Preliminary

Water Quality Management Plan

Provide Planning number

For:

8575 Ilex St.

Fontana, CA 92335

APN 0229-202-14-0-000

Prepared for:

-

Provide
Insert Owner/Developer Name
Insert Address
Insert City, State, ZIP
Insert Telephone

Prepared by:

Land Development Design Company, LLC

2313 E. Philadelphia St., Ste. F

Ontario, CA 91761

(909) 930-1466

NOT APPROVED
REVIEWED BY
Osvaldo Roque at 9:09:17 AM, **01/09/2020**

Date Prepared: June 6, 2019

Approval Date:_____

Project Owner's Certification

Provide Owner name

This Water Quality Management Plan (WQMP) has been prepared for _____ by Land Development Design Company, LLC. The WQMP is intended to comply with the requirements of the San Bernardino County and the NPDES Area-wide 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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PROJ-2019-00012

Project Data			
Permit/Application Number(s):	~~TBD~~	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	Lot 351 of TR 2102 MB 31/11-15	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN 0229-202-14-0-000

Owner's Signature			
Owner Name: TBD			
Title			
Company			
Address			
Email			
Telephone #			
Signature		Date	

Provide info. Signature and date required on final report.

Preparer's Certification

PROJ-2019-00012

Project Data			
Permit/Application Number(s):	~~TBD~~	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	Lot 351 of TR 2102 MB 31/11-15	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN 0229-202-14-0-000

"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: Kevin J. Richer		PE Stamp Below
Title	Project Engineer	
Company	Land Development Design Company, LLC	
Address	2313 E. Philadelphia St. Ste. F / Ontario, CA 91761	
Email	kevin.richer@lddc.net	
Telephone #	(909) 930-1466	
Signature		
Date		

provide, signature, date and stamp

Table of Contents

Forms

Section 1 Discretionary Permit(s)

provide a contact name and info

Form 1-1 Project Information

Project Name	8575 Ilex Street				
Project Owner Contact Name:					
Mailing Address:	TBD	E-mail Address:	TBD	Telephone:	TBD
Permit/Application Number(s):	TBD	Tract/Parcel Map Number(s):	LOT 351, TR 2102 MB31/11-15		
Additional Information/ Comments:					

PROJ-2019-00012

unincorporated

Specify materials or general activities consistent with OSHA SIC codes on next Form.

Provide breakdown of each drainage area including ft² of pavement, building, landscaping, etc.

Description of Project:

The project proposes to develop a 1.95-acre site located at 8575 Ilex St. in the city of Fontana. The site is bounded to the west by Ilex St., to the north by residential developments, and to the south and east by materials and equipment storage facilities. Site soils have been identified as Hydrologic Soil Group "A."

The project site is currently graded land with no permanent stabilization and structures. It is being used as a materials and equipment storage facility. Storm water sheets in a southwesterly direction across dirt and gravel. The majority of storm flows discharge from the site by sheeting across the southerly boundary into the adjacent property. The westerly portion of the project site discharges storm flows by sheeting across the westerly boundary and into the right-of-way of Ilex St. The project site accepts off-site run-on from the properties along its northerly boundary and this is included in determination of the DCV and BMP design.

The project proposes to develop the site for commercial use. The site design implements landscaping and gravel coverage to reduce the impervious footprint of the development. It will be 53% impervious. Improvements include a building structure with loading dock, AC pavement, gravel coverage, concrete sidewalks, concrete curb, concrete gutter, block wall, and landscaping. The proposed structural BMPs are inlet filters, rip-rap pads, an infiltration basin, and an underground storage infiltration system. The DCV of the project site is mitigated by infiltration.

The site design will mimic the existing drainage patterns of the project site, directing storm flows to the southwesterly corner and accepting the off-site run-on along the northerly boundary of the project site. There is one drainage area contributing storm water runoff to the proposed infiltration BMPs. The drainage area is further divided into subarea 1A encompassing the project site and subarea 1B consisting of the off-site tributary area northerly of the project site.

In subarea 1A, storm water sheets across proposed hardscape, landscape, and pavement to be intercepted by proposed concrete gutters, landscape swale, and gravel swale. These convey flows southerly and westerly to the southwesterly corner of the project site. There, storm flows discharge into the proposed infiltration basin in said corner via a proposed rip-rap pad. Storm water infiltrates into native soils and ponds up in this basin. Above the design ponding depth, storm water is intercepted by a proposed inlet with filter located in the

	southerly portion of the basin. This inlet discharges the remaining storm water runoff into the proposed underground storage infiltration system to be infiltrated into native soils. Run-on from Subarea 1B sheets across the northerly boundary of the project site. On the easterly side, run-on sheets onto proposed AC pavement of the project site. On the westerly side, run-on is intercepted by a proposed concrete channel that conveys flows westerly and southerly through the project site. Run-on comingles with storm water runoff from the project site and follows the on-site drainage pattern described above, eventually being infiltrated by the same proposed on-site infiltration BMPs. Overflows of the proposed basin and underground system pond up to a proposed underwalk drain located in the southwesterly corner of the project site, and discharge into the right-of-way of Ilex St.
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	Prepare WQMP per County guidelines.

Water quality analysis is limited to on-site activities. Revise description and calculations in this report to exclude run-on.

Section 2 Project Description

2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

Verify applicability

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 ft^2 or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft^2 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 ft^2 or more
☐ Hillside developments of 5,000 ft^2 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 ft^2 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 ft^2 or more exposed to storm water	☐ Retail gasoline outlets that are either 5,000 ft^2 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):	85,021	**3** Number of Dwelling Units:	n/a	**4** SIC Code:	5012, 5013

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)*

Describe activities and/or site use consistent with these codes on "Description of Project" portion of Form 1-1.

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

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

The maintenance of the proposed development is the responsibility of the owner. There is no homeowner or property owner's association set up for this proposed development. All of the BMPs are the responsibility of the owner to maintain. ~~Only the proposed storm drain facilities located within the right-of-way will be maintained by the City of Fontana.~~

Owner information:
TBD

Provide contact information. May list current property owner in the time being.

2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern

Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	Wild Birds and animal wastes, garbage.
Nutrients - Phosphorous	E ☒	N ☐	Fertilizers, food waste, garbage.
Nutrients - Nitrogen	E ☒	N ☐	Fertilizers, food waste, garbage.
Noxious Aquatic Plants	E ☒	N ☐	Landscape areas.
Sediment	E ☒	N ☐	Driveways, rooftops and sidewalks.
Metals	E ☒	N ☐	Car and truck use.
Oil and Grease	E ☒	N ☐	Car and truck use.
Trash/Debris	E ☒	N ☐	Poorly managed trash containers and parking lot.
Pesticides / Herbicides	E ☒	N ☐	Landscape use.
Organic Compounds	E ☒	N ☐	Landscape use and fertilizers.
Other: Oxygen Demanding Compounds	E ☒	N ☐	Landscape areas.
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

Exact activites and/or types of materials to be stored on site was not clear on project description. Verify/update POC table in conformance to site use.

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

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 % *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	n/a		

Section 3 Site and Watershed Description

Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

Provide lat and long for center of lot, this is for the adjacent property

Form 3-1 Site L rologic Features			
Site coordinates *take GPS measurement at approximate center of site*	Latitude 34° 5'52.17"N	Longitude 117°30'48.19"W	Thomas Bros Map page 603
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*			
Example only – modify for project specific WQMP using additional form			

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 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft^2)	85,021	71,772		
2 Existing site impervious area (ft^2)	0	15,102		
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	1	1		
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	A	A		
5 Longest flowpath length (ft)	292			
6 Longest flowpath slope (ft/ft)	1.2%	1.4%		
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Barren	Residential Landscape		
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*	Poor	Poor		

Verify, provide exhibit.

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool - http://sbcounty.permitrack.com/WAP See 'Drainage Facilities" link at this website*	San Sevaine Channel, Santa Ana River Reach 3, Prado Dam, Santa Ana River Reach 2, Santa Ana River Reach 1, Pacific Ocean
Applicable TMDLs *Refer to Local Implementation Plan*	San Sevaine Channel – None Santa Ana River Reach 3 - Pathogens, ~~Nitrogens & Nitrates~~ Prado Dam – ~~Pathogens~~ Santa Ana River Reach 2 – None Santa Ana River Reach 1 – None Pacific Ocean – None
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	San Sevaine Channel – None Santa Ana River Reach 3 - Copper/Lead/Pathogens Prado Dam – ~~Pathogens~~ ← PH Santa Ana River Reach 2 - Indicator Bacteria Santa Ana River Reach 1 – None Pacific Ocean - None
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	n/a
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP*	Santa Ana River-Reach 3, Prado Dam
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, project drains to an adequate sump, Prado Dam and Santa Ana River, per TGD 3.4.
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

provide calculations to prove this.

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

gather information and provide the prohibited items. Also include; pesticide application to be done by a certified applicator.

Provide fact sheets at the end of this WQMP

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	☒	☐	The owner shall familiarize himself with the contents of the WQMP and County & City Ordinances and brochures and furnish copies of city and county BMP factsheets to all future tenants through lease agreements.
N2	Activity Restrictions	☒	☐	Tenants shall not be allowed to discharge chemicals, chemical residues, wastewater or other prohibited discharges listed in the City and County Ordinances, to the outside, paved areas of the site.
N3	Landscape Management BMPs	☒	☐	Landscape crews shall inspect the irrigation system and shall report all drainage problems to the owner. All routine landscaping maintenance shall be done in conformance with BMP Factsheet SD-10 in Section 6.4.
	BMP Maintenance	☒	☐	Owner shall contract to have underground storage/infiltration system inspected and maintained in accordance with the Operations and Maintenance Agreement.
	Title 22 CCR Compliance (How development will comply)	☒	☐	The owner/tenant will file appropriate hazardous material disclosures, if any storage is conducted, w/ the City and County Fire.
N6	Local Water Quality Ordinances	☒	☐	sure that all business activities at the site comply with the ~~City of Fontana's~~ stormwater ordinance through the implementation of BMPs.
N7	Spill Contingency Plan	☒	☐	Any hazardous material storage, if any, will require a business/emergency response plan as required by the San Bernardino County Fire Hazmat.
N8	Underground Storage Tank Compliance	☐	☒	There are no underground storage tanks at this site.
N9	Hazardous Materials Disclosure Compliance	☒	☐	The owner/tenant will file appropriate hazardous material disclosures, if any storage is conducted, w/ the City and County Fire.

revise SD-10 only talks about new design not maintenance. What will be initiated for this project?

...of this WQMP

Verify medical hazardous waste storage.

unincorporated County of San Bernardino

Provide absorbent materials onsite in case of oil leaks or spills.

Article 80 is in regards to hazardous waste, verify storage.

Verify use of trash enclosures and dumpsters. Verify method of litter/debris control.

Form 4.1-1 Non-Structural Source Control BMPs

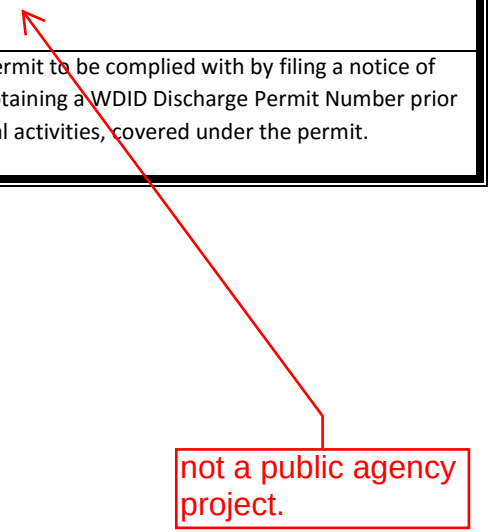
Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	All fire code requirements regarding products storage and safety shall be implemented.
N11	Litter/Debris Control Program	☒	☐	A program shall be implemented to pick up litter and sweep and clean the trash enclosure on a daily basis. Trash enclosures are designed to divert all flows around the enclosure. All dumpsters will have lids installed and will be inspected to ensure that the dumpsters remain covered and leak-proof. The owner shall ensure tenants contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.
N12	Employee Training	☒	☐	Owner shall utilize the attached County brochures for employee training on stormwater best management practices.
N13	Housekeeping of Loading Docks	☒	☐	The loading/unloading of materials will take place at the docks; therefore, n spilled, leaked, or lost during loading/unloading may collect in the soil or o surfaces and have the potential to be carried away by stormwater runoff or area is cleaned. Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. A program shall be implemented to train employees on applicable BMPs and general pollution prevention strategies and objectives. The dock area shall be swept daily and the maintenance policy for the site will address daily maintenance of the area.
N14	Catch Basin Inspection Program	☒	☐	The on-site catch basins shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The owner 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.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Parking lots shall be swept weekly to prevent sediment, garden waste, and trash, or other pollutants from entering on-site drains and public storm channels. Sweeping will be done by a landscape contractor or other contractor provided by the owner.

brochures not provided. How often will training occur.

Verify use onsite. Indicate all locations on exhibit.

Parking lots must be vacuum swept.

N16	Other Non-structural Measures for Public Agency Projects	☐	☒	n/a
N17	Comply with all other applicable NPDES permits	☒	☐	NPDES General Industrial Activities Permit to be complied with by filing a notice of intent and SWPPP with the state and obtaining a WDID Discharge Permit Number prior to commencement of industrial activities, covered under the permit.



Verify use. Indicate all locations on the exhibit.

Verify, see N11 litter implementation.

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)	☒	☐	A painted message "No Dumping-Drains to River" shall be placed on each catch basin. The message shall be inspected annually & repainted as necessary.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	No outdoor material storage shall be allowed at this facility.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	Stormwater flows are designed to flow around waste areas. All dumpster shall have working lids which shall be kept closed 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)	☒	☐	Implement landscape plans consistent with county or city water conservation resolutions, which shall include provision of weather-based controllers, rain shutoff devices, drip irrigation heads and recessed finish grade of all landscaped areas.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscape complies with depressed area requirements.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	Rip-rap proposed to prevent erosion along southerly boundary.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☒	☐	Proposed dock areas to be covered per architectural plans.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☒	☐	Maintenance bays are enclosed within existing buildings.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	n/a
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	n/a

Please state no vehicle washing on site - please include in activity restrictions N2

Enclosure shall have permanent roofing. Provide location and detail on exhibit.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	n/a
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	n/a
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	n/a
S14	Wash water control for food preparation areas	☐	☒	n/a
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	n/a

4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

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: Impervious area for the proposed development is less than average for a development of this nature.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: The proposed development includes an infiltration basin and an underground storage infiltration system to utilize the site's natural infiltration capacity.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: The existing drainage pattern has been mimicked in the site design, directing storm flows in a southerly direction. Proposed BMPs will result in a longer time of concentration than the existing condition.
Disconnect impervious areas: Yes ☒ No ☐ Explanation: On-site storm flows on the site are directed to the proposed on-site infiltration basin and underground storage infiltration system to be mitigated before possible overflow discharges from the site.
Protect existing vegetation and sensitive areas: Yes ☒ No ☐ Explanation: The existing site contains no vegetation or sensitive areas. The proposed development will increase vegetation of the site with proposed landscaping.
Re-vegetate disturbed areas: Yes ☒ No ☐ Explanation: The disturbed area will be stabilized with pavement and landscaping.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: The proposed infiltration basin and underground storage infiltration system is to be excavated only. No compaction is permitted within its limits.
Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: Vegetated swales are not feasible in the site design.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☒ No ☐ Explanation: Landscape areas to be staked off to prevent compaction of these areas.

statement says a swale will be utilized.

This item pertains to conveyance i.e. surface flow vs pipe flow. There is virtually no pipe flow proposed for this project, so this item is essentially included in the design.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P_6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development h rdino County Stormwater Program requires the use of the Rational Method (San Be Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including n, and peak runoff from the project site pre- and post-development using the H pproach. For projects greater than 640 acres (1.0 mi^2), the Rational Method an or such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Revise Form 1-1 to verify stated imperviousness. i.e. State ft^2 of bldg, landscaping, pavement, etc.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA1 DMA A)

1 Project area DA 1 (ft^2): 85,021	**2** Imperviousness after applying preventative site design practices (Imp%): 53%	**3** Runoff Coefficient (Rc): 0.359 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.537 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.795 *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 drawdown 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): 3,969 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 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 drawn in Form 3-1 Item 2*		

The design assumes an imperviousness of 40% of the proposed gravel cover of the southerly portion of the project site.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA1 DMA B)

1 Project area DA 1 (ft^2): 71,772	**2** Imperviousness after applying preventative site design practices (Imp%): 21%	**3** Runoff Coefficient (Rc): 0.176 *$R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.537 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*		
5 Compute P_6, Mean 6-hr Precipitation (inches): 0.795 *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 drawdown 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): 1,643 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 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 drawn in Form 3-1 Item 2*		

Project is not responsible for tributary run-on for water quality purposes. You may elect to include tributary drainage, but this will increase your design capture volume and on-site retention requirement.

Form 4.2-2 Summary of HCOC Assessment

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☐ No ☒

Go to: http://sbcounty.permitrack.com/WAP

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** *Form 4.2-3 Item 12*	**2** *Form 4.2-4 Item 13*	**3** *Form 4.2-5 Item 10*
Post-developed	**4** *Form 4.2-3 Item 13*	**5** *Form 4.2-4 Item 14*	**6** *Form 4.2-5 Item 14*
Difference	**7** *Item 4 – Item 1*	**8** *Item 2 – Item 5*	**9** *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** % *Item 7 / Item 1*	**11** % *Item 8 / Item 2*	**12** % *Item 9 / Item 3*

Form 4.2-3 HCOC Assessment for Runoff Volume

Weighted Curve Number Determination for: Pre-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type								
2a Hydrologic Soil Group (HSG)								
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
Weighted Curve Number Determination for: Post-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1b Land Cover type								
2b Hydrologic Soil Group (HSG)								
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								

5 Pre-Developed area-weighted CN:	**7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN:	**8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): *I_a = 0.2 * Item 8*

11 Precipitation for 2 yr, 24 hr storm (in):
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

13 Post-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet HCOC Requirement, (ft^3):
*V_{HCOC} = (Item 13 * 0.95) – Item 12*

Form 4.2-4 HCOC Assessment for Time of Concentration

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*				Post-developed DA1 *Use additional forms if there are more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*								
2 Change in elevation (ft)								
3 Slope (ft/ft), S_o *= Item 2 / Item 1*								
4 Land cover								
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*								
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*								
7 Cross-sectional area of channel (ft^2)								
8 Wetted perimeter of channel (ft)								
9 Manning's roughness of channel (n)								
10 Channel flow velocity (ft/sec) V_{fps} *= (1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5*								
11 Travel time to outlet (min) T_t *= Item 6 / (Item 10 * 60)*								
12 Total time of concentration (min) T_c *= Item 5 + Item 11*								

13 Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA*

14 Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA*

15 Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ *= (Item 13 * 0.95) – Item 14*

Form 4.2-5 HCOC Assessment for Peak Runoff

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6$_{DMAA}$ + [Item 6$_{DMAB}$ * (Item 1$_{DMAA}$ - Item 5$_{DMAB}$)/(Item 1$_{DMAB}$ - Item 5$_{DMAB}$)* Item 7$_{DMAA/2}$] + [Item 6$_{DMAC}$ * (Item 1$_{DMAA}$ - Item 5$_{DMAC}$)/(Item 1$_{DMAC}$ - Item 5$_{DMAC}$)* Item 7$_{DMAA/3}$]*	**9** Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6$_{DMAB}$ + [Item 6$_{DMAA}$ * (Item 1$_{DMAB}$ - Item 5$_{DMAA}$)/(Item 1$_{DMAA}$ - Item 5$_{DMAA}$)* Item 7$_{DMAB/1}$] + [Item 6$_{DMAC}$ * (Item 1$_{DMAB}$ - Item 5$_{DMAC}$)/(Item 1$_{DMAC}$ - Item 5$_{DMAC}$)* Item 7$_{DMAB/3}$]*	**10** Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6$_{DMAC}$ + [Item 6$_{DMAA}$ * (Item 1$_{DMAC}$ - Item 5$_{DMAA}$)/(Item 1$_{DMAA}$ - Item 5$_{DMAA}$)* Item 7$_{DMAC/1}$] + [Item 6$_{DMAB}$ * (Item 1$_{DMAC}$ - Item 5$_{DMAB}$)/(Item 1$_{DMAB}$ - Item 5$_{DMAB}$)* Item 7$_{DMAC/2}$]*

10 Peak runoff from pre-developed condition confluence analysis (cfs): *Maximum of Item 8, 9, and 10 (including additional forms as needed)*

11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*

14 Peak runoff from post-developed condition confluence analysis (cfs): *Maximum of Item 11, 12, and 13 (including additional forms as needed)*

15 Peak runoff reduction needed to meet HCOC Requirement (cfs): $Q_{p\text{-}HCOC}$ *= (Item 14 * 0.95) – Item 10*

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**.

Form 4.3-1 Infiltration BMP Feasibility

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 ☒

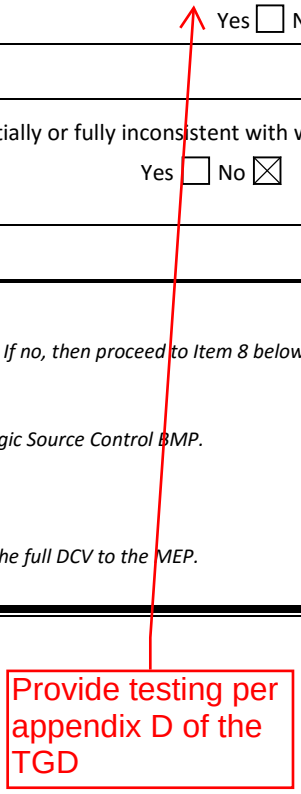
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

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": Yes ☒ 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

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA1)

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 1	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): 0 $V_{retention}$ *=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): 0 $V_{retention}$ *=Sum of Item 12 for all BMPs*			

Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs (DA1)

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): 0 *$V_{retention}$ =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): 0 *$V_{retention}$ = Sum of Item 24 for all BMPs*			
26 Implementation of residential rain barrels/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): 0 *$V_{retention}$ =Sum of Item 28 for all BMPs*			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: 0 *Sum of Items 5, 13, 20, 25 and 29*			

4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

.

Provide infiltration testing, based on Appendix D of the TGD minimum 2 tests.

underground?

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 5,612 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*			
BMP Type *Use columns to the right to 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: Infiltration Basin	DA 1 BMP Type: Infiltration System	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	7	7	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2	2	
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	~~3.5~~	~~3.5~~	
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	14	14	
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	1.25	N/A	
8 Infiltrating surface area, *SA_{BMP}* (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	621	600	
9 Amended soil depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	N/A	N/A	
10 Amended soil porosity	N/A	N/A	
11 Gravel depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	N/A	N/A	
12 Gravel porosity	N/A	N/A	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	1,320	~~525~~	
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	0	3,787	
16 Total Retention Volume from LID Infiltration BMPs (ft^3): 5,632 *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: 100% *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 for the applicable category of development and repeat all above calculations.*			

provide factor of safety sheet from Appendix D of the TGD to calculation this value

Verify

revise per comments on this sheet.

Underground systems have no above ground retention.

For this preliminary report, please commit to a product and provide manufacturer specifications. This system can be changed in the final report (provided there is adequate volume retention).

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs (DA1 & DA2)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3): 0

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 and 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

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): 0 *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): *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.*

Form 4.3-6 Volume Based Biotreatment – 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*			

Form 4.3-7 Volume Based Biotreatment – 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

Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary 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 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) 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

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

1 Total LID DCV for the Project DA-1 (ft^3): 5,612 *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): 5,632 *Copy Item 16 in Form 4.3-3* verify

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

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs

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)

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).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regula maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQM 1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQM detailed Operation and Maintenance Plan for all aintenance Agree jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

provide documentation for the owner in appendix of this WQMP

Provide summary

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

include the BMP names

how often should they re-educate themselves/look for updated material.

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
N1	Owner	The owner shall familiarize himself 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 tenants through lease agreements.	Educational materials should be kept onsite for reference.
N2	Owner	Tenants shall not be allowed to discharge chemicals, chemical residues, wastewater or other prohibited discharges listed in the City and County Ordinances, to the outside, paved areas of the site.	N/A
N3	Owner	Landscape crews shall inspect the irrigation system after each landscape procedure and shall report all drainage problems to the owner. All routine landscaping maintenance shall be done in conformance with BMP Factsheet SC-11 in section 6.4.	Be inspected after each landscape procedure.
N4	Owner	Landscape crews shall inspect the catch basins after each landscape procedure and shall report all drainage problems to the owner. The owner shall also check the basins for erosion and sediment buildup, after storm events. Owner to contract to have underground storage/infiltration system inspected and maintained in accordance with the Operations and Maintenance Agreement.	Be inspected after each landscape procedure.
N5	Owner	The owner/tenant will file appropriate hazardous material disclosures, if any storage is conducted, w/the City and County Fire.	N/A

how will the tenants receive the restrictions.

list them for the owner

what content/portion from this manual will be implemented?

be specific to this project.

Verify onsite

N6	Owner	The owner shall ensure that all business activities at the site comply with the City of Fontana's stormwater ordinance through the implementation of BMPs.	N/A
N7	Owner	Any hazardous material storage, if any, will require a business/emergency response plan as required by the San Bernardino County Fire Hazmat.	N/A
N9	Owner	The owner/tenant will file appropriate hazardous material disclosures, if any storage is conducted, w/ the City and County Fire.	
	Owner	A program shall be implemented to pick up litter and sweep and clean the trash enclosure on a daily basis. Trash Enclosure are designed to divert all flows around the enclosure. All dumpsters will have lids installed and will be inspected to ensure that the dumpsters remain covered and leak-proof. The owner shall ensure tenants contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.	Trash enclosure should be kept clean from litter and be swept on a daily basis.
N12	Owner	Owner shall utilize the attached County brochures for employee training on stormwater runoff best management practices.	Brochures from employee training should be kept on site for reference.
N13	Owner	The loading/unloading of materials will take place at the docks; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by stormwater runoff or when the area is cleaned. Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. A program shall be implemented to train employees on applicable BMPs and general pollution prevention strategies and objectives. The dock area shall be swept daily and the maintenance policy for the site will address daily maintenance of the area.	Docks areas need to be swept on a daily basis.
N14	Owner	The on-site catch basins shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The owner 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.	Shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation.
N15	Owner	Parking lots shall be swept weekly to prevent sediment, garden waste, and trash, or other pollutants from entering on-site drains and public storm channels. Sweeping will be done by a landscape contractor or other contractor provided by the owner.	Shall be swept weekly.

Verify onsite

Verify onsite

revise to reflect this WQMP

how often will training occur

provide brochures

Vacuum sweeping required.

Verify use.

N17	Owner	NPDES General Industrial Activities Permit to be complied with by filing a notice of intent and SWPPP with the state and obtaining a WDID Discharge Permit Number as needed for any operations covered under the general industrial permit.	SWPPP needs to be kept onsite, as needed.
S1	Owner	A painted message "No Dumping-Drains to River" shall be placed on each catch basin. The message shall be inspected annually & repainted as necessary.	Shall be inspected annually and repainted as necessary.
S3	Owner	Storm water flows are directed around dumpster shall have working lids which mes.	N/A
S4	Owner	Implement landscape plans consistent with county or city water conservation resolutions, which shall include provision of weather-based controllers, rain shutoff devices, drip irrigation heads and recessed finish grade of all landscape areas.	Be inspected after each landscape procedure.
S5	Owner	Landscape complies with depressed area requirements.	Be inspected after each landscape procedure.
S8	Owner	Maintenance bays are enclosed within existing buildings.	N/A
SC-30	Owner	Outdoor Loading/Unloading. Keep loading dock areas clean and orderly. Remove debris in a timely fashion.	Sweep loading dock areas weekly to minimize accumulated waste from being discharge into storm system.
SC-43	Owner	Parking/Storage Area Maintenance. Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.	Sweep parking lot weekly to minimize accumulated waste from being discharge into storm system.
SC-44	Owner	Drainage System Maintenance. Immediate repair of any deterioration threatening structural integrity. Clean catch basin sumps whenever >25% full.	At the beginning of the wet season and as necessary.
SD-13	Owner	Storm Drain Signage. Stencil sign containing brief statement that prohibits dumping.	Shall be inspected annually and repainted as necessary.
SD-32	Owner	Trash Enclosures. Keep loading dock areas clean and orderly. Remove debris in a timely fashion.	Sweep trash enclosures weekly to minimize accumulated waste from being discharge into storm

and/or fixed weekly

Verify onsite.

what with the owners be inspected.

identify the requirements.

Vacuum Sweeping required, verify frequency.

?

Verify use, call out on exhibit and provide detail

Verify use as per previous sections in this report. Call out location on exhibit.

			system.
TC-11 Infiltration Basin	Owner	Observe drawdown time for a storm after completion or following maintenance of the facility, to confirm that the drawdown time (48 hrs) has been obtained. Remove accumulated sedimentation from basin bottom whenever solids accumulate > 0.25' and remove ponded water that remains after 48 hours.	Quarterly and after extreme events
MP-52	Owner	Drain Insert. Inspect for sediment buildup and proper functioning. Verify that all stormwater is entering the unit and does not leak around the perimeter. Remove sediment whenever solids exceed 25% of storage ne for signs of illegal dumping into these	At the beginning of the wet season and as necessary.
Underground Storage Infiltration System	Owner	storage/infiltration system. Observe drawdown time for a storm after completion or following maintenance of the facility, to confirm that the drawdown time (48 hrs) has been obtained.	Quarterly and after extreme events

Verify use, call out on exhibit and provide detail

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

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 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.

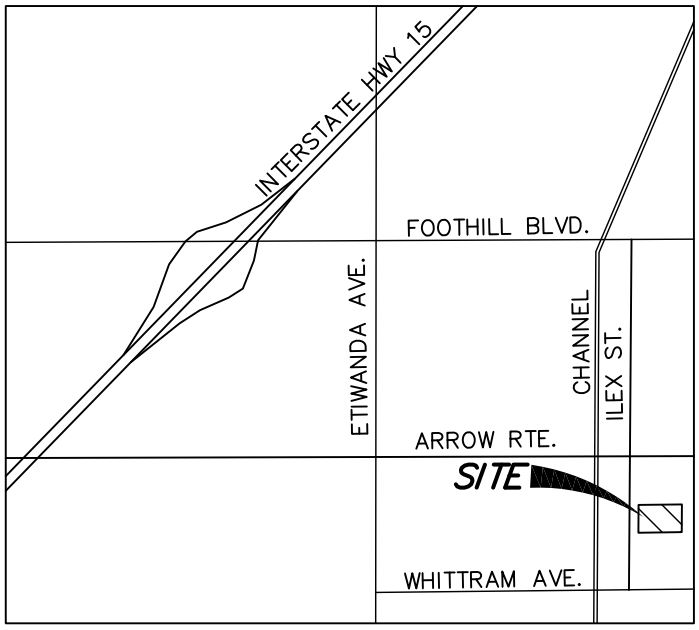
6.3 Post Construction

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

6.4 Other Supporting Documentation

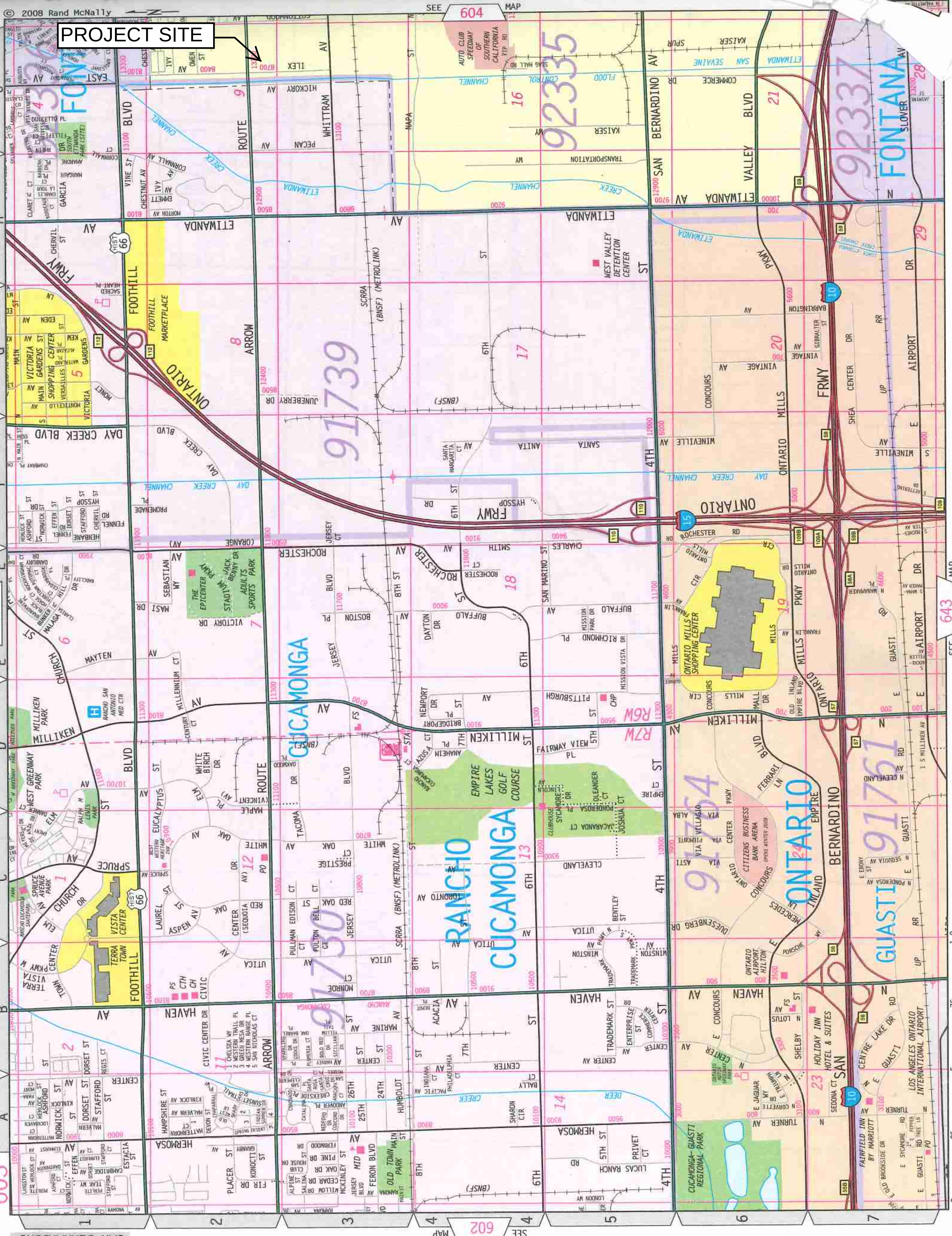
- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreements

6.1
Site Plan & Drainage Plan



VICINITY MAP

NTS



PROJECT SITE
© 2008 Rand McNally
SEE 604 MAP
SEE 573 MAP
SEE 643 MAP
SEE 602 MAP
603
SAN BERNARDINO
RANCHO CUCAMONGA
CUCAMONGA
ONTARIO
FONTANA
GUASTI
91739
91730
92335
91761
91764
92337
ONTARIO FRWY
SAN BERNARDINO FRWY
FOOTHILL BLVD
ARROW ROUTE
ETIWANDA AV
MILLIKEN AV
HAVEN AV
4TH ST
6TH ST
VICTORIA GARDENS SHOPPING CENTER
FOOTHILL MARKETPLACE
ONTARIO MILLS SHOPPING CENTER
EMPIRE LAKES GOLF COURSE
TERRA VISTA TOWN CENTER
EPICENTER
WEST VALLEY DETENTION CENTER
AUTO CLUB SPEEDWAY OF SOUTHERN CALIFORNIA
CITIZENS BUSINESS BANK ARENA
CUCAMONGA-GUASTI REGIONAL PARK
LOS ANGELES ONTARIO INTERNATIONAL AIRPORT
HOLIDAY INN HOTEL & SUITES
FAIRFIELD INN BY MARRIOTT
ONTARIO AIRPORT HILTON
miles 1 in. = 2400 ft.

6.2
Electronic Data Submittal

6.3
Post Construction

see previous comments be specific to this WQMP

OPERATIONS and MAINTENANCE (O&M) PLAN

For:

8575 Ilex St.

Project Location:
8575 Ilex St.
Fontana, CA 92335
APN 0229-202-14-0-000

Prepared for:
-

Prepared by:
Kevin J. Richer, RCE 43714
Land Development Design Company, LLC
2313 E. Philadelphia Street, Unit "F"
Ontario, CA 91761
(909) 930-1466
kevin.richer@lddc.net

Date Prepared: May 06, 2019

Table of Contents

Attachment

A. Educational Material
B. Inspection Form
C. Completed Inspection Forms

Responsible Party Information:

Name: -

Table 1. BMP Implementation, Maintenance, and Inspection Table

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Non-Structural Source Control BMPs			
Yes	**N1. Education for Property Owners, Tenants and Occupants** Educational materials will be provided to the owner. The Owner will provide educational materials related to the protection of water quality to their staff, sub- contractors, etc. The education materials will be provided by the Owner upon occupancy and annually thereafter. A list of the BMPs selected for this project can be found in Attachment "A".	Upon occupancy & annually thereafter.	*Owner*

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N2. Activity Restriction** There are no CC&Rs for the project. The Owner will include in the documents given to employees, tenants, owners, etc. the prohibited activities listed below. The maintenance contractor will be instructed to prohibit these activities. The owner is responsible to enforce these restrictions until such time as the building is sold. The dumping of any waste into drainage areas is prohibited. Waste disposal shall be limited to approve receptacles. Blowing or sweeping of debris such as grass clippings, plant trimmings, dead leaves, etc. into the drainage areas or streets is prohibited. All vehicle/equipment repairs shall be done within the proposed maintenance building. Vehicle/equipment repairs are prohibited outdoors. Outdoor storage is prohibited. Vehicle washing is prohibited.	Upon occupancy & annually thereafter.	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N3. Common Area Landscape Management** The Owner will hire a qualified landscape contractor to maintain the landscaping onsite. The landscaping is designed to minimize erosion and to promote water conservation. The maintenance visits shall be conducted biweekly at a minimum. The duties will include maintenance of the landscape, removal of debris, and removal of dead vegetation. The inspections of the irrigation system will be checked for broken pipes, overspray, broken or clogged heads, and proper spray pattern of each head. The timers shall be checked seasonally, at a minimum, to adjust for seasonal needs of watering to prevent overwatering. The rain sensors also need to be inspected to verify proper function.	Weekly at minimum.	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N4. BMP Maintenance** BMP implementation, operation, and maintenance are the owner's responsibility. This section provides the maintenance and frequency required for each BMP. In addition, implementation, operations, and maintenance will be implemented as specified in this Table. The owner shall use the "Record of BMP Implementation, Maintenance, and Inspection" Form in Attachment B. The Owner shall be responsible for completing and maintaining inspection reports that include the date of the inspection, the name of the person who performed the inspection, the signature of the person who performed the inspection, the name of the bmp inspected/maintained, a description of the Implementation, Maintenance, and Inspection Activity Performed. The Owner will be responsible for completing and maintaining inspection forms of their activities in Attachment C. Records shall be maintained continuously. The records shall be available for at least 5 years for inspection upon request from the City Engineer, Regional Water Quality Control Board, or the designated City Representative.	As specified in this table.	Owner
No	**N5. Title 22 CCR Compliance** Hazardous waste are not anticipated	N/A	N/A
No	**N7. Spill Contingency Plan** Fluids and hazardous wastes are not anticipated.	N/A	N/A
No	**N8. Underground Storage Tank Compliance** There will be no underground storage tanks.	N/A	N/A
No	**N9. Hazardous Materials Disclosure Compliance** Hazardous materials are not anticipated.	N/A	N/A

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N10. Uniform Fire Code Implementation** The Owner will meet compliance with Article 80 of the Uniform Fire Code enforced by a fire protection agency.	Annually at a minimum.	Owner
Yes	**N11. Common Area Litter Control** The Owner shall develop a plan to clean-up site for litter on a daily basis.	Site litter clean-up shall be done daily.	Owner
Yes	**N12. Employee Training** The owner will develop a training program for staff that includes the use of the educational materials; training on litter patrol, contingency plans for spill clean-up, housekeeping of the site, etc. The owner is responsible to supply education materials at the initial time of employment and on an annual basis.	Upon initial employment and annually thereafter.	Owner
Yes	**N13. Housekeeping of Loading Docks** Loading docks shall be swept daily to remove sediment and other debris; and spills will be cleaned immediately. The owner will be responsible for training employees.	Daily	Owner
Yes	**N14. Common Area Catch Basin Inspection** The Owner will hire a qualified maintenance contractor to inspect the drain inlets and inlet filter's (see manufacturer recommendations) prior to, during, and after the rainy season to assure that they are clean, working properly, free of standing water, and unobstructed from debris, sediment, etc.. The Owner will be responsible to contract with a qualified maintenance contractor to perform these inspections and maintenance services.	The drain inlets and inlet filter's (see manufacturer recommendations) shall be inspected/maintained prior to, during, and after the rainy season at a minimum.	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N15. Street Sweeping Private Streets and Parking Lots** The site's parking lot will be swept bi-weekly, at a minimum frequency, to remove sediment and other debris. The owner will contract with a qualified contractor to perform this BMP.	Bi-weekly at a minimum.	Owner
No	**N17. Comply with all other applicable NPDES permits** NPDES General Industrial Activities Permit to be complied with by filing a SWPPP with the state and obtaining a WDID Discharge Permit number as needed.	SWPPP needs to be kept onsite, as needed.	Owner
	Structural Source Control BMPs		
Yes	**Provide Storm Drain System Stenciling and Signage** Inspect Storm Drain System Stenciling and Signage. Replace as necessary. The drain inlet shall be stenciled "NO DUMPING-DRAINS TO OCEAN"	Annually at a minimum	Owner
No	**Design and Construct Outdoor Material Storage Areas to Reduce Pollutant Introduction** The will be no outdoor storage areas	N/A	N/A
Yes	**Design and Construct Trash and Waste Storage Areas to Reduce Pollutant Introduction** The trash enclosure was selected and designed to reduce pollution and dispose of the waste in a correct manner. The trash bins shall have solid lids. Furthermore, the trash enclosure was designed to prevent storm water runoff from entering or flowing through.	The Trash Enclosure shall be inspected and cleaned weekly at a minimum. The Dumpster pick-up shall be scheduled weekly at minimum.	Owner
Yes	**Use Efficient Irrigation Systems & Landscape Design** Will employ rain-triggered shutoff devices to prevent irrigation after precipitation. Implement landscape plans consistent with county or city water conservation resolutions, which may include provision of water sensors, programmable irrigation times.	The irrigation system and landscape shall be maintained at a weekly interval at a minimum.	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**Protect Slopes and Channels and Provide Energy Dissipation** Rip-rap shall be inspected to ensure it is free of sediment building and erosion. There are no proposed or existing slopes on the project site.	Rip-rap shall be inspected/maintained prior to, during, and following the rainy season at a minimum.	Owner
No	**Maintenance Bays** There will be no maintenance bays.	N/A	N/A
No	**Vehicle Wash Areas** There will be no vehicle washing areas	N/A	N/A
No	**Outdoor Processing Areas** There are no outdoor processing areas.	N/A	N/A
No	**Equipment Wash Areas** There are no equipment wash areas.	N/A	N/A
No	**Fueling Areas** There are no fueling areas.	N/A	N/A
No	**Hillside Landscaping** There are no proposed or existing slopes on the project site.	N/A	N/A
No	**Wash Water Controls for Food Preparation Areas** There are no food preparation area.	N/A	N/A
No	**Community Car Wash Racks** There is no community car wash racks.	N/A	N/A
Yes	**Inlet Filters** The inlet filters shall be inspected, cleaned, and replaced as necessary. The debris shall be removed and disposed of in proper receptacles. See manufactures maintenance recommendations in Section 6.4 of the WQMP.	The FlexStorm Inlet Filters shall be inspected/maintained prior to, during, and following the rainy season at a minimum.	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance, and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
	Infiltration BMPs		
Yes	**Infiltration Basin** Observe drawdown time for a storm after completion or following maintenance of the facility, to confirm that the drawdown time (48 hrs) has been obtained. Remove accumulated sedimentation from basin bottom whenever solids accumulate > 0.25' and remove ponded water that remains after 48 hours.	Quarterly and after extreme events	Owner
Yes	**Underground Storage Infiltration System** The Underground Infiltration Pipe System shall be inspected and maintained by a qualified maintenance contractor to ensure they are clean, free of standing water, working properly, and unobstructed from debris, sediment, etc. Operation, Inspections, and Maintenance shall be performed as specified in the Underground Infiltration System Inspection/Maintenance section. See Section 6.4 of the WQMP for additional inspection and maintenance recommendations.	The Underground Infiltration/Detention System shall be inspected/maintained prior to, during, and after the rainy season at a minimum. During the first year of operation, the Underground Infiltration Pipe System shall be inspected every 6 months at a minimum. After the first 6 months, the Underground Infiltration Pipe System shall be inspected yearly at a minimum. The Underground Infiltration Pipe System shall be maintained when 3 inches of sediment accumulate throughout the length of a row of pipe.	Owner

Regulatory Permits

This O&M Plan has been prepared in conjunction with the Water Quality Management Plan (WQMP) for Low Impact Development (LID) prepared for this project. Furthermore, this O&M Plan is in accordance with the Water Quality Management Plan (WQMP) for the Santa Ana River watershed located within San Bernardino County (Order No. R8-2010-0033, NPDES Permit No. CAS618033.

Forms to Record BMP Implementation, Maintenance, and Inspection

The Owner shall be responsible for BMP Implementation, Maintenance, and Inspection. See Table 1 for BMP implementation, maintenance, and inspection requirements. The form "Record of BMP Implementation, Maintenance, and Inspection" in Attachment B will be used to record implementation, maintenance, and inspection of BMPs. The inspection form shall include the date of the inspection, the name of the person who performed the inspection, the signature of the person who performed the inspection, the name of the bmp inspected/ maintained, a description of the implementation, maintenance, and inspection activity performed. Completed forms shall be kept in Attachment C. Records shall be maintained continuously.

Recordkeeping

All records must be maintained for at least five (5) years and must be made available for review upon request.

Employee Training Program

The Owner will develop a training program for staff that includes the use of the educational materials; training on litter patrol, contingency plans for spill clean-up, housekeeping of the site, etc. The owner is responsible to supply education materials at the time of initial employment and on an annual basis.

Revisions to O&M Plan

Revisions to the O&M Plan in the event of a substantial change to the project due to construction modifications or uses at the site will be the responsibility of the Property Owner. Modifications to the O&M Plan may be necessary if project changes result in a potential increase in pollutant discharge to storm water or if inspection and monitoring indicates that existing BMPs are ineffective. The Property Owner shall secure the services of the firm that prepared the original O&M Plan or other qualified person(s) to make any appropriate changes, additions, or deletions. Any revisions shall require approval by the local government that has jurisdiction over the subject property.

Funding

The Owner, as listed below, will be responsible for funding the installation and on-going maintenance for the BMPs. An appropriate mechanism for the long-term operation and maintenance will be developed by the Owner.

Owner/Responsible Party Information:

-

Attachment A:

Educational Material

Educational Materials

Practical information will be provided to the owner/operators of the facility on general good housekeeping practices that contribute to protection of storm water quality. Environmental awareness education materials are made available by the municipalities. See list attached for titles of reference materials provided to the operators prior to transfer.

Following are the educational materials included in this WQMP:

- Underground Pipe Storage System Inspection/Maintenance
- Flexstorm Inlet Filters Operation & Maintenance Plan
- Your Facility may need a Storm Water Permit
- SC-10 Non-Storm Water Discharges
- SC-11 Spill-Prevention, Control & Cleanup
- SC-30 Outdoor Loading / Unloading
- SC-41 Building & Grounds Maintenance
- SC-42 Building Repair and Construction
- SC-43 Parking Area Maintenance
- SC-44 Drainage System Maintenance
- SC-60 Housekeeping Practices
- SC-73 Landscape Maintenance
- SD-10 Site Design & Landscape Planning
- SD-11 Roof Runoff Controls
- SD-12 Efficient Irrigation
- SD-13 Storm Drain System Signs
- SD-32 Trash Enclosures
- TC-11 Infiltration Basin
- MP-52 Drain Insert

Public Education- Educational materials shall be provided to the owner or tenant concerning good housekeeping practices, and illegal dumping. These materials can be obtained from the city, other local agencies, and via the internet at http://www.cabmphandbooks.com/. A copy has been included in Section 6.4 of the WQMP.

Attachment B:

Inspection Form

RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

Attachment C:

Completed Inspection Forms

6.4
Other Supporting Documentation

UNDERGROUND STORAGE INFIL. SYSTEM

8'ϕ PERF. CMP ENCASED IN GRAVEL; SEE WQMP EXHIBIT

$V_{TRENCH} = (50\,LF)(12\,LF)(10\,LF) = 6{,}000\ CF$

$V_{PIPE} = \frac{\pi (8\,LF)^2}{4}(46\,LF) = 2{,}312\ CF$

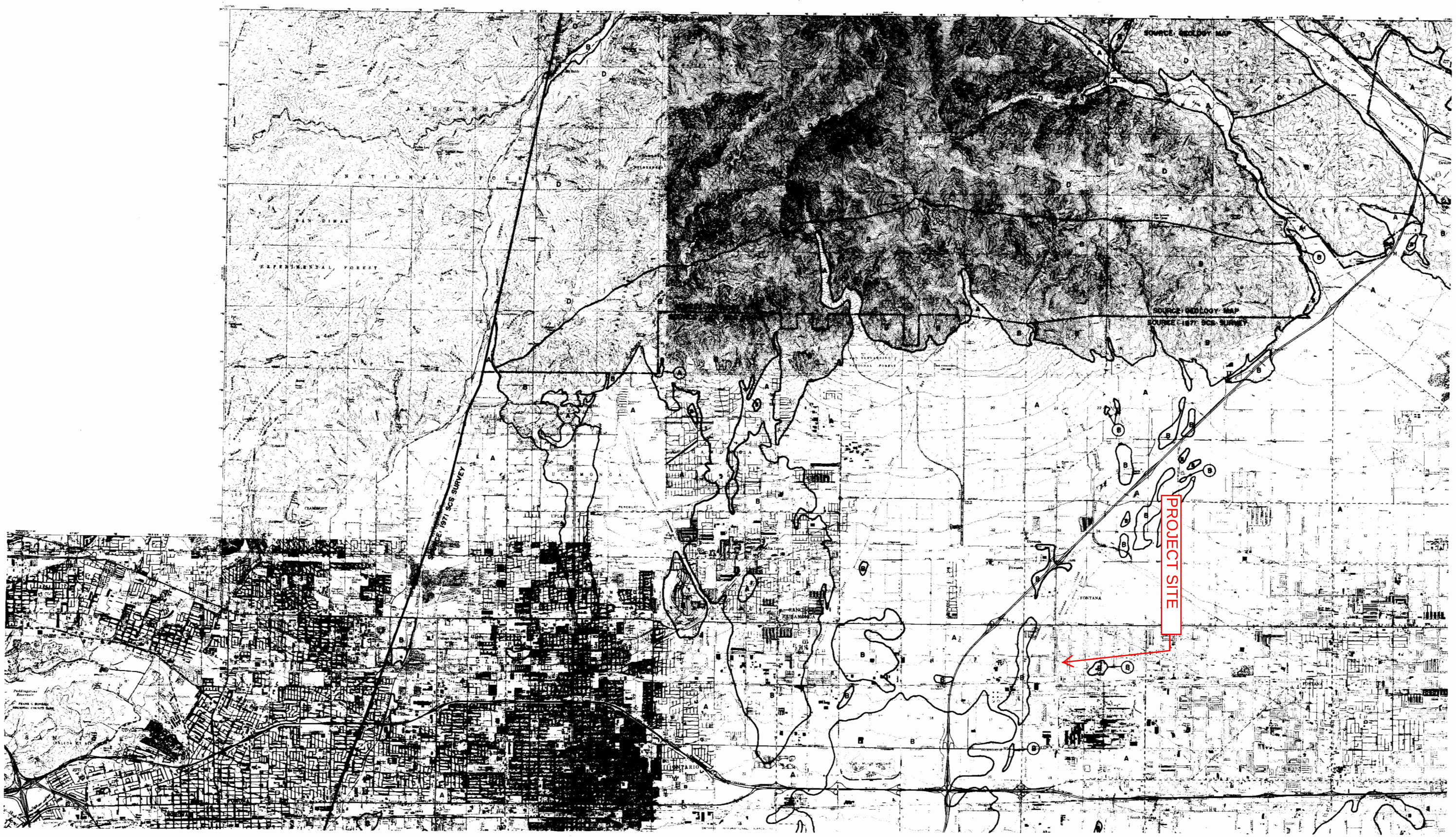
$V_{GRAVEL} = (40\%)(6000 - 2312) = 1{,}475\ CF$

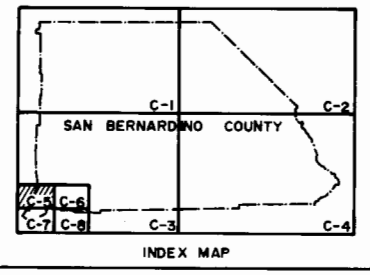
$V_{SYSTEM} = 2312 + 1475 = 3{,}787\ CF$

Manufactured system required.

LAND DEVELOPMENT DESIGN COMPANY
2313 E. Philadelphia St., Ste. F
ONTARIO, CA 91761
(909) 930-1466
FAX (909) 930-1468
PLANNING • CIVIL • SURVEYING

DATE:	SCALE:	SHEET:	JOB NO.	BMP DESIGN
			6054	





INDEX MAP

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

SCALE 1:48,000

SCALE REDUCED BY 1/2

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-A AREA

FIGURE C-13

NOAA Atlas 14, Volume 6, Version 2
Location name: Fontana, California, US*
Latitude: 34.0987°, Longitude: -117.5046°
Elevation: 1159 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point 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	0.110 (0.092-0.134)	0.145 (0.121-0.176)	0.193 (0.160-0.235)	0.232 (0.191-0.285)	0.289 (0.229-0.367)	0.333 (0.259-0.433)	0.380 (0.288-0.506)	0.430 (0.317-0.590)	0.500 (0.353-0.716)	0.557 (0.380-0.827)
10-min	0.158 (0.132-0.192)	0.208 (0.173-0.253)	0.276 (0.229-0.336)	0.333 (0.274-0.409)	0.414 (0.329-0.526)	0.478 (0.371-0.620)	0.545 (0.413-0.726)	0.616 (0.454-0.845)	0.717 (0.506-1.03)	0.799 (0.544-1.19)
15-min	0.191 (0.159-0.232)	0.252 (0.210-0.306)	0.334 (0.277-0.407)	0.403 (0.332-0.495)	0.500 (0.397-0.636)	0.578 (0.449-0.750)	0.659 (0.500-0.878)	0.745 (0.549-1.02)	0.867 (0.612-1.24)	0.966 (0.658-1.43)
30-min	0.280 (0.233-0.339)	0.368 (0.306-0.447)	0.488 (0.405-0.594)	0.589 (0.485-0.723)	0.731 (0.581-0.929)	0.844 (0.657-1.10)	0.963 (0.730-1.28)	1.09 (0.803-1.49)	1.27 (0.895-1.82)	1.41 (0.962-2.10)
60-min	0.408 (0.340-0.495)	0.537 (0.447-0.652)	0.713 (0.591-0.867)	0.860 (0.707-1.06)	1.07 (0.848-1.36)	1.23 (0.958-1.60)	1.41 (1.07-1.87)	1.59 (1.17-2.18)	1.85 (1.31-2.65)	2.06 (1.40-3.06)
2-hr	0.628 (0.523-0.761)	0.809 (0.673-0.982)	1.05 (0.873-1.28)	1.26 (1.03-1.54)	1.54 (1.22-1.96)	1.77 (1.37-2.29)	2.00 (1.52-2.67)	2.25 (1.66-3.09)	2.60 (1.84-3.72)	2.88 (1.96-4.28)
3-hr	0.808 (0.673-0.980)	1.03 (0.860-1.26)	1.33 (1.11-1.62)	1.58 (1.30-1.95)	1.93 (1.54-2.45)	2.20 (1.71-2.86)	2.49 (1.89-3.31)	2.79 (2.05-3.82)	3.21 (2.26-4.59)	3.54 (2.41-5.25)
6-hr	1.17 (0.976-1.42)	1.50 (1.24-1.82)	1.92 (1.59-2.34)	2.27 (1.87-2.78)	2.74 (2.18-3.48)	3.11 (2.42-4.03)	3.48 (2.64-4.64)	3.87 (2.85-5.30)	4.40 (3.10-6.30)	4.82 (3.28-7.14)
12-hr	1.57 (1.31-1.90)	2.03 (1.69-2.46)	2.61 (2.17-3.18)	3.08 (2.53-3.78)	3.70 (2.94-4.70)	4.16 (3.23-5.40)	4.61 (3.50-6.15)	5.08 (3.74-6.96)	5.69 (4.02-8.15)	6.16 (4.20-9.14)
24-hr	2.11 (1.87-2.43)	2.79 (2.47-3.22)	3.65 (3.22-4.22)	4.31 (3.77-5.03)	5.17 (4.38-6.23)	5.80 (4.81-7.13)	6.42 (5.20-8.08)	7.03 (5.54-9.10)	7.82 (5.91-10.5)	8.41 (6.15-11.7)
2-day	2.60 (2.30-2.99)	3.52 (3.11-4.06)	4.70 (4.14-5.43)	5.63 (4.93-6.57)	6.88 (5.82-8.28)	7.81 (6.48-9.60)	8.73 (7.07-11.0)	9.67 (7.62-12.5)	10.9 (8.25-14.7)	11.9 (8.67-16.5)
3-day	2.83 (2.50-3.26)	3.89 (3.44-4.49)	5.27 (4.65-6.10)	6.40 (5.60-7.46)	7.93 (6.71-9.55)	9.10 (7.55-11.2)	10.3 (8.33-13.0)	11.5 (9.07-14.9)	13.2 (9.97-17.8)	14.5 (10.6-20.2)
4-day	3.08 (2.73-3.55)	4.28 (3.78-4.93)	5.85 (5.16-6.77)	7.15 (6.25-8.33)	8.92 (7.55-10.7)	10.3 (8.54-12.7)	11.7 (9.49-14.8)	13.2 (10.4-17.1)	15.2 (11.5-20.5)	16.8 (12.3-23.4)
7-day	3.59 (3.18-4.14)	5.01 (4.43-5.78)	6.90 (6.09-7.99)	8.47 (7.41-9.88)	10.6 (9.01-12.8)	12.3 (10.2-15.2)	14.1 (11.4-17.8)	15.9 (12.6-20.6)	18.5 (14.0-24.9)	20.5 (15.0-28.6)
10-day	3.91 (3.46-4.50)	5.48 (4.84-6.32)	7.58 (6.68-8.77)	9.32 (8.16-10.9)	11.8 (9.95-14.2)	13.7 (11.3-16.8)	15.6 (12.7-19.7)	17.7 (14.0-23.0)	20.6 (15.6-27.8)	22.9 (16.8-32.0)
20-day	4.53 (4.01-5.22)	6.45 (5.70-7.44)	9.05 (7.98-10.5)	11.2 (9.83-13.1)	14.3 (12.1-17.2)	16.8 (13.9-20.6)	19.3 (15.7-24.3)	22.1 (17.4-28.6)	25.9 (19.6-34.9)	29.0 (21.2-40.4)
30-day	5.34 (4.73-6.15)	7.65 (6.77-8.83)	10.8 (9.53-12.5)	13.5 (11.8-15.7)	17.3 (14.6-20.8)	20.3 (16.8-25.0)	23.5 (19.0-29.6)	26.9 (21.2-34.9)	31.8 (24.1-42.9)	35.8 (26.2-49.9)
45-day	6.30 (5.58-7.26)	9.04 (7.99-10.4)	12.8 (11.3-14.8)	16.0 (14.0-18.7)	20.6 (17.4-24.8)	24.3 (20.1-29.9)	28.2 (22.9-35.6)	32.5 (25.6-42.1)	38.6 (29.2-52.0)	43.5 (31.8-60.8)
60-day	7.33 (6.49-8.44)	10.4 (9.23-12.0)	14.8 (13.0-17.1)	18.4 (16.1-21.5)	23.8 (20.1-28.6)	28.1 (23.3-34.5)	32.7 (26.5-41.2)	37.7 (29.7-48.8)	44.9 (34.0-60.6)	50.9 (37.2-71.0)

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

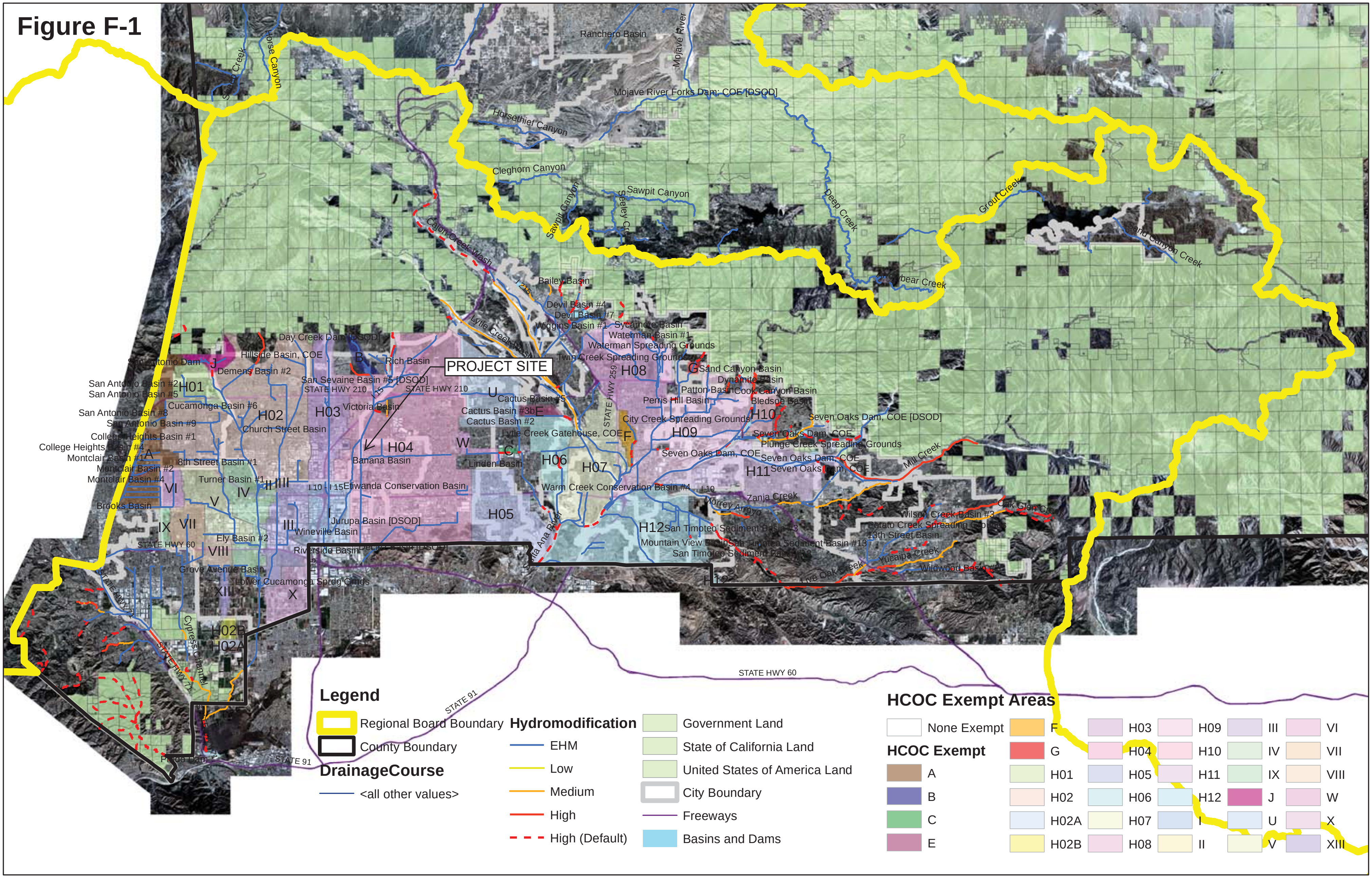
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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.

Back to Top

PF graphical

Figure F-1



PROJECT SITE
Legend
Regional Board Boundary
County Boundary
DrainageCourse
<all other values>
Hydromodification
EHM
Low
Medium
High
High (Default)
Government Land
State of California Land
United States of America Land
City Boundary
Freeways
Basins and Dams
HCOC Exempt Areas
None Exempt
HCOC Exempt
A
B
C
E
F
G
H01
H02
H02A
H02B
H03
H04
H05
H06
H07
H08
H09
H10
H11
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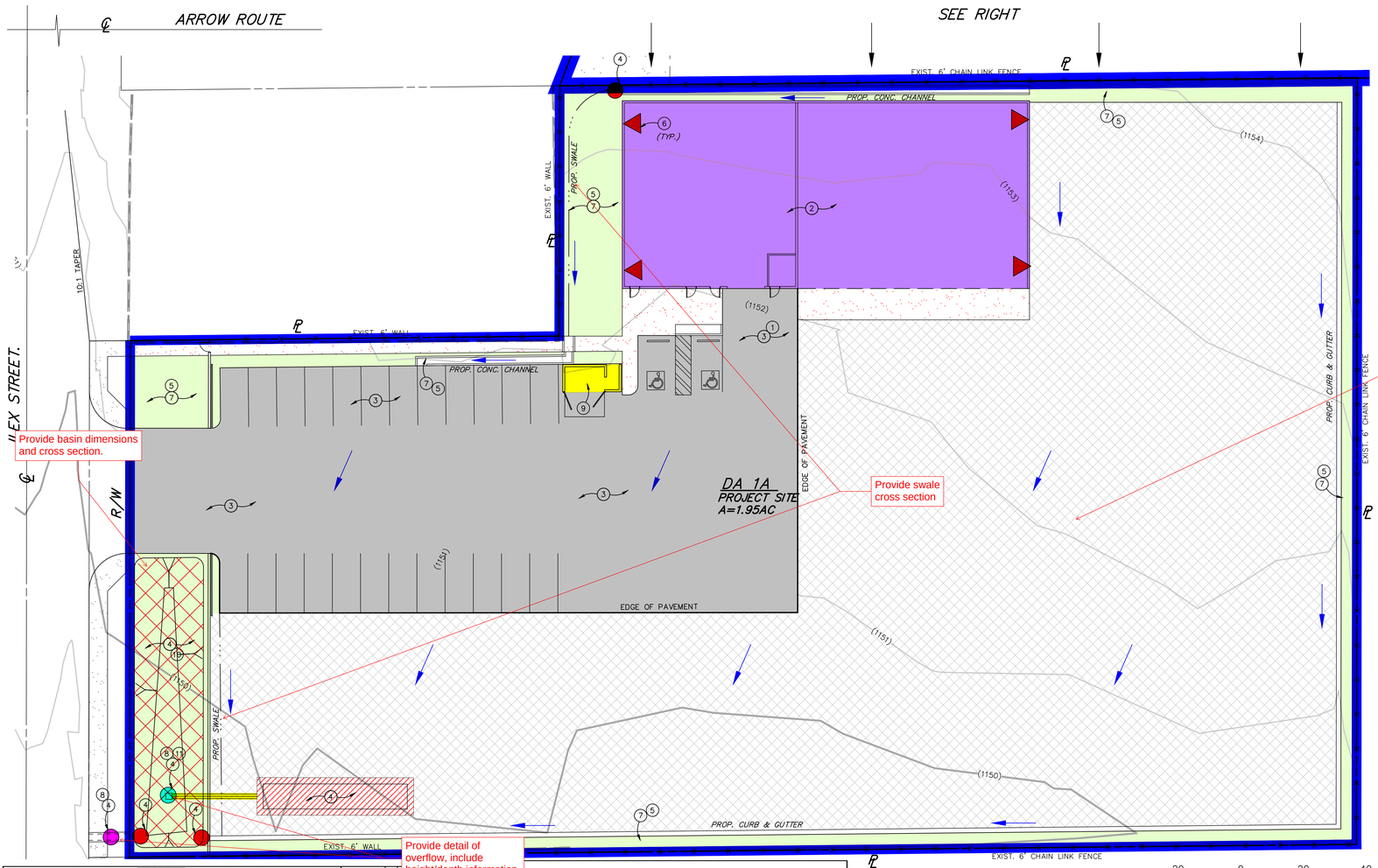
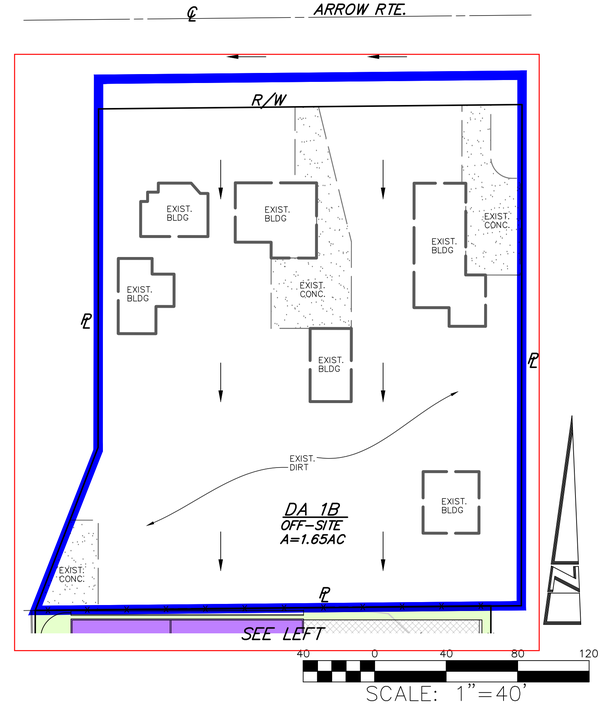
XIII
STATE HWY 60
STATE 91
STATE HWY 210





STORAGE VOLUME		
AREA	DCV REQ'D	VOL. PROV.
DA 1	5,612 CF	5,632 CF

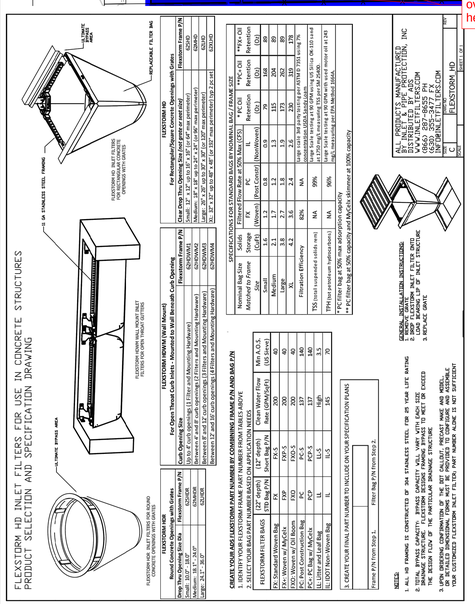
BMP LEGEND

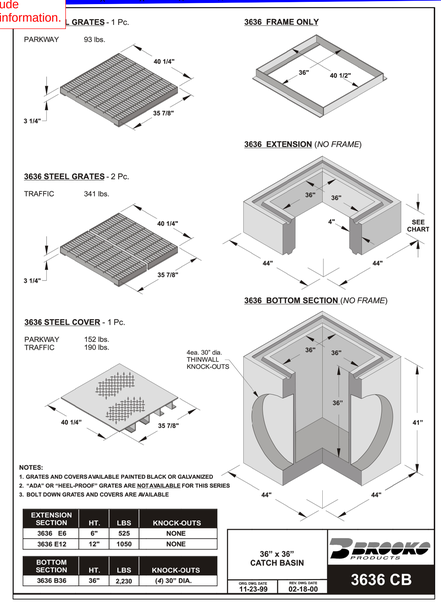
1	SC-30	OUTDOOR LOADING/UNLOADING
2	SC-42	BUILDING REPAIR AND CONSTRUCTION
3	SC-43	PARKING/STORAGE AREA MAINTENANCE
4	SC-44	DRAINAGE MAINTENANCE
5	SC-73	LANDSCAPE MAINTENANCE
6	SD-11	ROOF RUNOFF CONTROLS
7	SD-12	EFFICIENT IRRIGATION
8	SD-13	STORM DRAIN SIGNAGE
9	SD-32	TRASH ENCLOSURES
10	TC-11	INFILTRATION BASIN
11	MP-52	DRAIN INSERT

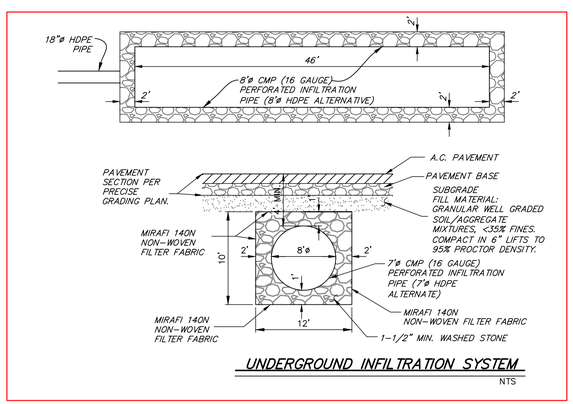
SC-10	NON-STORMWATER DISCHARGES
SC-11	SPILL PROTECTION, CONTROL AND CLEANUP
SC-41	BUILDING & GROUND MAINTENANCE
SC-60	HOUSEKEEPING PRACTICES
SD-10	SITE DESIGN & LANDSCAPE PLANNING

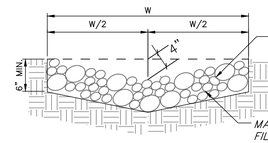
LEGEND

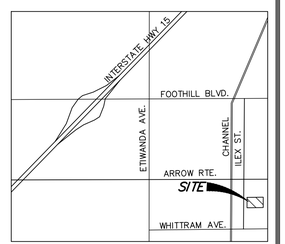
- LANDSCAPE
- AC PAVEMENT
- CONCRETE/SIDEWALK
- BUILDING
- TRASH ENCLOSURE
- UNDERGROUND STORAGE INFILTRATION SYSTEM
- INFILTRATION BASIN
- DRAINAGE AREA BOUNDARY
- PROP. STORM DRAIN
- DRAINAGE FLOW
- ROOF DRAIN
- PROP. INLET W/ FILTER
- PROP. RIP-RAP PAD
- PROP. UNDERWALK DRAIN











REGISTERED PROFESSIONAL ENGINEER
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No. 43714
Exp. 3/31/2021
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STATE OF CALIFORNIA

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REVISIONS:

PREPARED UNDER THE SUPERVISION OF:

KEVIN J. RICHER
R.C.E. 43714 LIC. EXP. 3/31/2021 DATE

APPROVED BY:

DATE

WQMP EXHIBIT

SITE LOCATION:
8575 ILEX ST.
FONTANA, CA 92335

PREPARED FOR:
8575 ILEX ST.
FONTANA, CA 92335

DATE: 06/06/19	JOB NO. 6054
DRAWN BY: JCQ	SCALE AS NOTED
DESIGNED BY: KJR	SHEET 1 OF 1 SHEETS
CHECKED BY:	