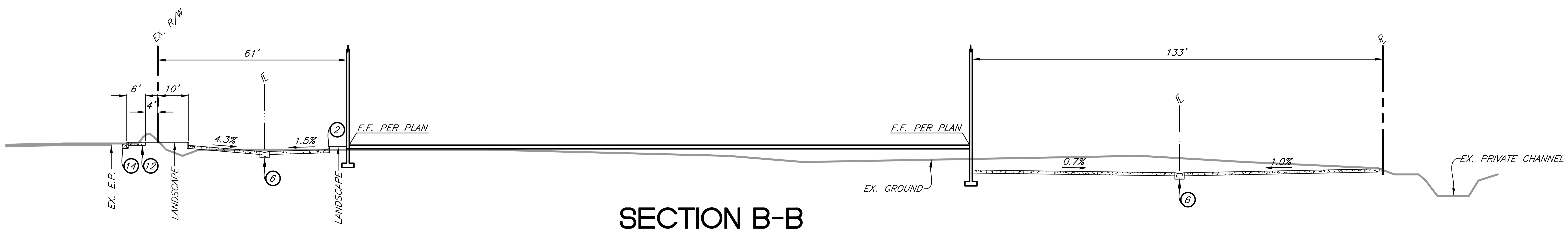
2 OF 3 SHEETS

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



SECTION A-A

1"=20' HORIZONTAL
1"=10' VERTICAL



SECTION B-B

1"=20' HORIZONTAL
1"=10' VERTICAL

CONSTRUCTION NOTES

(2) CONSTRUCT 6" CURB ONLY
(3) CONSTRUCT 6" CURB AND AND GUTTER
(4) CONSTRUCT 4" PCC SIDEWALK (FINISH PER LANDSCAPE PLANS)
(6) CONSTRUCT 3' WIDE CONCRETE RIBBON GUTTER
(9) CONSTRUCT RETAINING WALL
(12) CONSTRUCT PCC SIDEWALK PER CITY STD. IN R/W
(14) CONSTRUCT OFFSITE 6" CURB & GUTTER PER RIVERSIDE COUNTY STD. 200

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS				
MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. DRAWN BY: X.O.F.
CHECKED BY: D.S. PROJECT MANAGER: S.J.S.

PLANNING DIVISION: DATE: ________

PREPARED BY: DATE: ________

DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 — Exp. 9-30-23 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:

SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =20'

DATE: NOVEMBER 2022

BENCHMARK: NGS DESIGNATION #22A69 DESCRIBED BY CALTRANS 1969 NEAR PERRIS, FROM INTERSECTION OF INTERSTATE 215 AND CAJALCO EXPWY PROCEED WESTERLY ALONG CAJALCO EXPWY TO A STREET, PROCEED NORTHERLY ALONG A STREET TO MESSENIA LANE, PROCEED NORTHEASTERLY ALONG MESSENIA LANE TO END OF PAVEMENT, PROCEED WESTERLY ACROSS DIRT AREA APPROXIMATELY 0.1 MILE (0.2 KM) TO MONUMENT, 530 FEET (161.5 M) NORTH ALONG RAILROAD TRACKS FROM THE INTERSECTION OF THE RAILROAD TRACKS AND CAJALCO EXPWY BRIDGE, 4.5 FEET (1.4 M) WEST OF CHAIN-LINK FENCE, 24 FEET (7.3 M) EAST OF RAILROAD TRACKS, INDICATED BY AN ALUMINUM POST, FOUND A CA. DIV. OF HWY. BRASS DISK STAMPED BM 22A-69. REFERENCE MWD FB 4205 06 005. ELEV = 1500.67' (NAVD88)

CITY OF PERRIS
WESTPORT PERRIS
SECTIONS

FOR: W.O. CITY FILE NO.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

April 22, 2022

Westport Properties, Inc.
2201 Dupont Drive, Suite 700
Irvine, California 92612

Attention: Mr. David Kelly
Vice President of Development

Project No.: **22G116-2**

Subject: **Results of Infiltration Testing**
Proposed Industrial Building
NEC Ramona Expressway and Brennan Avenue
Perris, California

Reference: Geotechnical Investigation, Proposed Industrial Building, NEC Ramona Expressway and Brennan Avenue, Perris, California, prepared for Westport Properties, Inc, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G116-1, dated March 30, 2022.

Mr. Kelly:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 21P118, dated January 17, 2022. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the on-site soils. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The subject site is located at the northeast corner of Ramona Expressway and Brennan Avenue in Perris, California. The site is bounded to the north and east by a commercial/industrial development, to the south by Ramona Expressway and to the west by Brennan Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of four (4) square- to rectangular-shaped parcels which total 4.48± acres in size. The site is generally vacant and undeveloped; however, the southern region of the site appears to have been previously graded. Ground surface cover in the southern region of the site consists of exposed soil with some areas of aggregate base. Ground surface cover in the northern region of the site comprised of exposed soil with heavy native grass and weed growth.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the overall site slopes downward to the north to northeast at a gradient of less than 2± percent.

Proposed Development

SCG was provided with site plan (Scheme 1) prepared by HPA Architecture. Based on the site plan, the site will be developed with one (1) industrial building. The warehouse will be located in the central area of the site and will be 100,896± ft² in size. Dock-high doors will be constructed along a portion of the east building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout the site.

The proposed development will include on-site storm water infiltration. Based on conversations with representatives of SDH & Associates, the project civil engineer, the infiltration system will consist a below-grade chamber system located in the eastern area of the site. The bottom of the infiltration system will be 10± feet below the existing site grades.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site, which is referenced above. As part of this study, five (5) borings were advanced to depths of 15 to 26± feet below existing site grades.

Artificial fill soils were encountered at the ground surface at Boring Nos. B-2, B-3 and B-4, extending to depths of 3 to 4½± feet below ground surface. The fill soils generally consist of loose to medium dense silty fine to medium sands, fine sandy silts and clayey fine sands. Native alluvium was encountered beneath the artificial fill soils or at the ground surface at all of the boring locations, extending to at least the maximum depth explored of 26± feet below ground surface. The alluvial soils generally consist of medium dense to very dense silty fine to medium sands, clayey fine to medium sands and fine sandy silts, and very stiff to hard fine to medium sandy clays.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 26± feet at the time of the subsurface exploration.

Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. One monitoring well on record is located ½± mile west of the site. Water level readings within this monitoring well indicates a high groundwater level of 56± feet below ground surface in November 2020.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of two (2) backhoe-excavated trenches, extending to a depth 10± feet below existing site grades. The trenches were logged during excavation by a member of our staff. The approximate locations of the infiltration trenches (identified as I-1 and I-2) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Fill soils were encountered at the ground surface of Infiltration Test No. I-2, extending to 2± feet below existing site grades. The fill soils consist of medium dense silty fine to coarse sands. Native alluvium was encountered at the ground surface of Infiltration Test No. I-1, and beneath the fill soils at Infiltration Test No. I-2, extending 3 to 4± feet below existing site grades. The alluvium consists of medium dense fine sandy silts and dense fine to coarse sandy silts. The Trench Logs, which illustrate the conditions encountered at the infiltration test locations, are presented in this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration system that will be used at the subject site. As previously mentioned, the infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trench. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at both of the trench locations. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained using constant-head float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the tests.

The schedule for readings was determined based on the observed soil type at the base of each backhoe-excavated trench. Based on the existing soils at the trench locations, the volumetric

measurements were made at 15-minute increments. The water volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Measured Infiltration Rate (inches/hour)
I-1	10	Brown fine to medium Sandy Silt	0.0
I-2	10	Brown Silty fine to medium Sand to fine to medium Sandy Silt	0.2

Design Recommendations

Two (2) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range between 0.0 and 0.2 inches per hour. The major factors affecting the lack of infiltration at these locations is the presence of very dense alluvium and higher fines content. **Due to the poor infiltration characteristics of the on-site native soils at the tested depths, infiltration is not recommended.**

Although infiltration is not considered feasible at the site, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of storm water disposal systems should be performed by the project civil engineer, in accordance with the City of Perris and/or County of Riverside guidelines. It is recommended any such systems be designed and constructed to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the flow rates through the system. It should be noted that the recommended infiltration rates are based on infiltration testing at two (2) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of the subgrade soils. **The proposed infiltration systems for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the building(s), it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

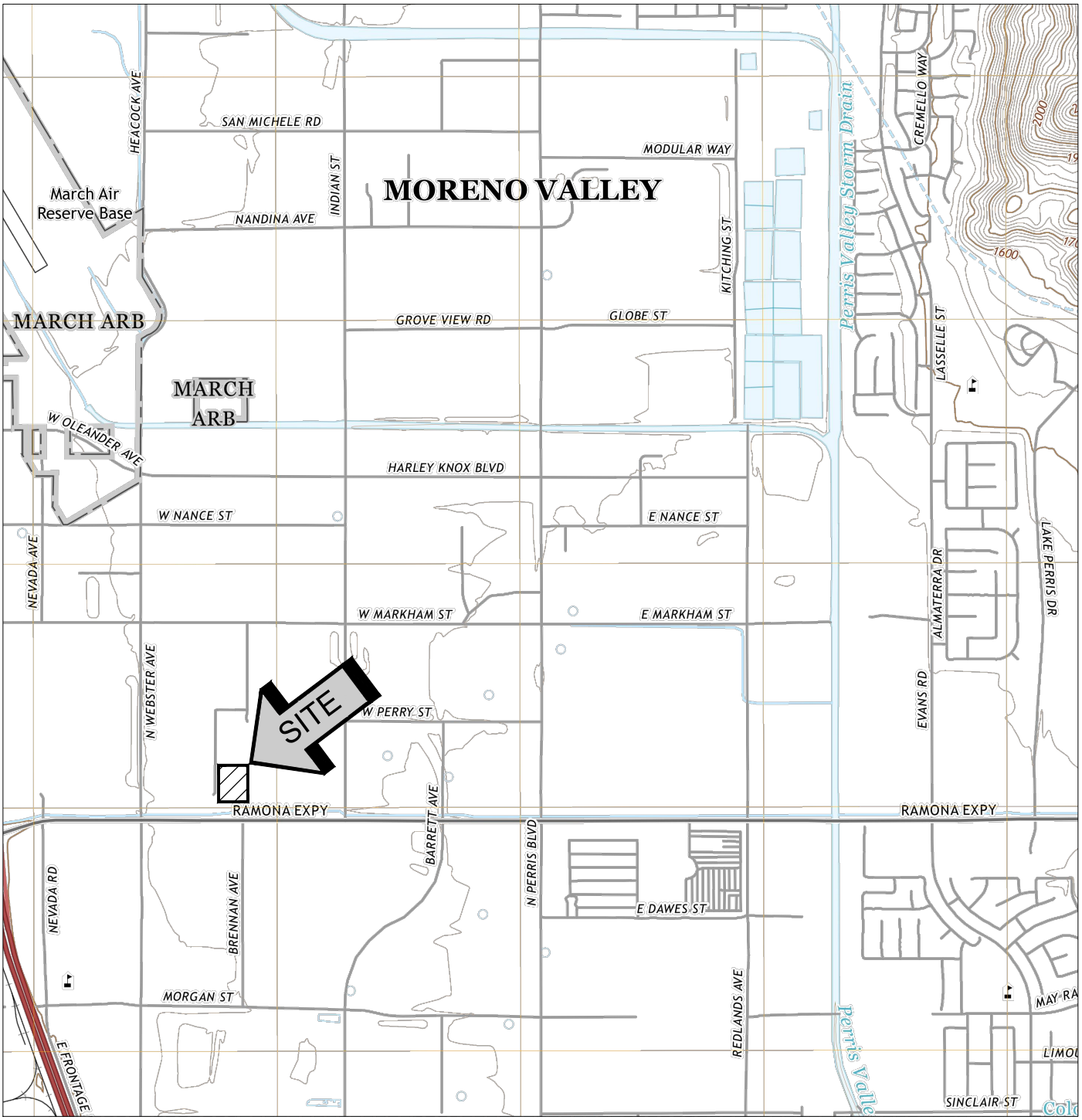
Ryan Bremer
Staff Geologist

Robert G. Trazo, GE 2655
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
ROBERT TRAZO
No. 2655
GEOTECHNICAL
STATE OF CALIFORNIA

Distribution: (1) Addressee

Enclosures: Plate 1: Site Location Map
Plate 2: Infiltration Test Location Plan
Trench Log Legend and Logs (4 pages)
Infiltration Test Results Spreadsheets (2 pages)
Grainsize Distribution Graphs (2 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE,RIVERSIDE COUNTY, CALIFORNIA, 2021.

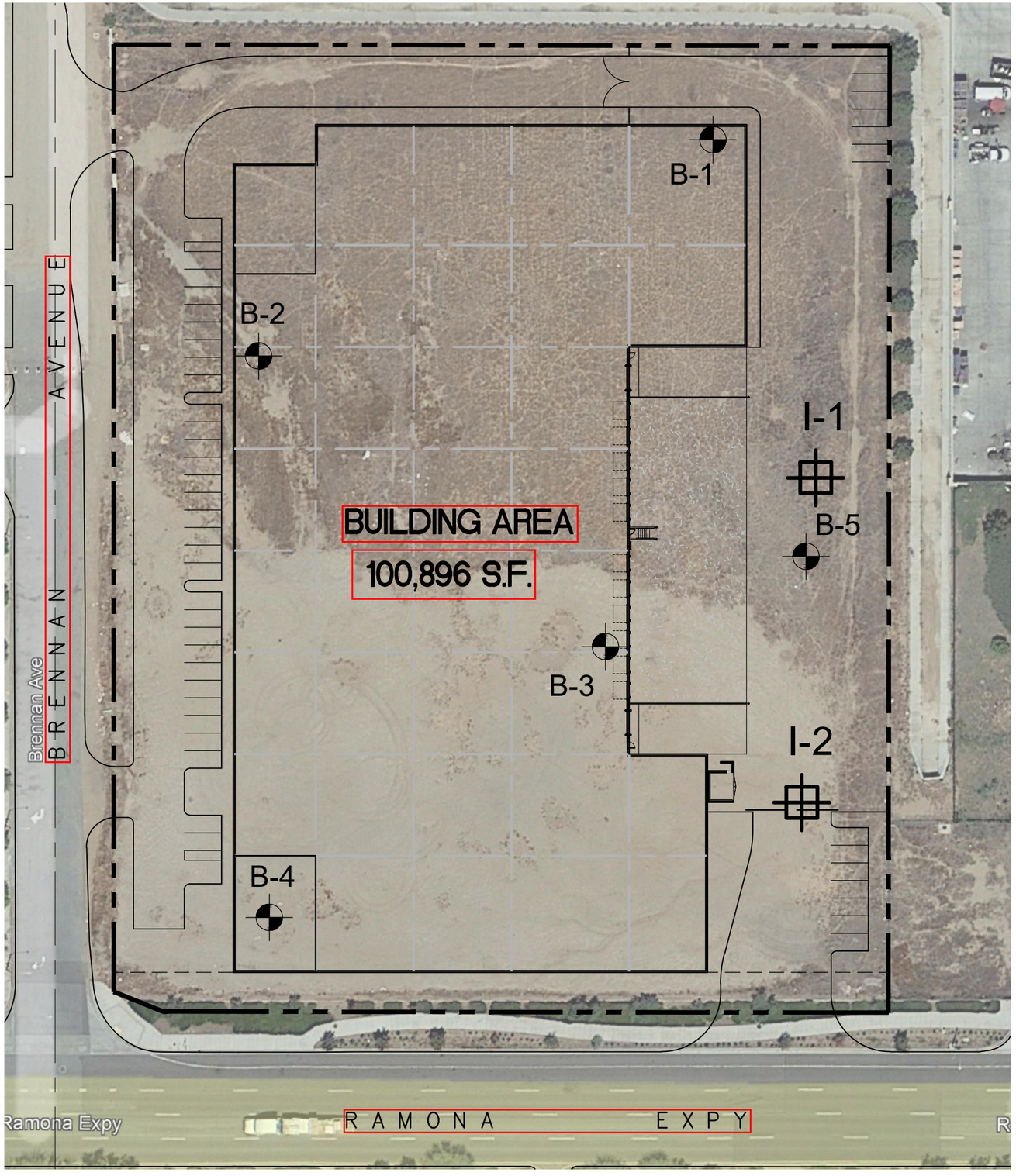
SITE LOCATION MAP

PROPOSED INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: PM CHKD: RGT	
SCG PROJECT 22G116-2	
PLATE 1	

SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION OF CONCURRENT STUDY (SCG PROJECT: 22G116-1)

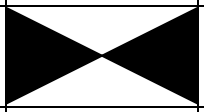
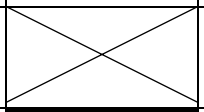
NOTE: CONCEPTUAL SITE PLAN PREPARED BY HPA ARCHITECTS. AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH.

INFILTRATION TEST LOCATION PLAN
PROPOSED INDUSTRIAL BUILDING
PERRIS, CALIFORNIA

SCALE: 1" = 60'	
DRAWN: MD CHKD: RGT	
SCG PROJECT 22G116-2	
PLATE 2	

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

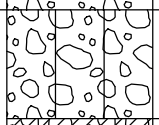
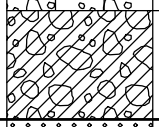
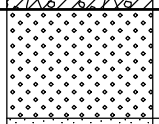
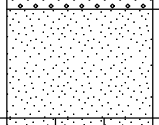
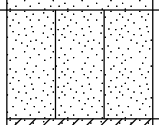
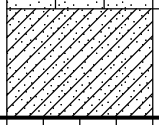
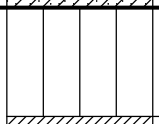
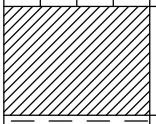
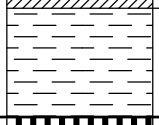
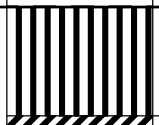
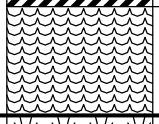
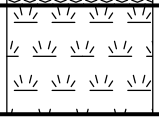
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	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
	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
				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

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-1

JOB NO.: 22G116-2
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

EXCAVATION DATE: 3/22/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Ryan Bremer

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Brown fine Sandy Silt, trace to little medium to coarse Sand, trace fine root fibers, medium dense-damp							
					Brown Silty fine to coarse Sand, trace Calcareous veining, very dense-damp							
5					Brown fine to medium Sandy Silt, trace Calcareous veining, very dense-damp							
			4.5				6			56		
10					Trench Terminated at 10'							

TBL 22G116-2.GPJ SOCALGEO.GDT 4/21/22

TEST TRENCH LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-2

JOB NO.: 22G116-2
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

EXCAVATION DATE: 3/22/22
EXCAVATION METHOD: Backhoe
LOGGED BY: Ryan Bremer

WATER DEPTH: ---
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: --- MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					FILL: Brown Silty fine to coarse Sand, medium dense-damp							
					ALLUVIUM: Brown fine to coarse Sandy Silt, dense-damp							
5					Brown fine to coarse Sandy Silt, very dense-damp							
					Brown Silty fine to medium Sand to fine to medium Sandy Silt, trace Calcareous nodules and veining, very dense-damp							
			4.5				5			48		
10					Trench Terminated at 10'							

TBL 22G116-2.GPJ SOCALGEO.GDT 4/21/22

TEST TRENCH LOG **PLATE B-2**

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Perris, California
Project Number	22G116-2
Engineer	Ryan Bremer

Infiltration Test No: I-1

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	10:54 AM	15	300	0	100	100	0.00	0.18	0.00	0.07
	Final	11:09 AM	**15**	300		200					
2	Initial	11:13 AM	15	300	0	200	0	0.00	0.00	0.00	0.00
	Final	11:28 AM	**30**	300		200					
3	Initial	11:30 AM	15	300	50	200	100	0.27	0.18	0.11	0.07
	Final	11:45 AM	**45**	350		300					
4	Initial	11:45 AM	15	350	0	300	100	0.00	0.18	0.00	0.07
	Final	12:00 PM	**60**	350		400					
5	Initial	12:04 PM	15	350	50	400	100	0.27	0.18	0.11	0.07
	Final	12:19 PM	**75**	400		500					
6	Initial	12:21 PM	15	400	0	500	100	0.00	0.18	0.00	0.07
	Final	12:36 PM	**90**	400		600					

INFILTRATION CALCULATIONS

Project Name	Proposed Industrial Building
Project Location	Perris, California
Project Number	22G116-2
Engineer	Ryan Bremer

Infiltration Test No: I-2

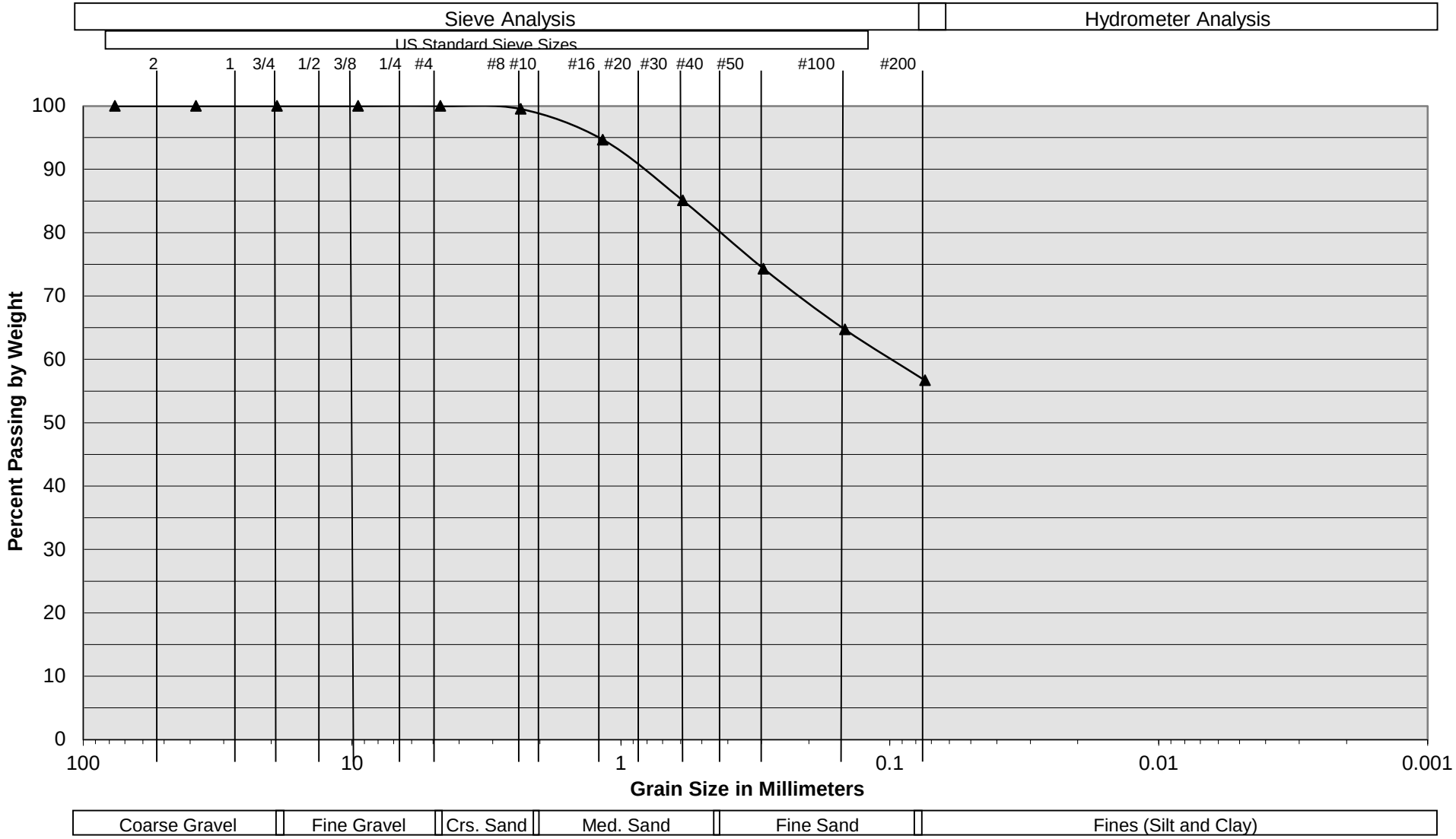
Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	10:54 AM	15	50	650	300	3900	3.56	7.13	1.40	2.81
	Final	11:09 AM	**15**	700		4200					
2	Initial	11:13 AM	15	700	750	4200	4500	4.11	8.22	1.62	3.24
	Final	11:28 AM	**30**	1450		8700					
3	Initial	11:30 AM	15	1450	300	8700	3800	1.64	6.94	0.65	2.73
	Final	11:45 AM	**45**	1750		12500					
4	Initial	11:45 AM	15	50	250	0	4700	1.37	8.59	0.54	3.38
	Final	12:00 PM	**60**	300		4700					
5	Initial	12:04 PM	15	300	250	4700	1200	1.37	2.19	0.54	0.86
	Final	12:19 PM	**75**	550		5900					
6	Initial	12:21 PM	15	550	100	0	3900	0.55	7.13	0.22	2.81
	Final	12:36 PM	**90**	650		3900					
7	Initial	12:21 PM	15	550	100	3900	4200	0.55	7.68	0.22	3.02
	Final	12:36 PM	**105**	650		8100					
8	Initial	12:21 PM	15	650	100	8100	3900	0.55	7.13	0.22	2.81
	Final	12:36 PM	**120**	750		12000					

Grain Size Distribution

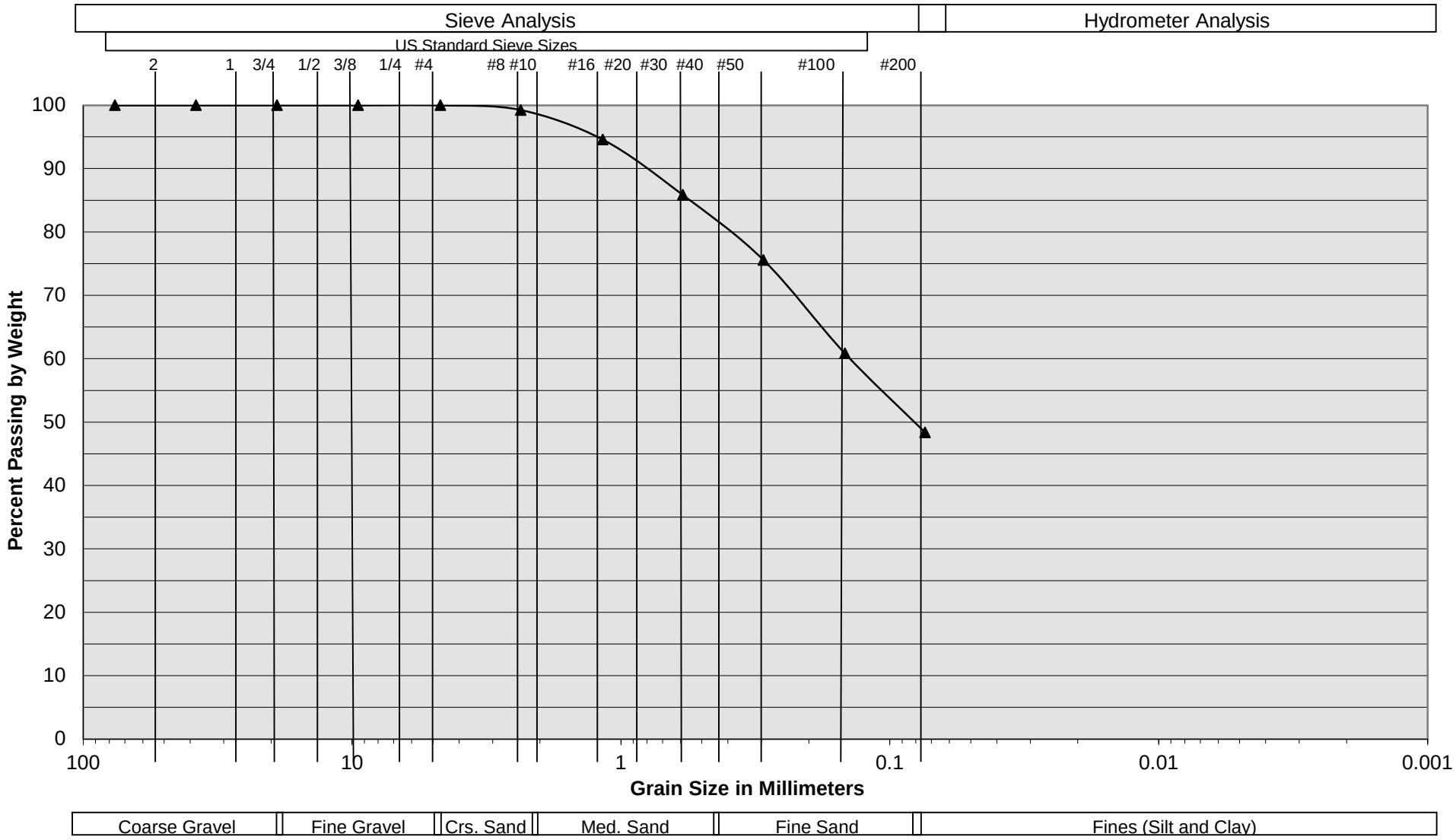


Sample Description	I-1 @ 10'
Soil Classification	ALLUVIUM: Brown fine to medium Sandy Silt

Proposed Industrial Building
Perris, California
Project No. 22G116-2
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-2 @ 10'
Soil Classification	ALLUVIUM: Brown Silty fine to medium Sand to fine to medium Sandy Silt

Proposed Industrial Building
Perris, California
Project No. 22G116-2
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL BUILDING

NEC Ramona Expressway and Brennan Avenue
Perris, California
for
First Industrial Realty Trust, Inc.

SOUTHERN
CALIFORNIA
GEOTECHNICAL
A California Corporation

March 30, 2022

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Westport Properties, Inc.
2201 Dupont Drive, Suite 700
Irvine, California 92612

Attention: Mr. David Kelly
Vice President of Development

Project No.: **22G116-1**

Subject: **Geotechnical Investigation**
Proposed Industrial Building
NEC Ramona Expressway and Brennan Avenue
Perris, California

Mr. Kelly:

In accordance with your request, we have conducted a geotechnical investigation at the subject site. We are pleased to present this report summarizing the conclusions and recommendations developed from our investigation.

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Pablo Montes Jr.
Project Engineer

Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Presented below is a brief summary of the conclusions and recommendations of this investigation. Since this summary is not all inclusive, it should be read in complete context with the entire report.

Geotechnical Design Considerations

- Artificial fill soils were encountered at most of the boring locations, extending to depths of 3 to 4½± feet. The existing fill soils are considered to represent undocumented fill.
- The near-surface alluvial soils within the upper 6 to 7± feet possess a moderate potential for collapse when exposed to moisture infiltration as well as settlement when exposed to load increases in the range of those that will be exerted by the new foundations.
- The undocumented fill soils and upper-portion of the alluvial soils generally possess varying strengths and unfavorable consolidation/collapse characteristics. These soils, in their present condition, are not considered suitable for support of the foundation loads of the new structure.
- Remedial grading will be necessary to remove the undocumented fill soils in their entirety and the upper portion of the alluvial soils and replace these materials as compacted structural fill soils.

Site Preparation

- Initial site preparation should include removal of all vegetation, including tree root masses and any organic topsoil.
- Remedial grading is recommended within the proposed building pad area to remove the undocumented fill soils, which extend to depths of 3 to 4½± feet at the boring locations, in their entirety. At a minimum, the building pad area should be overexcavated to a depth of at least 6 feet below existing grade and to a depth of at least 4 feet below proposed pad grade, whichever is greater. Overexcavation within the foundation areas is recommended to extend to a depth of at least 3 feet below proposed foundation bearing grade.
- After overexcavation has been completed, the subgrade soils should be evaluated by the geotechnical engineer to identify any additional soils that should be overexcavated. The resulting subgrade should then be scarified to a depth of 12 inches, moisture conditioned or air dried to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.
- The new pavement and flatwork subgrade soils are recommended to be scarified to a depth of 12± inches, moisture conditioned and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density.

Building Foundations

- Conventional shallow foundations, supported in newly placed compacted fill.
- 2,500 lbs/ft^2 maximum allowable soil bearing pressure.
- Reinforcement consisting of at least four (4) No. 5 rebars (2 top and 2 bottom) in strip footings. Additional reinforcement may be necessary for structural considerations.

Building Floor Slab

- Conventional Slab-on-Grade: minimum 6 inches thick.

- Modulus of Subgrade Reaction: k = 100 psi/in.
- Reinforcement is not expected to be necessary for geotechnical considerations. The actual thickness and reinforcement of the floor slab should be determined by the structural engineer.

Pavement Design Recommendations

ASPHALT PAVEMENTS (R=30)					
Materials	**Thickness (inches)**				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

PORTLAND CEMENT CONCRETE PAVEMENTS (R=30)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 5.0 to 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

2.0 SCOPE OF SERVICES

The scope of services performed for this project was in accordance with our Proposal No. 22P118, dated January 20, 2022. The scope of services included a visual site reconnaissance, subsurface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the building foundations, building floor slab, and parking lot pavements along with site preparation recommendations and construction considerations for the proposed development. The evaluation of the environmental aspects of this site was beyond the scope of services for this geotechnical investigation.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Site Conditions

The subject site is located at the northeast corner of Ramona Expressway and Brennan Avenue in Perris, California. The site is bounded to the north and east by a commercial/industrial development, to the south by Ramona Expressway and to the west by Brennan Avenue. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of four (4) square- to rectangular-shaped parcels which total 4.48± acres in size. The site is generally vacant and undeveloped, however, the southern region of the site appears to have been previously graded. Ground surface cover in the southern region of the site consists of exposed soil with some areas of aggregate base. Ground surface cover in the northern region of the site comprised of exposed soil with heavy native grass and weed growth.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the overall site slopes downward to the north to northeast at a gradient of less than 2± percent.

3.2 Proposed Development

SCG was provided with site plan (Scheme 1) prepared by HPA Architecture. Based on the site plan, the site will be developed with one (1) industrial building. The warehouse will be located in the central area of the site and will be 100,896± ft² in size. Dock-high doors will be constructed along a portion of the east building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock areas, and limited areas of concrete flatwork and landscape planters throughout the site.

Detailed structural information has not been provided. It is assumed the building will be of tilt-up concrete construction, typically supported on conventional shallow foundations with a concrete slab-on-grade floor. Based on the assumed construction, maximum column and wall loads are expected to be on the order of 100 kips and 4 to 7 kips per linear foot, respectively.

No significant amounts of below grade construction, such as crawl spaces or new basements, are expected to be included in the proposed development. Based on the assumed topography, cuts and fills of up to 4± feet are expected to be necessary to achieve the proposed site grades.

4.0 SUBSURFACE EXPLORATION

4.1 Scope of Exploration/Sampling Methods

The subsurface exploration for this project consisted of five (5) borings advanced to depths of 15 to 26± feet below the existing site grades. All of the borings were logged during drilling by a member of our staff.

The borings were advanced with hollow-stem augers, by a limited-access, track-mounted drilling rig. Representative bulk and relatively undisturbed soil samples were taken during drilling. Relatively undisturbed soil samples were taken with a split barrel "California Sampler" containing a series of one inch long, 2.416± inch diameter brass rings. This sampling method is described in ASTM Test Method D-3550. In-situ samples were also taken using a 1.4± inch inside diameter split spoon sampler, in general accordance with ASTM D-1586. Both of these samplers are driven into the ground with successive blows of a 140-pound weight falling 30 inches. The blow counts obtained during driving are recorded for further analysis. Bulk samples were collected in plastic bags to retain their original moisture content. The relatively undisturbed ring samples were placed in molded plastic sleeves that were then sealed and transported to our laboratory.

The approximate locations of the borings are indicated on the Boring Location Plan, included as Plate 2 in Appendix A of this report. The Boring Logs, which illustrate the conditions encountered at the boring locations, as well as the results of some of the laboratory testing, are included in Appendix B.

4.2 Geotechnical Conditions

Artificial Fill

Artificial fill soils were encountered at the ground surface at Boring Nos. B-2, B-3 and B-4, extending to depths of 3 to 4½± feet below ground surface. The fill soils generally consist of loose to medium dense silty fine to medium sands, fine sandy silts and clayey fine sands. The fill soils possess a disturbed and mottled appearance, resulting in their classification as artificial fill.

Alluvium

Native alluvium was encountered beneath the artificial fill soils or at the ground surface at all of the boring locations, extending to at least the maximum depth explored of 26± feet below ground surface. The alluvial soils generally consist of medium dense to very dense silty fine to medium sands, clayey fine to medium sands and fine sandy silts, and very stiff to hard fine to medium sandy clays.

Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 26± feet at the time of the subsurface exploration.

Recent water level data was obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. One monitoring well on record is located ½± mile west of the site. Water level readings within this monitoring well indicates a high groundwater level of 56± feet below ground surface in November 2020.

5.0 LABORATORY TESTING

The soil samples recovered from the subsurface exploration were returned to our laboratory for further testing to determine selected physical and engineering properties of the soils. The tests are briefly discussed below. It should be noted that the test results are specific to the actual samples tested, and variations could be expected at other locations and depths.

Classification

All recovered soil samples were classified using the Unified Soil Classification System (USCS), in accordance with ASTM D-2488. Field identifications were then supplemented with additional visual classifications and/or by laboratory testing. The USCS classifications are shown on the Boring Logs and are periodically referenced throughout this report.

Density and Moisture Content

The density has been determined for selected relatively undisturbed ring samples. These densities were determined in general accordance with the method presented in ASTM D-2937. The results are recorded as dry unit weight in pounds per cubic foot. The moisture contents are determined in accordance with ASTM D-2216, and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Consolidation

Selected soil samples have been tested to determine their consolidation and collapse potential, in accordance with ASTM D-2435. The testing apparatus is designed to accept either natural or remolded samples in a one-inch high ring, approximately 2.416 inches in diameter. Each sample is then loaded incrementally in a geometric progression and the resulting deflection is recorded at selected time intervals. Porous stones are in contact with the top and bottom of the sample to permit the addition or release of pore water. The samples are typically inundated with water at an intermediate load to determine their potential for collapse or heave. The results of the consolidation testing are plotted on Plates C-1 through C-4 in Appendix C of this report.

Maximum Dry Density and Optimum Moisture Content

A representative bulk sample has been tested for its maximum dry density and optimum moisture content. The results have been obtained using the Modified Proctor procedure, per ASTM D-1557, and are presented on Plate C-5 in Appendix C of this report. These tests are generally used to with compare the dry densities of undisturbed field samples, and for later compaction testing. Additional testing of other soil types or soil mixes may be necessary at a later date.

Soluble Sulfates

A representative sample of the near-surface soils has been submitted to a subcontracted analytical laboratory for evaluation of soluble sulfate content. Soluble sulfates are naturally present in soils, and if the concentration is high enough, can result in degradation of concrete

which comes into contact with these soils. The result of the soluble sulfate testing is presented below, and are discussed further in a subsequent section of this report.

Sample Identification	Soluble Sulfates (%)	Severity
B-1 @ 0 to 5 feet	0.014	Not Applicable (S0)

Corrosivity Testing

A representative bulk sample of the near-surface soils was submitted to a subcontracted corrosion engineering laboratory to determine if the near-surface soils possess corrosive characteristics with respect to common construction materials. The corrosivity testing included an evaluation of the electrical resistivity, pH, and chloride concentrations of the soils, as well as other tests. The results of some of these tests are presented below.

Sample Identification	Saturated Resistivity (ohm-cm)	pH	Chlorides (mg/kg)	Nitrates (mg/kg)
B-1 @ 0 to 5 feet	1,474	7.9	152.9	70.2

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our review, field exploration, laboratory testing and geotechnical analysis, the proposed development is considered feasible from a geotechnical standpoint. The recommendations contained in this report should be taken into the design, construction, and grading considerations.

The recommendations are contingent upon all grading and foundation construction activities being monitored by the geotechnical engineer of record. The recommendations are provided with the assumption that an adequate program of client consultation, construction monitoring, and testing will be performed during the final design and construction phases to verify compliance with these recommendations. Maintaining Southern California Geotechnical, Inc., (SCG) as the geotechnical consultant from the beginning to the end of the project will provide continuity of services. The geotechnical engineering firm providing testing and observation services shall assume the responsibility of Geotechnical Engineer of Record.

The Grading Guide Specifications, included as Appendix D, should be considered part of this report, and should be incorporated into the project specifications. The contractor and/or owner of the development should bring to the attention of the geotechnical engineer any conditions that differ from those stated in this report, or which may be detrimental for the development.

6.1 Seismic Design Considerations

The subject site is located in an area which is subject to strong ground motions due to earthquakes. The performance of a site-specific seismic hazards analysis was beyond the scope of this investigation. However, numerous faults capable of producing significant ground motions are located near the subject site. Due to economic considerations, it is not generally considered reasonable to design a structure that is not susceptible to earthquake damage. Therefore, significant damage to structures may be unavoidable during large earthquakes. The proposed structures should, however, be designed to resist structural collapse and thereby provide reasonable protection from serious injury, catastrophic property damage and loss of life.

Faulting and Seismicity

Research of available maps indicates that the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Furthermore, SCG did not identify any evidence of faulting during the geotechnical investigation. Therefore, the possibility of significant fault rupture on the site is considered to be low.

The potential for other geologic hazards such as seismically induced settlement, lateral spreading, tsunamis, inundation, seiches, flooding, and subsidence affecting the site is considered low.

Seismic Design Parameters

The 2019 California Building Code (CBC) provides procedures for earthquake resistant structural design that include considerations for on-site soil conditions, occupancy, and the configuration of

the structure including the structural system and height. The seismic design parameters presented below are based on the soil profile and the proximity of known faults with respect to the subject site.

Based on standards in place at the time of this report, the proposed development is expected to be designed in accordance with the requirements of the 2019 edition of the California Building Code (CBC), which was adopted on January 1, 2020.

The 2019 CBC Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool, a web-based software application available at the website www.seismicmaps.org. This software application calculates seismic design parameters in accordance with several building code reference documents, including ASCE 7-16, upon which the 2019 CBC is based. The application utilizes a database of risk-targeted maximum considered earthquake (MCE_R) site accelerations at 0.01-degree intervals for each of the code documents. The tables below were created using data obtained from the application. The output generated from this program is included as Plate E-1 in Appendix E of this report.

The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than 0.2. However, Section 11.4.8 of ASCE 7-16 also indicates an exception to the requirement for a site-specific ground motion hazard analysis for certain structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) indicates that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." **Based on our understanding of the proposed development, the seismic design parameters presented below were calculated assuming that the exception in Section 11.4.8 applies to the proposed structure at this site. However, the structural engineer should verify that this exception is applicable to the proposed structure.** Based on the exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

2019 CBC SEISMIC DESIGN PARAMETERS

Parameter		Value
Mapped Spectral Acceleration at 0.2 sec Period	S_S	1.500
Mapped Spectral Acceleration at 1.0 sec Period	S_1	0.572
Site Class	---	D
Site Modified Spectral Acceleration at 0.2 sec Period	S_{MS}	1.500
Site Modified Spectral Acceleration at 1.0 sec Period	S_{M1}	0.988
Design Spectral Acceleration at 0.2 sec Period	S_{DS}	1.000
Design Spectral Acceleration at 1.0 sec Period	S_{D1}	0.659

It should be noted that the site coefficient F_v and the parameters S_{M1} and S_{D1} were not included in the SEAOC/OSHPD Seismic Design Maps Tool output for the 2019 CBC. We calculated these parameters-based on Table 1613.2.3(2) in Section 16.4.4 of the 2019 CBC using the value of S_1

obtained from the Seismic Design Maps Tool, assuming that a site-specific ground motion hazards analysis is not required for the proposed buildings at this site.

Liquefaction

Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean (d_{50}) grain size in the range of 0.075 to 0.2 mm (Seed and Idriss, 1971). Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 (Bray and Sancio, 2006) are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.

The Riverside County GIS website indicates that the subject site is located within a zone of low liquefaction susceptibility. In addition, the subsurface conditions encountered at the boring locations are not considered to be conducive to liquefaction. These conditions consist of moderate to high strength native alluvial soils and no evidence of a long-term groundwater table within 26 feet of the ground surface. In addition, research of available well data indicates that the groundwater depths in the area of the site are more than 56 feet below grade. Based on these considerations, liquefaction is not considered to be a design concern for this project.

6.2 Geotechnical Design Considerations

General

Most of the borings encountered artificial fill materials, extending to depths of 3 to 4½± feet. Based on their strength characteristics and a lack of documentation regarding the placement and compaction of the existing fill materials, these soils are considered to consist of undocumented fill. In addition, the near-surface alluvial soils within the upper 6 to 7± feet possess a moderate potential for collapse when exposed to moisture infiltration as well as settlement when exposed to load increases in the range of those that will be exerted by the new foundations. The undocumented fill soils and the near-surface native alluvium are not considered to be suitable for the support of the foundation and floor slab loads of the proposed building. Based on these conditions, remedial grading is considered warranted within the proposed building area to completely remove the existing artificial fill soils and the upper portion of the near-surface native alluvium and replace these soils as compacted structural fill.

Settlement

The recommended remedial grading will remove all of the existing fill soils and a portion of the near-surface native alluvium, and replace these soils as compacted structural fill. The native soils that will remain in place below the recommended depth of overexcavation possess favorable consolidation and collapse characteristics and will not be subject to significant load increases from

the foundations of the new structure. Provided that the recommended remedial grading is completed, the post-construction settlement of the proposed structure is expected to be within tolerable limits.

Expansion

Laboratory testing performed on a representative sample of the near-surface soils indicates that these materials possess a low expansion potential (EI = 23). Based on the presence of potentially expansive soils at this site, care should be given to proper moisture conditioning the building pad subgrade soils to a moisture content of 2 to 4 percent above the ASTM D-1557 optimum during site grading. It is recommended that additional expansion index testing be conducted at the completion of rough grading to verify the expansion potential of the as-graded building pad.

Soluble Sulfates

The results of the soluble sulfate testing indicate that the tested soil sample possesses a level of soluble sulfates that is considered to be "not applicable" (S0) with respect to the American Concrete Institute (ACI) Publication 318-14 Building Code Requirements for Structural Concrete and Commentary, Section 4.3. Therefore, specialized concrete mix designs are not considered to be necessary, with regard to sulfate protection purposes. It is, however, recommended that additional soluble sulfate testing be conducted at the completion of rough grading to verify the soluble sulfate concentrations of the soils which are present at pad grade within the building area.

Corrosion Potential

The results of laboratory testing indicate that the tested sample of the on-site soils possesses a saturated resistivity of 1,474 ohm-cm, and a pH value of 7.9. These test results have been evaluated in accordance with guidelines published by the Ductile Iron Pipe Research Association (DIPRA). The DIPRA guidelines consist of a point system by which characteristics of the soils are used to quantify the corrosivity characteristics of the site. Sulfides, and redox potential are factors that are also used in the evaluation procedure. We have evaluated the corrosivity characteristics of the on-site soils using resistivity, pH, and moisture content. Based on these factors, and utilizing the DIPRA procedure, the on-site soils are considered to be corrosive to ductile iron pipe. Therefore, polyethylene encasement or some other appropriate method of protection is expected to be required for iron pipes.

A moderate concentration (152.9 mg/kg) of chlorides was detected in the sample submitted for corrosivity testing. In general, soils possessing chloride concentrations in excess of 500 parts per million (ppm) are considered to be corrosive with respect to steel reinforcement within reinforced concrete. Based on these test results, the site is considered to have a C1 chloride exposure in accordance with the American Concrete Institute (ACI) Publication 318 Building Code Requirements for Structural Concrete and Commentary. Therefore, a specialized concrete mix design for reinforced concrete for protection against chloride exposure is not considered warranted.

Nitrates present in soil can be corrosive to copper tubing at concentrations greater than 50 mg/kg. The tested sample possesses a nitrate concentration of 70.2 mg/kg. **Based on this test result, the on-site soils are considered to be corrosive to copper pipe.**

It should be noted that SCG does not practice in the field of corrosion engineering. Therefore, the client may wish to contact a corrosion engineer to provide a more thorough evaluation.

Shrinkage/Subsidence

Based on the results of the laboratory testing, removal and recompaction of the near-surface native alluvium will result in an average shrinkage of 3 to 11 percent. However, potential shrinkage for individual samples ranged locally between 1 and 18 percent. The potential shrinkage estimate is based on dry density testing performed on small-diameter samples taken at the boring locations. If a more accurate and precise shrinkage estimate is desired, SCG can perform a shrinkage study involving several excavated test-pits where in-place densities are determined using in-situ testing methods instead of laboratory density testing on small-diameter samples. Please contact SCG for details and a cost estimate regarding a shrinkage study, if desired.

Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be 0.1 feet. This estimate may be used for grading in areas that are underlain by native alluvial soils.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The actual amount of subsidence is expected to be variable and will be dependent on the type of machinery used, repetitions of use, and dynamic effects, all of which are difficult to assess precisely.

Grading and Foundation Plan Review

It is recommended that we be provided with copies of the finalized grading and foundation plans, when they become available, for review with regard to the conclusions, recommendations, and assumptions contained within this report.

6.3 Site Grading Recommendations

The grading recommendations presented below are based on the subsurface conditions encountered at the boring locations and our understanding of the proposed development. We recommend that all grading activities be completed in accordance with the Grading Guide Specifications included as Appendix D of this report, unless superseded by site-specific recommendations presented below.

Site Stripping and Demolition

Initial site preparation should also include stripping of the surficial vegetation and organic soils. Based on conditions encountered at the time of the subsurface exploration, removal of the moderate to heavy native grass and weed growth will be necessary in the northern region of the site. Any vegetation, organic topsoil, and all root masses should be removed during site stripping. These materials should be disposed of off-site. The actual extent of site stripping should be determined in the field by the geotechnical engineer, based on the organic content and stability of the materials encountered.

Treatment of Existing Soils: Building Pad

Remedial grading should be performed within the proposed building pad area in order to remove all of the existing undocumented fill soils and a portion of the near-surface native alluvium. The undocumented fill soils extend to depths of 3 to 4½± the boring locations within the building area. The soils within the proposed building pad area should also be overexcavated to a depth of 6 feet below existing grade and to a depth of at least 4 feet below proposed building pad subgrade elevation. The proposed foundation influence zones within the industrial building should be overexcavated to a depth of at least 3 feet below proposed foundation bearing grade.

The overexcavation areas should extend at least 5 feet beyond the building and foundation perimeters, and to an extent equal to the depth of fill below the new foundations. If the proposed structure incorporates any exterior columns (such as for a canopy or overhang) the area of overexcavation should also encompass these areas.

Following completion of the overexcavation, the subgrade soils within the overexcavation areas should be evaluated by the geotechnical engineer to verify their suitability to serve as the structural fill subgrade, as well as to support the foundation loads of the new structure. This evaluation should include proofrolling and probing to identify any soft, loose, or otherwise unstable soils that must be removed. Some localized areas of deeper excavation may be required if additional fill or loose, porous, or low-density native soils are encountered at the base of the overexcavation. Deeper undocumented fill soils may also exist at locations not explored by our borings.

After a suitable overexcavation subgrade has been achieved, the exposed soils should be scarified to a depth of at least 12 inches, and moisture conditioned to at 2 to 4 percent above optimum moisture content, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. The previously excavated soils may then be replaced as compacted structural fill.

Treatment of Existing Soils: Retaining Walls and Site Walls

The existing soils within the areas of proposed retaining and non-retaining site walls should be overexcavated to a depth of at least 3 feet below foundation bearing grade and replaced as compacted structural fill. Any existing fill soils in these areas should be removed. Subgrades for erection pads for concrete tilt-up walls are considered to be a part of the foundation system and should also be overexcavated. Additional overexcavation may be required if porous or collapsible alluvium is encountered, as discussed above. The overexcavation subgrade soils should be evaluated by the geotechnical engineer prior to scarifying, moisture conditioning and recompacting the upper 12 inches of exposed subgrade soils. The previously excavated soils may then be replaced as compacted structural fill.

If the full lateral extent of overexcavation is not achievable for the proposed walls, the foundations should be redesigned using a lower bearing pressure. The geotechnical engineer of record should be contacted for recommendations pertaining to this type of condition.

Treatment of Existing Soils: Parking and Drive Areas

Based on economic considerations, overexcavation of the undocumented fill soils and near-surface alluvial soils in the new parking and drive areas is not considered warranted, with the

exception of areas where lower strength, or unstable soils are identified by the geotechnical engineer during grading.

Subgrade preparation in the new parking and drive areas should initially consist of removal of all soils disturbed during stripping. The geotechnical engineer should then evaluate the subgrade to identify any areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of artificial fill and variable strength alluvial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

The grading recommendations presented above for the proposed parking and drive areas assume that the owner and/or developer can tolerate minor amounts of settlement within the proposed parking areas. The grading recommendations presented above do not completely mitigate the extent of existing undocumented fill soils in the parking areas. As such, settlement and associated pavement distress could occur. Typically, repair of such distressed areas involves significantly lower costs than completely mitigating these soils at the time of construction. If the owner cannot tolerate the risk of such settlements, the parking and drive areas should be overexcavated to a depth of 2 feet below proposed pavement subgrade elevation, with the resulting soils replaced as compacted structural fill.

Treatment of Existing Soils: Flatwork Areas

Subgrade preparation in the new flatwork areas should initially consist of removal of soils disturbed during stripping operations. The geotechnical engineer should then evaluate the subgrade to identify areas of additional unsuitable soils. The subgrade soils should then be scarified to a depth of 12± inches, moisture conditioned to 2 to 4 percent above optimum, and recompacted to at least 90 percent of the ASTM D-1557 maximum dry density. Based on the presence of variable strength alluvial soils throughout the site, it is expected that some isolated areas of additional overexcavation may be required to remove zones of lower strength, unsuitable soils.

Fill Placement

- Fill soils should be placed in thin (6± inches), near-horizontal lifts, moisture conditioned to 2 to 4 percent above the optimum moisture content, and compacted.
- On-site soils may be used for fill provided they are cleaned of any debris to the satisfaction of the geotechnical engineer.
- All grading and fill placement activities should be completed in accordance with the requirements of the 2019 CBC and the grading code of the city of Perris and/or the county of Riverside.
- All fill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. Fill soils should be well mixed.
- Compaction tests should be performed periodically by the geotechnical engineer as random verification of compaction and moisture content. These tests are intended to aid the contractor. Since the tests are taken at discrete locations and depths, they may not be indicative of the entire fill and therefore should not relieve the contractor of his responsibility to meet the job specifications.

Imported Structural Fill

All imported structural fill should consist of very low expansive (EI < 20), well graded soils possessing at least 10 percent fines (that portion of the sample passing the No. 200 sieve). Additional specifications for structural fill are presented in the Grading Guide Specifications, included as Appendix D.

Utility Trench Backfill

In general, all utility trench backfill soils should be compacted to at least 90 percent of the ASTM D-1557 maximum dry density. As an alternative, a clean sand (minimum Sand Equivalent of 30) may be placed within trenches and compacted in place (jetting or flooding is not recommended). Compacted trench backfill should conform to the requirements of the local grading code, and more restrictive requirements may be indicated by the city of Perris and/or the county of Riverside. All utility trench backfills should be witnessed by the geotechnical engineer. The trench backfill soils should be compaction tested where possible; probed and visually evaluated elsewhere.

Utility trenches which parallel a footing, and extending below a 1h:1v plane projected from the outside edge of the footing should be backfilled with structural fill soils, compacted to at least 90 percent of the ASTM D-1557 standard. Pea gravel backfill should not be used for these trenches.

6.4 Construction Considerations

Excavation Considerations

The near surface soils generally consist of low strength silty to clayey fine sands and fine sandy silts with minor clay content, underlain by moderate strength sandy clays. These upper materials may be subject to minor caving within shallow excavations. Where caving occurs within shallow excavations, flattened excavation slopes may be sufficient to provide excavation stability. On a preliminary basis, the inclination of temporary slopes should not exceed 2h:1v for sands and 1.5h:1v for moderate strength clays, or the Cal-OSHA excavation guidelines for the type of soil encountered. Deeper excavations may require some form of external stabilization such as shoring or bracing or flattened/stepped excavations. Maintaining adequate moisture content within the near-surface soils will improve excavation stability. Excavation activities on this site should be conducted in accordance with Cal-OSHA regulations.

Moisture Sensitive Subgrade Soils

Most of the near surface soils possess appreciable silt and clay content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

Unstable subgrade soils may be encountered at the base of the overexcavations within the proposed building area. The extent of unstable subgrade soils will, to a large degree depend on

methods used by the contractor to avoid adding additional moisture to these soils or disturbing soils which already possess high moisture contents. If grading occurs during a period of relatively wet weather, an increase in subgrade instability should also be expected.

If the construction schedule dictates that site grading will occur during a period of wet weather, allowances should be made for costs and delays associated with drying the on-site soils or import of a drier, less moisture sensitive fill material. Grading during wet or cool weather may also increase the depth of overexcavation in the pad area.

Groundwater

The static groundwater table is considered to exist at a depth greater than 26± feet below existing grade. Therefore, groundwater is not expected to impact the grading or foundation construction activities.

6.5 Foundation Design and Construction

Based on the preceding grading recommendations, it is assumed that the new building pad will be underlain by newly placed structural fill soils extending to depths of at least 3 feet below foundation bearing grade. Based on this subsurface profile, the proposed structure may be supported on shallow foundations.

Foundation Design Parameters

New square and rectangular footings may be designed as follows:

- Maximum, net allowable soil bearing pressure: 2,500 lbs/ft^2.
- Minimum wall/column footing width: 14 inches/24 inches.
- Minimum longitudinal steel reinforcement within strip footings: Four (4) No. 5 rebars (2 top and 2 bottom).
- Minimum foundation embedment: 12 inches into suitable structural fill soils, and at least 18 inches below adjacent exterior grade. Interior column footings may be placed immediately beneath the floor slab.
- It is recommended that the perimeter building foundations be continuous across all exterior doorways. Any flatwork adjacent to the exterior doors should be doweled into the perimeter foundations in a manner determined by the structural engineer.

The allowable bearing pressures presented above may be increased by 1/3 when considering short duration wind or seismic loads. The minimum steel reinforcement recommended above is based on standard geotechnical practice. Additional rigidity may be necessary for structural considerations. The actual design of the foundations should be determined by the structural engineer.

Foundation Construction

The foundation subgrade soils should be evaluated at the time of overexcavation, as discussed in Section 6.3 of this report. It is further recommended that the foundation subgrade soils be evaluated by the geotechnical engineer immediately prior to steel or concrete placement. Soils suitable for direct foundation support should consist of newly placed structural fill compacted at least 90 percent of the ASTM D-1557 maximum dry density. Any unsuitable materials should be removed to a depth of suitable bearing compacted structural fill, with the resulting excavations backfilled with compacted fill soils. As an alternative, lean concrete slurry (500 to 1,500 psi) may be used to backfill such isolated overexcavations.

The foundation subgrade soils should also be properly moisture conditioned to 2 to 4 percent above the Modified Proctor optimum, to a depth of at least 12 inches below bearing grade. Since it is typically not feasible to increase the moisture content of the floor slab and foundation subgrade soils once rough grading has been completed, care should be taken to maintain the moisture content of the building pad subgrade soils throughout the construction process.

Estimated Foundation Settlements

Post-construction total and differential settlements of shallow foundations designed and constructed in accordance with the previously presented recommendations are estimated to be less than 1.0 and 0.5 inches, respectively, under static conditions. Differential movements are expected to occur over a 50-foot span, thereby resulting in an angular distortion of less than 0.002 inches per inch.

Lateral Load Resistance

Lateral load resistance will be developed by a combination of friction acting at the base of foundations and slabs and the passive earth pressure developed by footings below grade. The following friction and passive pressure may be used to resist lateral forces:

- Passive Earth Pressure: 300 lbs/ft^3
- Friction Coefficient: 0.30

These are allowable values, and include a factor of safety. When combining friction and passive resistance, the passive pressure component should be reduced by one-third. These values assume that footings will be poured directly against compacted structural fill soils. The maximum allowable passive pressure is 3,000 lbs/ft^2.

6.6 Floor Slab Design and Construction

Subgrades which will support the new floor slab should be prepared in accordance with the recommendations contained in the ***Site Grading Recommendations*** section of this report. Based on the anticipated grading which will occur at this site, the floor of the proposed structure may be constructed as a conventional slab-on-grade, supported on newly placed structural fill, extending to a depth of at least 4 feet below finished pad grade. Based on geotechnical considerations, the floor slab may be designed as follows:

- Minimum slab thickness: 6 inches.

- Modulus of Subgrade Reaction: 100 psi/in.

- Minimum slab reinforcement: Not required for geotechnical considerations. The actual floor slab reinforcement should be determined by the structural engineer, based upon the imposed loading.

- Slab underlayment: If moisture sensitive floor coverings will be used then minimum slab underlayment should consist of a moisture vapor barrier constructed below the entire slab area where such moisture sensitive floor coverings are expected. The moisture vapor barrier should meet or exceed the Class A rating as defined by ASTM E 1745-97 and have a permeance rating less than 0.01 perms as described in ASTM E 96-95 and ASTM E 154-88. A polyolefin material such as a 15 mil Stego® Wrap Vapor Barrier or equivalent will meet these specifications. The moisture vapor barrier should be properly constructed in accordance with all applicable manufacturer specifications. Given that a rock free subgrade is anticipated and that a capillary break is not required, sand below the barrier is not required. The need for sand and/or the amount of sand above the moisture vapor barrier should be specified by the structural engineer or concrete contractor. The selection of sand above the barrier is not a geotechnical engineering issue and hence outside our purview. Where moisture sensitive floor coverings are not anticipated, the vapor barrier may be eliminated.

- Moisture condition the floor slab subgrade soils to 2 to 4 percent above the Modified Proctor optimum moisture content, to a depth of 12 inches. The moisture content of the floor slab subgrade soils should be verified by the geotechnical engineer within 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

The actual design of the floor slab should be completed by the structural engineer to verify adequate thickness and reinforcement.

6.7 Exterior Flatwork Design and Construction

Subgrades which will support new exterior slabs-on-grade for sidewalks, patios, and other concrete flatwork, should be prepared in accordance with the recommendations contained in the ***Grading Recommendations*** section of this report. Based on geotechnical considerations, exterior slabs on grade may be designed as follows:

- Minimum slab thickness: 4½ inches.

- Minimum slab reinforcement: No. 3 bars at 18 inches on center, in both directions.

- The flatwork at building entry areas should be structurally connected to the perimeter foundation that is recommended to span across the door opening. This recommendation is designed to reduce the potential for differential movement at this joint.

- Moisture condition the flatwork subgrade soils to at least 2 to 4 percent of optimum moisture content, to a depth of at least 12 inches. Adequate moisture conditioning should be verified by the geotechnical engineer 24 hours prior to concrete placement.

- Proper concrete curing techniques should be utilized to reduce the potential for slab curling or the formation of excessive shrinkage cracks.

- Control joints should be provided at a maximum spacing of 8 feet on center in two directions for slabs and at 6 feet on center for sidewalks. Control joints are intended to direct cracking. Minor cracking of exterior concrete slabs on grade should be expected.

Expansion or felt joints should be used at the interface of exterior slabs on grade and any fixed structures to permit relative movement.

6.8 Retaining Wall Design and Construction

Although not indicated on the site plan, some small (less than 6 feet in height) retaining walls may be required in truck court area and to facilitate the new site grades. The parameters recommended for use in the design of these walls are presented below.

Retaining Wall Design Parameters

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. We have provided parameters assuming the use of on-site soils for retaining wall backfill. The on-site soils generally consist of silty sands, sandy silts, and clayey sands. Based on their classifications, the on-site silty sands, sandy silts and clayey sands are expected to possess a friction angle of at least 30 degrees when compacted to 90 percent of the ASTM-1557 maximum dry density.

If desired, SCG could provide design parameters for an alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal. If select backfill material behind the retaining wall is desired, SCG should be contacted for supplementary recommendations.

RETAINING WALL DESIGN PARAMETERS

Design Parameter		Soil Type
		On-Site Silty Sands, Sandy Silts, Clayey Sands
Internal Friction Angle (ϕ)		30°
Unit Weight		136 lbs/ft^3
Equivalent Fluid Pressure:	Active Condition (level backfill)	45 lbs/ft^3
	Active Condition (2h:1v backfill)	73 lbs/ft^3
	At-Rest Condition (level backfill)	68 lbs/ft^3

Regardless of the backfill type, the walls should be designed using a soil-footing coefficient of friction of 0.30 and an equivalent passive pressure of 300 lbs/ft^3. The structural engineer should incorporate appropriate factors of safety in the design of the retaining walls.

The active earth pressure may be used for the design of retaining walls that do not directly support structures or support soils that in turn support structures and which will be allowed to deflect. The at-rest earth pressure should be used for walls that will not be allowed to deflect such as those which will support foundation bearing soils, or which will support foundation loads directly.

Where the soils on the toe side of the retaining wall are not covered by a "hard" surface such as a structure or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance due to the potential for the material to become disturbed or degraded during the life of the structure.

Seismic Lateral Earth Pressures

In accordance with the 2019 CBC, any retaining walls more than 6 feet in height must be designed for seismic lateral earth pressures. If walls 6 feet or more are required for this site, the geotechnical engineer should be contacted for supplementary seismic lateral earth pressure recommendations.

Retaining Wall Foundation Design

The retaining wall foundations should be supported within newly placed compacted structural fill, extending to a depth of at least 3 feet below proposed foundation bearing grade. Foundations to support new retaining walls should be designed in accordance with the general Foundation Design Parameters presented in a previous section of this report.

Backfill Material

On-site soils may be used to backfill the retaining walls. However, all backfill material placed within 3 feet of the back-wall face should have a particle size no greater than 3 inches. The retaining wall backfill materials should be well-graded.

It is recommended that a properly installed prefabricated drainage composite such as the MiraDRAIN 6000XL (or approved equivalent), which is specifically designed for use behind retaining walls be used. If the drainage composite material is not covered by an impermeable surface, such as a structure or pavement, a 12-inch thick layer of a low permeability soil should be placed over the backfill to reduce surface water migration to the underlying soils. The drainage composite should be separated from the backfill soils by a suitable geotextile, approved by the geotechnical engineer.

All retaining wall backfill should be placed and compacted under engineering-controlled conditions in the necessary layer thicknesses to ensure an in-place density between 90 and 93 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D1557). Care should be taken to avoid over-compaction of the soils behind the retaining walls, and the use of heavy compaction equipment should be avoided.

Subsurface Drainage

As previously indicated, the retaining wall design parameters are based upon drained backfill conditions. Consequently, some form of permanent drainage system will be necessary in conjunction with the appropriate backfill material. Subsurface drainage may consist of either:

- A weep hole drainage system typically consisting of a series of 2-inch diameter holes in the wall situated slightly above the ground surface elevation on the exposed side of the wall and at an approximate 10-foot on-center spacing. Alternatively, 4-inch diameter holes at an approximate 20-foot on-center spacing can be used for this type of drainage system. In addition, the weep holes should include a 2 cubic foot pocket of open graded gravel, surrounded by an approved geotextile fabric, at each weep hole location.

- A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or tied into a storm drainage system. The actual design of this type of system should be determined by the civil engineer to verify that the drainage system possesses the adequate capacity and slope for its intended use.

Weep holes or a footing drain will not be required for building stem walls.

6.9 Pavement Design Parameters

Site preparation in the pavement area should be completed as previously recommended in the ***Site Grading Recommendations*** section of this report. The subsequent pavement recommendations assume proper drainage and construction monitoring, and are based on either PCA or CALTRANS design parameters for a twenty (20) year design period. However, these designs also assume a routine pavement maintenance program to obtain the anticipated 20-year pavement service life.

Pavement Subgrades

It is anticipated that the new pavements will be primarily supported on a layer of compacted structural fill, consisting of scarified, thoroughly moisture conditioned and recompacted existing soils. The on-site soils generally consist of silty sands, sandy silts, clayey sands. These soils are generally considered to possess fair to good pavement support characteristics with estimated R-values ranging from 30 to 40. The subsequent pavement design is therefore based upon an assumed R-value of 30. Any fill material imported to the site should have support characteristics equal to or greater than that of the on-site soils and be placed and compacted under engineering controlled conditions. It is recommended that R-value testing be performed after completion of rough grading. Depending upon the results of the R-value testing, it may be feasible to use thinner pavement sections in some areas of the site.

Asphaltic Concrete

Presented below are the recommended thicknesses for new flexible pavement structures consisting of asphaltic concrete over a granular base. The pavement designs are based on the traffic indices (TI's) indicated. The client and/or civil engineer should verify that these TI's are representative of the anticipated traffic volumes. If the client and/or civil engineer determine that the expected traffic volume will exceed the applicable traffic index, we should be contacted for supplementary recommendations. The design traffic indices equate to the following approximate daily traffic volumes over a 20 year design life, assuming six operational traffic days per week.

Traffic Index	No. of Heavy Trucks per Day
4.0	0
5.0	1
6.0	3
7.0	11
8.0	35
9.0	93

For the purpose of the traffic volumes indicated above, a truck is defined as a 5-axle tractor trailer unit with one 8-kip axle and two 32-kip tandem axles. All of the traffic indices allow for 1,000 automobiles per day.

ASPHALT PAVEMENTS (R=30)					
Materials	**Thickness (inches)**				
	Auto Parking and Auto Drive Lanes (TI = 4.0 to 5.0)	Truck Traffic			
		TI = 6.0	TI = 7.0	TI = 8.0	TI = 9.0
Asphalt Concrete	3	3½	4	5	5½
Aggregate Base	6	8	10	11	13
Compacted Subgrade	12	12	12	12	12

The aggregate base course should be compacted to at least 95 percent of the ASTM D-1557 maximum dry density. The asphaltic concrete should be compacted to at least 95 percent of the Marshall maximum density, as determined by ASTM D-2726. The aggregate base course may consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB), which is a recycled gravel, asphalt and concrete material. The gradation, R-Value, Sand Equivalent, and Percentage Wear of the CAB or CMB should comply with appropriate specifications contained in the current edition of the "Greenbook" Standard Specifications for Public Works Construction.

Portland Cement Concrete

The preparation of the subgrade soils within concrete pavement areas should be performed as previously described for proposed asphalt pavement areas. The minimum recommended thicknesses for the Portland Cement Concrete pavement sections are as follows:

PORTLAND CEMENT CONCRETE PAVEMENTS (R=30)				
Materials	**Thickness (inches)**			
	Autos and Light Truck Traffic (TI = 5.0 to 6.0)	Truck Traffic		
		TI = 7.0	TI = 8.0	TI = 9.0
PCC	5	5½	6½	8
Compacted Subgrade (95% minimum compaction)	12	12	12	12

The concrete should have a 28-day compressive strength of at least 3,000 psi. The maximum joint spacing within all of the PCC pavements is recommended to be equal to or less than 30 times the pavement thickness.

7.0 GENERAL COMMENTS

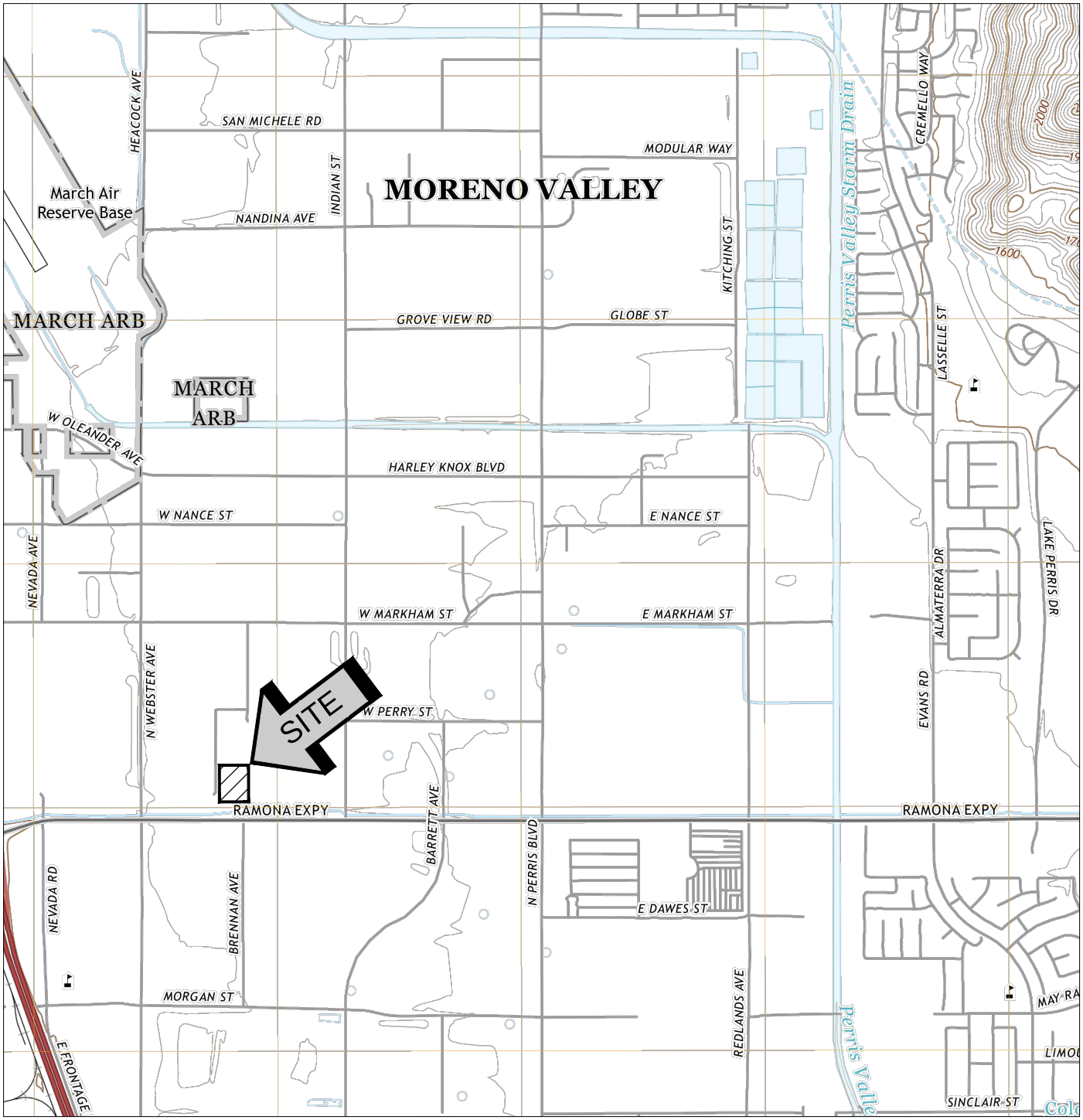
This report has been prepared as an instrument of service for use by the client, in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, civil engineer, and/or structural engineer. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The client(s)' reliance upon this report is subject to the Engineering Services Agreement, incorporated into our proposal for this project.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and sample depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

APPENDIX A



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE,RIVERSIDE COUNTY, CALIFORNIA, 2021.

SITE LOCATION MAP

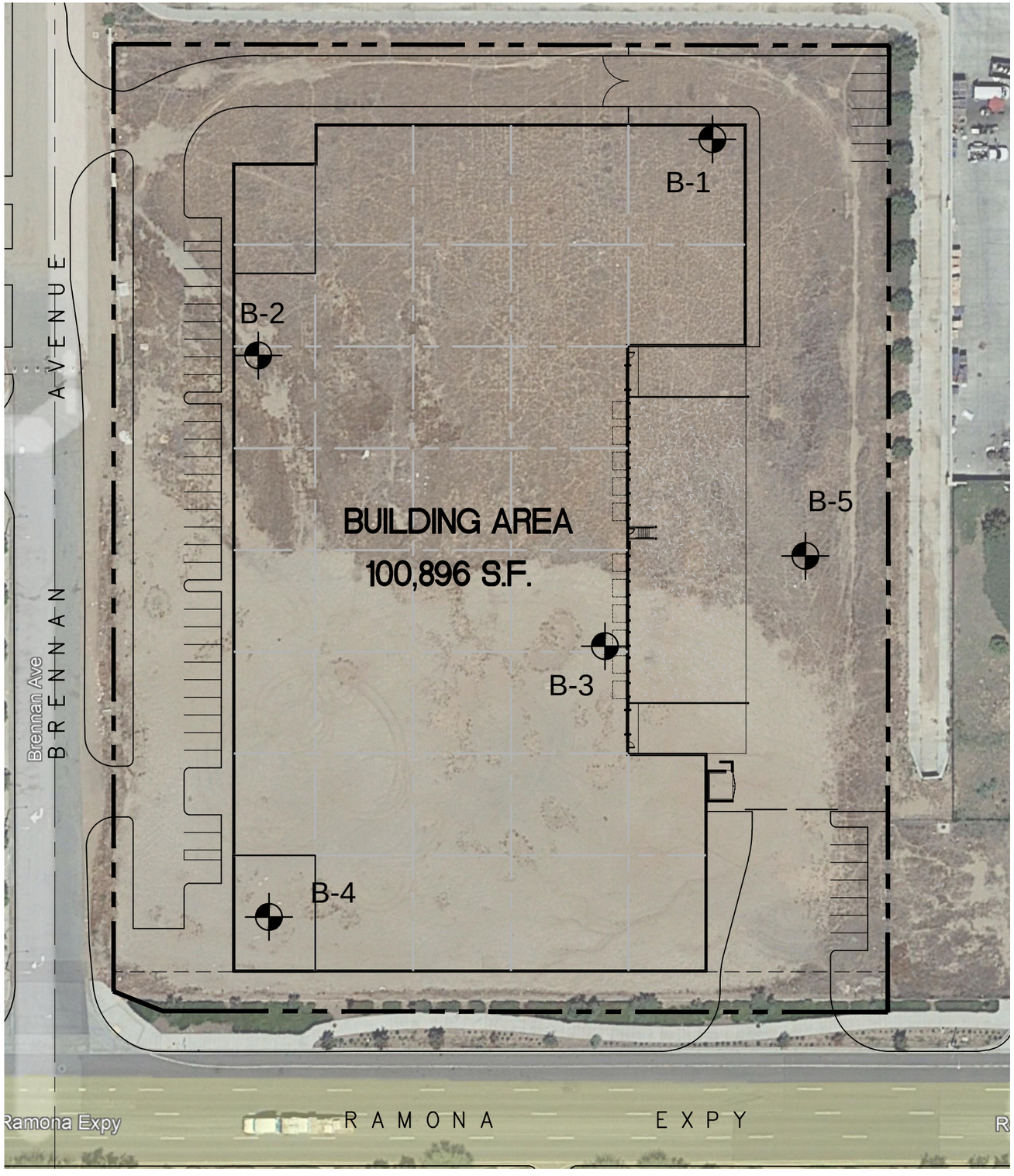
PROPOSED INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: PM CHKD: RGT	
SCG PROJECT 22G116-1	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

APPROXIMATE BORING LOCATION

NOTE: CONCEPTUAL SITE PLAN PREPARED BY HPA ARCHITECTS.
AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH.

BORING LOCATION PLAN

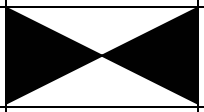
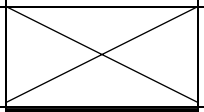
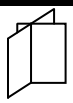
PROPOSED INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

SCALE: 1" = 60'	SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: PM CHKD: RGT	
SCG PROJECT 22G116-1	
PLATE 2	

APPENDIX B

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

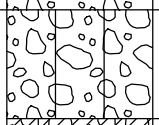
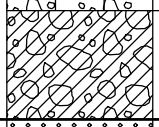
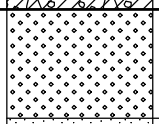
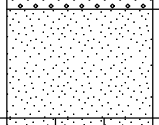
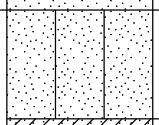
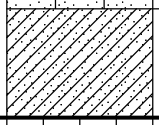
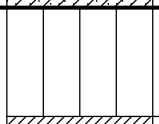
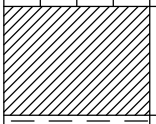
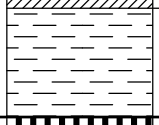
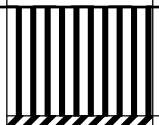
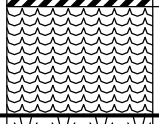
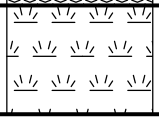
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	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
	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
				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

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 22G116-1
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

DRILLING DATE: 2/23/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 15 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		20			ALLUVIUM: Brown Silty fine to medium Sand, little to some Clay, some Calcareous nodules, medium dense-damp	114	6					EI = 23 @ 0-5'
		33			Brown Clayey fine to medium Sand, little Silt, slightly porous, some Calcareous nodules, medium dense to dense-damp to moist	119	9					
5		29				125	9					
		30				123	7					
		53				125	6					
10												
		39	4.5		Brown fine Sandy Clay, trace medium Sand, little Silt, hard-moist		9					
15												
		19			Gray Brown fine Sandy Silt, little Clay, medium dense-moist		9					
20												
		22			Gray Brown fine to medium Sand, little Silt, trace coarse Sand, medium dense-damp		4					
25					Boring Terminated at 25'							

TBL 22G116-1.GPJ SOCALGEO.GDT 3/30/22

TEST BORING LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 22G116-1
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

DRILLING DATE: 2/23/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 19 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		5			FILL: Dark Brown Silty fine to medium Sand, trace Clay, loose-moist		9					
		13			ALLUVIUM: Brown Silty fine to medium Sand, trace coarse Sand, trace Clay, medium dense-damp to moist		7					
5		24					7					
		67			Brown Clayey fine to medium Sand, trace to little Silt, trace Calcareous nodules, very dense-moist		8					
10												
		29	4.5		Dark Gray Brown fine to medium Sandy Clay, little Silt, trace Calcareous nodes, very stiff-damp		7					
15												
		15			Dark Brown Silty fine to medium Sand, trace Clay, some Calcareous nodules, medium dense-moist		8					
20					Boring Terminated at 20'							

TBL 22G116-1.GPJ SOCALGEO.GDT 3/30/22

TEST BORING LOG **PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 22G116-1
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

DRILLING DATE: 2/23/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 14 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		21			FILL: Light Brown fine Sandy Silt, trace medium to coarse Sand, trace to little Clay, medium dense-dry		2					
		20			ALLUVIUM: Brown fine to medium Sandy Silt, trace Calcareous veins, little Clay, medium dense-damp		4					
5		31	4.5		Brown fine to medium Sandy Clay, little Silt, trace Calcareous veining, very stiff to hard-damp		7					
		33	4.5				7					
10					Dark Brown fine Sandy Silt, some Clay, trace Calcareous veins, dense-moist							
		42					10					
15					Boring Terminated at 15'							

TBL 22G116-1.GPJ SOCALGEO.GDT 3/30/22

TEST BORING LOG

PLATE B-3

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 22G116-1
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

DRILLING DATE: 2/23/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 23 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		20			FILL: Light Gray Brown fine Sandy Silt, little Calcareous nodules, medium dense-dry	113	2					
		27			FILL: Brown Clayey fine Sand, trace medium Sand, little Silt, medium dense-damp	122	6					
5		33			ALLUVIUM: Light Brown fine Sandy Silt, trace medium Sand, trace Clay, trace fine Root Fibers, medium dense-dry	111	2					
		27			Brown Clayey fine to medium Sand, little Silt, medium dense-damp	122	5					
10		37			Brown Silty fine to medium Sand, some Clay, medium dense-damp	114	4					
		33			Brown fine Sandy Silt, little Clay, little medium Sand, medium dense to dense-moist to very moist		13					
15												
		17					10					
20												
		15					10					
25		23				111	8					
					Boring Terminated at 26'							

TBL 22G116-1.GPJ SOCALGEO.GDT 3/30/22

TEST BORING LOG

PLATE B-4

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 22G116-1
PROJECT: Proposed Industrial Building
LOCATION: Perris, California

DRILLING DATE: 2/23/22
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 19 feet
READING TAKEN: At Completion

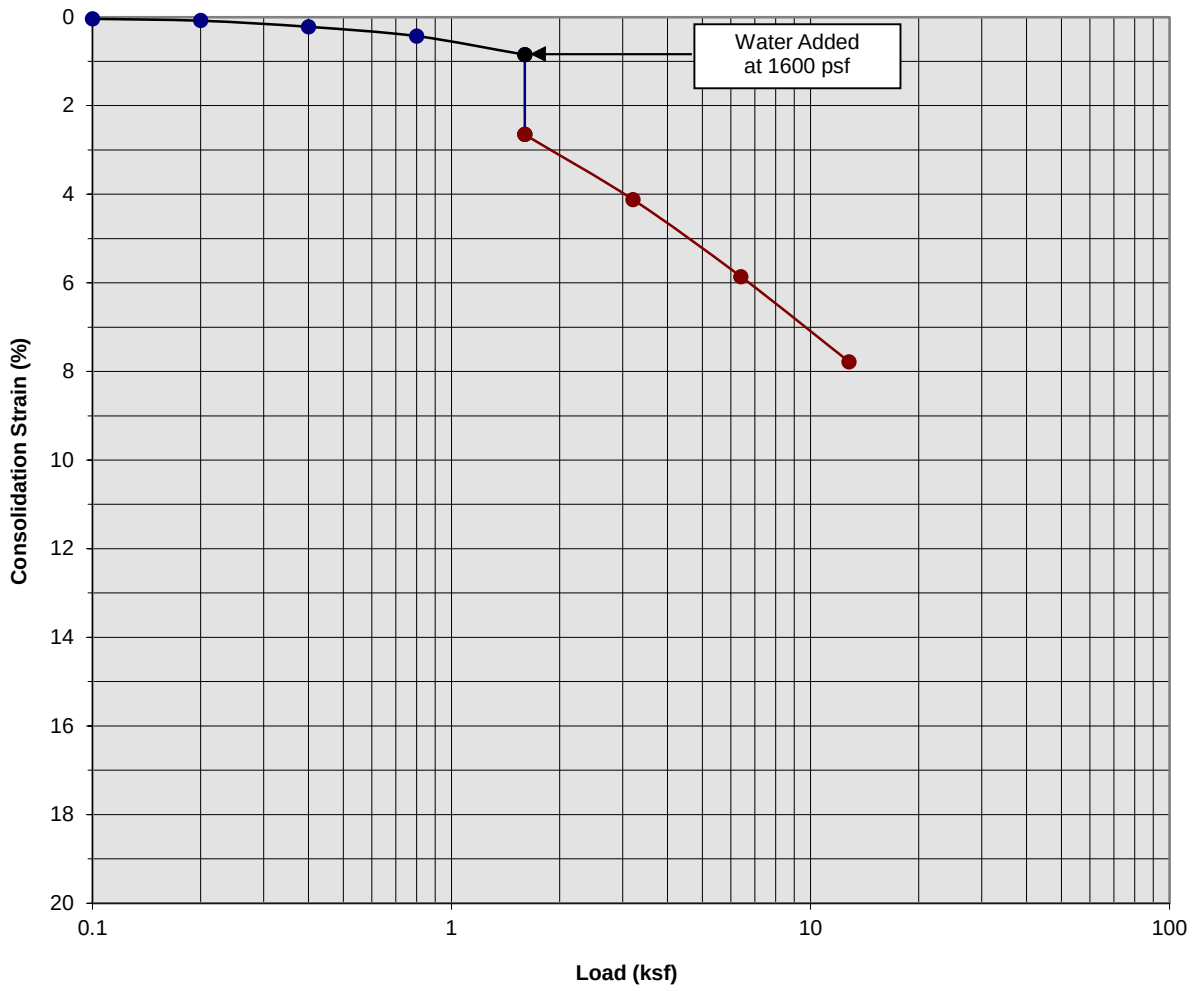
FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
		20			ALLUVIUM: Light Gray Brown Clayey fine to medium Sand, trace Silt, medium dense-damp		4					
		19	4.0		Light Brown fine Sandy Clay, trace medium Sand, very stiff to hard-damp		5					
5		20	4.5				6					
		32	4.5				8					
10												
		49	4.5				7					
15					Gray Brown fine Sandy Silt, trace to little Clay, some Calcareous nodules, medium dense-moist							
		18					12					
20		29				99	10					
					Boring Terminated at 21'							

TBL 22G116-1.GPJ SOCALGEO.GDT 3/30/22

TEST BORING LOG **PLATE B-5**

APPENDIX C

Consolidation/Collapse Test Results



Classification: FILL: Brown Clayey fine Sand, trace medium Sand, little Silt

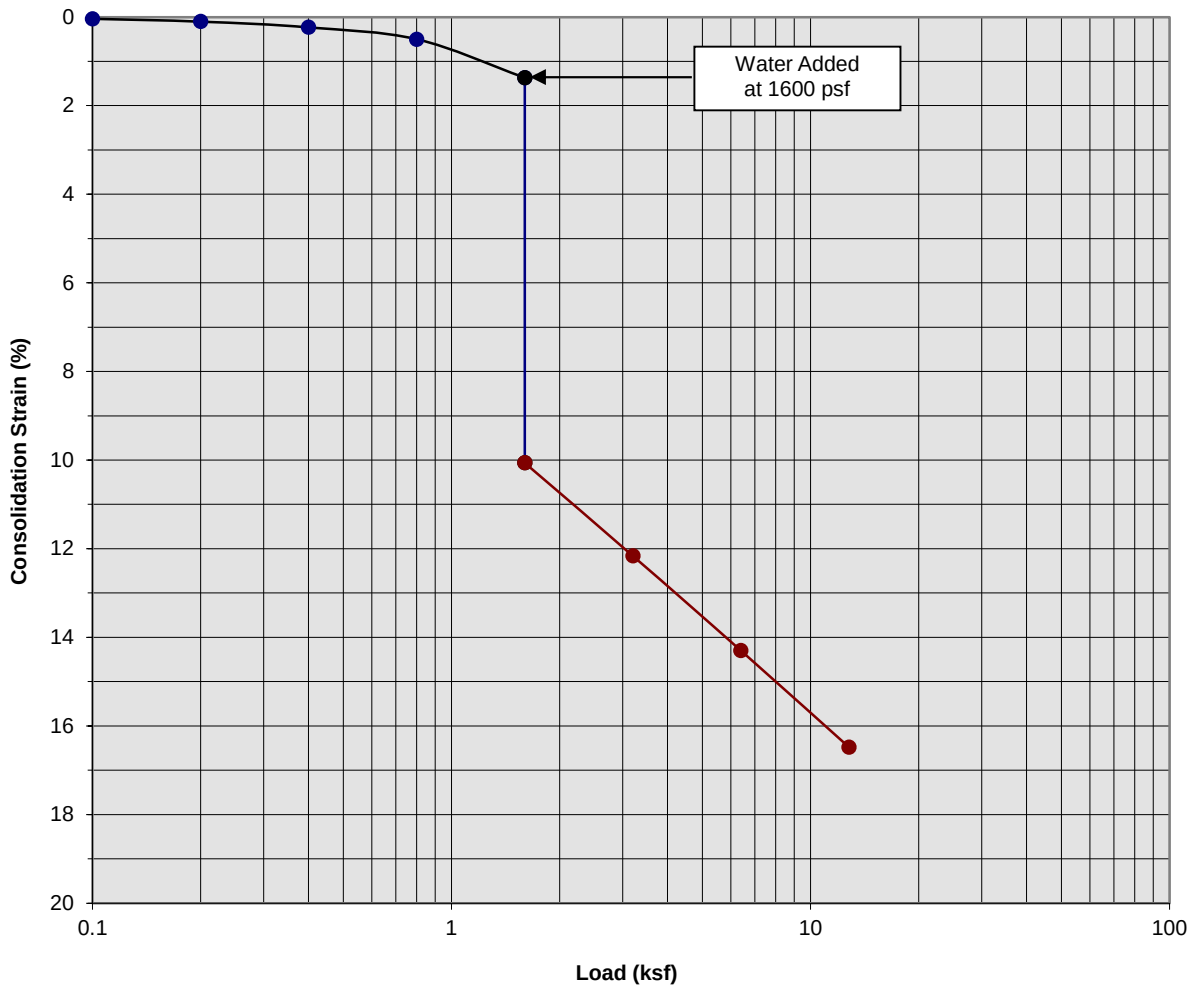
Boring Number:	B-4	Initial Moisture Content (%)	6
Sample Number:	---	Final Moisture Content (%)	13
Depth (ft)	3 to 4	Initial Dry Density (pcf)	122.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	132.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.80

Proposed Industrial Building
Perris, California
Project No. 22G116

PLATE C-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Light Brown fine Sandy Silt, trace medium Sand, trace Clay

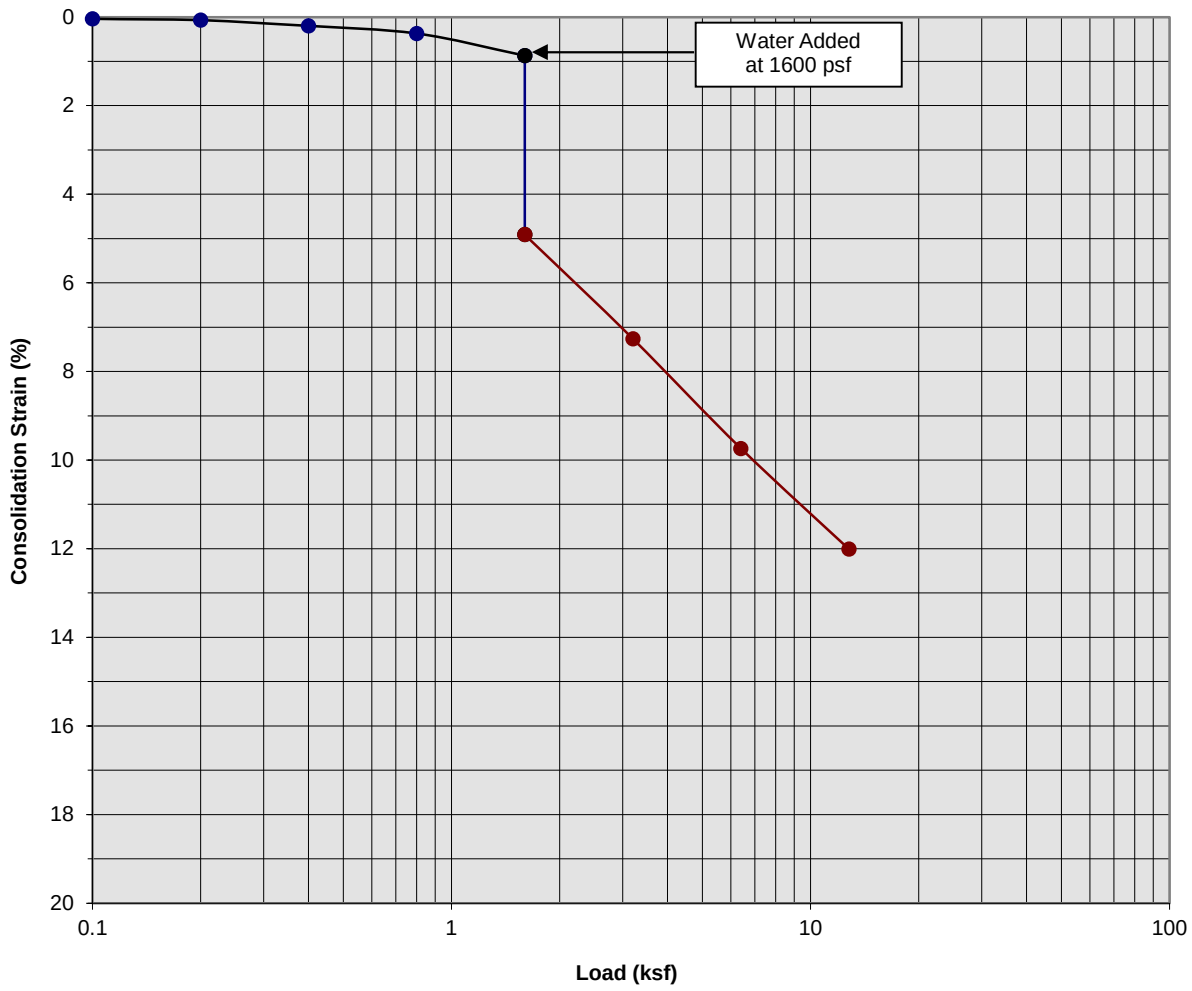
Boring Number:	B-4	Initial Moisture Content (%)	2
Sample Number:	---	Final Moisture Content (%)	13
Depth (ft)	5 to 6	Initial Dry Density (pcf)	111.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	132.2
Specimen Thickness (in)	1.0	Percent Collapse (%)	8.69

Proposed Industrial Building
Perris, California
Project No. 22G116

PLATE C-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Brown Clayey fine to medium Sand, little Silt

Boring Number:	B-4	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	13
Depth (ft)	7 to 8	Initial Dry Density (pcf)	122.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	138.4
Specimen Thickness (in)	1.0	Percent Collapse (%)	4.04

Proposed Industrial Building
Perris, California
Project No. 22G116

PLATE C-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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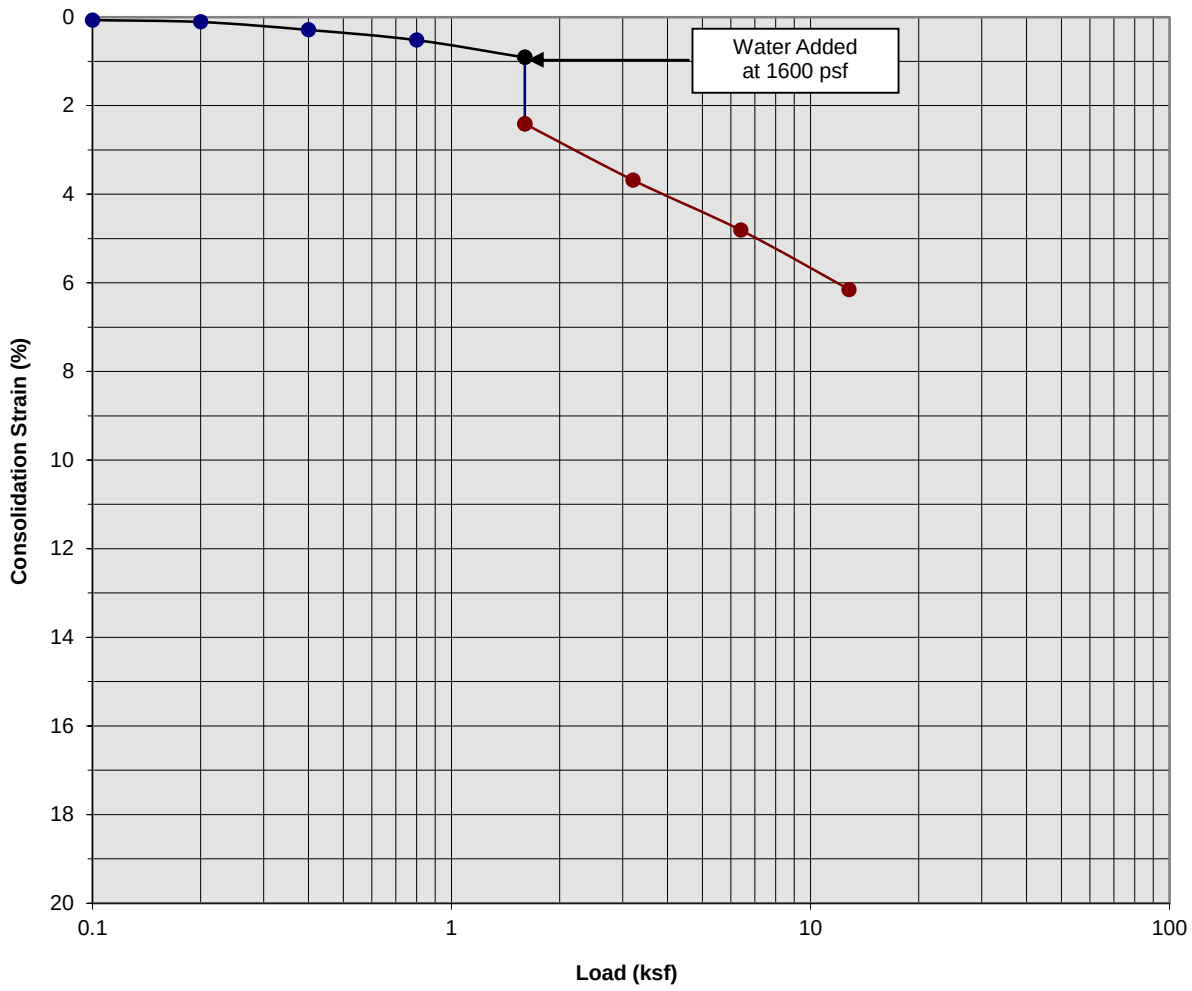
Consolidation/Collapse Test Results



Classification: Brown Silty fine to medium Sand, some Clay

Boring Number:	B-4	Initial Moisture Content (%)	4
Sample Number:	---	Final Moisture Content (%)	14
Depth (ft)	9 to 10	Initial Dry Density (pcf)	114.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	121.5
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.50

Proposed Industrial Building
Perris, California
Project No. 22G116
PLATE C-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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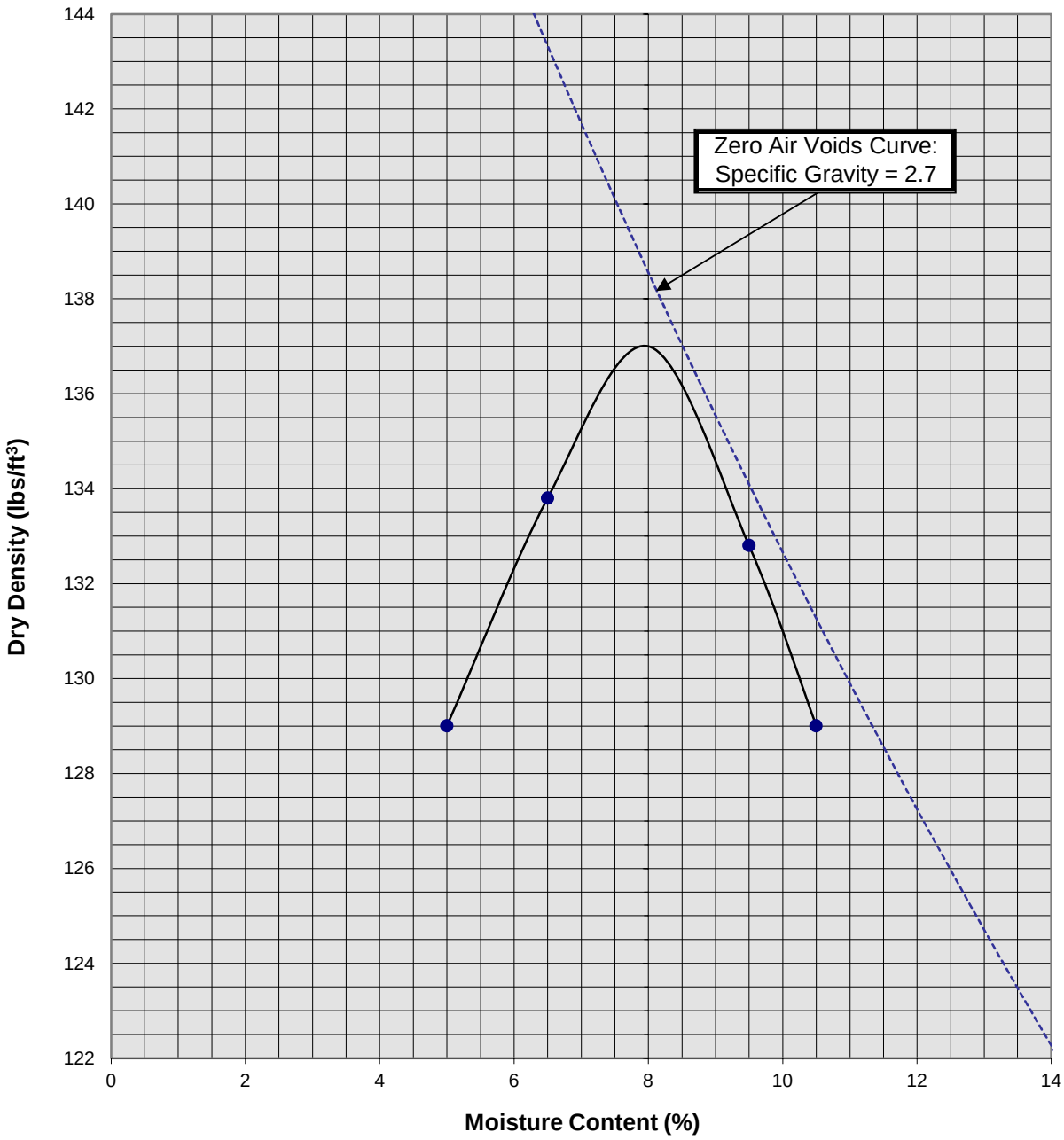
Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-1 @ 0-5'
Optimum Moisture (%)	8
Maximum Dry Density (pcf)	137
Soil Classification	Brown Silty fine to medium Sand, little to some Clay

Proposed Industrial Building
Perris, California
Project No. 21G116-1

PLATE C-5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
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APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

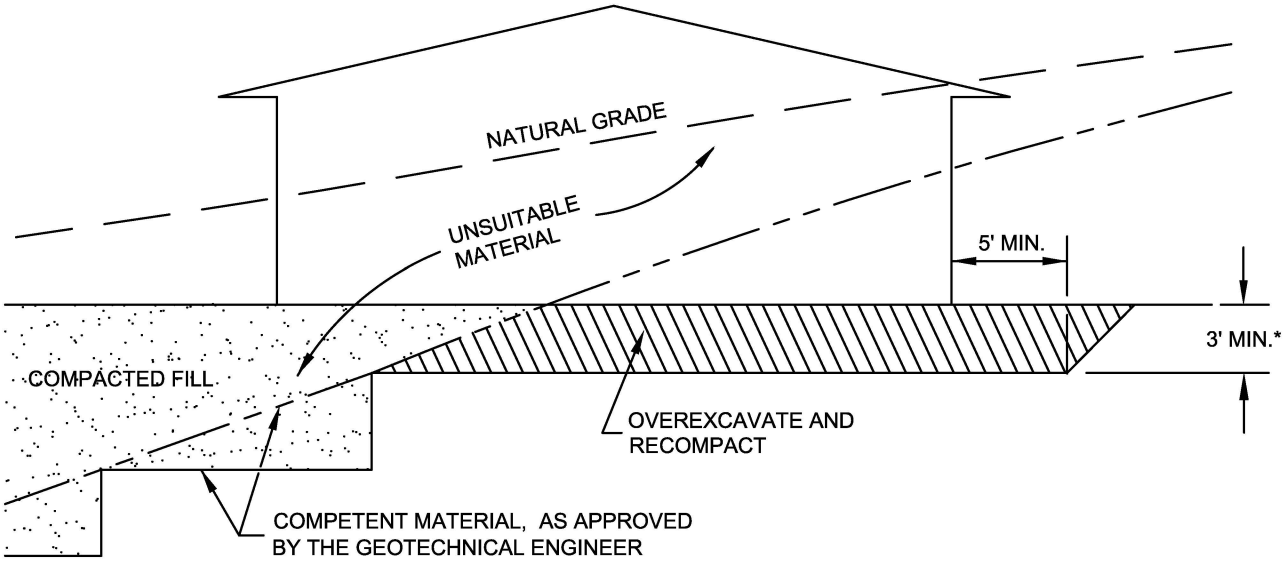
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

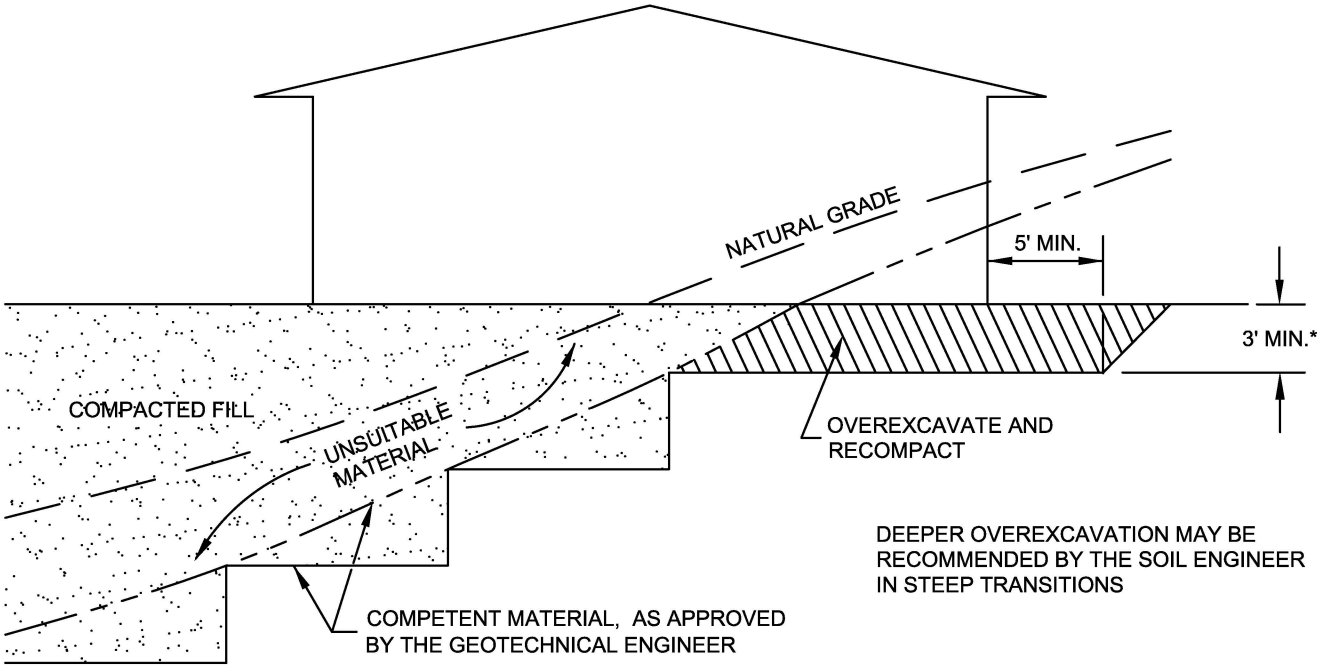
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

GRADING GUIDE SPECIFICATIONS

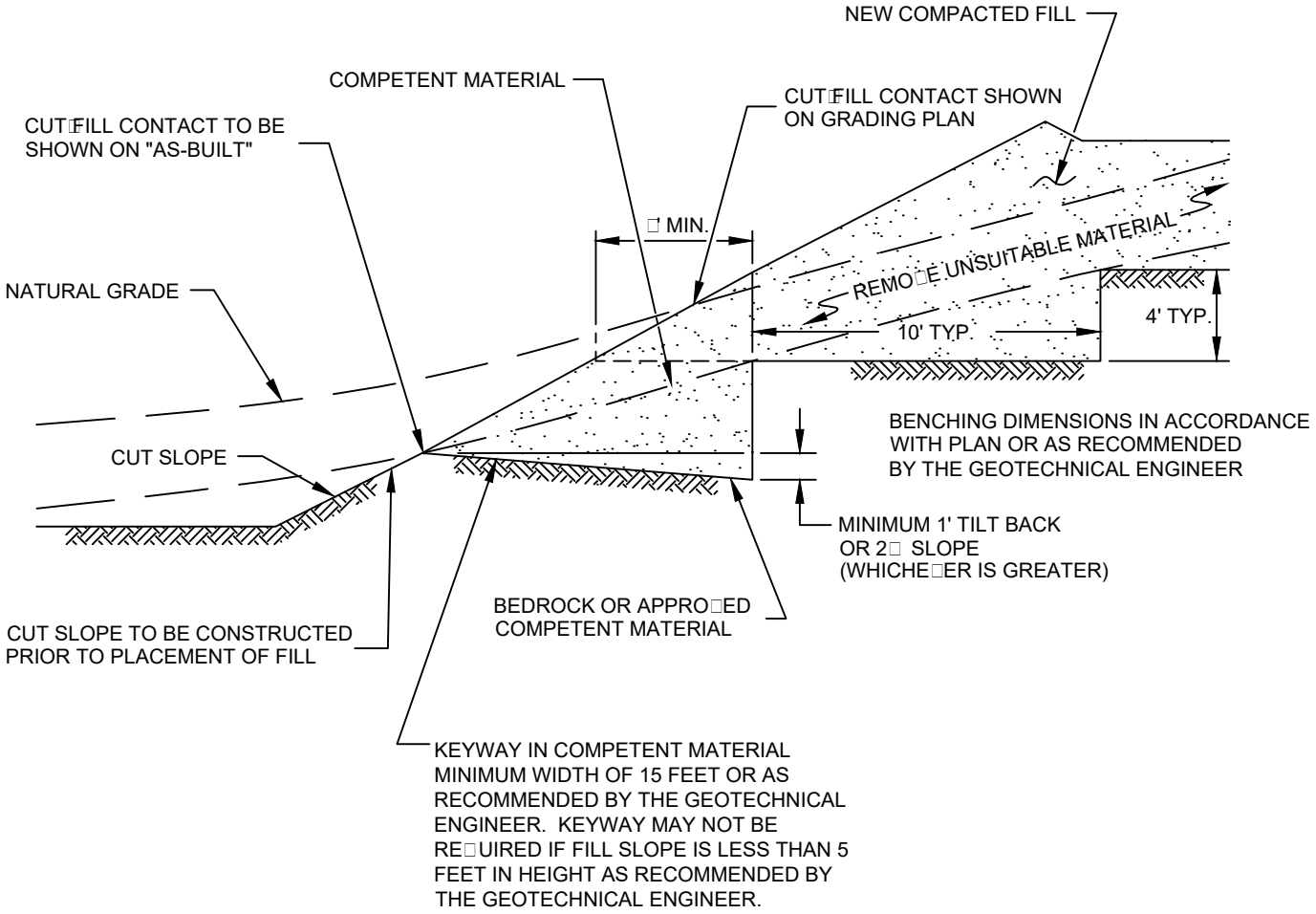
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

GRADING GUIDE SPECIFICATIONS

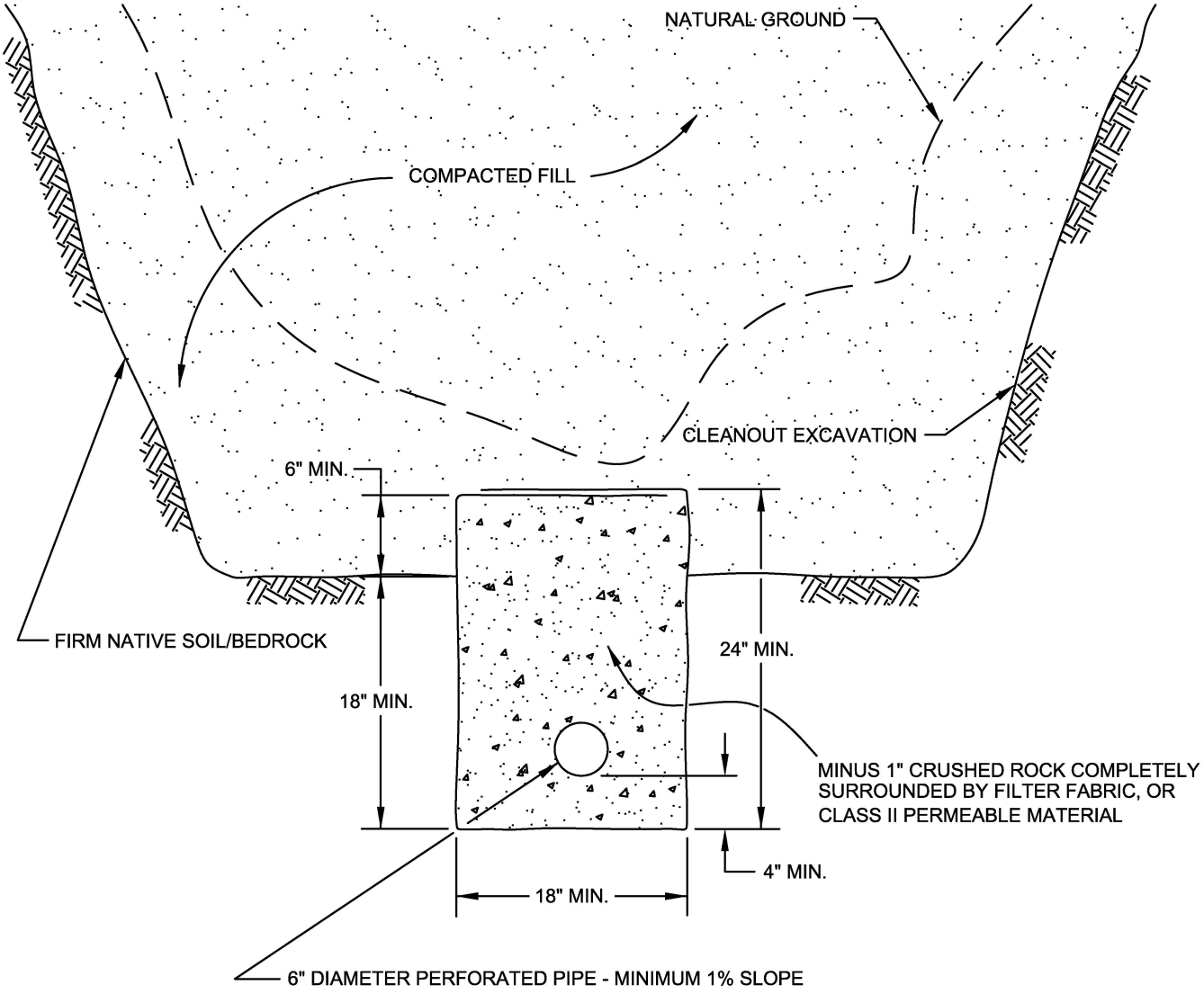
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL

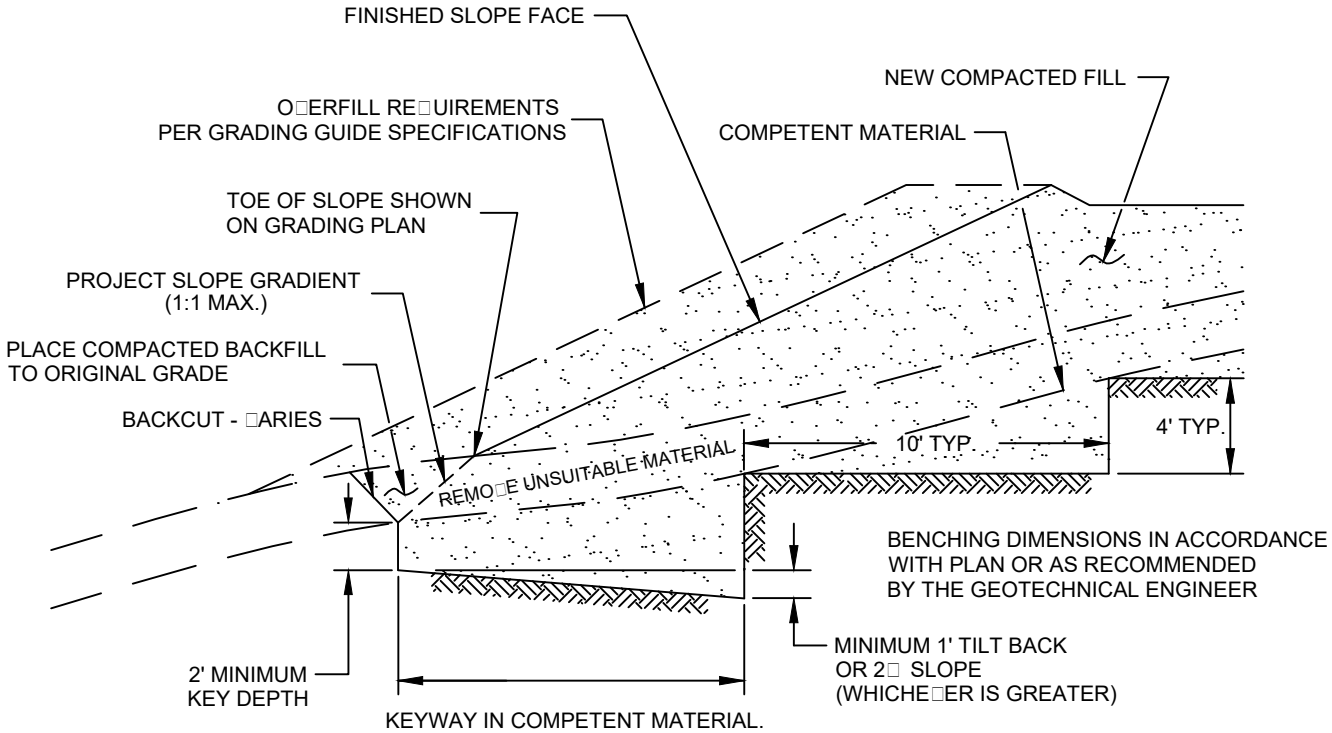
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE:
BENCHING SHALL BE RE□UIRED
WHEN NATURAL SLOPES ARE
E□UAL TO OR STEEPER THAN 5:1
OR WHEN RECOMMENDED BY
THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

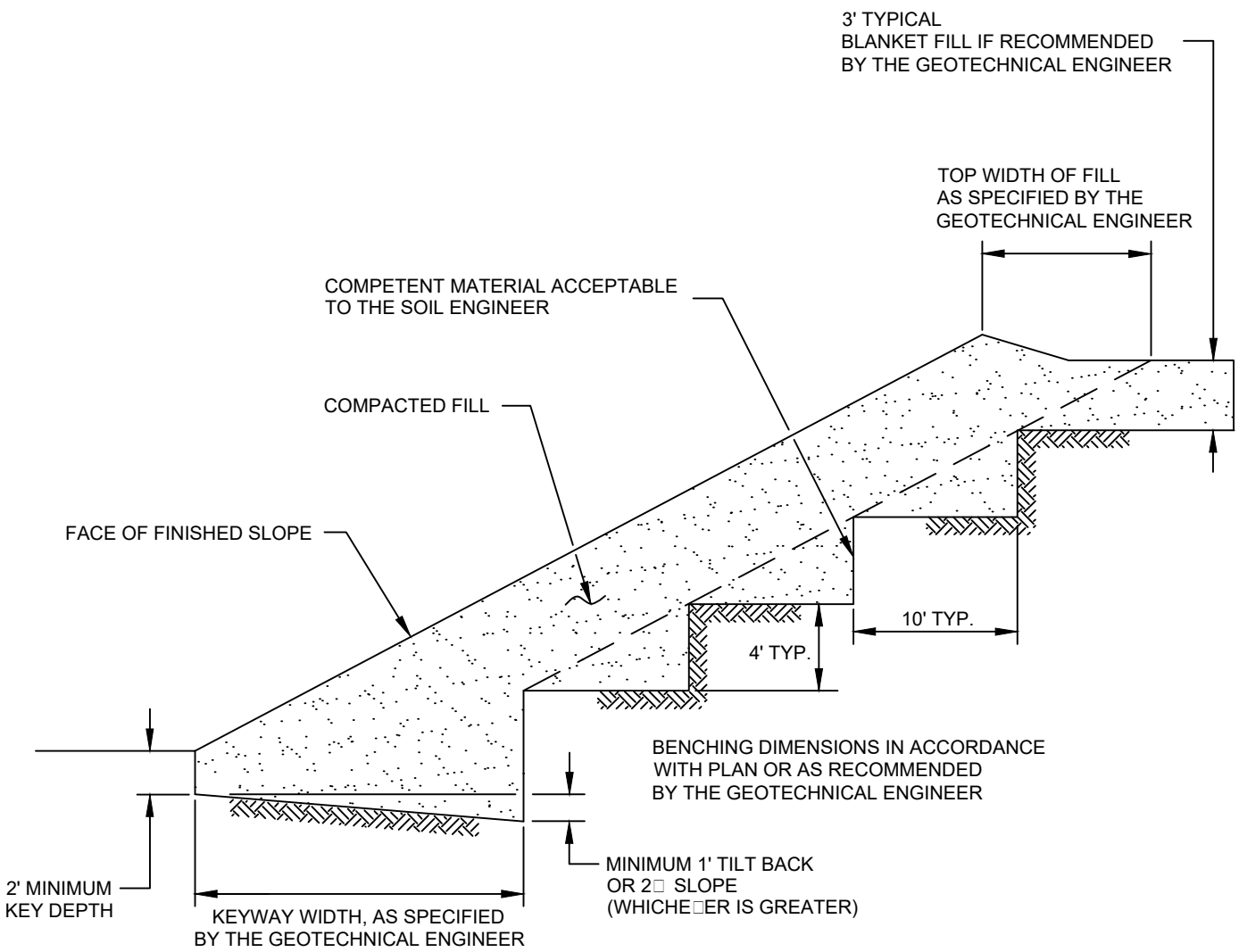
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



STABILIZATION FILL DETAIL

GRADING GUIDE SPECIFICATIONS

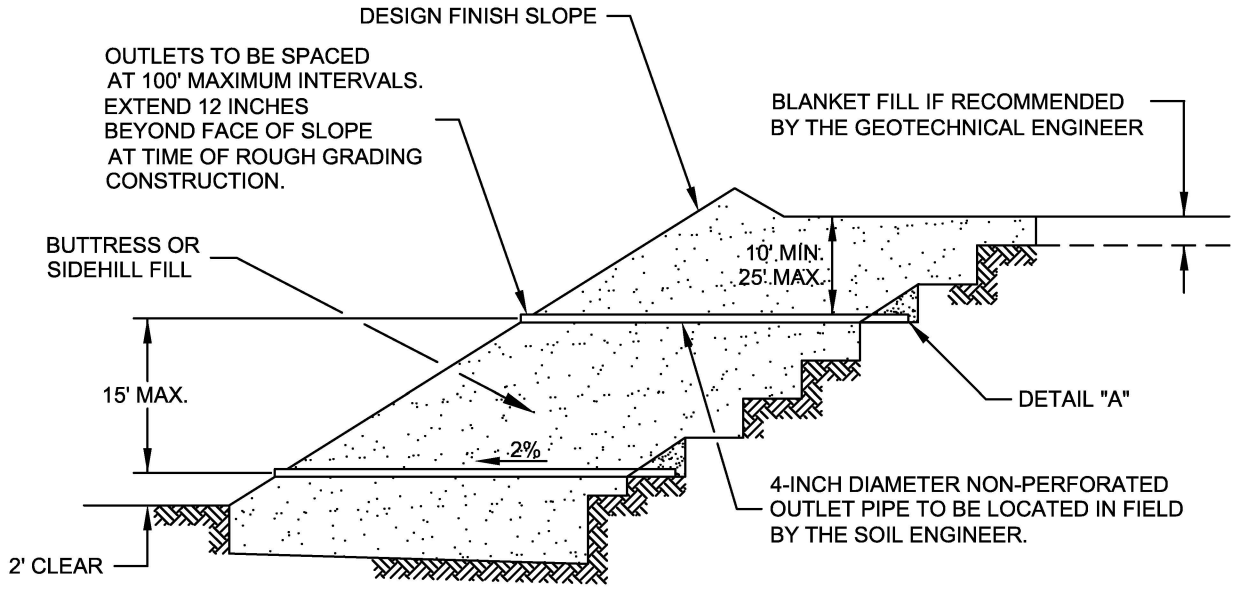
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



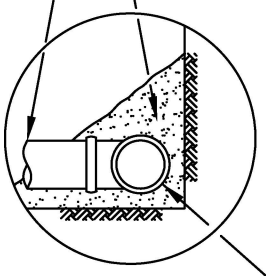
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

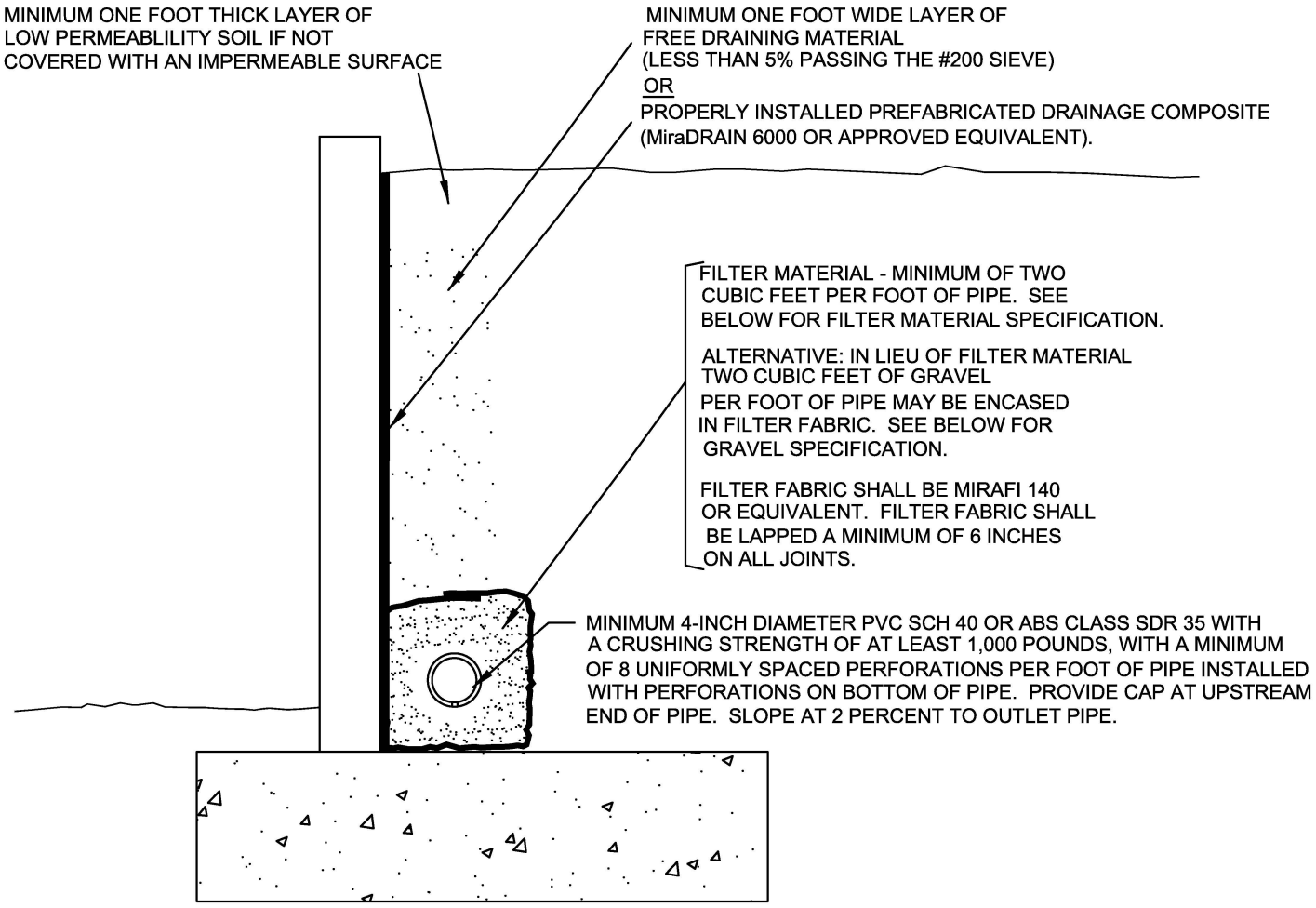
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

GRADING GUIDE SPECIFICATIONS

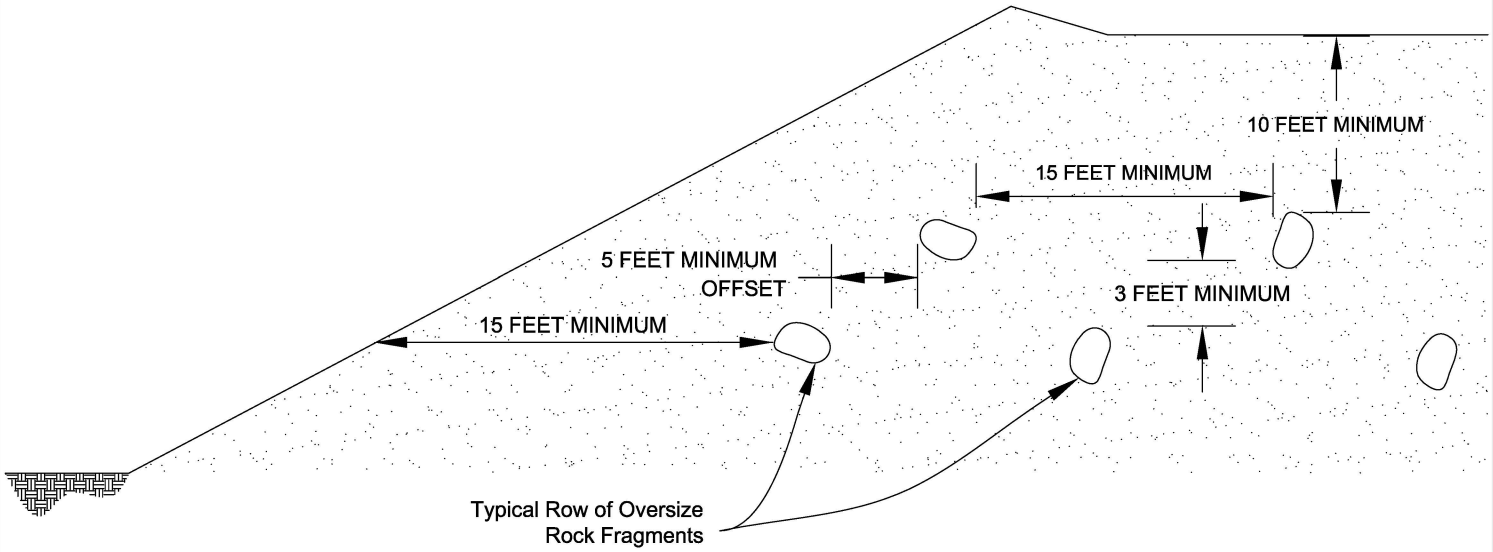
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

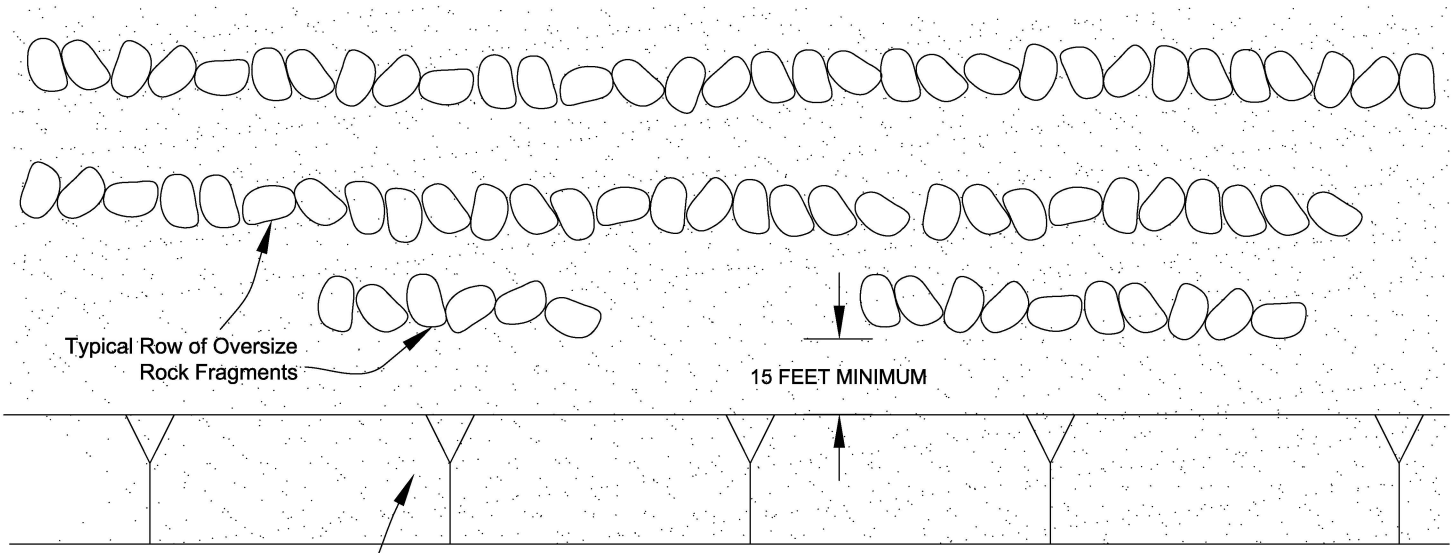
PLATE D-7

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

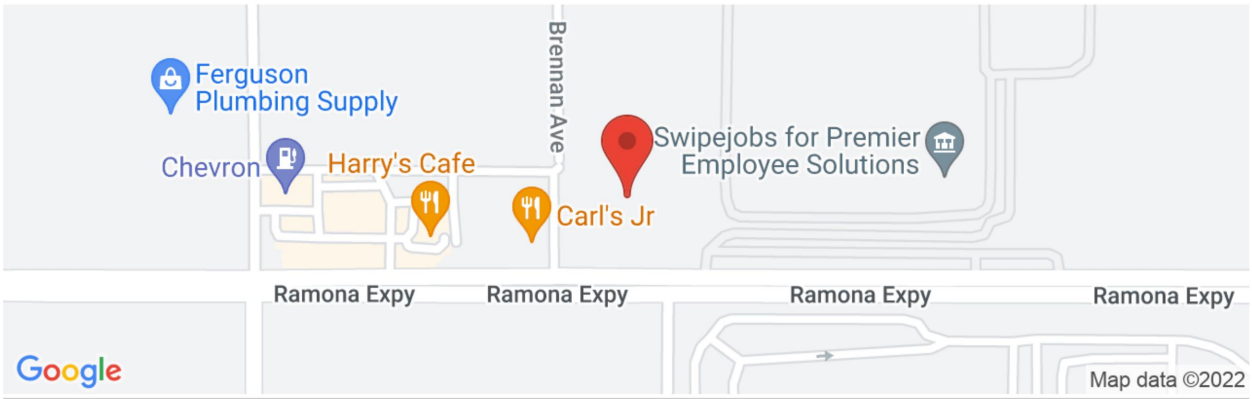
PLATE D-8

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX E

Latitude, Longitude: 33.84535217, -117.23975418



Date	3/8/2022, 5:18:07 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.5	MCE_R ground motion. (for 0.2 second period)
S_1	0.572	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.5	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.55	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.534	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.641	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.572	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.627	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.935	Mapped value of the risk coefficient at short periods
C_{R1}	0.912	Mapped value of the risk coefficient at a period of 1 s

SOURCE: SEAOC/OSHPD Seismic Design Maps Tool
<https://seismicmaps.org/>

SEISMIC DESIGN PARAMETERS - 2019 CBC
PROPOSED INDUSTRIAL BUILDING
PERRIS, CALIFORNIA

DRAWN: PM
CHKD: RGT
SCG PROJECT 22G116-1
PLATE E-1

SOUTHERN CALIFORNIA GEOTECHNICAL

Appendix 4: Historical Site Conditions

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

Not included.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A – Runoff from the project is directed to Canon Lake, which ultimately drains to Lake Elsinore. Based on the infiltration investigation from the geotechnical engineer, infiltration is not technically feasible for this project. A LID Biotreatment BMP (vegetated swale) and a proprietary Modular Wetland System (MWS) are proposed to address the treat runoff from the site and address the storm water quality management plan requirements.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	SDH & Associates, Inc.	Date	11/8/2022
Designed by	NM	Case No	P22-00021
Company Project Number/Name	2202 Westport-Perris		

BMP Identification

BMP NAME / ID: MWS / BMP 1A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.62 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA 1A-1	8,130	Ornamental Landscaping	0.1	0.11	898			
DMA 1A-2	51,728	Concrete or Asphalt	1	0.89	46141.4			
DMA 1A-3	46,327	Roofs	1	0.89	41323.7			
	106185	Total			88363.1	0.62	4565.4	N/A

Notes:

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: SDH & Associates, Inc. — Date: 11/8/2022

Designed by: NM — Case No: P22-00021

Company Project Number/Name: 2202 Westport-Perris

BMP Identification

BMP NAME / ID: MWS / BMP 1A

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)*
DMA 1A-1	*8,130*	*Ornamental Landscaping*	*0.1*	*0.11*	*898*			
DMA 1A-2	*51,728*	*Concrete or Asphalt*	*1*	*0.892*	*46141.4*			
DMA 1A-3	*46,327*	*Roofs*	*1*	*0.892*	*41323.7*			
	106185	***Total***			88363.1	0.20	*0.4*	*0.406*

DMAs

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	SDH & Associates, Inc.	Date	11/8/2022
Designed by	NM	Case No	P22-00021
Company Project Number/Name	2202 Westport-Perris		

BMP Identification

BMP NAME / ID: Biotreatment (Vegetated Swale) / BMP 1B

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.62 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1B-1	*15,934*	*Ornamental Landscaping*	*0.1*	*0.11*	*1760*			
DMA 1B-2	*22,124*	*Concrete or Asphalt*	*1*	*0.89*	*19734.6*			
DMA 1B-3	*51,019*	*Roofs*	*1*	*0.89*	*45508.9*			
	89077	***Total***			**67003.5**	**0.62**	***3461.8***	***3572***

Notes:

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

Company Name:	SDH & Associates, Inc.	Date:	11/8/2022
Designed by:	NM	County/City Case No.:	P21-00021

Design Volume

Enter the area tributary to this feature	A_T=	2.04	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	3,462	ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	1.8	ft
Top Width of Bioretention Facility, excluding curb	w_T =	12.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.37	ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	2,534	ft^2
Proposed Surface Area	A=	2,796	ft^2

Bioretention Facility Properties

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

Notes: The actual provided volume as designed is approximately 3,572 C.F.
The aboveground portion provides approximately 2,039 C.F.; amended soil section provides approximately 1,468 C.F.; and the aggregate section provides approximately 65 C.F. -> 2,039+1,468+65=3,572 C.F.

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: SDH & Associates, Inc.
Date: 11/8/2022
Designed by: NM
Case No: P22-00021
Company Project Number/Name: 2202 Westport-Perris

BMP Identification

BMP NAME / ID: Biotreatment (Vegetated Swale) / BMP 1B

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)*
DMAs	*DMA 1B-1*	*15,934*	*Ornamental Landscaping*	*0.1*	*0.11*	*1760*			
	DMA 1B-2	*22,124*	*Concrete or Asphalt*	*1*	*0.892*	*19734.6*			
	DMA 1B-3	*51,019*	*Roofs*	*1*	*0.892*	*45508.9*			
		89077	***Total***			**67003.5**	**0.20**	***0.3***	***0.3***

Notes:

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Nov 7 2022

Proposed Vegetated Swale - DMA 1B (Node 135 to Node 140)

Trapezoidal

Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 1.25
Invert Elev (ft)	= 67.00
Slope (%)	= 0.60
N-Value	= 0.250

Calculations

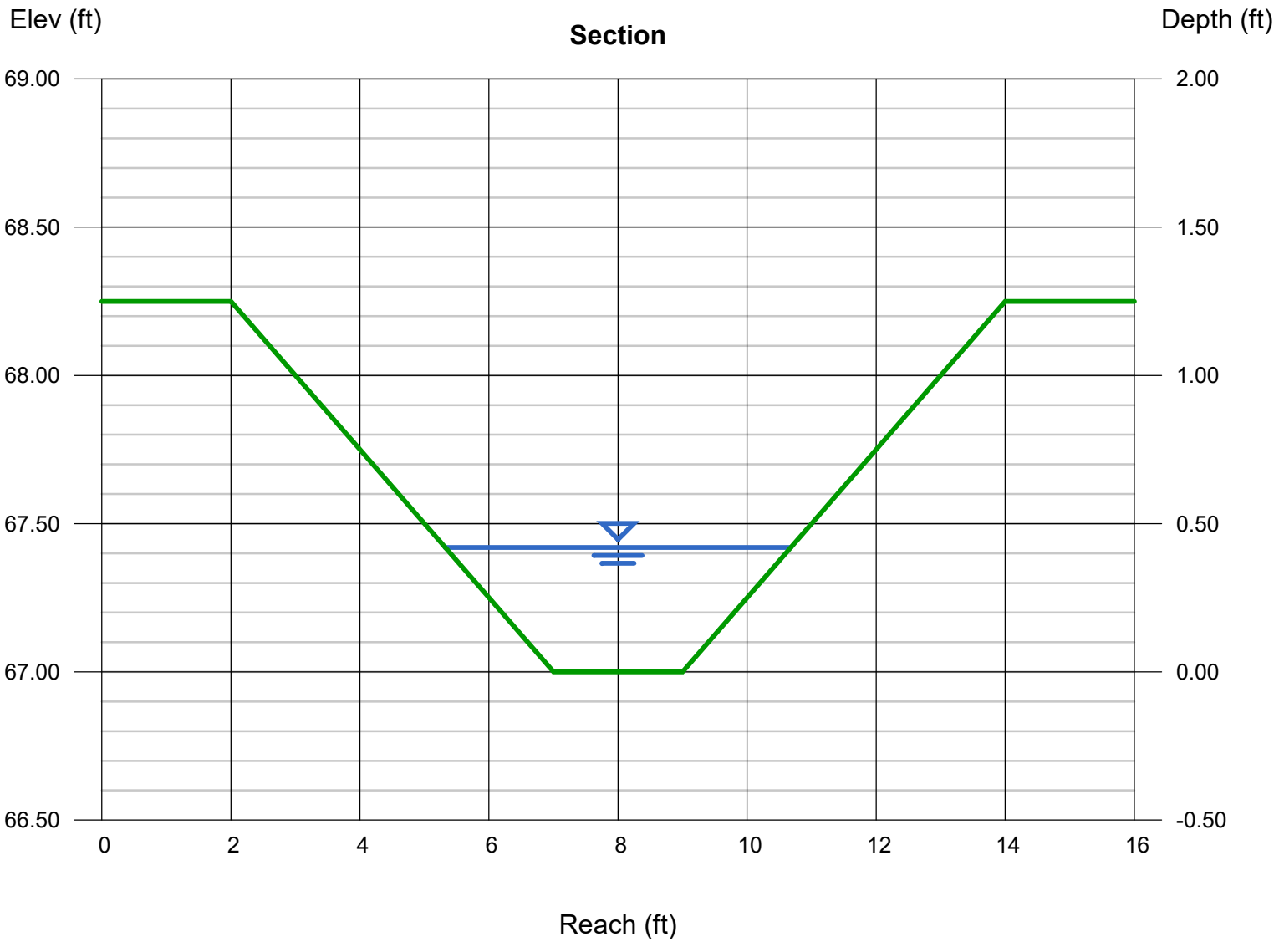
Compute by:	Known Q
Known Q (cfs)	= 0.30

w/ Water Quality Flow Rate of ~0.3 cfs.

Highlighted

Depth (ft)	= 0.42
Q (cfs)	= 0.300
Area (sqft)	= 1.55
Velocity (ft/s)	= 0.19
Wetted Perim (ft)	= 5.46
Crit Depth, Yc (ft)	= 0.09
Top Width (ft)	= 5.36
EGL (ft)	= 0.42

To meet a 10-minute residence time, the proposed vegetated swale would need to be a minimum of 108', based on L=(0.19 ft/sec)*(10 min)*(60 sec/min)=114'. The proposed swale will have approximately 233 feet. Therefore, OK.



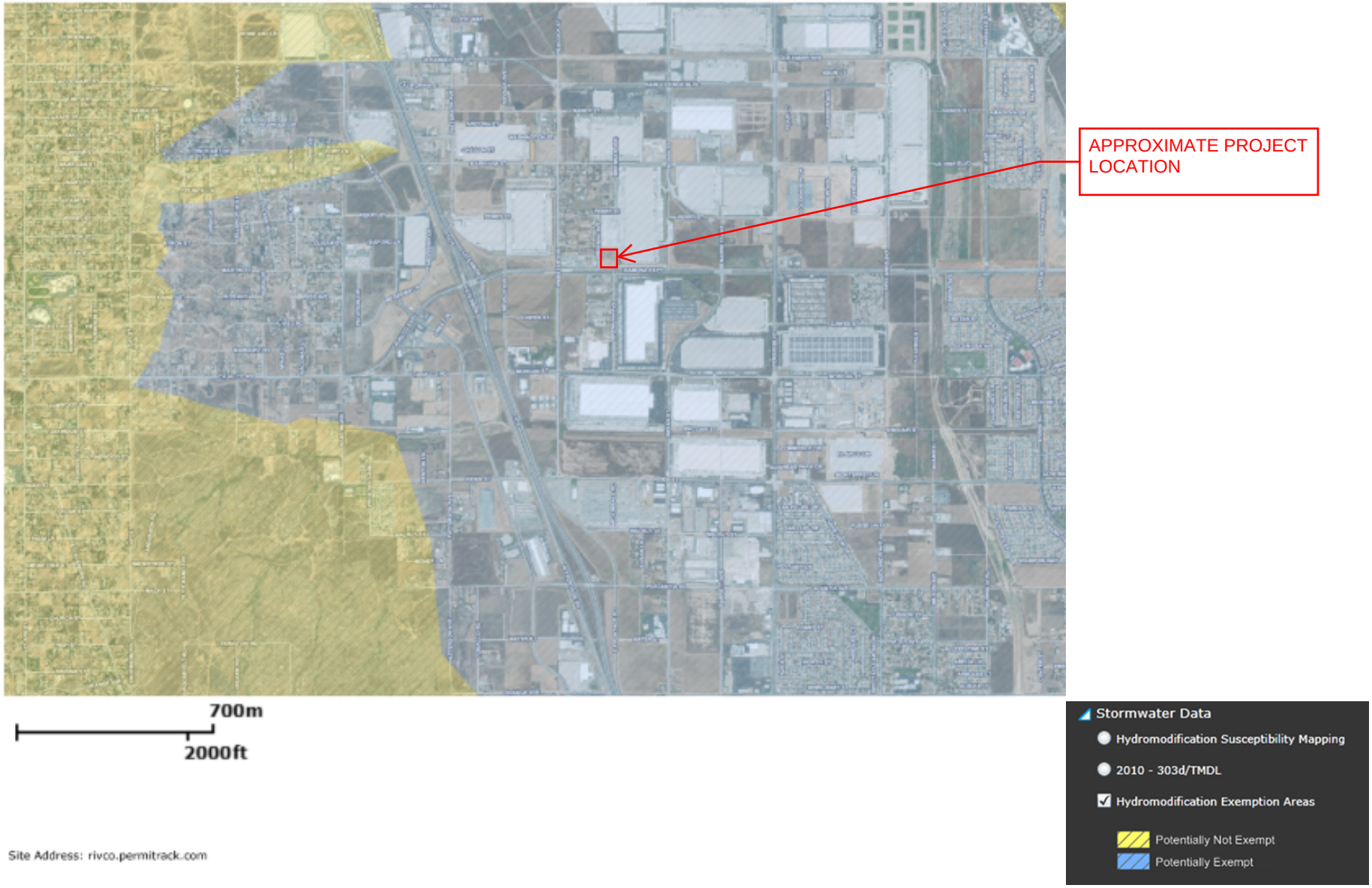
Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Note: The project is within the Riverside County WAP HCOC Exemption area approved on April 20, 2017. Therefore, the project is exempt from the HCOC requirements.

SCREEN CAPTURE - RIVERSIDE COUTY STORM WATER & WATER CONSERVATION TRACKING TOOL

HCOC EXEMPTION AREAS



NOTE: THE PROJECT IS WITHIN THE RIVERSIDE COUNTY WAP HCOC EXEMPTION AREA APPROVED ON APRIL 20, 2017. THEREFORE, THE PROJECT SHOULD BE EXEMPT FROM THE HCOC REQUIREMENTS.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Note: The Source Control checklist will be prepared during final engineering (construction document) stage at the time of the final WQMP.

Appendix 9: O&M

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

Note: The O&M Plan will be prepared during final engineering (construction document) stage at the time of the final WQMP.

Appendix 10: Educational Materials

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

Note: Copies of the proposed BMP reference materials (sizing table, etc.) are included for reference purpose. The following reference materials are anticipated to be included in this Appendix during final engineering stage at the time of the final WQMP.

- **SAMPLE – Employee Training Certification Log**
- **Riverside County Pamphlets**
- **BMP – TC-30 – Vegetated Swale – Maintenance Information**
- **BMP – Modular Wetland System**
- **SC-10 – Non-Stormwater Discharges**
- **SC-11 – Spill Prevention, Control & Cleanup**
- **SC-21 – Vehicle and Equipment Cleaning (Maintenance)**
- **SC-30 – Outdoor Loading/Unloading**
- **SC-34 – Waste Handling and Disposal**
- **SC-41 – Building & Grounds Maintenance**
- **SC-43 – Parking/Storage Area Maintenance**
- **SC-60 – Housekeeping Practices**
- **SC-73 – Landscape Maintenance**
- **SC-74 – Drainage System Maintenance**
- **SD-10 – Site Design and Landscape Planning**
- **SD-11 – Roof Runoff Controls**
- **SD-12 – Efficient Irrigation**
- **SD-13 – Storm Drain Signage**
- **SD-31 – Maintenance Bays & Docks**
- **SD-32 – Trash Storage Areas**

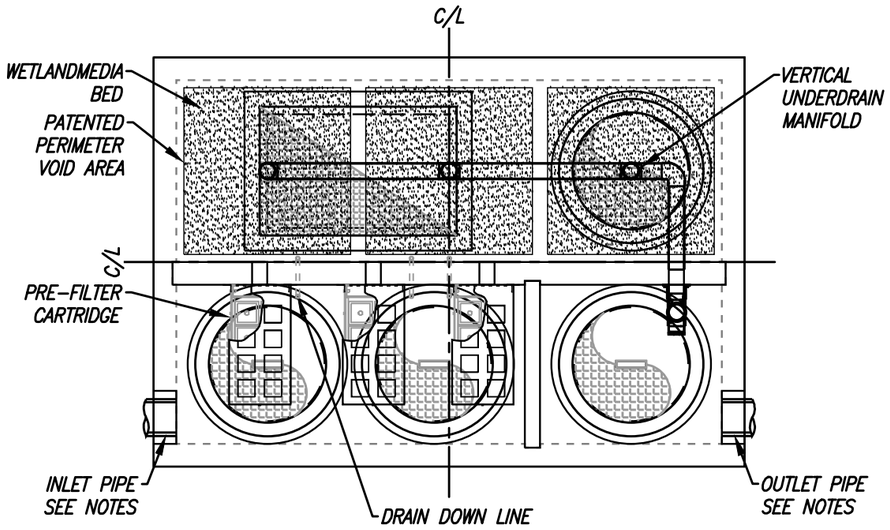
MWS Linear 2.0 HGL Sizing Calculations

MWS MODEL SIZE	WETLAND PERMITER LENGTH	LOADING RATE GPM/SF	HGL HEIGHT																												
			SHALLOW MODELS																			STANDARD HEIGHT MODEL	HIGH CAPACITY MODELS									
			1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.65	3.70	3.75	3.80	3.85	3.90	3.95
MWS-L-4-4	6.70	1.0	0.022	0.023	0.025	0.026	0.028	0.029	0.031	0.032	0.034	0.035	0.037	0.038	0.040	0.042	0.043	0.045	0.046	0.048	0.049	0.051	**0.052**	0.054	0.055	0.056	0.057	0.058	0.058	0.059	0.060	0.061
MWS-L-3-6	10.06	1.0	0.032	0.035	0.037	0.039	0.042	0.044	0.046	0.048	0.051	0.053	0.055	0.058	0.060	0.062	0.065	0.067	0.069	0.072	0.074	0.076	**0.078**	0.081	0.083	0.084	0.085	0.087	0.088	0.089	0.090	0.091
MWS-L-4-6	9.30	1.0	0.030	0.032	0.034	0.036	0.038	0.041	0.043	0.045	0.047	0.049	0.051	0.053	0.055	0.058	0.060	0.062	0.064	0.066	0.068	0.070	**0.073**	0.075	0.077	0.078	0.079	0.080	0.081	0.082	0.083	0.084
MWS-L-4-8	14.80	1.0	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.071	0.075	0.078	0.082	0.085	0.088	0.092	0.095	0.099	0.102	0.105	0.109	0.112	**0.115**	0.119	0.122	0.124	0.126	0.127	0.129	0.131	0.132	0.134
MWS-L-4-13	18.40	1.0	0.059	0.063	0.068	0.072	0.076	0.080	0.084	0.089	0.093	0.097	0.101	0.106	0.110	0.114	0.118	0.122	0.127	0.131	0.135	0.139	**0.144**	0.148	0.152	0.154	0.156	0.158	0.160	0.163	0.165	0.167
MWS-L-4-15	22.40	1.0	0.072	0.077	0.082	0.087	0.093	0.098	0.103	0.108	0.113	0.118	0.123	0.129	0.134	0.139	0.144	0.149	0.154	0.159	0.165	0.170	**0.175**	0.180	0.185	0.188	0.190	0.193	0.195	0.198	0.200	0.203
MWS-L-4-17	26.40	1.0	0.085	0.091	0.097	0.103	0.109	0.115	0.121	0.127	0.133	0.139	0.145	0.151	0.158	0.164	0.170	0.176	0.182	0.188	0.194	0.200	**0.206**	0.212	0.218	0.221	0.224	0.227	0.230	0.233	0.236	0.239
MWS-L-4-19	30.40	1.0	0.098	0.105	0.112	0.119	0.126	0.133	0.140	0.147	0.153	0.160	0.167	0.174	0.181	0.188	0.195	0.202	0.209	0.216	0.223	0.230	**0.237**	0.244	0.251	0.255	0.258	0.262	0.265	0.269	0.272	0.276
MWS-L-4-21	34.40	1.0	0.111	0.118	0.126	0.134	0.142	0.150	0.158	0.166	0.174	0.182	0.189	0.197	0.205	0.213	0.221	0.229	0.237	0.245	0.253	0.261	**0.268**	0.276	0.284	0.288	0.292	0.296	0.300	0.304	0.308	0.312
MWS-L-6-8	18.80	1.0	0.060	0.065	0.069	0.073	0.078	0.082	0.086	0.091	0.095	0.099	0.104	0.108	0.112	0.116	0.121	0.125	0.129	0.134	0.138	0.142	**0.147**	0.151	0.155	0.157	0.160	0.162	0.164	0.166	0.168	0.170
MWS-L-8-8	29.60	1.0	0.095	0.102	0.109	0.115	0.122	0.129	0.136	0.143	0.149	0.156	0.163	0.170	0.177	0.183	0.190	0.197	0.204	0.211	0.217	0.224	**0.231**	0.238	0.245	0.248	0.251	0.255	0.258	0.262	0.265	0.268
MWS-L-8-12	44.40	1.0	0.143	0.153	0.163	0.173	0.183	0.194	0.204	0.214	0.224	0.234	0.245	0.255	0.265	0.275	0.285	0.296	0.306	0.316	0.326	0.336	**0.346**	0.357	0.367	0.372	0.377	0.382	0.387	0.392	0.397	0.402
MWS-L-8-16	59.20	1.0	0.190	0.204	0.217	0.231	0.245	0.258	0.272	0.285	0.299	0.312	0.326	0.340	0.353	0.367	0.380	0.394	0.408	0.421	0.435	0.448	**0.462**	0.476	0.489	0.496	0.503	0.509	0.516	0.523	0.530	0.537
MWS-L-8-20	74.00	1.0	0.238	0.255	0.272	0.289	0.306	0.323	0.340	0.357	0.374	0.391	0.408	0.425	0.442	0.459	0.476	0.493	0.509	0.526	0.543	0.560	**0.577**	0.594	0.611	0.620	0.628	0.637	0.645	0.654	0.662	0.671
MWS-L-10-20 or MWS-L-8-24	88.80	1.0	0.285	0.306	0.326	0.346	0.367	0.387	0.408	0.428	0.448	0.469	0.489	0.509	0.530	0.550	0.571	0.591	0.611	0.632	0.652	0.673	**0.693**	0.713	0.734	0.744	0.754	0.764	0.774	0.785	0.795	0.805
4'x'4 media cage	14.80	1.0	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.071	0.075	0.078	0.082	0.085	0.088	0.092	0.095	0.099	0.102	0.105	0.109	0.112	**0.115**	0.119	0.122	0.124						

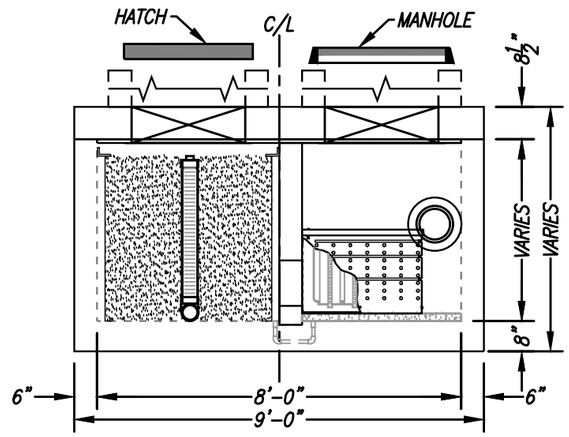
Q=0.406 CFS TO BE PROVIDED AT 4.0' CAPACITY MODEL.

SITE SPECIFIC DATA			
PROJECT NUMBER		732122 - 010	
PROJECT NAME		WESTPORT - PERRIS	
PROJECT LOCATION		PERRIS, CA	
STRUCTURE ID		BMP 1A	
TREATMENT REQUIRED			
FLOW BASED (CFS)			
0.406			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	63.01	HDPE	8"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	59.61	HDPE	8"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	68.6		
SURFACE LOAD	DIRECT TRAFFIC		
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



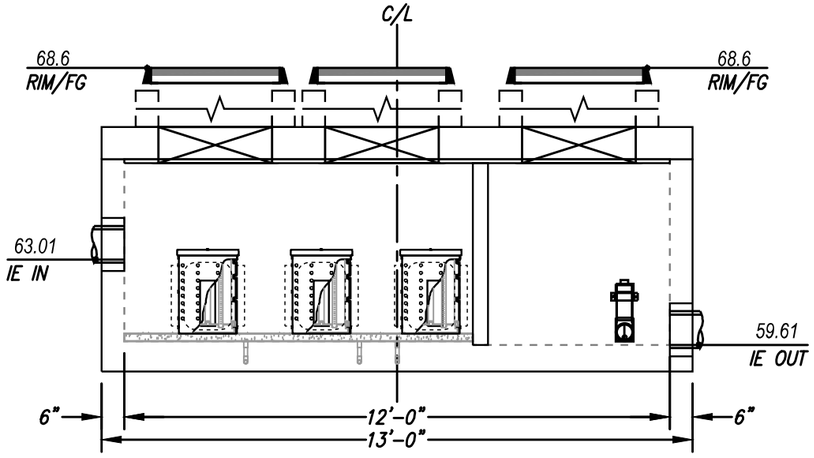
LEFT END VIEW

INSTALLATION NOTES

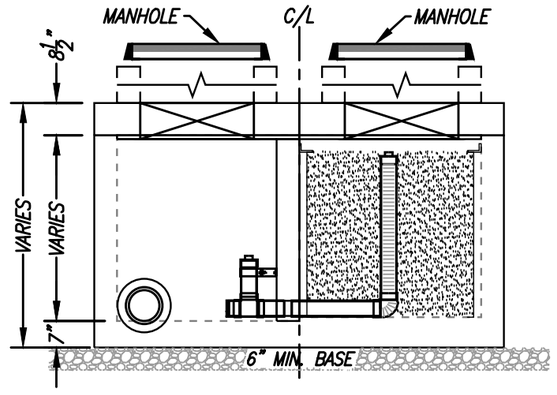
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S 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 WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH 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 CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH 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 CONTECH.



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.406
OPERATING HEAD (FT)	4.0
PRETREATMENT LOADING RATE (GPM/SF)	2.4
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com

MWS-L-8-12-V-UG
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL