Preliminary Water Quality Management Plan

For:

AIREF BEECH LOGISTICS CENTER LP

RWQCB ORDER NO. TBD

Prepared for:

Ares Management LLC.
4675 MacArthur Court, Suite 625
Newport Beach, CA 92660

Prepared by:

JLC Engineering and Consulting, Inc.

41660 Ivy Street, Suite A

Murrieta, CA 92562

951-304-9552

Submittal Date: April 11, 2022

Approval Date:

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared on behalf of Westland Group by JLC Engineering & Consulting, Inc. The WQMP is intended to comply with the requirements of the San Bernardino County and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

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Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TBD	Building Permit Number(s):	TBD
NW Corner of Beech Ave and Pacific Electric Trail, Fontana, CA			APN 1110-161-12, 1110-161-13, 1110-161-14

Owner's Signature			
Owner Name: Ares Management LLC, c/o Peter Schafer			
Title	Vice President		
Company	**Ares Management LLC**		
Address	4675 MacArthur Court, Suite 625, Newport Beach, CA 92660		
Email	pschafer@aresmgmt.com		
Telephone #	949.892.4904		
Signature		Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
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NW Corner of Beech Ave and Pacific Electric Trail, Fontana, CA			APN 1110-161-12, 1110-161-13, 1110-161-14

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: Joseph L. Castaneda		PE Stamp Below
Title	Professional Engineer	
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Signature		
Date	04/11/2022	

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Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	AIREF Beech Logistics Center LP				
Project Owner Contact Name:	Ares Management LLC, c/o Peter Schafer				
Mailing Address:	4675 MacArthur Court, Suite 625, Newport Beach, CA 92660	E-mail Address:	pschafer@aresmgmt.com	Telephone:	949.892.4904
Permit/Application Number(s):	TBD		Tract/Parcel Map Number(s):	TBD	
Additional Information/ Comments:	APN 1110-161-12, 1110-161-13, 1110-161-14				
Description of Project:	The project is a proposed development project that will construct approximately 185,300 sf of industrial building, parking area and storm drain facilities.				
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	The project is required during the entitlement phase to identify the proposed structures and improvements for the project site. The City of Fontana will evaluate the project conceptual design to ensure that the project will meet land use requirements, ordinance, and policies. As part of the entitlement process the City of Fontana requires a Preliminary WQMP to be submitted and reviewed as part of the conceptual design. The Preliminary WQMP will be used to develop Conditions of Approval.				

Section 2 Project Description

2.1 Project Information

Project Overview

The project site utilizes the minimum impervious area feasible for the site based on implementing City of Fontana ordinances and policies. The project is incorporating one subsurface infiltration basin that will be used to store the water quality volume. The subsurface storage systems will store water quality runoff volume and additional runoff will be allowed to flow into the proposed Rose Avenue storm drain system. The project has identified one Drainage Areas that requires treatment, Area A. This project is exempt from hydromodifications based on the San Bernardino County "Stormwater Facility Mapping Tool." A printout of the mapping tool is included in Section 6.7.

It should be noted that the project has high infiltration potential based on the soils & infiltration report. The subsurface storage system was located in the project site had the highest infiltration potential. Based on the soils and infiltration studies groundwater was not encountered. The soils report indicates that the groundwater is at approximately 245 feet in depth based on the closest well location.

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☐ Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft² or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft² or more
☐ Hillside developments of 5,000 ft² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft² of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft² or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft² or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

2 Project Area (ft2):	383,763.6	**3** Number of Dwelling Units:	0	**4** SIC Code:	N/A

5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

6 Does Project include roads? Yes ☐ No ☒ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

2.2 Property Ownership/Management

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

The entire site is proposed to be owned and maintained by the applicant. As a result, the long term maintenance will be the responsibility of the property owner.

2.3 Potential Stormwater Pollutants

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	Domestic Refuse
Nutrients - Phosphorous	E ☒	N ☐	Fertilizers
Nutrients - Nitrogen	E ☒	N ☐	Fertilizers
Noxious Aquatic Plants	E ☐	N ☒	The proposed development does not include any areas where water will be standing long enough to allow the growth of aquatic plants.
Sediment	E ☒	N ☐	Pavement and Landscaped Areas
Metals	E ☒	N ☐	Motor Vehicles
Oil and Grease	E ☒	N ☐	Motor Vehicles
Trash/Debris	E ☒	N ☐	Outdoor Trash Receptacles, Open Parking Lot
Pesticides / Herbicides	E ☒	N ☐	Landscaped Areas
Organic Compounds	E ☒	N ☐	Motor Vehicles, Fertilizers
Other: Oxygen Demanding Compounds	E ☒	N ☐	Motor Vehicles
Other: Solvents	E ☒	N ☐	Motor Vehicles
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

2.4 Water Quality Credits

Form 2.4-1 Water Quality Credits			
1 Project Types that Qualify for Water Quality Credits: *Select all that apply*			
☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
2 Total Credit 0% *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	Project is redeveloping a project site and is not planning to request any credits.		

The proposed project will not utilize any water quality credits.

Section 3 Site and Watershed Description

Form 3-1 Site Location and Hydrologic Features			
Site coordinates *take GPS measurement at approximate center of site*	Latitude 34.106°	Longitude 117.471°	Thomas Bros Map Page n/a
1 San Bernardino County climatic region: ☒ Valley ☐ Mountain			
2 Does the site have more than one drainage area (DA): Yes☐ No☒ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*			

Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA

Form 3-2 Existing Hydrologic Characteristics for Drainage Area A				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	A			
1 DMA drainage area (ft^2)	383,763.6			
2 Existing site impervious area (ft^2)*	383,763.6			
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	1			
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	A			
5 Longest flowpath length (ft)	450			
6 Longest flowpath slope (ft/ft)	0.01			
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Undeveloped fallow land			
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Undeveloped fallow land Fair Cover			

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/ See 'Drainage Facilities" link at this website*	Wst Fontana Channel San Sevaine Channel Santa Ana River - Reach 3 Santa Ana River - Reach 2 Santa Ana River - Reach 1
Applicable TMDLs *Refer to Local Implementation Plan*	None
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	Copper, Indicator Bacteria, Lead, pH,
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	N/A
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	Santa Ana River
Hydrologic Conditions of Concern	☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☒ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

All applicable non-structural and structural source control Best Management Practices for this project are listed in the following Forms 4.1-1 and 4.1-2.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	Educational material will be provided to employees at time of hire.
N2	Activity Restrictions	☒	☐	Acitivty restirctions will be enforced, including requiring dumpster lids to be closed at all times; and prohibit blowing, sweeping, or hosing of debris into streets, storm drain inlets, or infiltration basin. Project will provide onsite trash enclosure will require maintenance on a daily basis. Onsite car washes shall be prohibited.
N3	Landscape Management BMPs	☒	☐	The landscaped areas within the project site are to be tended to and maintained by outside contractor. Landscape maintenance shall including mowing and trimming.
N4	BMP Maintenance	☒	☐	BMP maintenance will be provided by the project site owner and will take place at a minimum of twice a year and after any major rainfall event.
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	The project site does not incorporate hazardous waste.
N6	Local Water Quality Ordinances	☒	☐	The project will comply with the City of Fontana Water Quality Ordinances, ensuring clean stormwater discharges to public properties.
N7	Spill Contingency Plan	☐	☒	There will be no hazardous materials stored onsite that require a spill contingency plan.
N8	Underground Storage Tank Compliance	☐	☒	The project site does not incorporate underground storage tanks.
N9	Hazardous Materials Disclosure Compliance	☐	☒	The project site will not incorporate hazardous materials onsite.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	The project will implement unifrm fire codes.
N11	Litter/Debris Control Program	☒	☐	The project will implement the maintenance and removal of littler from common areas by private contractor that will collect trash weekly.
N12	Employee Training	☒	☐	Training will be required within 6 months of hire dates for new employees, and then annually thereafter. Project site owner will be required to educate and train new employees.
N13	Housekeeping of Loading Docks	☒	☐	The project will incorporate housekeeping of loading docks.
N14	Catch Basin Inspection Program	☒	☐	The project site will incorporate a catch basin inspection program that will be done by a private contractor semi annually by visual inspection of facilities. The intent of the program is to ensure catch basin insert are cleaned and operational, identify any illegal dumping or identify any illicit discharges.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	The project will incoporate street sweeping along the common street and parking lot areas. Street sweeping shall be done on a bi-monthly basis and it is recommended to be performed after waste management company picks-up trash for the project area.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	The project is not a Public Agency Project.
N17	Comply with all other applicable NPDES permits	☒	☐	The project will comply with all other applicable NPDES permits.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☒	☐	The project will place stencilling/signage at storm drain inlet locations with language stating "No Dumping – Drains to River" or the most current language implemented by City of Colton to discouraging the illegal dumping of improper materials. Stenciling shall be inspected annually to ensure legibility.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	The project site does not produce pollutates which require specialized handling or storage. Materials are stored in garages.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	The project site will have individual receptacles for each unit, and the receptacles shall be required to be closed and/or covered at all times.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Landscaped irrigation systems will be designed efficiently to reduce excessive runoff (i.e. drought tolerant landscaping and/or drip system irrigation).
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscaped areas will incorporate a minimum of 1-2" below top of curb/sidewalk/pavement and top of landscape areas.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☐	☒	Project does not incorporate slopes and channels.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	Project will covered incorporate dock areas.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☒	☐	Project site will incorporate covered maintenance bays.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	The project site does not incorporate vehicle wash areas. Refer to N2.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	The project does not incorporate an outdoor processing area in the site design.
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	The project site does not incorporate wash areas.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	The project site does not incorporate fueling areas.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	The project does not incorporate hillside landscaping in the site design.
S14	Wash water control for food preparation areas	☐	☒	The project site does not incorporate food preparation areas.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	The project site does not include community car wash racks.

4.1.2 Preventative LID Site Design Practices

Form 4.1-3 Preventative LID Site Design Practices Checklist
Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☒ No ☐ Explanation: The project site will minimize the impervious areas by incorporating landscaping in all feasible areas to the maximum extent practicable.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: The project site will utilize 1 subsurface infiltration storage system to allow water quality volume to be held for a period not to exceed 48 hours. The volume will be allowed to infltrate through the in-situ soils. Therefore, the project will maximize the natural infiltration capacity.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: Existing westerly drainage pattern is perpetuated. The project discharges into storm drain systems which are designed for the ultiamte land use condition.
Disconnect impervious areas: Yes ☐ No ☒ Explanation: The roof and paved areas will surface flow into storm drain inlets. Due to the density of the project, the use of disconnected impervious areas is not feasible. The project implemented the use of a subsurface storage sytems to increase infiltration potential of the site.
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: The project site is an industrial site with no existing vegetation to preserve.
Re-vegetate disturbed areas: Yes ☒ No ☐ Explanation: The project will incorporate landscaped area over a small portion of the disturbed area.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: The project will minimize unnecessary compaction in the landscape areas.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: The project does not incorporate swales in place of piping.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: The project will stake landscaped areas and the subsurface storage system location to minimize compation during construction.

The project site utilizes the minimum impervious area feasible for the site. The project is incorporating 1 subsurface storage system to promote water quality treatment and ground water infiltration. The project design has planned the locations of the buildings and drive aisles in a manner to maximize the water quality treatment and strategically locate the project BMP in an area with the highest infiltration potential.

4.2 Project Performance Criteria

The project has met the objectives of the Water Quality Management Plan by retaining/infiltrating the project Design Capture Volume onsite and Forms 4.2-1 and 4.3-3 document how the project meets these objectives.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume
DMA A

1 Project area DA 1 (ft^2):	**2** Impervious area after applying preventative		3 Runoff Coefficient (Rc):	0.7303
383,764	site design practices (Imp%):	0.9	$R_c = 0.858(Imp\%)^3 - 0.78(Imp\%)^2 + 0.774(Imp\%) + 0.04$	
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in):			0.584	http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html
5 Compute P_6, Mean 6-hr Preciptiation (inches)		0.8647		
*P_6 = Item 4 * C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*				
6 Drawdown Rate				
Use 48 hours as the default condition. Selection and use of the 24 hour drawdonw time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.				24-hrs ☐
				48-hrs ☑
7 Compute design capture volume, DCV (ft^3)		39,644		
*DCV = 1/12 * [Item 1 * Item 3 * Item 5 * C2], where C2 is a function of drawdown rate (24-hr = 1.582; 48-hr =1.963)*				
Compute separate DCV for each outlet from the project site per schematic drawdown in Form 3-1 Item 2				

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

The project went through several iteration processing a site design for the project. Based on the infiltration testing, the project has implemented a subsurface storage system at the location with the largest infiltration rate. The project will not implement HSC BMPs since the project is infiltrating all water quality volume

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☒
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.
If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No":
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.
Proceed to Form 4.3-2, Hydrologic Source Control BMP.

4.3.1 Site Design Hydrologic Source Control BMP

The project went through several iteration processing a site design for the project. The project design ensured that the infiltration potential of the project site can be maximized. The project did not incorporate HSC BMPs since the entire water quality is being allowed to infiltrate. Moreover, the subsurface storage system will include an area to allow sediment, silts, and debris to settle.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)			
3 Ratio of pervious area receiving runoff to impervious area			
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*			
5 Sum of retention volume achieved from impervious area dispersion (ft^3):		$V_{retention}$ *=Sum of Item 4 for all BMPs*	
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3):		$V_{retention}$ *=Sum of Item 12 for all BMPs*	

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA 1)

14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)			
16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*			
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*			
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*			
19 Retention Volume (ft^3) $V_{retention}$ = *Item 17 * (Item 18 / 24)*			
20 Runoff volume retention from evapotranspiration BMPs (ft^3):	$V_{retention}$ =*Sum of Item 19 for all BMPs*		
21 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) $V_{retention}$ = *Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3):	$V_{retention}$ = *Sum of Item 24 for all BMPs*		
26 Implementation of residential rain barrel/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns			
28 Runoff volume retention from rain barrels/cisterns (ft^3) $V_{retention}$ = *Item 27 * 3*			
29 Runoff volume retention from residential rain barrels/Cisterns (ft3):	$V_{retention}$ =*Sum of Item 28 for all BMPs*		
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs:	*Sum of Items 5, 13, 20, 25 and 29*		

4.3.2 Infiltration BMPs

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DMA A)				
1 Remaining LID DCV not met by site design HSC BMP (ft^3):	39,644	V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30		
BMP Type *Use columns to the right compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 BMP Type	BMP A See Note 1		DA DMA BMP Type
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TBD for WQMP for minimum requirements for assessment methods*	12.1			
3 Amended soil infiltration safety factor *See TBD Section 5.4.2*	5			
4 Design percolation rate (in/hr) P_{design} = *Item 2 / Item 3*	2.42			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48			
6 Maximum ponding depth (ft) *BMP Specific, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A			
7 Ponding Depth (ft) d_{BMP} = *Minimum of (1/12 * Item 4 * Item 5) or Item 6*	N/A			
8 Infiltrating surface area (ft^2), *SABMP (ft2) the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	N/A			
9 Amended soil depth (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	N/A			
10 Amended soil porosity	N/A			
11 Gravel depth (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	N/A			
12 Gravel porosity	N/A			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3 hrs*	3			
14 Above Ground Retention Volume (ft^3) $V_{retention}$ = *Item 8 * [Item 7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	0			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	43,670			
16 Total Retention Volume from LID Infiltration BMPs:	**43670**	*(Sum of Items 14 and 15 for all infiltration BMP included in plan)*		
17 Fraction of DCV achieved with infiltration BMP:	**110%**	*Retention % = Item 16 / Form 4.2-1 Item 7*		
18 Is full LID DCV retained on-site with combination of hydrologic source control and LID retention and Infiltration BMPs?			___ Yes	___ No
If yes, demonstrate conformance using Form 4.3-10; if no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.				

Note 1: 5-Barrel-96" Subsurface Storage System, L=195'
Note 2: An infiltration rate of 12.1 in/hr was used.

Form 4.3-3 is used to compute on-site retention of runoff from proposed subsurface storage system.

4.3.3 Harvest and Use BMP

(NOT IMPLEMENTED PROJECT ADDRESSES WATER QUALITY VOLUME THOURGH INFILTRATION)

Harvest and Use BMPs were not considered for this project since the full LID DCV can be met by maximizing infiltration BMPs.

Form 4.3-4 Harvest and Use BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3):
V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16

BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility			
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*			
4 Landscaped area planned for use of harvested stormwater (ft^2)			
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day			
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*			
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*			
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*			

9 Total Retention Volume (ft^3) from Harvest and Use BMP *Sum of Item 8 for all harvest and use BMP included in plan*

10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐

If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.

4.3.4 Biotreatment BMP

(NOT IMPLEMENTED PROJECT ADDRESSES WATER QUALITY VOLUME THOURGH INFILTRATION)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA 1)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.*	
2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): **0** *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

(NOT IMPLEMENTED PROJECT ADDRESSES WATER QUALITY VOLUME THOURGH INFILTRATION)

Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*			
2 Amended soil infiltration rate *Typical ~ 5.0*			
3 Amended soil infiltration safety factor *Typical ~ 2.0*			
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*			
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*			
8 Amended soil surface area (ft^2)			
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity, *n*			
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
12 Gravel porosity, *n*			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: *Sum of Item 14 for all volume-based BMPs included in this form*			

N/A

(NOT IMPLEMENTED PROJECT ADDRESSES WATER QUALITY VOLUME THOURGH INFILTRATION)

Form 4.3-7 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft^3) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-8 Flow Based Biotreatment (DA 2)

Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	DA DMA BMP Type *(Use additional forms for more BMPs)*	DA DMA BMP Type *(Use additional forms for more BMPs)*	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*			
2 Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
4 Manning's roughness coefficient			
5 Bottom width (ft) **[calculated (actual)]** b_w = *(Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)*			
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*			
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*			
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*			
11 Water surface area at water quality flow depth (ft^2) SA_{top} = *(Item 5 + (2 * Item 2 * Item 6)) * Item 10*			

4.3.5 Conformance Summary

Form 4.3-9 demonstrates how on-site LID DCV is met with proposed retention/infiltration BMPs. This on-site LID BMP achieves full retention/infiltration of the LID DCV.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA A)

1 Total LID DCV for the Project DMA-A (ft^3): **39,644** *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): **0** *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): **43,670** *Copy Item 16 in Form 4.3-3*

4 On-site retention with LID harvest and use BMP (ft^3): **0** *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): **0** *Copy Item 3 in Form 4.3-5*

6 Flow capacity provided by flow based biotreatment BMP (cfs): **0** *Copy Item 6 in Form 4.3-5*

7 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☒ No ☐
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

8 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

PROJECT IS EXEMPT FROM HYDROMODIFICATIONS PER SAN BERNARDINO COUNTY STORMWATER FACILITY MAPPING TOOL

Form 4.3-10 Hydromodification Control BMPs (DA 1)

1 Volume reduction needed for HCOC performance criteria (ft^3): *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
3 Remaining volume for HCOC volume capture (ft^3): *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*

5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
  BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

7 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☐
  BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

4.4 Alternative Compliance Plan (if applicable)

(NOT IMPLEMENTED PROJECT ADDRESSES WATER QUALITY VOLUME THOURGH INFILTRATION)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

N/A

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)			
BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Subsurface Storage Systems	Property Owner / HOA	Check for sediment and debris build up; remove sediment, debris, trash, etc; repair broken pipes or structures; check for standing water longer than 48 hours.	Monthly, including after rain events
Catch Basin Inserts	Property Owner / HOA	Inspect catch basins and catch basin inserts to ensure trash and debris build up does not overload catch basin insert.	Minimum of twice annually, including after rain events
S1 Inlet Stencils	Property Owner / HOA	Check that signage is visible; remove/replace sign if illegible; remove graffiti; repair broken signs. The stenciling shall state "No Dumping - Drains to River" or per City of Colton specifications.	Minimum of twice annually, repair as needed
Trash Receptacles	Property Owner / HOA	Trash receptacles shall be closed or covered at all times; display signs of "No hazardous waste dumping" or equivalent; ensure regular waste pick-up and maintain solid roofs over enclosure. Trash receptacles shall be closed at all time and must remain onsite.	As needed, with minimum weekly inspections
Street/Parking Lot Sweeping	Property Owner / HOA	Street sweeping shall be implemented within streets and pavement areas at a minimum of bi-weekly	Minimum bi-weekly
Landscape Maintenance	Property Owner / HOA	Maintain landscape area vegetation, slope protection and 1" – 2" depressed grades, adjacent to hardscape and prevent discharges of landscape maintenance waste into storm drains	Weekly
N1 Education for Property Owners, Tenants, and Occupants	Property Owner / HOA	The current property owner/HOA shall be familiar with the contents of the WQMP and the County & City Ordinance and brochures and furnish copies of city and County BMP factsheets to all future property owners.	Education materials should be kept onsite for reference.

N2 Activity Restrictions	Property Owner / HOA	Property owners and their tenants or occupants shall not be allowed to discharge chemicals, chemical residues, wastewater or other prohibited discharges listed in the City stormwater Ordinance, to the outside, paved areas of the site; or store chemicals or other pollutant sources in a non-spill contained or covered facilities as stipulated in the CC&Rs. Dumpsters and/or trash receptacles shall remain closed.	The property owners / HOA shall control the discharge of stormwater pollutants from this site.
N3 Landscape Management	Property Owner / HOA	The HOA and their landscape maintenance contractor shall inspect the irrigation system plant health and erosion problems after each landscape procedure and shall report all repairs and problems to the POA. All routine landscaping maintenance.	Inspection Weekly
N4 BMP Maintenance	Property Owner / HOA	The HOA shall inspect for standing water in the water retention/infiltration basins, 48 hours after storm events. BMP maintenance shall be performed per the schedule in Form 5-1, as needed to restore free drainage.	The HOA shall inspect 48 hours after storm events.
N6 Local Water Quality Ordinance	Property Owner / HOA	The HOA shall ensure that all maintenance activities at the site comply with the City of Colton's Stormwater Ordinance, through the implementation of BMPs.	Ongoing
N10 Uniform Fire Code Implementation	Property Owner / HOA	The current owners or the future HOA shall require all fire code requirements to be implemented at this project site.	Property Owner / HOA
N11 Litter Control	Property Owner / HOA	The property owners, HOA and their contractor shall pick up litter and sweep and clean the existing trash enclosure weekly. The trash enclosure is designed to divert all flows around the dumpsters and shall be roofed. The HOA shall contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.	Trash pickup once per week. Trash enclosure should be kept clean from litter and be swept on a weekly basis.
N14 Catch Basin Inspection	Property Owner / HOA	The on-site catch basins shall be inspected monthly during the rainiy season (October-May) and before and after each storm to ensure proper operation. The HOA shall contract with a qualified landscape contractor to inspect and clean out accumulation of trash, litter and sediment and check for evidence of illegal dumping of waste materials into on-site drains.	Quarterly inspections during the rainy season (October – May) and before and after each storm to ensure proper operation.

N15 Vacuum Sweeping of Private Streets and Parking Lots	Property Owner / HOA	The paved areas and common open areas of the project site shall be swept and cleaned weekly by the HOA's contractor.	Inspection weekly
S3 Design and construct outdoor material storage areas to reduce pollution introduction	Property Owner / HOA	Project will implement trash cans for each unit. The project does not have any trash enclosures. Trash cans will be placed in designated collection points per the CC&Rs and enforced by HOA. Trash cans will be kept in the garage and will have lids to eliminate potential runoff from entering the trash cans. All trash cans shall have working lids which shall be kept closed, at all times. Trash enclosure shall comply with CASQA SD-32 and shall have doors and a solid roof.	Construction Superintendent
S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	Property Owner / HOA	The irrigation system will include devices to prevent low head drainage, overspray and run off through the use of pressure regulating devices, check valves, rain shutoff valves, flow sensors, pressure drop sensors, proper spacing, low precipitation emission devices and ET or weather based controllers. Landscape and irrigation shall be consistent with the State Model Water Efficient landscape Ordinance and the City of Ontario landscape Development Standards. Plants installed will be arranged according to similar hydrozones and meet the required water budget for the site. Shade trees shall be used to intercept rainwater and reduce heat gain on paving.	Landscape & irrigation to be inspected weekly after each landscape procedure.
S5 Finish grade of landscaped areas	Property Owner / HOA	All landscaped areas shall comply with depressed grading requirements by finish grading to a minimum of 1" below pavement grades or top-of-curb.	Landscape & irrigation to be inspected weekly after each landscape procedure.

Maintenance and Operation Summary

The Maintenance and Operation Summary has been prepared as a predecessor to the Maintenance and Operation Manual that will not be submitted until permit closure as required per the Technical Guidance Manual Section 8.3. The Maintenance and Operation Summary provides the following:

1. Storm Drain and Water Quality Overview
2. Table 1 Proposed Water Quality / BMP Features
3. Table 2 – Recommended Water Quality/BMP Features Maintenance & Operation

Storm Drain and Water Quality BMP System Overview

The Project has developed a storm drain system for the project to ensure that the project treats the water quality runoff from the project site. The project area is broken into a total of 1 drainage areas (DA) defined as DA A. The following discussions have been included as part of the summary.

Drainage Area A (DA A)
DA A collects the entire project area. The runoff is collected by a proposed storm drain system that discharges flows into a subsurface systems that consist of 96" CMP. The subsurface 96" CMP subsurface storage system stores the runoff and will allow the volume to be infiltrate into the in-situ soil.

For runoff in excess of water quality flow rate/volume refer to the Hydrology and Hydraulic Report

Table 1 - Proposed Water Quality/BMP Features

Drainage Area	Water Quality / BMP Feature	Purpose
DA A	96" Subsurface Storage System	Designed to convey and to store runoff for project area

Table 2 – Recommended Water Quality/BMP Features Maintenance & Operation

Water Quality / BMP Feature	System Description and Maintenance	Maintenance Intervals
Subsurface Storage within Pipe Systems	The project has a 96" storm drain system designed to store runoff volume. The project will be required to do the following: 1. Remove debris and sediments from system. 2. Inspect the storm drain pipe system for corrosion or structural issues. 3. Assess connection points to system and remove blockage or other obstructions	Annually

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

SHEET 1 OF 1

BEECH STREET INDUSTRIAL SITE

IN THE CITY OF FONTANA, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

WQMP SITE PLAN

HIGH POINT
1286.50

DETENTION BASIN A
PROPOSED 96" SUBSURFACE
INFILTRATION STORAGE SYSTEM
Q_{IN}=28.0 ft^3/s
WQ VOLUME=39,644 ft^3
WATER QUALITY AND INCREASED
RUNOFF MITIGATION STORAGE
VOLUME REQUIRED = 1.5 AC-FT

BUILDING AREA
185,380 S.F.

A
8.81

LINE A, REACH 1
36" HDPE
Q_{100}=28.0 ft^3/s
S=0.005

HIGH POINT
1288.20 FS

LOW POINT
1279.60 FS

LOW POINT
1277.40 FS

LINE A, REACH 2
30" HDPE
Q_{100}=17.4 ft^3/s
S=0.005

HIGH POINT
1281.60 FS

LOW POINT
1275.50 FS

HIGH POINT
1278.50 FS

BEECH AVE SD
REACH 2
24" HDPE
Q_{100}=17.3 ft^3/s
S=0.015

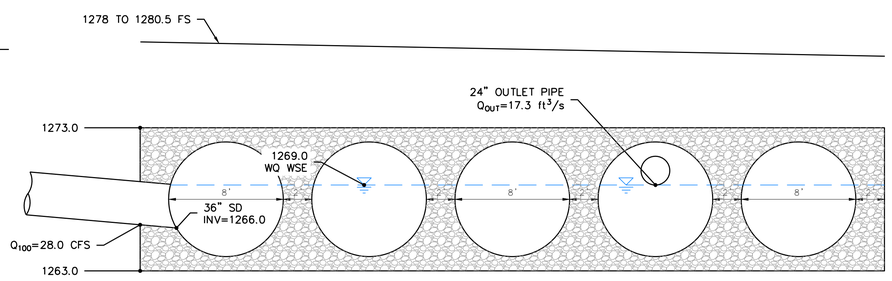
LINE A, REACH 3
30" HDPE
Q_{100}=17.1 ft^3/s
S=0.005

LEGEND:

XXX / X.X — *SUB AREA / ACRES*

FLOW PATH

WATERSHED BOUNDARY



SCALE: 1"=30'

30 15 0 30

SCALE: 1"=30'

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

FIGURE A

WQMP SITE PLAN

Drawing Name: O:\265.22.22\Engineering\WQMP\Maps & Site Plan\FIGURE-2-WQMP SITE PLAN.dwg
Last Opened: Apr 11, 2022 - 10:23am by pe

SHEET 1 OF 1

BEECH STREET INDUSTRIAL SITE

IN THE CITY OF FONTANA, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

DRAINAGE FACILITIES MAP

DESIGN NOTES:

1. THE PROPOSED 6'X8' RCB IS A CITY OF FONTANA MASTER DRAINAGE PLAN SYSTEM. THE SYSTEM CAN ACCEPT THE 25-YR DEVELOPED FLOW RATE PER DRAINAGE STUDY PREPARED BY MADOLE & ASSOCIATED, DATED 1/2003.
2. THE PROPOSED 6'X8' RCB WILL INCLUDE THE EXTENSION OF AN INTERIM 66" RCP THAT WILL CONNECT TO EXISTING 66" STORM DRAIN LOCATED WEST OF HEMLOCK AVENUE.
3. THE PROPOSED 6'X8' RCB WILL CONNECT TO A FUTURE 90" RCP THAT WILL EXTEND ALONG HEMLOCK AVENUE SOUTH OF FOOTHILL BLVD. THE 90" RCP EXTENDING IN THE SOUTHERLY DIRECTION ALONG HEMLOCK AVENUE IS THE FUTURE CITY OF FONTANA MASTER DRAINAGE PLAN SYSTEM
4. BEECH STREET ROADWAY IMPROVEMENTS ARE PART OF THE CITY OF FONTANA IMPROVEMENTS THAT ARE BEING DEVELOPED BY KOA.

SCALE 1"=60'

60 30 0 60

SCALE: 1"=60'

JLC Engineering & Consulting, Inc.

41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

EXHIBIT "C"

DRAINAGE FACILITIES MAP

Drawing Name: O:\265.22.22\Engineering\WQMP\Maps & Site Plan\FIGURE B-DRAINAGE FACILITIES MAP.dwg
Last Opened: Apr 11, 2022 - 10:24am by jse

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

The following will be done during Final Engineering and approval of the Final WQMP:

After written approval of the final WQMP the owner shall provide to the City a CD including a PDF copy of the approved WQMP which includes a photocopy of the completed and signed owner certificate and BMP Maintenance agreement.

6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

The O&M Plan will be submitted after 1st Plan Check. This will ensure that design of BMPs and drainage infrastructure has been reviewed technically and analytically by the City. After 1st Plan Check, the 2nd submittal will include an O&M Plan.

6.4 Water Quality Documentaion

6.5 Precipitation

General Information
Homepage
Progress Reports
FAQ
Glossary

Precipitation Frequency
Data Server
GIS Grids
Maps
Time Series
Temporals
Documents

Probable Maximum Precipitation
Documents

Miscellaneous
Publications
Storm Analysis
Record Precipitation

Contact Us
Inquiries

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth **Units:** English **Time series type:** Partial duration

Select location

1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

b) By station (list of CA stations): Select station

c) By address Search

2) Use map (if ESRI interactive map is not loading, try adding the host: **https://js.arcgis.com/** to the firewall, or contact us at hdsc.questions@noaa.gov):

a) Select location
Move crosshair or double click

b) Click on station icon
Show stations on map

Location information:
Name: Fontana, California, USA*
Latitude: 34.1092°
Longitude: -117.4724°
Elevation: 1284.36 ft **

* Source: ESRI Maps
** Source: USGS

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2

PF tabular PF graphical Supplementary information Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.117** (0.097-0.141)	**0.153** (0.128-0.186)	**0.203** (0.168-0.247)	**0.244** (0.201-0.300)	**0.302** (0.240-0.384)	**0.349** (0.271-0.453)	**0.397** (0.301-0.529)	**0.449** (0.331-0.615)	**0.522** (0.368-0.747)	**0.581** (0.396-0.862)
10-min	**0.167** (0.139-0.203)	**0.220** (0.183-0.267)	**0.291** (0.241-0.354)	**0.350** (0.288-0.430)	**0.433** (0.344-0.551)	**0.500** (0.389-0.649)	**0.569** (0.432-0.758)	**0.643** (0.474-0.882)	**0.748** (0.528-1.07)	**0.833** (0.567-1.24)
15-min	**0.202** (0.168-0.245)	**0.266** (0.221-0.323)	**0.352** (0.292-0.428)	**0.423** (0.348-0.520)	**0.524** (0.417-0.666)	**0.604** (0.470-0.785)	**0.688** (0.522-0.917)	**0.778** (0.573-1.07)	**0.904** (0.638-1.30)	**1.01** (0.686-1.49)
30-min	**0.300** (0.250-0.364)	**0.394** (0.328-0.479)	**0.522** (0.433-0.635)	**0.629** (0.517-0.772)	**0.778** (0.618-0.989)	**0.897** (0.698-1.17)	**1.02** (0.775-1.36)	**1.16** (0.850-1.58)	**1.34** (0.947-1.92)	**1.49** (1.02-2.22)
60-min	**0.444** (0.370-0.539)	**0.584** (0.486-0.709)	**0.773** (0.641-0.941)	**0.931** (0.766-1.14)	**1.15** (0.916-1.47)	**1.33** (1.03-1.73)	**1.51** (1.15-2.02)	**1.71** (1.26-2.35)	**1.99** (1.40-2.85)	**2.21** (1.51-3.28)
2-hr	**0.678** (0.565-0.822)	**0.881** (0.733-1.07)	**1.15** (0.953-1.40)	**1.37** (1.13-1.68)	**1.67** (1.33-2.13)	**1.91** (1.48-2.48)	**2.15** (1.63-2.86)	**2.40** (1.77-3.30)	**2.75** (1.94-3.94)	**3.03** (2.07-4.50)
3-hr	**0.872** (0.726-1.06)	**1.13** (0.939-1.37)	**1.46** (1.21-1.78)	**1.74** (1.43-2.13)	**2.10** (1.67-2.68)	**2.39** (1.86-3.10)	**2.68** (2.03-3.57)	**2.98** (2.19-4.09)	**3.39** (2.39-4.85)	**3.72** (2.53-5.51)
6-hr	**1.27** (1.06-1.54)	**1.64** (1.37-2.00)	**2.12** (1.76-2.58)	**2.50** (2.06-3.07)	**3.01** (2.39-3.83)	**3.39** (2.64-4.41)	**3.78** (2.87-5.04)	**4.18** (3.08-5.73)	**4.71** (3.32-6.74)	**5.12** (3.48-7.59)
12-hr	**1.71** (1.43-2.08)	**2.23** (1.85-2.70)	**2.87** (2.38-3.50)	**3.38** (2.78-4.16)	**4.05** (3.22-5.15)	**4.55** (3.54-5.91)	**5.04** (3.82-6.71)	**5.53** (4.07-7.58)	**6.17** (4.36-8.84)	**6.66** (4.54-9.88)
24-hr	**2.32** (2.06-2.68)	**3.07** (2.71-3.54)	**3.99** (3.52-4.62)	**4.72** (4.13-5.50)	**5.66** (4.79-6.81)	**6.34** (5.26-7.80)	**7.02** (5.68-8.84)	**7.69** (6.06-9.95)	**8.55** (6.47-11.5)	**9.20** (6.73-12.8)
2-day	**2.83** (2.50-3.26)	**3.82** (3.38-4.41)	**5.08** (4.48-5.87)	**6.07** (5.31-7.08)	**7.38** (6.25-8.90)	**8.37** (6.94-10.3)	**9.34** (7.56-11.8)	**10.3** (8.13-13.4)	**11.6** (8.79-15.7)	**12.6** (9.21-17.6)
3-day	**3.05** (2.70-3.51)	**4.18** (3.70-4.82)	**5.64** (4.97-6.53)	**6.82** (5.97-7.95)	**8.40** (7.12-10.1)	**9.61** (7.97-11.8)	**10.8** (8.77-13.6)	**12.1** (9.51-15.6)	**13.7** (10.4-18.5)	**15.0** (11.0-21.0)
4-day	**3.28** (2.90-3.78)	**4.55** (4.02-5.25)	**6.20** (5.47-7.17)	**7.54** (6.60-8.79)	**9.36** (7.93-11.3)	**10.8** (8.93-13.2)	**12.2** (9.87-15.4)	**13.7** (10.8-17.7)	**15.7** (11.8-21.1)	**17.2** (12.6-24.0)
7-day	**3.74** (3.31-4.31)	**5.27** (4.66-6.08)	**7.27** (6.41-8.41)	**8.92** (7.80-10.4)	**11.2** (9.46-13.5)	**12.9** (10.7-15.9)	**14.7** (11.9-18.5)	**16.6** (13.1-21.5)	**19.1** (14.5-25.8)	**21.2** (15.5-29.5)
10-day	**4.06** (3.60-4.68)	**5.76** (5.09-6.65)	**8.01** (7.07-9.27)	**9.87** (8.63-11.5)	**12.4** (10.5-15.0)	**14.4** (12.0-17.8)	**16.5** (13.4-20.8)	**18.7** (14.7-24.2)	**21.6** (16.4-29.2)	**24.0** (17.6-33.5)
20-day	**4.80** (4.25-5.53)	**6.90** (6.10-7.96)	**9.72** (8.57-11.2)	**12.1** (10.6-14.1)	**15.4** (13.0-18.6)	**18.0** (15.0-22.2)	**20.8** (16.8-26.2)	**23.7** (18.7-30.7)	**27.8** (21.0-37.5)	**31.1** (22.8-43.4)
30-day	**5.65** (5.00-6.51)	**8.11** (7.17-9.36)	**11.5** (10.1-13.3)	**14.3** (12.5-16.7)	**18.4** (15.6-22.1)	**21.6** (17.9-26.6)	**25.0** (20.3-31.5)	**28.7** (22.6-37.2)	**33.9** (25.7-45.8)	**38.2** (27.9-53.3)
45-day	**6.71** (5.95-7.74)	**9.56** (8.45-11.0)	**13.5** (11.9-15.6)	**16.8** (14.7-19.6)	**21.7** (18.3-26.1)	**25.6** (21.2-31.5)	**29.8** (24.1-37.5)	**34.3** (27.0-44.4)	**40.9** (30.9-55.1)	**46.3** (33.8-64.6)
60-day	**7.88** (6.97-9.08)	**11.1** (9.77-12.8)	**15.5** (13.7-17.9)	**19.3** (16.9-22.5)	**24.9** (21.0-29.9)	**29.4** (24.4-36.2)	**34.3** (27.8-43.2)	**39.7** (31.3-51.4)	**47.5** (35.9-64.1)	**54.0** (39.5-75.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates Submit

Main Link Categories:
Home | OWP

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Water Prediction (OWP)
1325 East West Highway
Silver Spring, MD 20910
Page Author: HDSC webmaster
Page last modified: April 21, 2017

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6.6 Infiltration Testing

December 8, 2021

AIREF ACQUISITIONS, LLC
4675 MacArthur Court, Suite 625
Newport Beach, California 92660

Attention: Mr. Peter F. Schafer
AVP, Development

Project No.: **21G260-2**

Subject: **Results of Infiltration Testing**
Proposed Warehouse
Beech Avenue, North of Foothill Boulevard
Fontana, California

Reference: Geotechnical Investigation, Proposed Warehouse, Beech Avenue, North of Foothill Boulevard, Fontana, California, prepared for AIREF ACQUISITIONS, LLC, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 21G260-1, dated December 7, 2021.

Dear Mr. Schafer:

In accordance with your request, we have conducted additional 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. 21P453R, dated October 19, 2021. 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 site is located on the west side of Beech Avenue, 330± feet north of Foothill Boulevard in Fontana, California. The site is bounded to the north by a vacant lot, to the west by an existing commercial/industrial building and a vacant lot, to the south by a single-family residence and a vacant lot, and to the east by the Beech Avenue easement. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of an irregular-shaped parcel, 8.38± acres in size. The site is presently vacant and undeveloped. Ground surface consists of exposed soil and cobbles with sparse grass and weed growth. One large tree is located in the central area of the site.

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 generally slopes downward to the south at a gradient of 1.5± percent.

Proposed Development

Based on a conceptual site plan provided to our office by the client, the site will be developed with one (1) new industrial building, 185,380± ft^2 in size, located in the west-central area of the site. 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. Beech Avenue will be paved with asphaltic concrete for this new development.

The proposed development will include on-site stormwater infiltration systems. We understand that the infiltration system will consist of a below-grade chamber system, located in the southern and northern regions of the site. The bottom of the below-grade chamber system is expected to be 10 to 12± feet below existing site grades.

Concurrent Study

Southern California Geotechnical, Inc. (SCG) concurrently conducted a geotechnical investigation at the subject site, referenced above. As a part of this study, seven (7) borings (identified as Boring Nos. B-1 through B-7) were advanced to depths of 5 to 25± feet below existing site grades.

Native alluvium was encountered at the ground surface of all boring locations, extending to at least the maximum depth explored of 25± feet below ground surface. The near-surface alluvial soils, within the upper 2½ to 4½± feet, generally consist of medium dense to dense silty fine sands and silty fine to coarse sands with varying cobble content. At depths greater than 4½± feet, the alluvial soils generally consist of medium dense to very dense fine to coarse sands with little fine to coarse gravel and occasional to abundant cobbles. Boring No. B-3 encountered gravelly fine to coarse sands from the ground surface, extending to 15± feet below ground surface.

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 25± 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 5,121± feet north of the site. Water level readings within this monitoring well indicates a high groundwater level of 492± feet below ground surface in April 2016.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of four (4) backhoe-excavated trenches, extending to depths of 10 to 12± 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 through I-4) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Native alluvial soils were encountered at all of the trench locations, extending to the maximum explored depth of 12± feet below existing site grades. The alluvial soils within the upper 1-foot consists of medium dense silty sands. The alluvium encountered at greater depths consists of dense to very dense gravelly fine to coarse sands, with varying amounts of silt and occasional to extensive cobbles.

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 6-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	Infiltration Rate (inches/hour)
I-1	12	Gray Brown Gravelly fine to coarse Sand, trace Silt	20.2
I-2	10	Light Brown Gravelly fine to coarse Sand	12.1
I-3	10	Gray Brown Gravelly fine to coarse Sand	22.4
I-4	10	Light Brown Gravelly fine to coarse Sand, trace Silt	21.3

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples within the borings were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Trench Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-4 of this report.

Design Recommendations

Four (4) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 12.1 to 22.4 inches per hour. **Based on the results of infiltration testing, we recommend the following infiltration rate be used for the design of the proposed infiltration system:**

Infiltration Test No.	Location	Infiltration Rate (Inches per Hour)
I-1 & I-2	**Eastern System**	**12.1**
I-3 & I-4	**Southern Ssytem**	**21.3**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration system to identify the soil classification at the base of the infiltration basin. It should be confirmed that the soils at the base of the proposed infiltration system corresponds with those presented in this report to ensure that the performance of the system will be consistent with the rates reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Fontana and/or County of San Bernardino guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended infiltration rates are based on infiltration testing at four (4) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

Infiltration Rate Considerations

The infiltration rates presented herein was determined in accordance with the San Bernardino County guidelines and are considered valid only for the time and place of the actual test. Varying subsurface conditions will exist in other areas of the site, which could alter the recommended infiltration rates presented above. The infiltration rates will decline over time between maintenance cycles as silt or clay particles accumulate on the BMP surface. The infiltration rate is highly dependent upon a number of factors, including density, silt and clay content, grainsize distribution throughout the range of particle sizes, and particle shape. Small changes in these factors can cause large changes in the infiltration rates.

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Construction Considerations

The infiltration rates presented in this report are specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Compaction of the soils at the bottom of the infiltration system can significantly reduce the infiltration ability of the basins. Therefore, the subgrade soils within proposed infiltration system areas should not be over-excavated, undercut

or compacted in any significant manner. **It is recommended that a note to this effect be added to the project plans and/or specifications.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each system. It should be confirmed that the soils at the base of the proposed infiltration systems correspond with those presented in this report to ensure that the performance of the systems will be consistent with the rates reported herein.

We recommend that scrapers and other rubber-tired heavy equipment not be operated on the basin bottom, or at levels lower than 2 feet above the bottom of the system, particularly within basins. As such, the bottom 24 inches of the infiltration systems should be excavated with non-rubber-tired equipment, such as excavators.

Infiltration Chamber Maintenance

The proposed project may include infiltration chambers. Water flowing into these chambers will carry some level of sediment. This layer has the potential to significantly reduce the infiltration rate of the chamber subgrade soils. Therefore, a formal chamber maintenance program should be established to ensure that these silt and clay deposits are removed from the chamber on a regular basis.

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 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 rates 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 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.

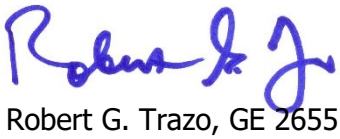
This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. 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.

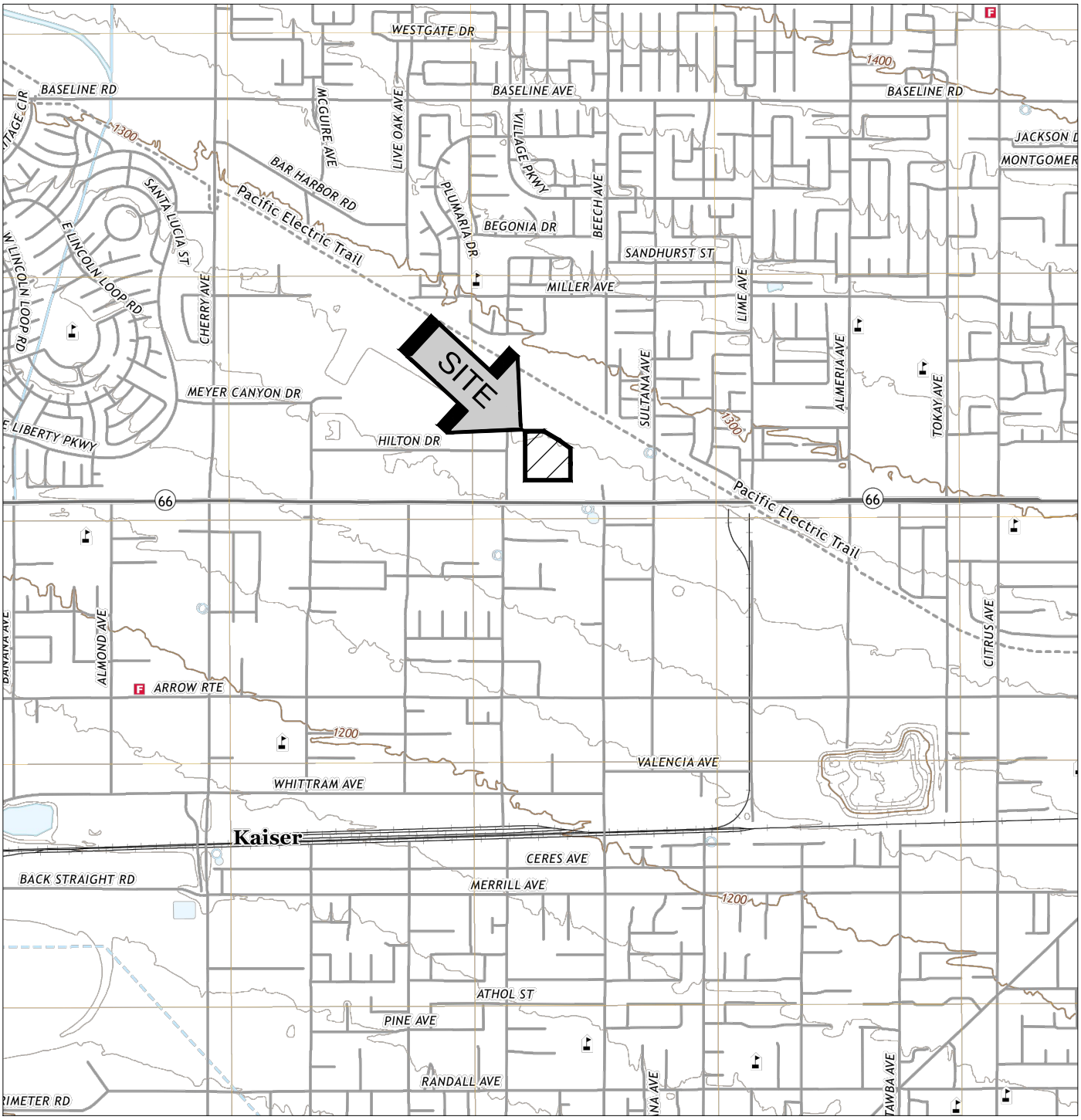
Ricardo Frias, RCE 91772
Project Engineer



Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Log Legend and Logs (6 pages)
Infiltration Test Results Spreadsheets (4 pages)
Grain Size Distribution Graphs (4 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE FONTANA QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

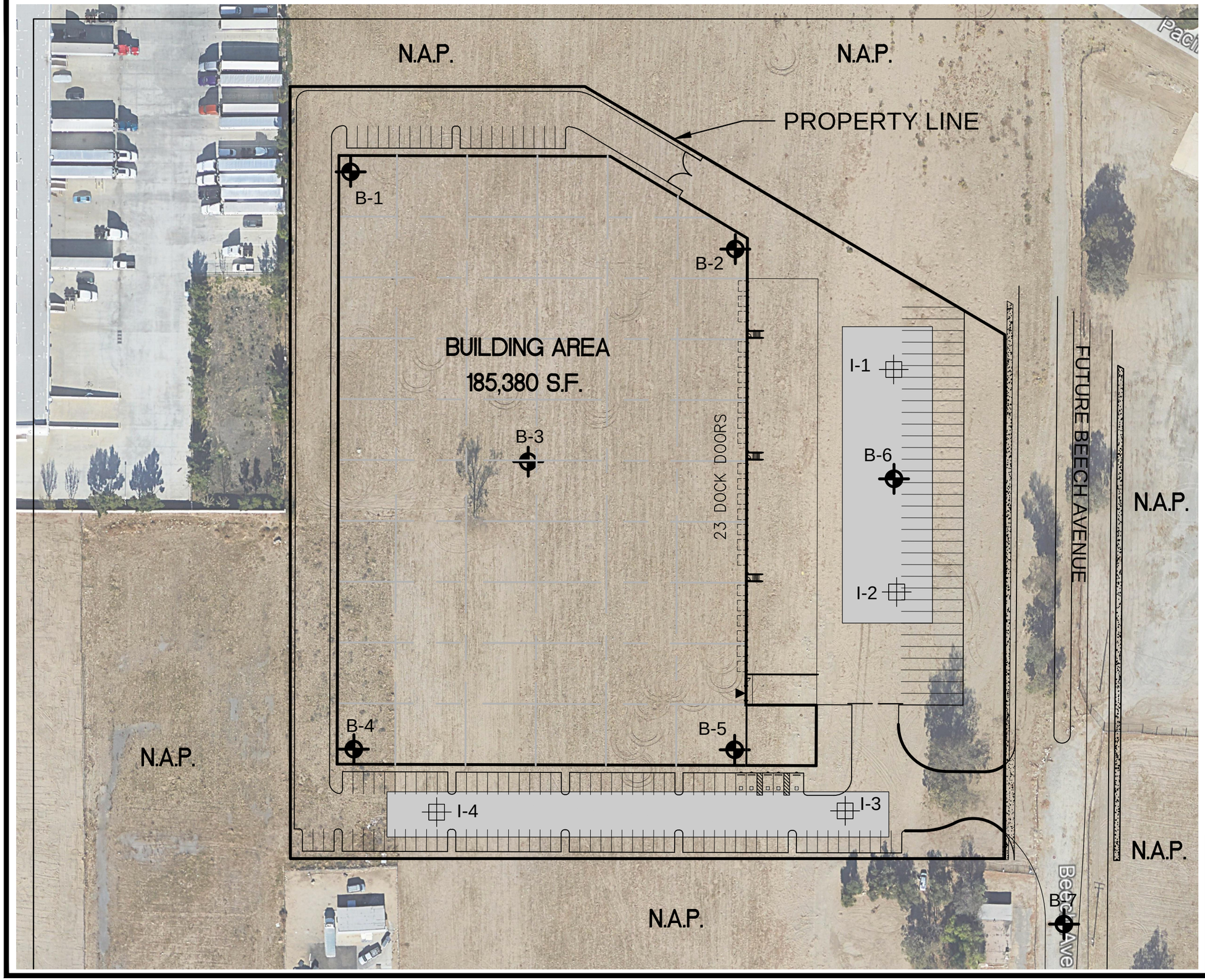
PROPOSED WAREHOUSE

FONTANA, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: MD CHKD: RGT	
SCG PROJECT 21G260-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



NORTH
SoCalGeo

GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY (SCG PROJECT NO. 21G260-1)
- APPROXIMATE UNDERGROUND CHAMBER SYSTEM LOCATION

NOTE: SITE PLAN PREPARED BY HPA ARCHITECTURE.
AERIAL PHOTO OBTAINED FROM GOOGLE EARTH.

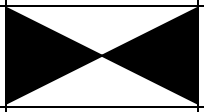
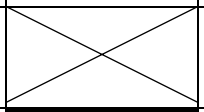
INFILTRATION TEST LOCATION PLAN

PROPOSED WAREHOUSE

FONTANA, CALIFORNIA

SCALE: 1" = 80'	SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: MD CHKD: RGT	
SCG PROJECT 21G260-2	
PLATE 2	

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.

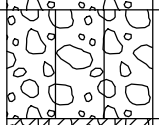
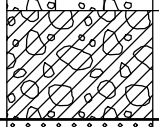
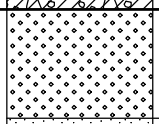
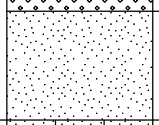
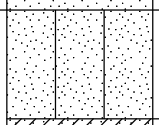
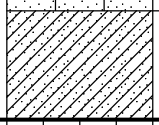
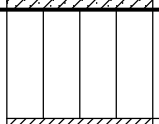
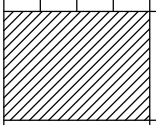
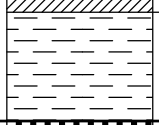
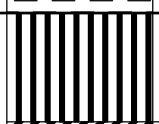
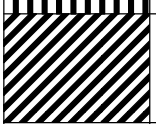
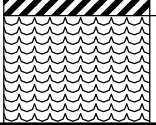
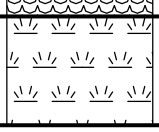
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

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.: 21G260-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

EXCAVATION DATE: 11/9/21
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 12 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
					ALLUVIUM: Light Brown Silty fine to coarse Sand, little fine Gravel, trace fine root fibers, medium dense-dry							
					Gray Brown Gravelly fine to coarse Sand, trace Silt, occasional to extensive Cobbles, dense to very dense-dry to damp							
5												
10												
							4			2		
					Trench Terminated at 12'							

TBL 21G260-2.GPJ SOCALGEO.GDT 12/8/21

TEST TRENCH LOG **PLATE B-1**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-2

JOB NO.: 21G260-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

EXCAVATION DATE: 11/9/21
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 10 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
0					ALLUVIUM: Light Brown Silty fine to coarse Sand, trace fine to coarse Gravel, medium dense-dry							
					Light Brown Gravelly fine to coarse Sand, extensive Cobbles, dense to very dense-dry							
5												
10							1			1		
					Trench Terminated at 10'							

TBL 21G260-2.GPJ SOCALGEO.GDT 12/8/21

TEST TRENCH LOG **PLATE B-2**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-3

JOB NO.: 21G260-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

EXCAVATION DATE: 11/9/21
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 10 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
0					ALLUVIUM: Light Brown Silty fine to medium Sand, little coarse Sand, trace fine Gravel, trace fine root fibers, medium dense-dry							
					Light Brown Gravelly fine to medium Sand, trace Silt, occasional Cobbles, dense-dry							
5												
					Gray Brown Gravelly fine to coarse Sand, occasional to extensive Cobbles, dense to very dense-dry							
							1			1		
10					Trench Terminated at 10'							

TBL 21G260-2.GPJ SOCALGEO.GDT 12/8/21

TEST TRENCH LOG

PLATE B-3

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

TRENCH NO. I-4

JOB NO.: 21G260-2
PROJECT: Proposed Warehouse
LOCATION: Fontana, California

EXCAVATION DATE: 11/9/21
EXCAVATION METHOD: Backhoe
LOGGED BY: Caleb Brackett

WATER DEPTH: Dry
CAVE DEPTH: 10 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
0					ALLUVIUM: Light Brown Silty fine to coarse Sand, trace fine Gravel, trace fine root fibers, medium dense-dry							
					Light Brown Gravelly fine to coarse Sand, trace Silt, extensive Cobbles, dense to very dense-dry to damp							
5												
							3			3		
10					Trench Terminated at 10'							

TBL 21G260-2.GPJ SOCALGEO.GDT 12/8/21

TEST TRENCH LOG **PLATE B-4**

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Fontana, CA
Project Number	21G260-2
Engineer	Caleb Brackett

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	7:10 AM	6	0	7000	0	24000	95.94	109.64	37.77	43.17
	Final	7:16 AM	**6**	7000		24000					
2	Initial	7:16 AM	6	0	6000	0	26000	82.23	118.78	32.38	46.76
	Final	7:22 AM	**12**	6000		26000					
3	Initial	7:22 AM	6	0	5500	0	24000	75.38	109.64	29.68	43.17
	Final	7:28 AM	**18**	5500		24000					
4	Initial	7:28 AM	6	0	4750	0	23000	65.10	105.08	25.63	41.37
	Final	7:34 AM	**24**	4750		23000					
5	Initial	7:34 AM	6	0	4250	0	22000	58.25	100.51	22.93	39.57
	Final	7:40 AM	**30**	4250		22000					
6	Initial	7:40 AM	6	0	4000	0	22000	54.82	100.51	21.58	39.57
	Final	7:46 AM	**36**	4000		22000					
7	Initial	7:46 AM	6	0	3750	0	22000	51.40	100.51	20.23	39.57
	Final	7:52 AM	**42**	3750		22000					
8	Initial	7:52 AM	6	0	3750	0	22000	51.40	100.51	20.23	39.57
	Final	7:58 AM	**48**	3750		22000					
9	Initial	7:58 AM	6	0	3750	0	22000	51.40	100.51	20.23	39.57
	Final	8:04 AM	**54**	3750		22000					
10	Initial	8:04 AM	6	0	3750	0	22000	51.40	100.51	20.23	39.57
	Final	8:10 AM	**60**	3750		22000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Fontana, CA
Project Number	21G260-2
Engineer	Caleb Brackett

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)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	8:30 AM	6	0	3500	0	11500	47.97	52.54	18.89	20.68
	Final	8:36 AM	**6**	3500		11500					
2	Initial	8:36 AM	6	0	3000	0	10000	41.12	45.68	16.19	17.99
	Final	8:42 AM	**12**	3000		10000					
3	Initial	8:42 AM	6	0	3000	0	9700	41.12	44.31	16.19	17.45
	Final	8:48 AM	**18**	3000		9700					
4	Initial	8:48 AM	6	0	2800	0	9400	38.38	42.94	15.11	16.91
	Final	8:54 AM	**24**	2800		9400					
5	Initial	8:54 AM	6	0	2600	0	9300	35.63	42.49	14.03	16.73
	Final	9:00 AM	**30**	2600		9300					
6	Initial	9:00 AM	6	0	2400	0	9400	32.89	42.94	12.95	16.91
	Final	9:06 AM	**36**	2400		9400					
7	Initial	9:06 AM	6	0	2250	0	9500	30.84	43.40	12.14	17.09
	Final	9:12 AM	**42**	2250		9500					
8	Initial	9:12 AM	6	0	2250	0	9400	30.84	42.94	12.14	16.91
	Final	9:18 AM	**48**	2250		9400					
9	Initial	9:18 AM	6	0	2250	0	9500	30.84	43.40	12.14	17.09
	Final	9:24 AM	**54**	2250		9500					
10	Initial	9:24 AM	6	0	2250	0	9500	30.84	43.40	12.14	17.09
	Final	9:30 AM	**60**	2250		9500					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Fontana, CA
Project Number	21G260-2
Engineer	Caleb Brackett

Infiltration Test No: I-3

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)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	9:45 AM	6	0	5000	0	20000	68.53	91.37	26.98	35.97
	Final	9:51 AM	**6**	5000		20000					
2	Initial	9:51 AM	6	0	5000	0	20000	68.53	91.37	26.98	35.97
	Final	9:57 AM	**12**	5000		20000					
3	Initial	9:57 AM	6	0	4850	0	20000	66.47	91.37	26.17	35.97
	Final	10:03 AM	**18**	4850		20000					
4	Initial	10:03 AM	6	0	4700	0	18500	64.42	84.52	25.36	33.27
	Final	10:09 AM	**24**	4700		18500					
5	Initial	10:09 AM	6	0	4600	0	18500	63.05	84.52	24.82	33.27
	Final	10:15 AM	**30**	4600		18500					
6	Initial	10:15 AM	6	0	4400	0	18500	60.30	84.52	23.74	33.27
	Final	10:21 AM	**36**	4400		18500					
7	Initial	10:21 AM	6	0	4150	0	17000	56.88	77.66	22.39	30.58
	Final	10:27 AM	**42**	4150		17000					
8	Initial	10:27 AM	6	0	4150	0	17000	56.88	77.66	22.39	30.58
	Final	10:33 AM	**48**	4150		17000					
9	Initial	10:33 AM	6	0	4150	0	17000	56.88	77.66	22.39	30.58
	Final	10:39 AM	**54**	4150		17000					
10	Initial	10:39 AM	6	0	4150	0	17000	56.88	77.66	22.39	30.58
	Final	10:45 AM	**60**	4150		17000					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Fontana, CA
Project Number	21G260-2
Engineer	Caleb Brackett

Infiltration Test No: I-4

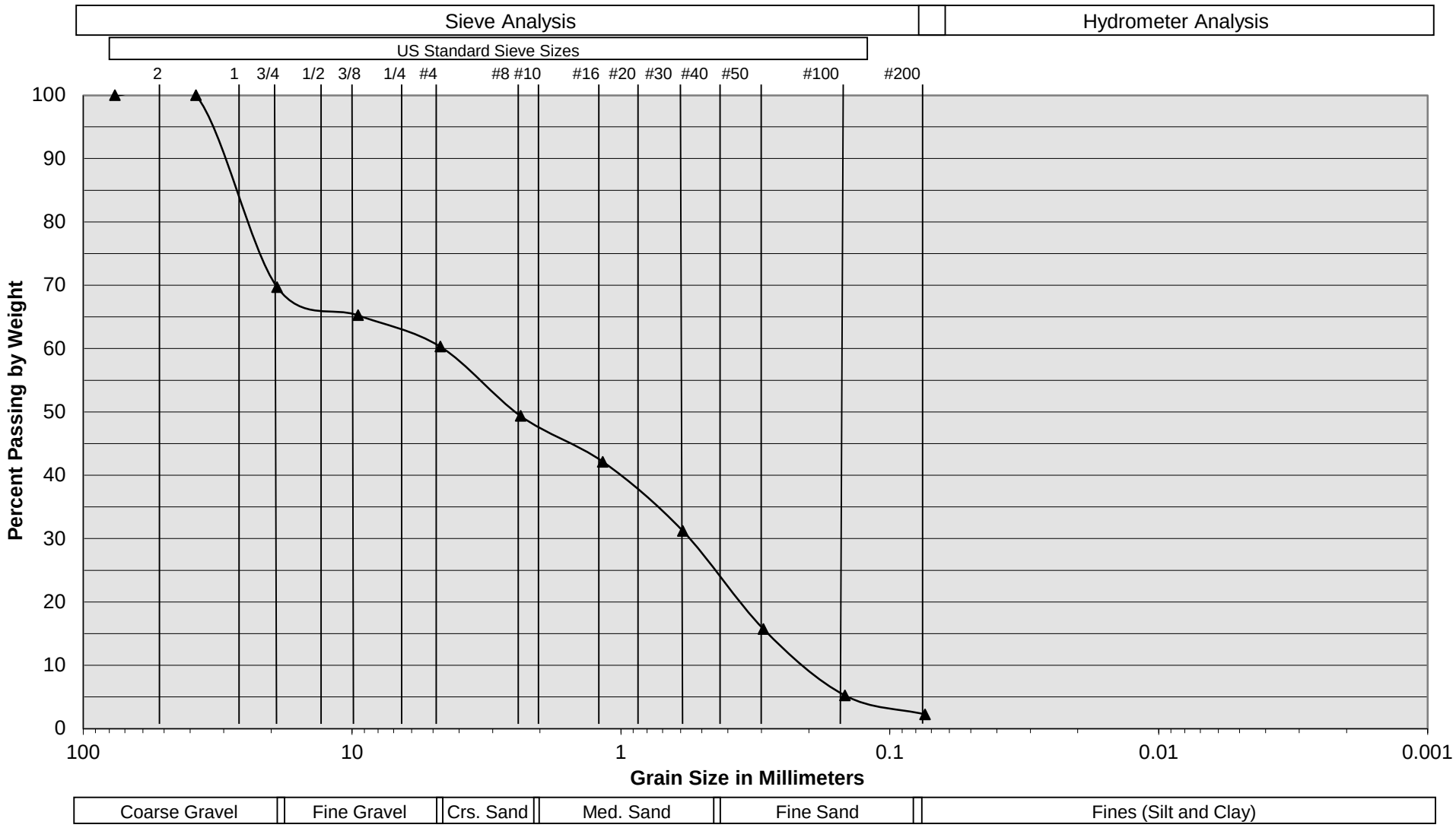
Constants

	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)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	11:30 AM	6	0	4850	0	20000	66.47	91.37	26.17	35.97
	Final	11:36 AM	**6**	4850		20000					
2	Initial	11:36 AM	6	0	4850	0	20000	66.47	91.37	26.17	35.97
	Final	11:42 AM	**12**	4850		20000					
3	Initial	11:42 AM	6	0	4600	0	20000	63.05	91.37	24.82	35.97
	Final	11:48 AM	**18**	4600		20000					
4	Initial	11:48 AM	6	0	4500	0	20000	61.67	91.37	24.28	35.97
	Final	11:54 AM	**24**	4500		20000					
5	Initial	11:54 AM	6	0	4250	0	19200	58.25	87.72	22.93	34.53
	Final	12:00 PM	**30**	4250		19200					
6	Initial	12:00 PM	6	0	4200	0	18000	57.56	82.23	22.66	32.38
	Final	12:06 PM	**36**	4200		18000					
7	Initial	12:06 PM	6	0	3950	0	16000	54.14	73.10	21.31	28.78
	Final	12:12 PM	**42**	3950		16000					
8	Initial	12:12 PM	6	0	3950	0	16000	54.14	73.10	21.31	28.78
	Final	12:18 PM	**48**	3950		16000					
9	Initial	12:18 PM	6	0	3950	0	15000	54.14	68.53	21.31	26.98
	Final	12:24 PM	**54**	3950		15000					
10	Initial	12:24 PM	6	0	3950	0	15000	54.14	68.53	21.31	26.98
	Final	12:30 PM	**60**	3950		15000					

Grain Size Distribution

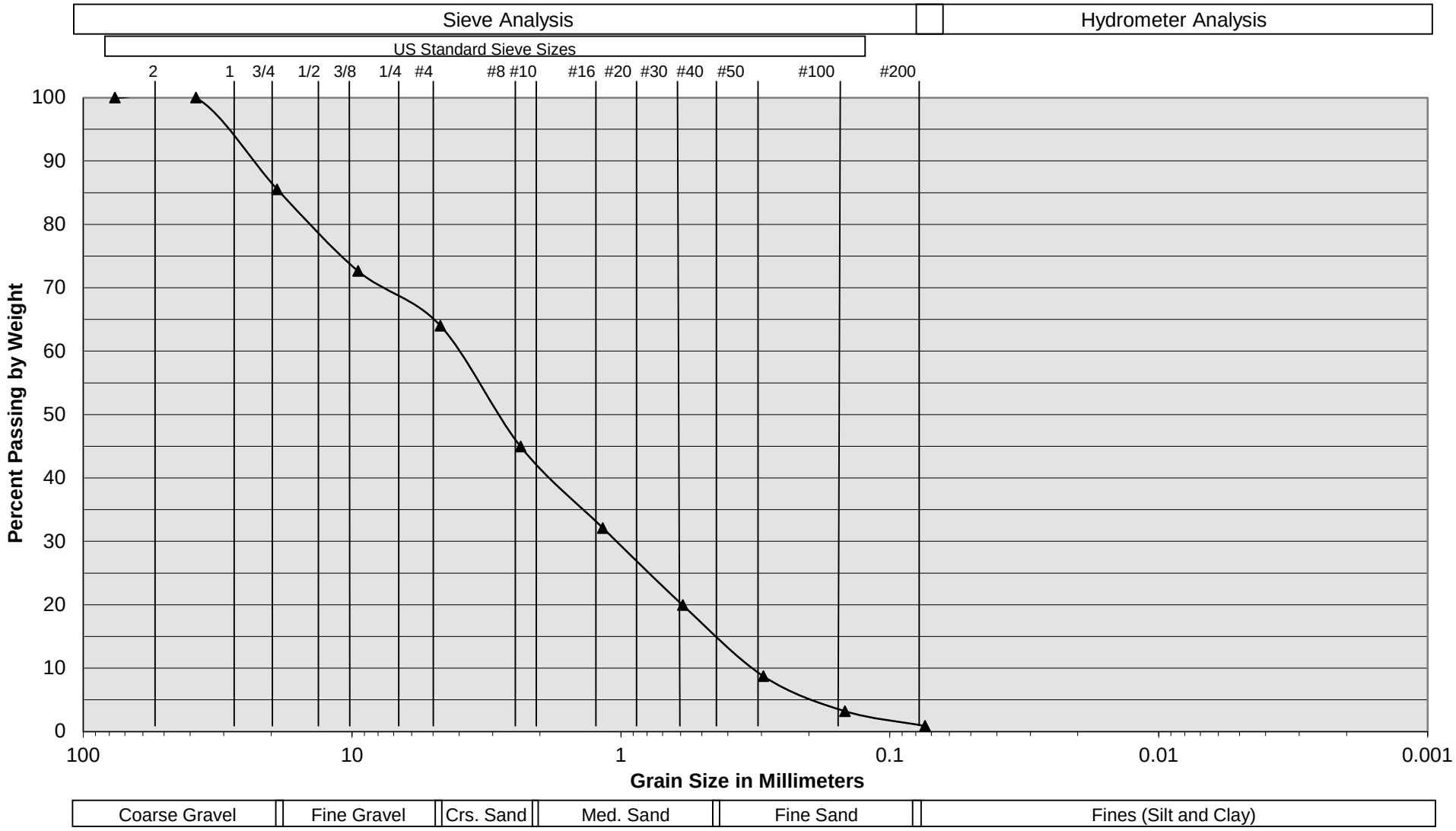


Sample Description	I-1 @ 12'
Soil Classification	Gray Brown Gravelly fine to coarse Sand, trace Silt

Proposed Warehouse
Fontana, California
Project No. 21G260-2
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-2 @ 10'
Soil Classification	Light Brown Gravelly fine to coarse Sand

Proposed Warehouse
Fontana, California
Project No. 21G260-2
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

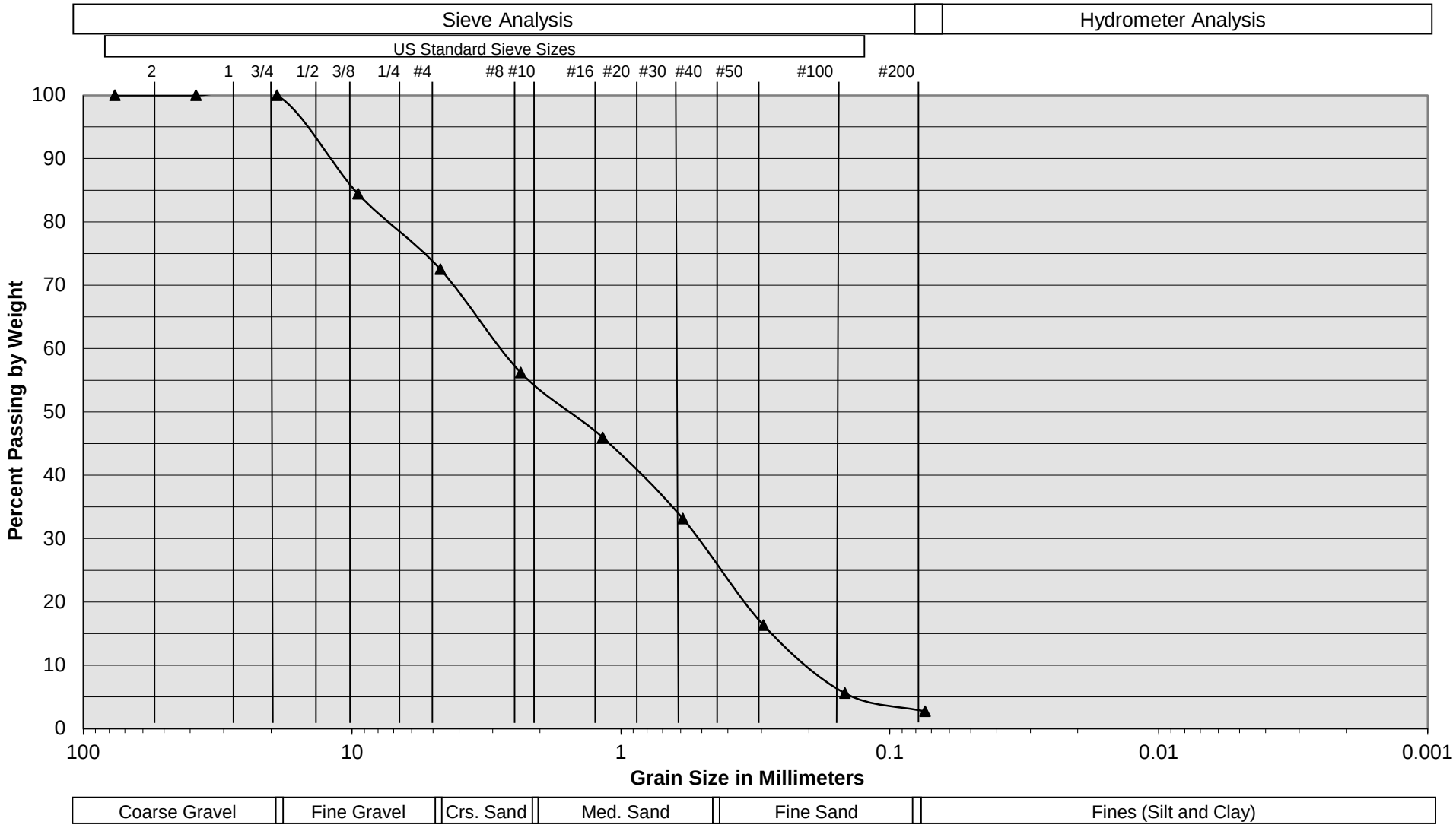
Grain Size Distribution

Sample Description	I-3 @ 10'
Soil Classification	Gray Brown Gravelly fine to coarse Sand

Proposed Warehouse
Fontana, California
Project No. 21G260-2
PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-4 @ 10'
Soil Classification	Light Brown Gravelly fine to coarse Sand, trace Silt

Proposed Warehouse
Fontana, California
Project No. 21G260-2
PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

6.7 Hydrologic Conditions of Concern

PROJECT IS EXEMPT FROM HCOC PER STORMWATER FACILITY MAPPING TOOL.

6.8 Education Materials

EDUCATION MATERIALS WILL BE PROVIDED DURING FINAL ENGINEERING

6.9 Vicinity Map

VICINITY MAP

FIGURE 1

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

6.10 Receiving Waters Map

WILL BE PART OF FINAL ENGINEERING

6.11 Improvement Plans

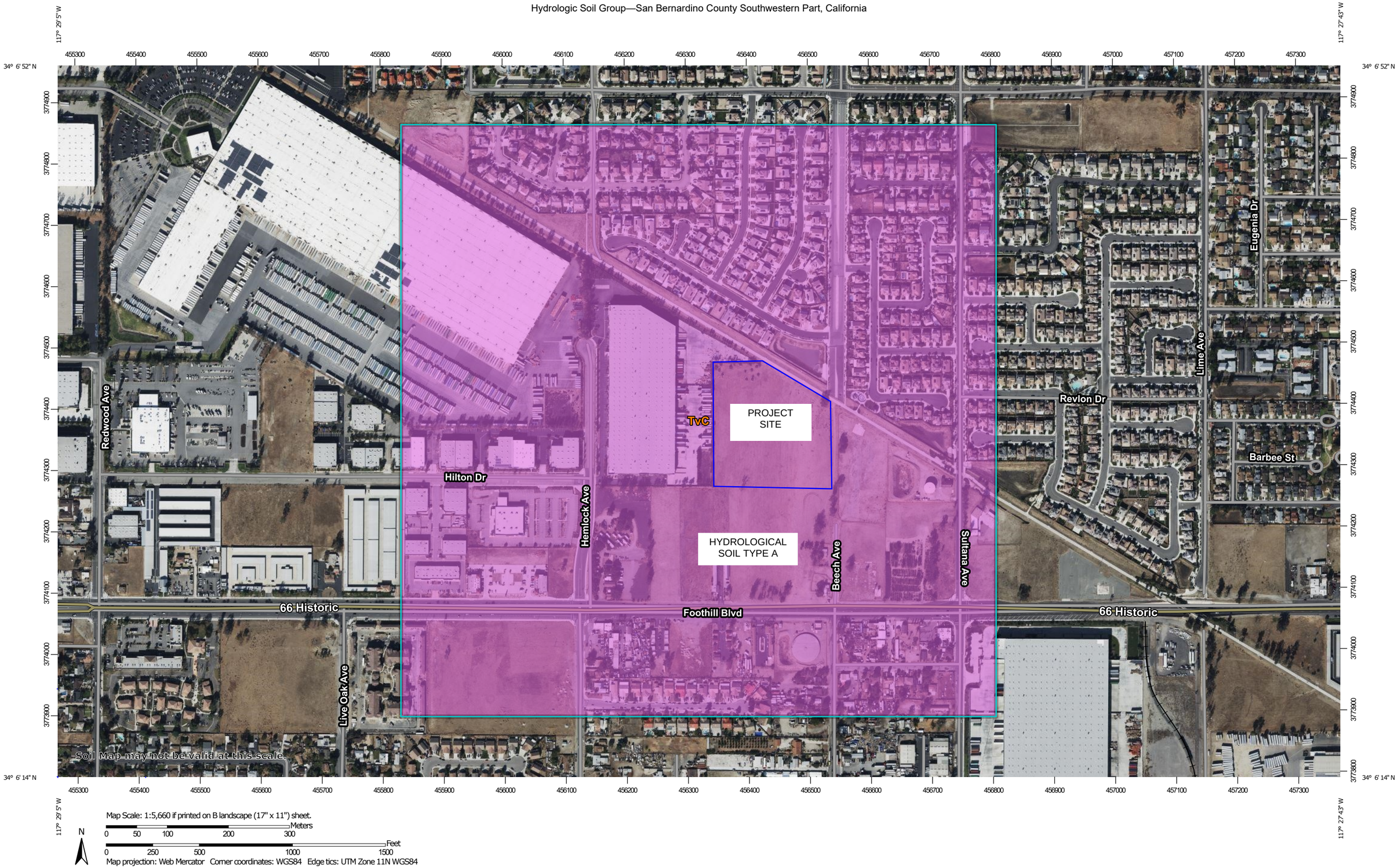
WILL BE PART OF FINAL ENGINEERING

6.12 Preliminary WQMP

WILL BE PART OF FINAL ENGINEERING

6.13 Hydrologic Soils Map

Hydrologic Soil Group—San Bernardino County Southwestern Part, California



Map Scale: 1:5,660 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	A	233.5	100.0%
Totals for Area of Interest			**233.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition