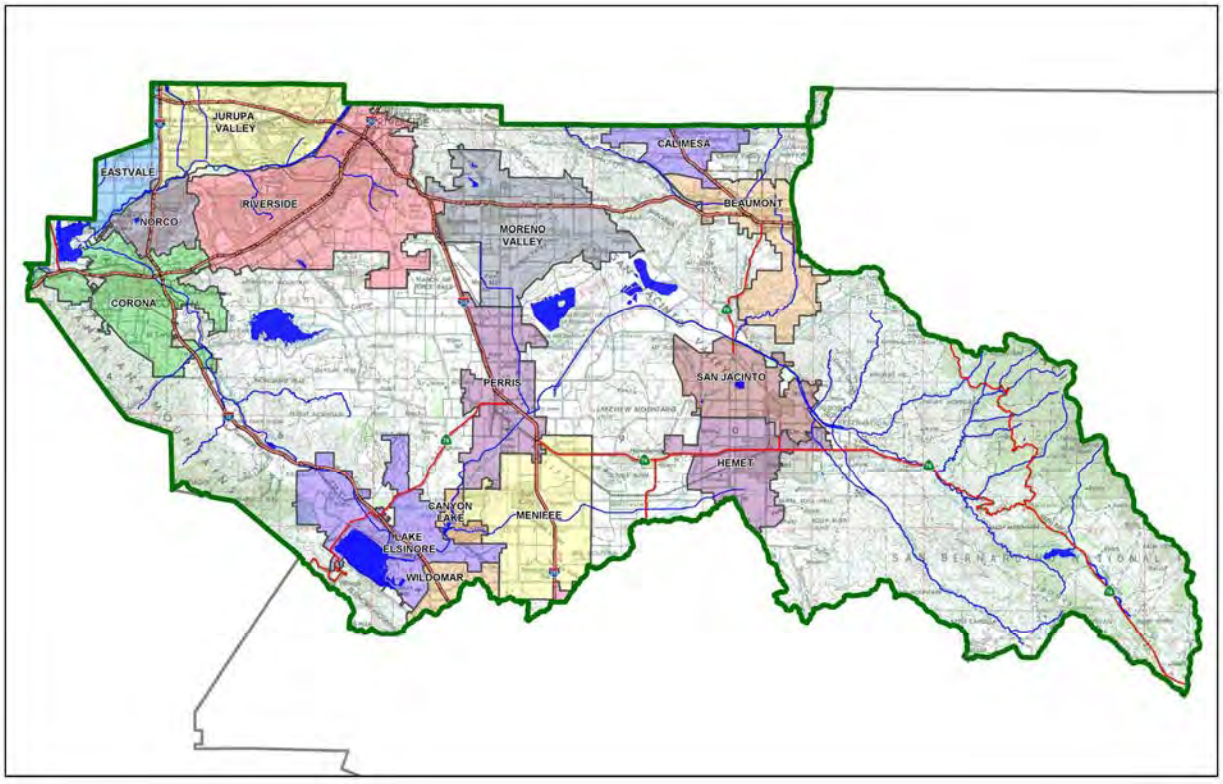
Project Specific Water Quality Management Plan

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

Project Title: State and Cotton Retail

Development No: SPDR-18-04

Design Review/Case No: SPDR-18-04



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☒ **Preliminary**
☐ **Final**

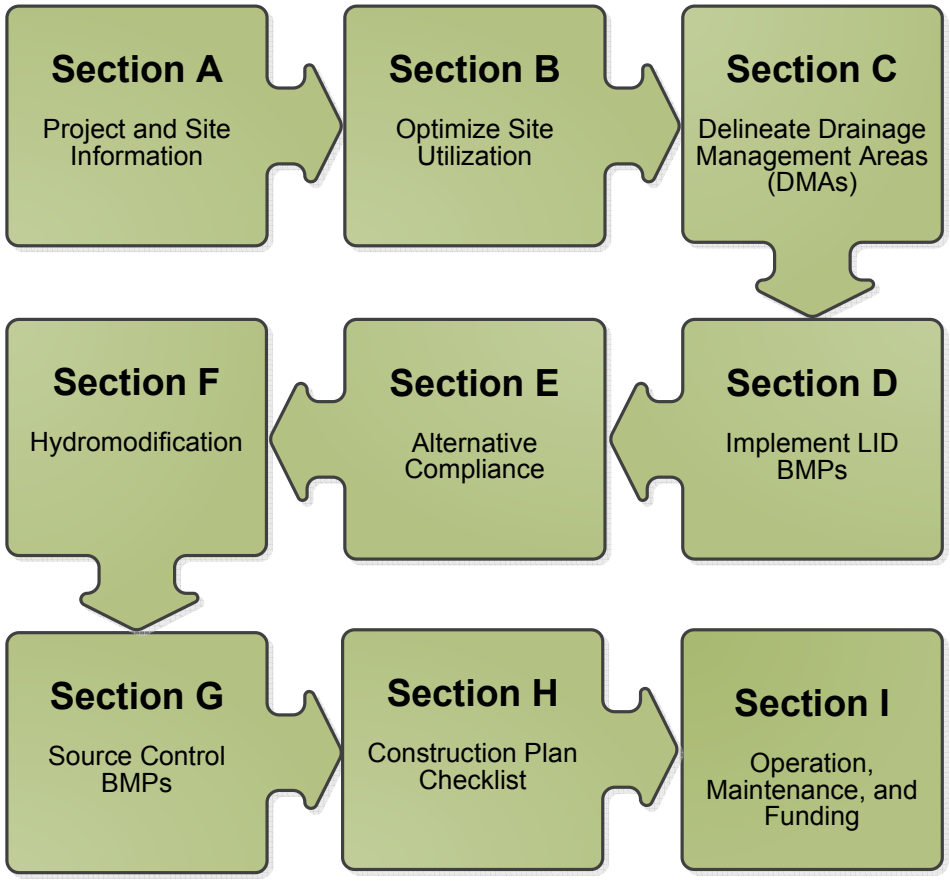
Original Date Prepared: May 25, 2018

Revision Date(s): 9-8-18, 10-10-18, 2-11-19

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

A Brief Introduction

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



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Kal Pacific by SWS Engineering for the State and Cotton Retail project (SPDR 18-04).

This WQMP is intended to comply with the requirements of Riverside for San Jacinto which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under San Jacinto Water Quality Ordinance (Municipal Code Section 13.44).

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

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

PREPARER'S CERTIFICATION

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

Preparer's Signature	Date
Michael D. Schweitzer	CEO / President
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION		
Type of Project:	Retail	
Planning Area:	San Jacinto	
Community Name:	San Jacinto	
Development Name:	State and Cotton Retail	
PROJECT LOCATION		
Latitude & Longitude (DMS): 33.8152, -117.0208		
Project Watershed and Sub-Watershed: San Jacinto Valley, San Jacinto, 802.21		
Gross Acres: 2.6 APN(s): 434-050-032 Map Book and Page No.: Page 810, Grid J1; Page 811, Grid A1		
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Retail	
Proposed or Potential SIC Code(s)	53, 55, 58	
Area of Impervious Project Footprint (SF)	83,763	
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	83,763	
Does the project consist of offsite road improvements?	☒ Y	☐ N
Does the project propose to construct unpaved roads?	☐ Y	☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N
EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0	
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N
If so, identify the Cell number:		
Are there any natural hydrologic features on the project site?	☐ Y	☒ N
Is a Geotechnical Report attached?	☒ Y	☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)		
What is the Water Quality Design Storm Depth for the project?	0.7	

The existing 2.6-acre project site located on the corner of Cottonwood Avenue and State Street is currently undeveloped, natural pervious surface. This project proposes the grading and improvements associated with the development of a retail center which would make 1.92 acres of the site impervious. The retail center will include a restaurant, service center, and fueling station. Appropriate source control BMPs are to be provided through the site. Site BMPs will consist of two biofiltration basins and one subsurface detention/infiltration structure. Storm water runoff will be collected at either the basins or subsurface structure for infiltration into the native soils. The fueling station runoff will collect at its own biofiltration basin BMP. Landscape areas

A.1 Maps and Site Plans

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

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

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Jacinto River	None	ALL	N/A
Canyon Lake	Nutrients	AGR, GWR, MUN, REC1, REC2, WARM, WILD	N/A
Lake Elsinore	Nutrients	REC1, REC2, WARM, WILD	N/A

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

Table A.2 Other Applicable Permits

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

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

Section B: Optimize Site Utilization (LID Principles)

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

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

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

Site Optimization

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

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

Yes, the existing drainage pattern sheet flows to the SE corner of the property. This drainage pattern will be maintained in the post development condition. This drainage pattern will allow for the fueling station to drain to its own bioretention BMP.

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

No, the entire site will be graded.

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

Yes, the soil areas below the biofiltration basins are to remain undisturbed for infiltration. Soils testing results indicate an infiltration rate of 2.1 inches per hour after applying a safety factor of 2.

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

Yes, drive aisles and parking stalls are minimum dimensions. The % of site landscaping is per the current City code requirements.

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

Yes, landscape areas are dispersed throughout the site to receive runoff dispersal from adjacent impervious areas. These landscape areas are identified on the WQMP site plan but are not self-treating as their sloping allows for run-off to other impervious areas.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
1	Mixed – Impermeable and Permeable	64,469 SF	Underground Infiltration Pipes
2	Mixed – Impermeable and Permeable	20,908 SF	Biofiltration with Infiltration (Type D)
3	Mixed – Impermeable and Permeable	7,667 SF	Biofiltration with Infiltration (Type D)

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

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

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

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

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

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

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

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

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

DMA Name or ID	BMP Name or ID
DMA 1	BMP 1
DMA 2	BMP 2
DMA 3	BMP 3

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		x
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		x
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		x
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour? *(2.1 inches/hour with safety factor of 2)*		x
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		x
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		x
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape: .37

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

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

Total Area of Impervious Surfaces: 1.6

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

Enter your EIATIA factor: 1.32

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

Minimum required irrigated area: 2.1

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

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
2.1	.37

Toilet Use Feasibility

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

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

Projected Number of Daily Toilet Users: 120

Project Type: Commercial

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

Total Area of Impervious Surfaces: 1.6

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

Enter your TUTIA factor: 150

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

Minimum number of toilet users: 240

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

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
240	120

Other Non-Potable Use Feasibility

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

There are no other non-potable water uses on the site.

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

Average Daily Demand: Projected Average Daily Use (gpd)

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

Total Area of Impervious Surfaces: Insert Area (Acres)

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

Enter the factor from Table 2-4: Enter Value

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

Minimum required use: Minimum use required (gpd)

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

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
1	☐	☐	☒	☐	☐
2	☐	☐	☒	☐	☐
3	☐	☐	☒	☐	☐

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

Not applicable to this development.

D.5 LID BMP Sizing

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

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]			
Bio/1	*64,575*	*Mixed*	*.88*	*.70*	*45,318*			
Bio/2	*23,062*	*Mixed*	*.90*	*.73*	*16,842*			
Bio/3	*8,112*	*Mixed*	*.86*	*.67*	*5,471*			
						Design Storm Depth (in)	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	A_T = 95,749				Σ= 67,631	0.70	[F] = 3,945	***4,866***

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

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

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

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

- *Or* -

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

N/A

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

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

E.3 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

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

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

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

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

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

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

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

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

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

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

INSERT TEXT HERE

F.2 HCOC Mitigation

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

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

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

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

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

HCOC criteria is mitigated by mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. The analysis of this mitigation, which includes a summary of methodologies used along with calculations, is in Appendix 7. The Riverside County Geodatabase was used to check for HCOC exemptions for this project location but, they are not applicable.

Section G: Source Control BMPs

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

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

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

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

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

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
A. Onsite storm drains	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar.	Maintain inlet markings. Provide storm water pollution prevention information to new owners, lessees, or operators. Adhere to CASQA Drainage System Maintenance. Include in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

F. Food service	Sewer drain to connect to a grease interceptor before discharging to the sanitary sewer	See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/. To be provided to new site owners, lessees, and operators.
G. Refuse areas	Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	Proper implementation of the following will be provided to: Provide adequate number of receptacles that are maintained and replaced to prevent leaks. They will be kept covered and prevention of dumping of liquids or hazardous wastes. Signs will be posted "no hazardous materials. Regular inspection and daily litter pick up. Spills will be cleaned up immediately. Spill control materials will be kept onsite.
H. Industrial Process.	Signs will be placed onsite stating "All process activities to be performed in process areas. No processes to drain to exterior to storm drain system.	Operations will be in accordance with CASQA Stormwater quality standards per SC-10, "non-stormwater discharges"
I. Outdoor storage of equipment or materials.	Detailed description of materials and storage will be provided for appropriate equipment and/or materials. Where appropriate reference documentation will be provided for Hazardous waste generation, hazardous materials, CalARP, above ground tank storage.	Operations will be in accordance with CASQA Outdoor liquid container storage and outdoor storage of raw materials.
K. Vehicle/Equipment Repair and Maintenance	No vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. There are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. There are no tanks, containers or sinks to be used for parts cleaning or	In the Stormwater Control Plan, note that all the following restrictions apply to use the site: No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether

	rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.
L. Fuel Dispensing Areas	Fueling areas shall have impermeable floors graded at the minimum slope necessary to prevent ponding; and separated from the rest of the site by a grade break that prevents run-on of stormwater the maximum extent practical. Shall be covered by a canopy that extends a minimum of ten feet in each direction from the pump	The property owner shall dry sweep the fueling area routinely. See the Fact Sheet SD-30, "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
P. plazas, sidewalks, and parking lots.	Parking lots are noted on WQMP site plan	Sweep parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to storm drain.

Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
1	1	GP1.0	33.81, -117.02
2	2	GP1.0	33.81, -117.02
3	3	GP1.0	33.81, -117.02

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

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

Section I: Operation, Maintenance and Funding

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

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

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

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

Maintenance Mechanism: POA

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

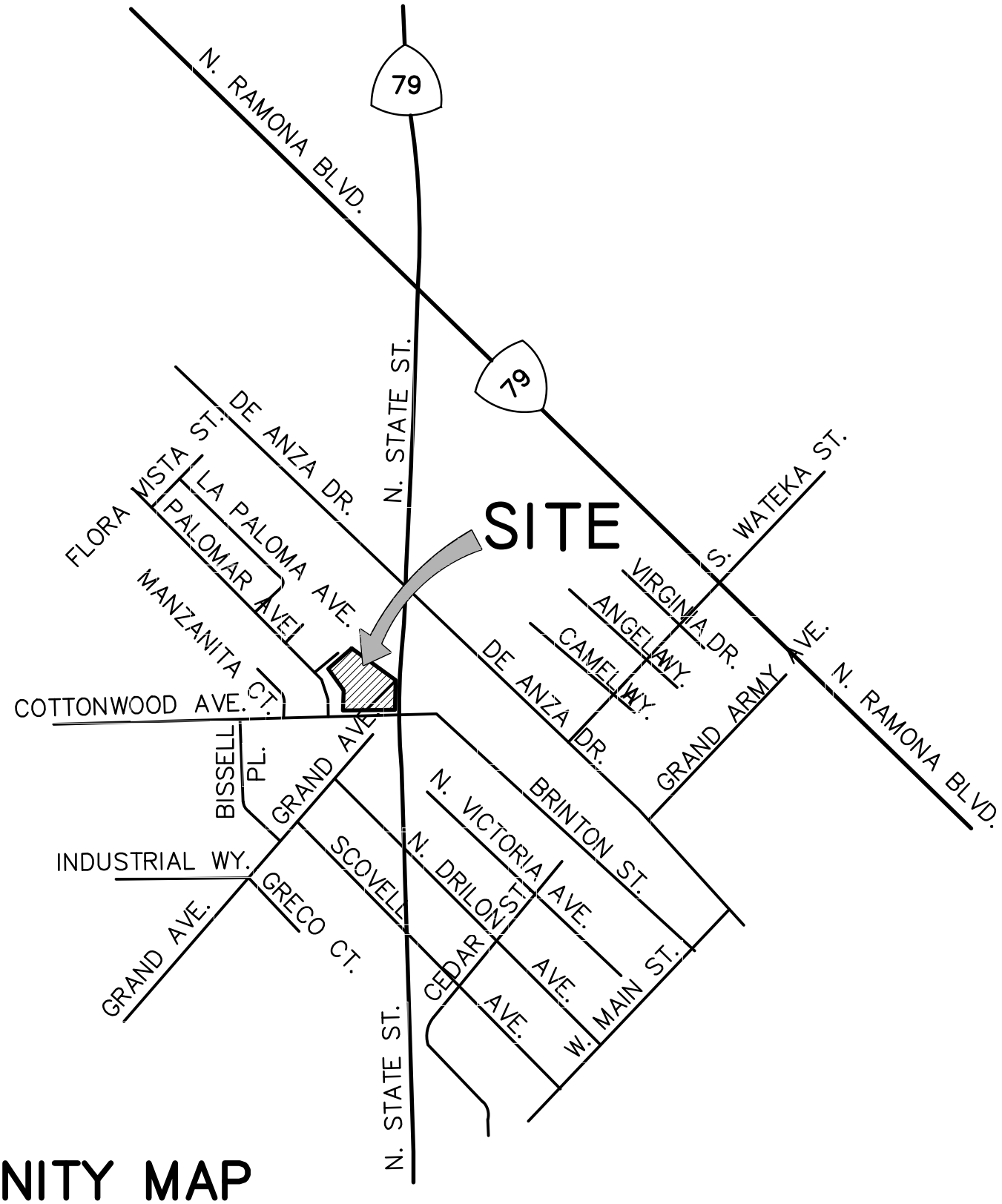
☒ Y ☐ N

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

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

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

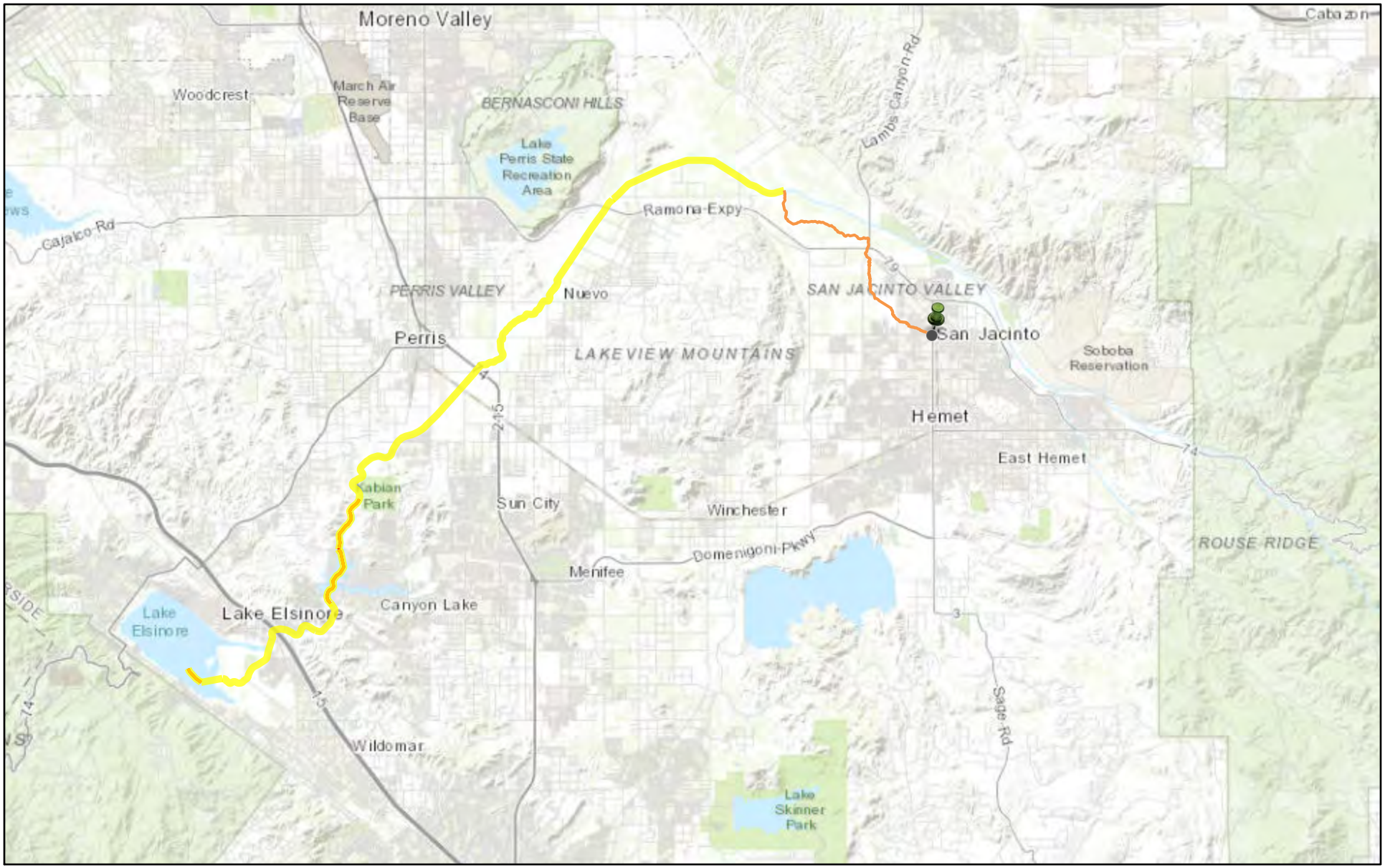


VICINITY MAP

THOMAS GUIDE ED. 2006: 811–A1

NO SCALE

WATERS GeoViewer Receiving Waters Map



2/12/2019, 8:08:27 AM

1:302,137

0 2 4 8 mi

0 3.25 6.5 13 km

Result: Link Path

Result: Linear Linked Data

303(d) Listed Impaired Waters

TMDLs on Impaired Waters

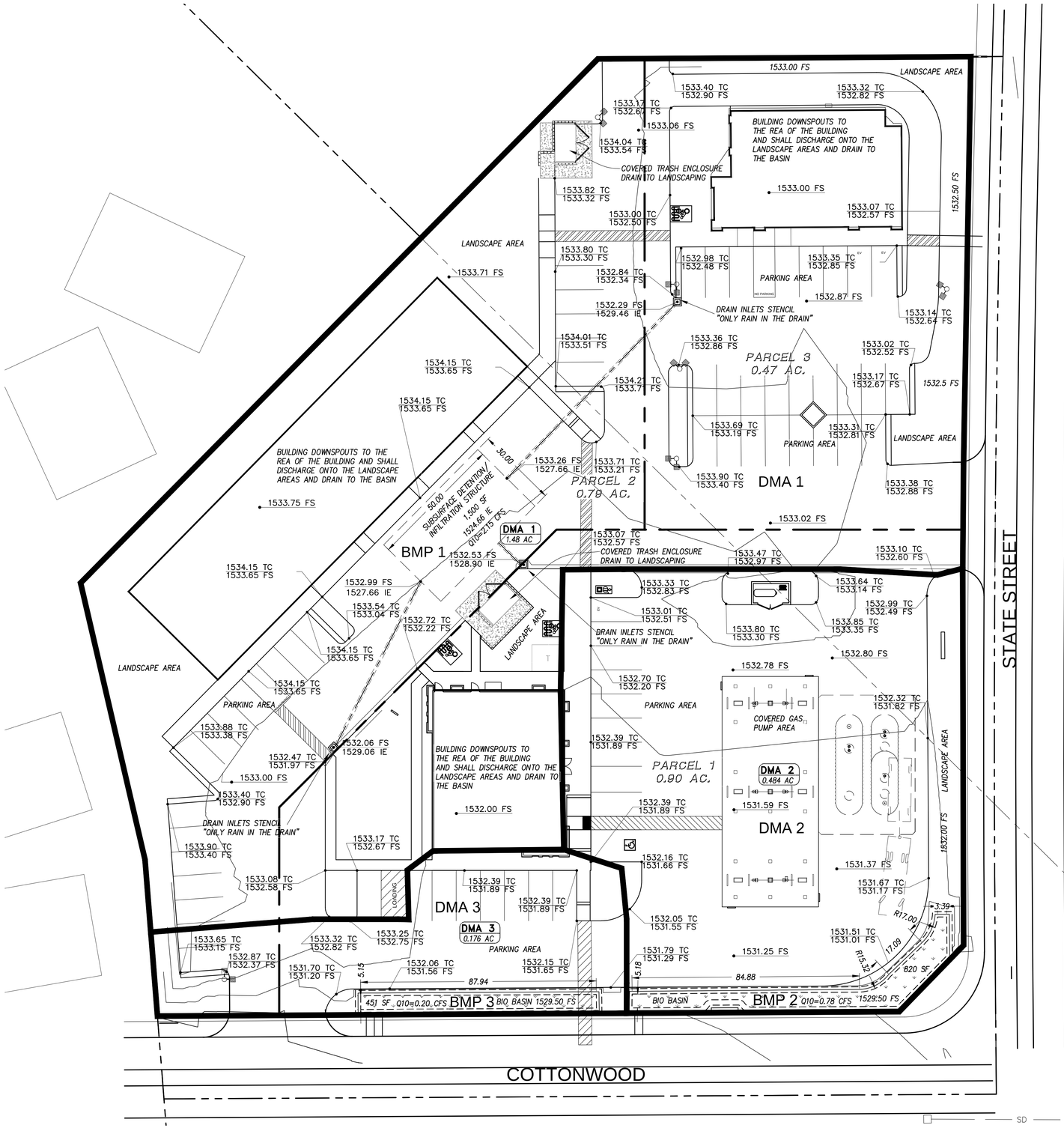
Result: Streams Selected

Streams

US EPA, Sources: Esri, HERE, Garmin, Intermap, increment P Corp.,

US Environment Protection Agency

County of Riverside, Bureau of Land Management, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | US EPA |



SUMMARY

DESCRIPTION	DMA 1	DMA 2	DMA 3
IMPERVIOUS SURFACE	56,826 SF	20,744 SF	6,975 SF
PERVIOUS SURFACE	7,749 SF	1,498 SF	686 SF
BIOFILTRATION SURFACE	0 SF	820 SF	451 SF
TOTAL	64,575 SF	23,062 SF	8,112 SF

LEGEND

- DMA BOUNDARY
- STORM DRAIN PIPE
- STORM DRAIN INLET/CATCH BASIN

NOTES

SOILS GROUP – A

NO GROUNDWATER WAS OBSERVED IN THE TEST PITS. PER SOILS REPORT

NO EXISTING HYDROLOGIC FEATURES

NO CCYSA WITHIN THE PROJECT LIMITS

POTENTIAL POLLUTANTS – NUTRIENTS

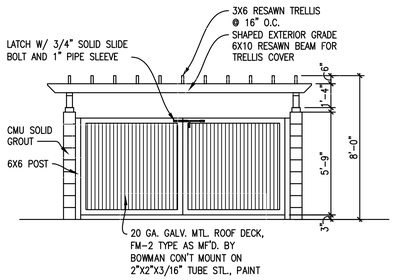
NO RUN–ON TO SITE

STORM WATER DISCHARGES VIA INFILTRATION FOR FLOWS UP TO THE LISTED Q10 VALUES; FLOWS GREATER THAN THIS DISCHARGE OUT THE SOUTHERN DRIVEWAY TO THE EXISTING PUBLIC GUTTER AND THEN STORM DRAIN SYSTEM

BMPS ARE DESIGNED FOR 10–YEAR STORM EVENT, WHICH IS GREATER THAN THE 2–YEAR AND BMP SIZING

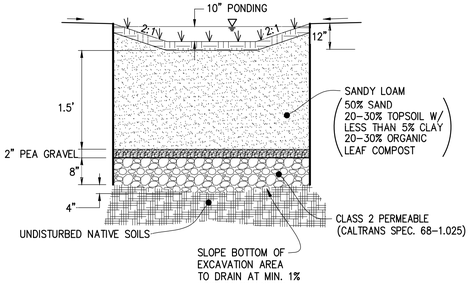
TRASH ENCLOSURE DETAIL

NOT TO SCALE



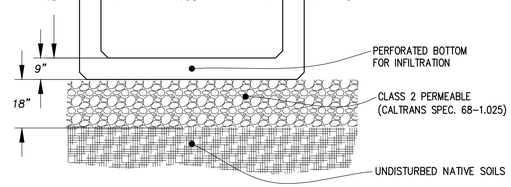
BIOFILTRATION BASIN DETAIL

NOT TO SCALE



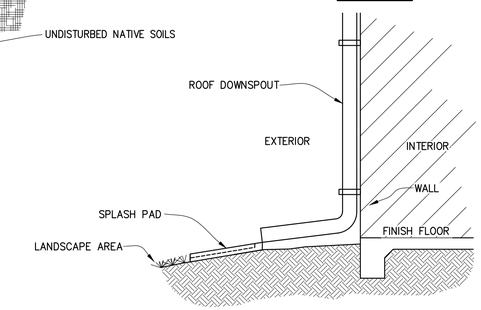
SUBSURFACE DETENTION/INFILTRATION STRUCTURE DETAIL

NOT TO SCALE



ROOF DRAIN/DOWNSPOUT DETAIL

NOT TO SCALE



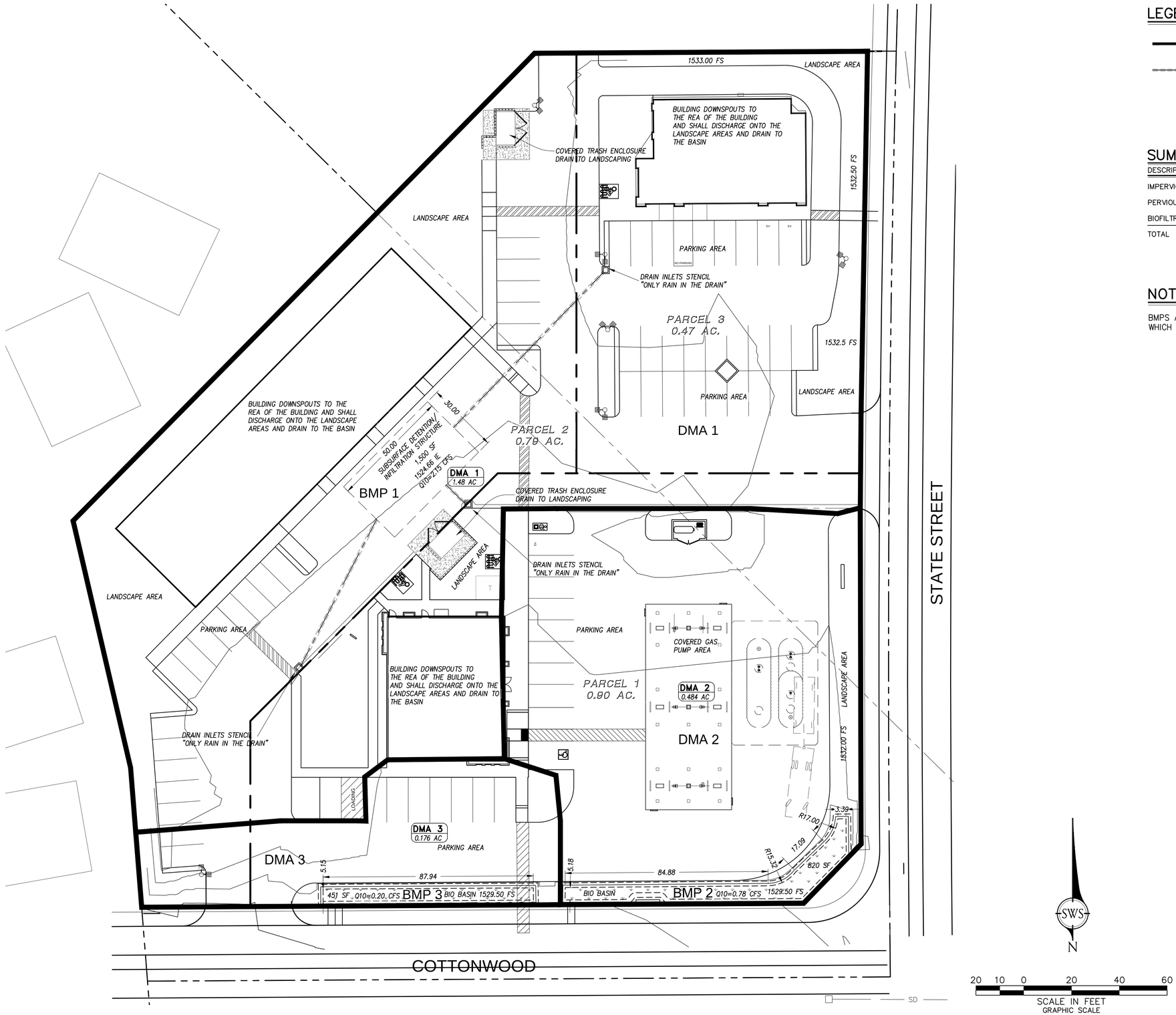
SWS
N

20 10 0 20 40 60
SCALE IN FEET
GRAPHIC SCALE

POST-CONSTRUCTION BMP SITE PLAN FOR STATE STREET AND COTTONWOOD AVENUE RETAIL SPDR 18-04

SWS ENGINEERING, INC.
CIVIL ENGINEERING ◆ LAND PLANNING ◆ SURVEYING
261 Autumn Drive, Suite 115
San Marcos, CA 92069
P: 760-744-0011 F: 760-744-0046
31045 Temecula Parkway, Suite 201
Temecula, CA 92592
P: 951-296-3407 F: 951-587-9451

DATE: Feb 14, 19 12:56pm by:carol.stein
FILE: Z:\Projects\2017\17-043\PROD\Reports\WQMP\17-043_WQMP EXHIBIT.dwg



LEGEND

- DMA BOUNDARY
- STORM DRAIN PIPE
- STORM DRAIN INLET/CATCH BASIN

SUMMARY

DESCRIPTION	DMA 1	DMA 2	DMA 3
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PERVIOUS SURFACE	7,749 SF	1,498 SF	686 SF
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TOTAL	64,575 SF	23,062 SF	8,112 SF

NOTES

BMPS ARE DESIGNED FOR 10-YEAR STORM EVENT, WHICH IS GREATER THAN THE 2-YEAR AND BMP SIZING

DMA MAP FOR STATE STREET AND COTTONWOOD AVENUE RETAIL SPDR 18-04

SWS ENGINEERING, INC.
CIVIL ENGINEERING ◆ LAND PLANNING ◆ SURVEYING
261 Autumn Drive, Suite 115
San Marcos, CA 92069
P: 760-744-0011 F: 760-744-0046
31045 Temecula Parkway, Suite 201
Temecula, CA 92592
P: 951-296-3407 F: 951-587-9451

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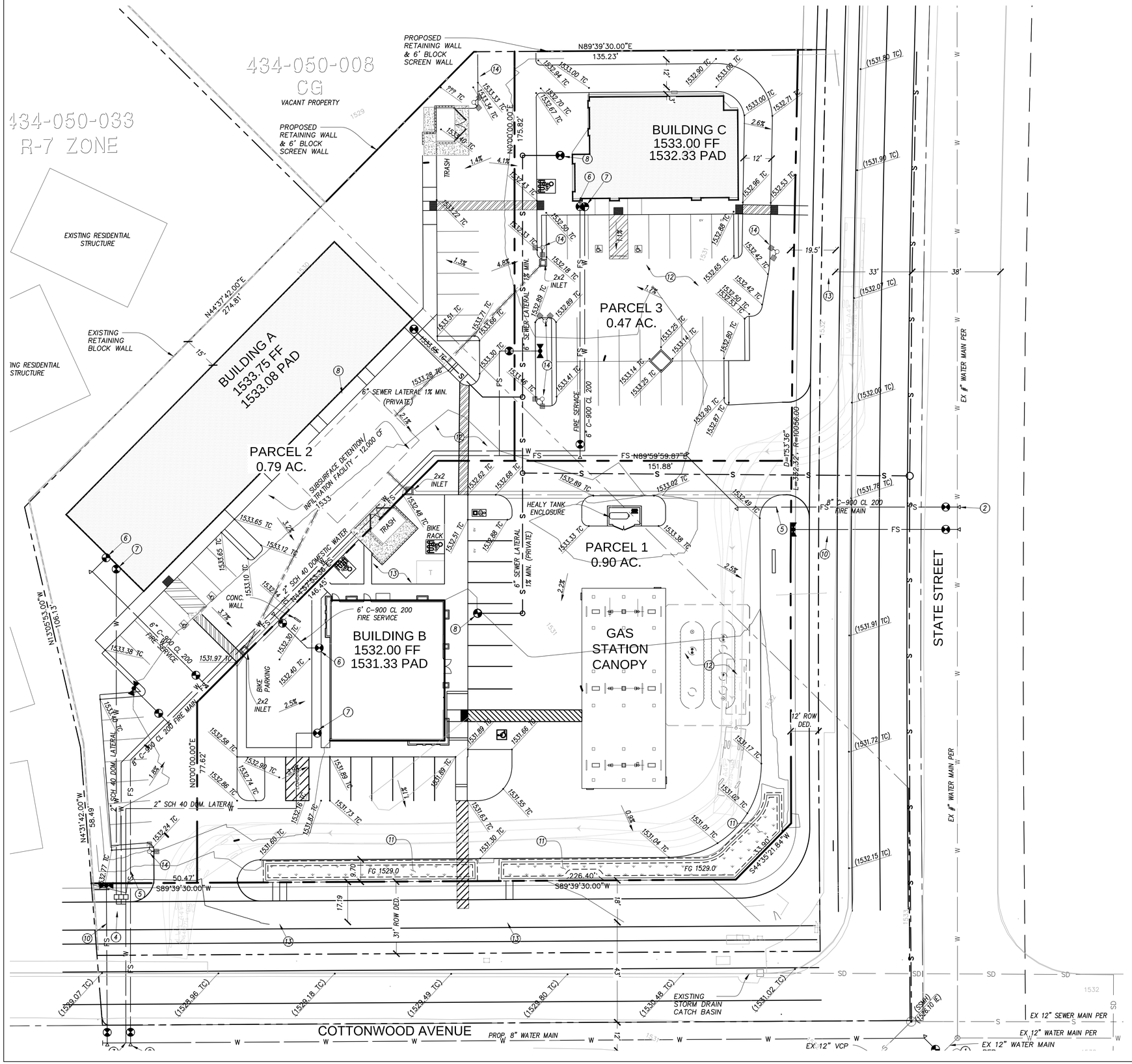
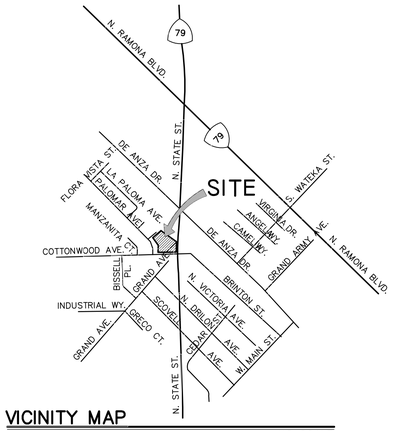
Appendix 2: Construction Plans

Grading and Drainage Plans





VICINITY MAP

THOMAS GUIDE ED. 2006: 811–A1 NO SCALE

CONSTRUCTION NOTES

1. 8"X8"X8" TEE
2. 8" FIRE LATERAL PER EMWD STD DWG
3. 4" DOMESTIC LATERAL PER EMWD B–658
4. 2" WATER METER W/2" BFP PER EMWD B–344
5. 8" RPDA, DDC, & PIV PER EMWD B–597C
6. 6" FIRE P.O.C.
7. 2" DOMESTIC WATER P.O.C.
8. 6" SEWER P.O.C.
9. CONNECT TO EXISTING SSMH, REFDCM BASE.
10. PUBLIC FIRE HYDRANT PER EMWD B–645 PRIVATE FIRE HYDRANT
11. BIOFILTRATION BASIN PER DETAIL HERON
12. PAVEMENT PER GEOTECH RECOMMENDATIONS
13. THRU CURB DRAIN PER DETAIL ON TPM 2
14. PARKING LOT LIGHTING
15. 2x2 CATCH BASIN W/ OPEN BOTTOM PER DETAIL SHEET TPM 2
16. 2x2 CATCH BASIN W/ CLOSED BOTTOM PER DETAIL SHEET TPM 2

CONTIGUOUS OWNERSHIP NOTE:

THE TENTATIVE PARCEL MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDED

LEGAL DESCRIPTION:

A PORTION OF FARM LOT 141 OF THE LANDS OF THE SAN JACINTO LAND ASSOCIATION IN THE CITY OF SAN JACINTO, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 8, PAGE 357 OF MAPS, RECORDS OF SAN DIEGO COUNTY.

FIELD TOPOGRAPHY:

THE TOPOGRAPHY SHOWN HEREIN IS BASED ON A FIELD TOPOGRAPHY PREPARED BY MASSON & ASSOCIATES INC. ON FEBRUARY 15, 2007

OWNER:

D & D CAPITAL RESOURCES, LLC 41720 WINCHESTER ROAD, SUITE 100 TEMECULLA, CA 92590–4871 PHONE: (951) 587–9450

APN:

A.P.N. 434–050–032

APPLICANT / ENGINEER

SWS ENGINEERING, INC
MICHAEL D. SCHWEITZER, P.E.
261 AUTUMN DRIVE, SUITE 115
SAN MARCOS, CA 92069
PHONE: 760.744.0011
FAX: 760.744.0044

MICHAEL D. SCHWEITZER, P.E. *R.C.E. NO. 59658*

SCHOOL DISTRICT:

SAN JACINTO SCHOOL DISTRICT
2043 S SAN JACINTO AVE,
SAN JACINTO, CA 92583
PHONE: (951) 929–7700

UTILITY PURVEYORS:

SEWER
CITY OF SAN JACINTO 201 E. MAIN STREET, SAN JACINTO, CA 92583 PHONE: (951) 487–7330

WATER
EASTERN MUNICIPAL WATER DISTRICT 2270 TRUMBLE ROAD, PERRIS, CA 92570 PHONE: (951) 925–7676

ELECTRIC
SOUTHERN CALIFORNIA EDISON
1351 E FRANCIS ST. ONTARIO, CA 91761
PHONE: (909) 930–8591

PHONE
VERIZON 3607 W FLORIDA AVE, HEMET, CA 92545 PHONE: (951) 925–9295

GAS
THE GAS COMPANY 26528 KELVIN COURT, MURRIETA, CA 92562 PHONE: (951) 304–0093

SCALE: 1" = 20'

SCALE IN FEET
GRAPHIC SCALE

PRELIMINARY GRADING & UTILITY PLAN

SWS ENGINEERING, INC.
CIVIL ENGINEERING • LAND PLANNING • SURVEYING
261 Autumn Drive, Suite 115 San Marcos, CA 92069 P: 760-744-0011 F: 760-744-0046
31045 Temecula Parkway, Suite 201 Temecula, CA 92592 P: 951-296-3407 F: 951-587-9451

DATE: Feb 14, 19 1:26pm By: carol.stein
FILE: Z:\Projects\2017\17-043\PROD\Planning\DRC\17-043_PRELIM_GRADING.dwg

MARK	REVISIONS	APPROVED	DATE

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

Company Name:	SWS Engineering, Inc	Date:	2/11/2019
Designed by:	Michael D. Schweitzer	County/City Case No.:	SPDR18-04

Design Volume

Enter the area tributary to this feature	A_T=	1.48	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,107	ft^3

Type of Bioretention Facility Design

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	1.5	ft
Top Width of Bioretention Facility, excluding curb	w_T =	18.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.35	ft
Minimum Surface Area, A_m			
$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	820	ft^2
Proposed Surface Area	A=	2,333	ft^2
Minimum Required Length of Bioretention Facility, L	L =	45.6	ft

Bioretention Facility Properties

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

Notes:

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

Company Name:	SWS Engineering, Inc	Date:	2/11/2019
Designed by:	Michael D. Schweitzer	County/City Case No.:	SPDR18-04

Design Volume

Enter the area tributary to this feature	A_T=	0.53	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	982	ft^3

Type of Bioretention Facility Design

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	1.5	ft
Top Width of Bioretention Facility, excluding curb	w_T =	5.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.35	ft
Minimum Surface Area, A_m			
$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	728	ft^2
Proposed Surface Area	A=	820	ft^2
Minimum Required Length of Bioretention Facility, L	L =	145.6	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	2	:1
Diameter of Underdrain			inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet
Describe Vegetation:	Natural Grasses		

Notes:

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

Company Name:	SWS Engineering, Inc	Date:	2/11/2019
Designed by:	Michael D. Schweitzer	County/City Case No.:	SPDR18-04

Design Volume

Enter the area tributary to this feature	A_T=	0.19	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	329	ft^3

Type of Bioretention Facility Design

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	1.5	ft
Top Width of Bioretention Facility, excluding curb	w_T =	5.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.35	ft
Minimum Surface Area, A_m			
$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	244	ft^2
Proposed Surface Area	A=	451	ft^2
Minimum Required Length of Bioretention Facility, L	L =	48.8	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	2	:1
Diameter of Underdrain			inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet
Describe Vegetation:	Natural Grasses		

Notes:

SANTA ANA WATERSHED BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(NOTE THIS WORKSHEET SHALL **only** BE USED IN CONJUNCTION WITH BMP DESIGNS FROM THE **DID BMP Design Handbook**)*

Company Name	SWS Engineering Inc	Date	2/11/2019
Designed by	Michael D. Schweitzer	Case No	SPDR 18-04
Company Project Number/Name	State & Cotton Retail (17-043)		

BMP Identification

BMP NAME / ID: 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.70 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Bio/1	*64575*	*Mixed Surface Types*	*0.88*	*0.70*	*45318.2*			
	64575		*Total*		45318.2	*0.70*	*2643.6*	*3150*

Notes:

SANTA ANA WATERSHED BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(NOTE THIS WORKSHEET SHALL **only** BE USED IN CONJUNCTION WITH BMP DESIGNS FROM THE **DID BMP Design Handbook**)*

Company Name	SWS Engineering Inc	Date	2/11/2019
Designed by	Michael D. Schweitzer	Case No	SPDR 18-04
Company Project Number/Name	State & Cotton Retail (17-043)		

BMP Identification

BMP NAME / ID: 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.70 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Bio/2	*23062*	*Mixed Surface Types*	*0.9*	*0.73*	*16841.8*			
	23062		*Total*		16841.8	0.70	*982.4*	*1107*

Notes:

SANTA ANA WATERSHED BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(NOTE THIS WORKSHEET SHALL **only** BE USED IN CONJUNCTION WITH BMP DESIGNS FROM THE **DID BMP Design Handbook**)*

Company Name	SWS Engineering Inc	Date	2/11/2019
Designed by	Michael D. Schweitzer	Case No	SPDR 18-04
Company Project Number/Name	State & Cotton Retail (17-043)		

BMP Identification

BMP NAME / ID: 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.70 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Bio/3	*8112*	*Mixed Surface Types*	*0.86*	*0.67*	*5471.4*			
	8112	***Total***			**5471.4**	**0.70**	***319.2***	***609***

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

HMP MEMO – STATE & COTTON

January 21, 2019

The proposed project was modeled using both the Environmental Protection Agency (EPA) Storm Water Management Model software with the PCSWMM overlay. SWMM models were prepared for the pre- and post-development condition. SWMM was used to model the biofiltration basin and subsurface detention/infiltration structure BMPs in DMAs 1-3.

The DMAs were modeled as one sub-catchment, which discharges to POC-1 in the pre-development condition. In the post-development condition, the DMA sub-catchments discharge to sub-catchments modeled as a either an infiltration trench LID (DMA 1) or a bioretention LID (DMAs 2-3), and then discharge to POC-1. The use of the infiltration trench LID to model a subsurface detention/infiltration structure is discussed in the Modeling section below.

Runoff from the lot will drain into either of the biofiltration basins by sheet flow or roof/storm drains. Runoff from the 100-year storm event in the bioretention basins will overflow into catch basins that connect to the same underground storm drain system. This system discharges to a catch basin on Cottonwood Street as in pre-development conditions.

Q2 and Q10 Determination

Q2 and Q10 were determined using a partial statistical analysis of the runoff time series and the Cunnane plotting position method. Q2 and Q10 were determined for the points of compliance POC-1.

Bioretention Basin and Detention/Infiltration Structure Modeling

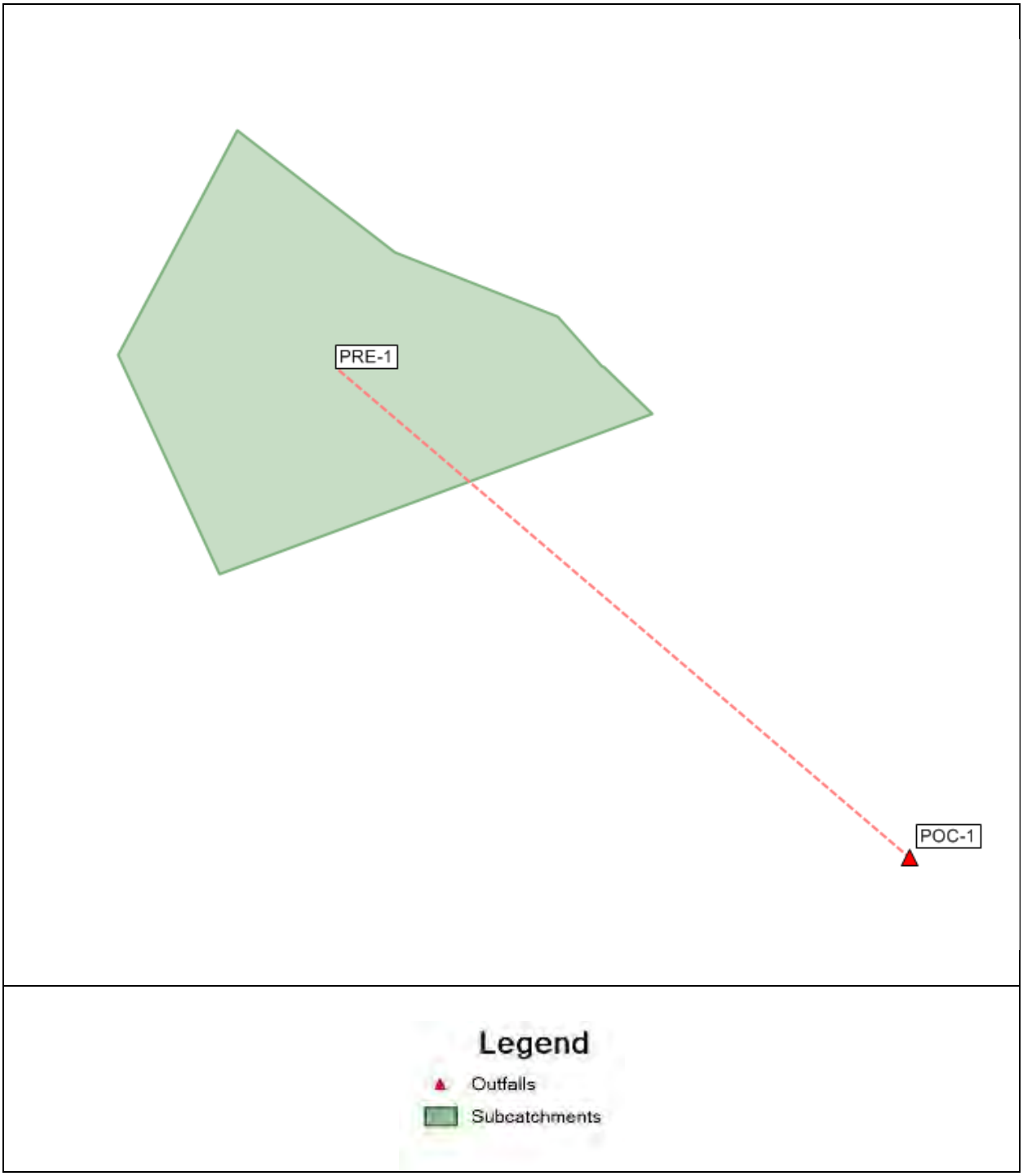
The bioretention basin was modeled using the biofiltration LID module within SWMM. The subsurface detention/infiltration structure was modeled using the infiltration trench LID module within SWMM. This was used with the ponding surface representing detention structure volume and the gravel area as typical infiltration/storage area. The flow duration curves were compared using the hydromodification assessment tool within PCSWMM. The range between 10% of Q2 and Q10 was divided into 100 equal intervals, and the flow duration curves were compared at each interval to confirm that the post-development curve is within 110% of the pre-development curve. The project “passed” and satisfies this requirement at the point of compliance POC-1.

ATTACHMENTS

Pre-Development Map POC-1
Pre-Development Input Summary POC-1
Pre-Development Output Summary POC-1
Post-Development Map POC-1
Post-Development Input Summary POC-1
Post-Development Output Summary POC-1
Hydromodification Assessment Graph at POC-1
PCSWMM Input Summaries (Sub-catchments and LID Control)

State & Cotton

Pre-Development



```
[TITLE]


[OPTIONS]
;;Options             Value
;;------------------- ------------
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           05/07/1971
START_TIME           00:00:00
REPORT_START_DATE    05/07/1971
REPORT_START_TIME    00:00:00
END_DATE             11/27/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         60
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              4

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
MONTHLY      .06    .08    .11    .16    .18    .21    .21    .2     .16    .12    .08    .06
DRY_ONLY     NO

[RAINGAGES]
```

```
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Elsinore         VOLUME    0:15   1      TIMESERIES Elsinore

[SUBCATCHMENTS]
;;                                              Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet          Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- --------------- -------- -------- -------- -------- -------- --------
PRE-1            Elsinore         POC-1           2.2704   0        225      3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
PRE-1            0.012      0.1        0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
PRE-1            9          0.025      0.33

[OUTFALLS]
;;               Invert     Outfall      Stage/Table      Tide
;;Name           Elev.      Type         Time Series      Gate Route To
;;-------------- ---------- ------------ ---------------- ---- ----------------
POC-1            0          FREE                          NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Elsinore         FILE "Z:\Projects\2015\15-078\PROD\Reports\WQMP\Construction\PCSWMM\Support Docs\NOAA Rain Gauge Data-Edited.dat

[REPORT]
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       -202.576205529832 64.7912670280215 -57.2535460895431 185.486130141523
UNITS            Feet

[COORDINATES]
```

```
;;Node           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
POC-1            0                0

[VERTICES]
;;Link           X-Coord          Y-Coord
;;-------------- ---------------- ----------------

[POLYGONS]
;;Subcatchment   X-Coord          Y-Coord
;;-------------- ---------------- ----------------
PRE-1            -195.971         124.634
PRE-1            -166.5           180
PRE-1            -127.5           150
PRE-1            -87.258          133.993
PRE-1            -76.348          121.748
PRE-1            -75.738          121.394
PRE-1            -63.859          109.875
PRE-1            -170.772         70.277
PRE-1            -195.971         124.634

[SYMBOLS]
;;Gage           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 1
Number of nodes 1
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Elsinore	Elsinore	VOLUME	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
PRE-1	2.27	225.00	0.00	3.0000	Elsinore	POC-1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
POC-1	OUTFALL	0.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,

not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 05/07/1971 00:00:00
Ending Date 11/27/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	69.550	367.600
Evaporation Loss	4.052	21.414
Infiltration Loss	55.048	290.949
Surface Runoff	13.970	73.838
Final Storage	0.000	0.000
Continuity Error (%)	-5.060	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	13.970	4.552
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	13.970	4.552
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000

Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
PRE-1	367.60	0.00	21.41	290.95	73.84	4.55	1.90	0.201

Analysis begun on: Mon Jan 21 11:44:19 2019
Analysis ended on: Mon Jan 21 11:44:25 2019
Total elapsed time: 00:00:06

Peak Flow Event List and Determination of Q2 thru Q10
State & Cotton - POC-1
Pre-Development Condition

Number of Years Analyzed, n = 57

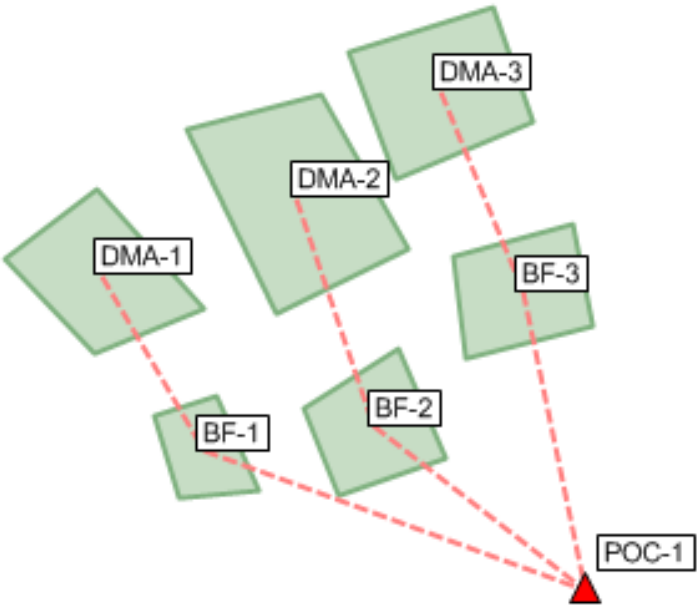
Event Date	Peak Runoff (cfs)	Position, i	Probability, P	Period of Return (Years)
1/18/1993 4:00	0.3146	57	0.99	1.01
1/29/1983 0:55	0.319	56	0.97	1.03
3/20/1979 16:00	0.3197	55	0.95	1.05
3/14/1982 16:55	0.3217	54	0.94	1.07
4/8/1975 20:55	0.3243	53	0.92	1.09
2/15/1986 4:50	0.3337	52	0.90	1.11
1/2/1978 11:50	0.3364	51	0.88	1.13
2/11/1973 5:30	0.3463	50	0.87	1.15
3/24/1983 2:50	0.3619	49	0.85	1.18
2/18/1993 15:10	0.3681	48	0.83	1.20
2/19/2005 4:50	0.3688	47	0.81	1.23
1/17/1988 10:50	0.3911	46	0.80	1.25
12/19/1984 17:45	0.4158	45	0.78	1.28
1/31/1979 8:40	0.4337	44	0.76	1.31
1/6/1993 8:40	0.448	43	0.74	1.34
12/25/2003 17:40	0.4665	42	0.73	1.38
1/4/1974 14:25	0.4734	41	0.71	1.41
3/1/1981 10:20	0.4873	40	0.69	1.44
3/1/1991 5:30	0.4957	39	0.67	1.48
12/28/2004 9:35	0.4959	38	0.66	1.52
12/7/1992 7:50	0.5044	37	0.64	1.56
2/9/1976 3:35	0.5119	36	0.62	1.61
2/8/1993 1:15	0.513	35	0.60	1.65
2/25/2003 5:25	0.5155	34	0.59	1.70
1/7/1974 14:30	0.5258	33	0.57	1.75
1/14/1978 14:45	0.5322	32	0.55	1.81
3/2/1983 17:45	0.5455	31	0.53	1.87
2/15/1992 11:35	0.5509	30	0.52	1.93
1/9/2005 16:30	0.577	29	0.50	2.00
2/12/1992 15:30	0.5959	28	0.48	2.07
1/3/2005 9:10	0.6154	27	0.47	2.15
2/3/1975 7:30	0.6158	26	0.45	2.23
3/25/1994 13:30	0.6365	25	0.43	2.33
12/4/1974 6:10	0.6438	24	0.41	2.42
2/14/1998 14:30	0.6472	23	0.40	2.53
3/17/1982 13:35	0.6561	22	0.38	2.65
3/27/1991 0:00	0.6647	21	0.36	2.78
12/25/1977 14:30	0.6662	20	0.34	2.92
10/20/2004 6:40	0.7	19	0.33	3.08
2/27/1983 14:20	0.7258	18	0.31	3.25
2/21/2005 3:45	0.7603	17	0.29	3.45
1/15/1993 13:55	0.761	16	0.27	3.67
8/15/1983 14:35	0.8138	15	0.26	3.92
12/27/1984 18:20	0.8298	14	0.24	4.21
2/17/1980 20:45	0.8495	13	0.22	4.54
2/14/1980 18:00	0.8677	12	0.20	4.93
2/7/1998 22:40	0.8702	11	0.19	5.40
10/27/2004 1:45	0.8975	10	0.17	5.96
1/10/1995 14:45	0.9013	9	0.15	6.65
2/3/1998 10:15	0.9028	8	0.13	7.53
1/4/1995 16:05	1.068	7	0.12	8.67
3/1/1983 12:05	1.07	6	0.10	10.21
2/26/1983 10:30	1.21	5	0.08	12.43
1/5/1979 19:35	1.285	4	0.06	15.89
12/6/1997 8:20	1.348	3	0.05	22.00
2/23/1998 18:15	1.623	2	0.03	35.75
11/30/1982 8:25	1.791	1	0.01	95.33

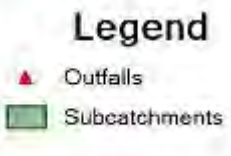
Storm Event (year)	Flow (cfs)
2	0.58
3	0.68
4	0.82
5	0.87
6	0.90
7	0.90
8	0.98
9	1.07
10	1.07

Probability, P	Position, i
0.50	29.00
0.33	19.47
0.25	14.70
0.20	11.84
0.17	9.93
0.14	8.57
0.13	7.55
0.11	6.76
0.10	6.12

Cotton & State

Post-Development





```
[TITLE]


[OPTIONS]
;;Options             Value
;;------------------- ------------
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           05/07/1971
START_TIME           00:00:00
REPORT_START_DATE    05/07/1971
REPORT_START_TIME    00:00:00
END_DATE             11/27/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         60
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              4

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
MONTHLY      .06    .08    .11    .16    .18    .21    .21    .2     .16    .12    .08    .06
DRY_ONLY     NO

[RAINGAGES]
```

```
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Elsinore         VOLUME    0:15   1      TIMESERIES Elsinore

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
BF-1             Elsinore         POC-1            0.0723   0        30       0        0
BF-2             Elsinore         POC-1            0.0188   0        7        0        0
BF-3             Elsinore         POC-1            0.0104   0        5        0        0
DMA-1            Elsinore         BF-1             1.4824   88       250      3        0
DMA-2            Elsinore         BF-2             0.5106   90       125      3        0
DMA-3            Elsinore         BF-3             0.1759   86       125      3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
BF-1             0.012      0.1        0.05       0.1        25         OUTLET
BF-2             0.012      0.1        0.05       0.1        25         OUTLET
BF-3             0.012      0.1        0.05       0.1        25         OUTLET
DMA-1            0.012      0.1        0.05       0.1        25         OUTLET
DMA-2            0.012      0.1        0.05       0.1        25         OUTLET
DMA-3            0.012      0.1        0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
BF-1             1.5        0.3        0.3
BF-2             1.5        0.3        0.3
BF-3             1.5        0.3        0.3
DMA-1            9          0.025      0.33
DMA-2            9          0.025      0.33
DMA-3            9          0.025      0.33

[LID_CONTROLS]
;;               Type/Layer Parameters
;;-------------- ---------- ----------
BF-1             IT
BF-1             SURFACE    12         0          0          0          5
BF-1             STORAGE    18         0.67       2.1        0
BF-1             DRAIN      0          0.5        0          6

BF-2             BC
BF-2             SURFACE    10         0          0          0          5
```

```
BF-2             SOIL       18         0.4        0.2        0.1        5          5          1.5
BF-2             STORAGE    12         0.67       2.1        0
BF-2             DRAIN      0          0.5        0          6

BF-3             BC
BF-3             SURFACE    10         0          0          0          5
BF-3             SOIL       18         0.4        0.2        0.1        5          5          1.5
BF-3             STORAGE    12         0.67       2.1        0
BF-3             DRAIN      0          0.5        0          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSatur  FromImprv  ToPerv     Report File                    Drai
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------------------ ----
BF-1             BF-1             1       3149.38    0          0          100        0
BF-2             BF-2             1       818.92     0          0          100        0
BF-3             BF-3             1       453.02     0          0          100        0

[OUTFALLS]
;;               Invert     Outfall      Stage/Table      Tide
;;Name           Elev.      Type         Time Series      Gate Route To
;;-------------- ---------- ------------ ---------------- ---- ----------------
POC-1            0          FREE                          NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Elsinore         FILE "Z:\Projects\2015\15-078\PROD\Reports\WQMP\Construction\PCSWMM\Support Docs\NOAA Rain Gauge Data-Edited.dat

[REPORT]
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       -746.5           -207.6           -295.5           168.6
UNITS            Feet

[COORDINATES]
;;Node           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
POC-1            -321             -253.5
```

```
[VERTICES]
;;Link           X-Coord          Y-Coord
;;-------------- ---------------- ----------------

[POLYGONS]
;;Subcatchment   X-Coord          Y-Coord
;;-------------- ---------------- ----------------
BF-1             -622             -133.5
BF-1             -578             -119.5
BF-1             -549             -185.5
BF-1             -605             -190.5
BF-1             -622             -133.5
BF-2             -452             -85.5
BF-2             -418             -162.5
BF-2             -493             -187.5
BF-2             -518             -127.5
BF-2             -452             -85.5
BF-3             -413             -22.5
BF-3             -330             1.5
BF-3             -316             -69.5
BF-3             -404             -92.5
BF-3             -413             -22.5
DMA-1            -587             -58.5
DMA-1            -663             -89.5
DMA-1            -726             -23.5
DMA-1            -661             25.5
DMA-1            -587             -58.5
DMA-2            -599             66.5
DMA-2            -505             90.5
DMA-2            -444             -16.5
DMA-2            -537             -61.5
DMA-2            -599             66.5
DMA-3            -487             121.5
DMA-3            -386             151.5
DMA-3            -357             71.5
DMA-3            -454             31.5
DMA-3            -487             121.5

[SYMBOLS]
;;Gage           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 6
Number of nodes 1
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Elsinore	Elsinore	VOLUME	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
BF-1	0.07	30.00	0.00	0.0000	Elsinore	POC-1
BF-2	0.02	7.00	0.00	0.0000	Elsinore	POC-1
BF-3	0.01	5.00	0.00	0.0000	Elsinore	POC-1
DMA-1	1.48	250.00	88.00	3.0000	Elsinore	BF-1
DMA-2	0.51	125.00	90.00	3.0000	Elsinore	BF-2
DMA-3	0.18	125.00	86.00	3.0000	Elsinore	BF-3

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated
BF-1	BF-1	1	3149.38	0.00	100.00	100.00
BF-2	BF-2	1	818.92	0.00	100.00	100.00

BF-3 BF-3 1 453.02 0.00 100.00 100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
POC-1	OUTFALL	0.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Starting Date 05/07/1971 00:00:00
Ending Date 11/27/2008 23:00:00
Antecedent Dry Days 0.0
Report Time Step 01:00:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Initial LID Storage	0.004	0.023
Total Precipitation	69.550	367.600
Evaporation Loss	9.113	48.166
Infiltration Loss	66.250	350.156

Surface Runoff	2.142	11.324
Final Storage	0.011	0.060
Continuity Error (%)	-11.447	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.142	0.698
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	2.142	0.698
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Subcatchment Runoff Summary

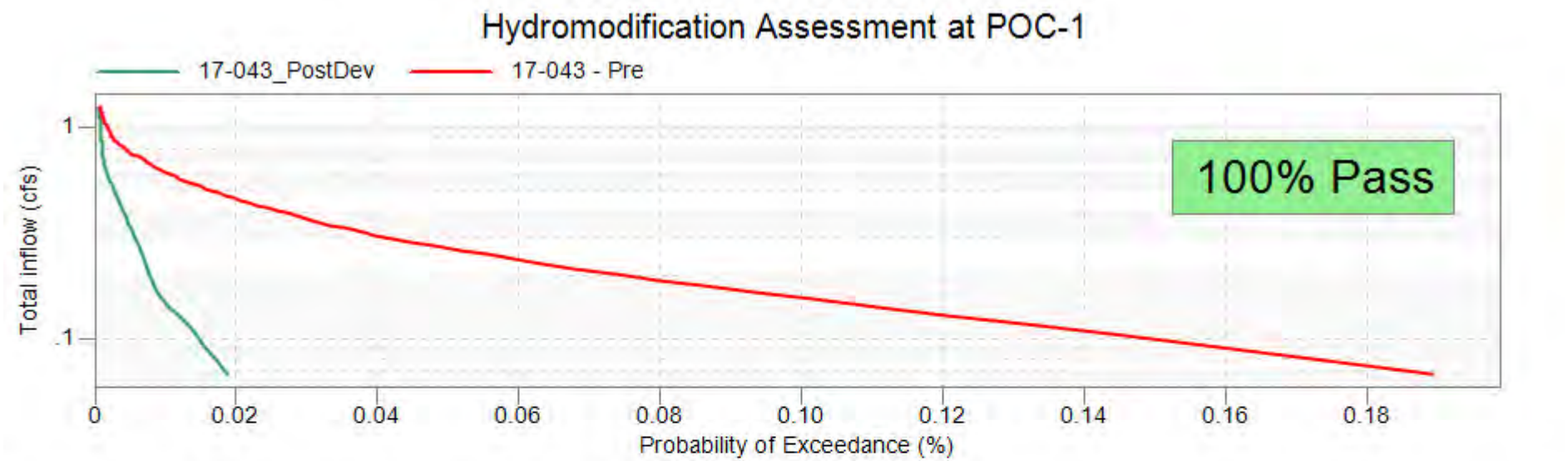
Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
BF-1	367.60	6849.74	3.10	7035.56	178.50	0.35	2.15	0.025
BF-2	367.60	9325.31	544.82	8507.90	640.24	0.33	0.78	0.066
BF-3	367.60	5649.74	536.91	5406.51	73.72	0.02	0.20	0.012
DMA-1	367.60	0.00	43.32	33.25	334.08	13.45	2.91	0.909
DMA-2	367.60	0.00	43.23	27.60	343.35	4.76	1.01	0.934
DMA-3	367.60	0.00	39.88	38.48	334.04	1.60	0.35	0.909

LID Performance Summary

	Total Inflow	Evap Loss	Infil Loss	Surface Outflow	Drain Outflow	Initial Storage	Final Storage	Continuity Error

Subcatchment	LID Control	in	in	in	in	in	in	in	%
BF-1	BF-1	7217.34	3.10	7035.83	178.51	0.00	0.00	0.00	-0.00
BF-2	BF-2	9692.91	544.85	8508.30	640.27	0.00	1.80	3.57	-0.02
BF-3	BF-3	6017.34	536.93	5406.76	73.73	0.00	1.80	3.57	-0.03

Analysis begun on: Mon Jan 21 11:50:43 2019
Analysis ended on: Mon Jan 21 11:50:51 2019
Total elapsed time: 00:00:08



Data | Objectives | Error | Storage | Patterns | Edit | Derive | Audit | Events | Scatter | Duration | IDF

Duration:
- [ ] Log
- [x] Percent
- [ ] Y-axis

Function:
- [x] Log
- [ ] Percent
- [ ] Normalize

Sampling interval:
- ( ) Incremental value: 1
- (•) Number of intervals: 100

Sampling range:
- Minimum value: .0683
- Maximum value: 1.265

Hydromodification | Event-based

- Apply to: POC-1 17-043_Po...
- Base line: POC-1 17-043 - P...

Tolerance:
- Low threshold: 0 factor
- High threshold: 1.1 factor
- Control level: 100 %

PCSWMM INPUT VALUES
SUBCATCHMENTS

	SUBCATCHMENT VALUES - DMA				SUBCATCHMENT VALUES - BMP		
	POC-1				POC-1		
	PRE-DEV	**DMA-1**	**DMA-2**	**DMA-3**	**BF-1**	**BF-2**	**BF-3**
Soil type	A (D)	A (D)	A (D)	A (D)	A	A	A
Attributes							
Area (ac)	2.2704	1.4824	0.5106	0.1759	0.0723	0.0188	0.0104
Area (sf)	98899	64575	22242	7661	3150	820	451
Width (ft)	225	60	20	125	30	10	5
Slope (%)	3	3	3	3	0	0	0
Impervious %	0	88	90	86	0	0	0
N Imperv	0.012	0.012	0.012	0.012	0.012	0.012	0.012
N Perv	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Dstore Imperv (in)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Dstore Perv(in)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Zero Imperv (%)	25	25	25	25	25	25	25
Subarea Routing	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET
Percent Routed	100	100	100	100	100	100	100
Curb Length	0	0	0	0	0	0	0
Snow Pack	-	-	-	-	-	-	-
LID Controls	0	0	0	0	0	0	0
Groundwater	NO	NO	NO	NO	NO	NO	NO
Erosion	NO	NO	NO	NO	NO	NO	NO
Infiltration (Green_Ampt)							
Suction Head	9	9	9	9	1.5	1.5	1.5
Conductivity	0.025	0.025	0.025	0.025	0.3	0.3	0.3
Initial Deficit	0.33	0.33	0.33	0.33	0.3	0.3	0.3

PCSWMM INPUT VALUES
LID CONTROLS

	LID CONTROL		
	POC-1		
	BF-1 (Infiltration Trench)	**BF-2 (Bioretention Cell)**	**BF-3 (Bioretention Cell)**
LID Usage Editor			
Number of Replicate Units	1	1	1
LID Occupies Full Subcatchment?	Y	Y	Y
Area (sf)	3150	820	451
% Subcatchment Occupied	100	100	100
Top Width of Overland Flow Surface (Ft)	0	0	0
% Initially Saturated	0	0	0
% of Impervious Area Treated	100	100	100
LID Control Editor - Surface			
Storage Depth (in)	12	10	10
Vegetation Volume Fraction	0	0	0
Surface Roughness (Mannings n)	0	0	0
Surface Slope (%)	0	0	0
LID Control Editor - Soil			
Thickness (in)	--	18	18
Porosity (volume fraction)	--	0.4	0.4
Field Capacity (volume fraction)	--	0.2	0.2
Wilting Point (volume fraction)	---	0.1	0.1
Conductivity (in/hr)	--	5	5
Conductivity Slope	--	5	5
Suction Head (in)	--	1.5	1.5
LID Control Editor - Storage			
Height (in)	18	12	12
Void Ratio (Voids/Solids)	0.67	0.67	0.67
Conductivity (in/hr) *[use "0" if the LID unit has an impermeable bottom]*	2.1	2.1	2.1
Clogging Factor	0	0	0
LID Control Editor - Bioretention Cell - Underdrain			
Drain Coefficient (in/hr)	0	0	0
Drain Exponent	0.5	0.5	0.5
Drain Offset Height (in)	0	0	0